

# **SOUTHWEST CONFERENCE on BOTANICAL MEDICINE**



## **Proceedings**

April 10 – 11, 2010  
Southwest College of Naturopathic Medicine  
Tempe, Arizona

Proceedings of the

**SOUTHWEST  
CONFERENCE**

on

**BOTANICAL MEDICINE**

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Medicine & Health Sciences  
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# Introduction to the Arvigo Technique of Maya Abdominal Massage™: *Bridging the Gap with Ancient Healing Traditions*

Rosita Arvigo, DN

Women's health care, the Maya way, is rich in traditional healing, incorporating Maya abdominal massage, herbal remedies, vaginal steam baths (bajos), and emotional and spiritual healing. Don Elijo Panti, one of the last traditional healers/shamans from Belize, believed that a woman's uterus was her center: "If a woman's uterus is out of balance, so is she." Ch'ulel emanates from the uterus, which is the seat of creation. This workshop will provide an overview of this holistic approach to women's health care.

## The Arvigo Techniques of Maya Abdominal Massage™

The uterus is slung in the lower pelvic cavity by four major ligaments: broad, uterosacral, round, and cardinal. Ligaments are pliant and flexible to allow for movement, but strong, tough, and inextensible, so as not to yield to applied force. Due to the nature of ligaments having to accommodate the changing size of a uterus during monthly cycles, pregnancy, and menopause, the uterus shifts from its normal, optimal anatomical position. This can cause abnormal pressure, restricting the flow of fluids to arteries, veins, lymph and nerve tissue, and Chi.

This restriction of vital fluids and Chi often can be the cause of most of our female ailments, ranging from irregular periods to infertility to cancer of the reproductive organs. If the ligaments become weak, flaccid, or oxygen starved, they cannot hold the uterus in position. The uterus may become displaced and exert abnormal pressure to any of the five channels of flow. This will adversely affect the uterus, the fallopian tubes, the ovaries, the intestines, the vagina, the uterine ligaments, and all

surrounding connective tissue. A cycle of pathology is created; however, it is possible to return the uterus to its rightful location using the simple, external and ancient massage techniques of Maya Abdominal Massage.

## Common Female Reproductive Symptoms

Painful periods  
Late, early, or irregular periods  
Dark, thick blood at onset and/or at end of menstruation  
Painful ovulation  
Failure to ovulate regularly, chronic anovulation  
Abnormal uterine bleeding with blood clots during menstruation  
Headache or migraine with menstruation  
Dizziness with menstruation  
Uterine fibroids, polyps  
Endometriosis, endometritis, uterine infections, pelvic infections, vaginitis  
PMS/depression prior to menses  
Bladder infections or cystitis  
Chronic miscarriages, premature deliveries, weak newborn infants, false pregnancies  
Difficult pregnancy or delivery  
Infertility  
Painful intercourse, lack of sexual desire  
Constipation  
Ovarian and breast cysts  
Difficult menopause, dry vagina with or without menopause  
Cancer of the vagina, cervix, uterus, fallopian tubes, lower bowel or bladder



## Causes of the Displaced Uterus

Multiple pregnancies close together with difficult deliveries

Bad professional care during pregnancy, delivery, and postpartum

Carrying heavy burdens just before or during menstruation and too soon after childbirth

Walking barefoot on cold floors and/or wet grass

Wearing high-heeled shoes

Running on cement surfaces

Injury to the sacrum or tailbone from a fall, a severe blow, or car accident

Chronic constipation

Poor alignment of pelvic bones with the spinal column

Chronic spasms around the low back and sacrum.

Carrying young children on the hip for prolonged periods of time

Modern life

Emotional armoring from rape, sexual abuse, or incest at any time in the lifespan

Aging and the pull of gravity on ligaments

A career in high-impact dancing, aerobics, or sports

## Recommendations for Female Reproductive Health Care

**Maya Abdominal Massage:** This external massage provides support and corrects the numerous symptoms as noted above. Please consult the web site: [www.arvigomassage.com](http://www.arvigomassage.com) to find a practitioner near you and a complete training schedule.

**Herbal Therapies:** Every herbalist has his/her formulations to support female reproductive health care for the cycles of a woman's life. Herbal remedies, when used in conjunction with Maya Abdominal massage, nourish the well being of this system. Remember, the "Herbs have no Hands!"

**Female Tonic:** This is a formula that, in part, I learned from my mentor of a decade, Don Eljio Panti. There are six different herbs in the formula, four of which were in Don Eljio's original formula that he devised from what he learned from his teacher in the 1930s in Belize. This formula is used to address the numerous symptoms of the displaced uterus with excellent results.

## Contents:

*Croton guatemalensis*, Copalchi Bark

Used in Central America to support many female symptoms; best used to help flush old uterine fluids from the walls of the uterus.

*Agonandra racemosa*, Man Vine

Antispasmodic, relaxes involuntary muscles.

*Sweetia panmensis*, Billy Webb Bark

Bitter bark, used for uterine cleansing, works with Copalchi Bark.

*Chiococca alba*, Skunk Root, "the thinking herb"

Diverse herb, used by Mayas, heals ulcerations of mucous membranes, strengthens the uterus.

*Dioscorea spp.*, Wild Yam

The basis of birth control pills and cortisone, active principle is diosgenin, precursor to hormones estrogen and progesterone. Assists in balancing hormone levels.

*Zingiber officinalis*, Ginger Root

Traditionally used by Maya women to bring warmth to the uterus, improving circulation to and out of the pelvis, acts as an anti-inflammatory agent, antioxidant, and a support in digestion. Side effects: Increase in menstrual fluids for 2-3 cycles; for adult use only. Contraindications: Pregnancy or extreme fatigue

## Vaginal Steam Baths

Bajos (ba-hoes) as they are called in Spanish, are a respected treatment for women used by Maya midwives and healers. They cleanse the pelvis with aromatic herbs, are good for chronic and supportive care of the reproductive organs. Herbs commonly used are rosemary, motherwort, oregano, lavender, red clover, yarrow, calendula, etc. Do not use essential oils!

## Emotional and Spiritual Healing

Like other Amerindian cultures, the Maya consider that psychological disorders are related to the concept of a variety of harsh emotional experiences. The Maya word for soul is ch'ulel. It is the vital energy force that pulsates rhythmically in and out of the body. The inward and outward flow of this energy needs to be harmonious and steady. "Not too much. Not too little," was what the old Maya shaman Don Eljio Panti used to say. Besides

prayer, the Maya healer also uses herbal baths, incense, rituals and a strong sprinkling of faith and laughter into the healing mixture.

Healing of any form cannot happen effectively without including emotional and spiritual healing. I would encourage you to attend my four-day Spiritual Healing retreat for an in-depth exploration of this topic.

**Diet:** Whole foods, nuts, grains, greens, etc. Eliminate processed foods, contaminated meats. Meats,

dairy, eggs, if consumed, need to be in small amounts and organic. A vegetarian diet is best!

**Exercise:** Yoga, stretching, belly dancing, movement!

The female pelvis is a powerhouse of energy transformation, the very throne of creation through which universal creative energy patterns course and flow. This depends on balance within the system—physical, emotional, and spiritual.

# Spiritual Bathing for Self and Clients

Rosita Arvigo, DN

Maya healing incorporates the use of herbal baths for spiritual healing. We will discuss the most commonly used plants, such as rue, marigold, and roses, used in herbal bathing to promote spiritual healing.

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Excerpted from *Spiritual Bathing* by Nadine Epstein and Rosita Arvigo, in the July/August 2003 issue of *Spirituality & Health* magazine.

From baptisms to Mayan baths to waterfalls, tubs, and saunas, spiritual bathing is a deeply healing, connecting, and soul-fulfilling practice. We know that it feels wonderful to soak in a warm bath or to swim in the sea; that it is blissful to meditate upon the sound of river water rushing over rocks; and that the sight of sunlit drops bursting from a waterfall is magnificent.

How often do we think of these experiences as spiritual? Yet in ancient times, the spiritual essence of water evoked a sense of wonder, reminding people that they were threads in the divine web of life. Foremost in the great creation myths and traditions of nearly every culture is the recognition that water gave birth to humankind. It was seen as a divine, life-giving, healing, cleansing, renewing force. "Water symbolizes the whole of potentiality; it is *fons et origo*, the source of all possible existence," wrote Mircea Eliade, the late historian of comparative religion.

Water was the primordial element from which most of the ancients believed the earth was created. The Egyptian god Nun was the god of chaos and waters who created the earth. The Yoruba goddess Obatala created the world from a floating ball of water, and Vishnu formed the earth while floating on a serpent in the cosmic seas. In Native American myths, Old Man, drifting on a

raft, willed the earth into existence out of water.

The human affinity for water was also expressed through spiritual bathing, which drew men, women, children, and whole communities closer to the divine. Immersion symbolized rebirth, regeneration, and momentary death. Sprinkling, splashing, pouring, sweating, and even drinking were also important parts of such bathing.

Water rituals may be even more meaningful now as people struggle to find their own paths to, and relationships with, God. Our overscheduled lives require as many ways as possible to regain a sense of interconnectedness and harmony, within and without. Spiritual bathing strengthens our tenuous connections with the natural world and its reflection of the divine. Baths not only ease our passage through the stresses of daily life, they also separate the extraordinary from the mundane, transport us to a holier place, and mark rites of passage. Spiritual bathing can open the door to one's own inner guidance, uplifting the soul to foster a more reverent, peaceful state of mind.

Although many rituals have religious roots, contemporary spiritual bathing transcends the particularity of a religious community, institution, or spiritual tradition by incorporating diverse ideals and practices. At the same time, it helps us to deepen our understanding of traditions in order to reshape rituals for modern times and to create new ones. These rituals can be used as a private journey, or celebrated communally with friends and family at home, in the backyard, or by a sea, lake, river, spring, or pond.

Petals of roses, hollyhock, marigold, and hibiscus flowers swirl with basil, rue, and sage, creating patterns in the water that are achingly lovely. Caroline climbs into

the tub as copal smoke billows from the incense holder. She feels disconnected from herself, from her husband, and from the divine. As she immerses herself, she prays for connection and clarity. Repeating her prayers and focusing her intentions, she soaks for 30 minutes while absorbing the changing patterns of petals and leaves into her soul, gathering the rue buds up in her hands and breathing in their pungent fragrance. When she arises from the bath, she feels renewed and reconnected to the divinity within herself, and the divinity within the world.

Spiritual bathing is intertwined with healing practices throughout the world and can benefit even those who do not hold any particular religious or spiritual beliefs. A spiritual bath combines water—whether in liquid or vapor form—with prayer, and sometimes plants, stones, gems, honey, milk, or wine to wash away the negative effects of anger, fear, anxiety, grief, trauma, exhaustion, world-weariness, stress, and confusion. Whether you are brokenhearted or in transition, bathing can heal you if it incorporates two essential components: water and prayer.

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### Spiritual Herbal Bathing

Herbal baths are used to refresh and purify the body. The combination of the power of water and healing properties of the plants provides deep cleansing and renewal at an energetic level. Collect your plants with prayer and intention in preparation for your bath.

### Plants

Choose plants for your bath that bring meaning and healing for you. Each plant brings its own healing wisdom to aid in your healing. Commonly used plants

are lavender, oregano, basil, marigold, rose, yarrow, lemon balm, hibiscus, St. John's wort, echinacea, or any non-toxic plant you resonate with.

### Directions

- In a large pot containing 1-2 gallons of water, add 1-2 quarts of fresh herbs and 1-2 cups of dried herbs. Fill with hot or warm water and allow the mixture to gently cool to touch, being careful the steam will not burn you. Crush the herbs with both hands into the water, offering your prayers and thanks to the plants to aid in your healing. Be specific so they are clear about your healing request.

- The water will turn color depending on the plants you are using (greenish brown colors are most typical), as these are the healing qualities of the plant. Sip some of this liquid—about 2-4 ounces.

- Begin to meditate on your healing.

- Place your feet in the water to soak. Take 2 basil leaves, cross them, and starting with your right wrist put them over the pulse saying 3 prayers into your pulse. These prayers can be to whatever Spirit offers you guidance; Goddess, Jesus, Christ, God, Mother Earth, Father in Heaven, etc. It is the *Prayer and the Intention* that is important. Speak your prayers three times into each wrist and three more times with the basil leaves on the crown of your head.

- While in your shower or tub, slowly scoop the herbal bath water over yourself, finally pouring the remaining liquid over your head.

- Rest, meditate, journal, be with yourself in this healing way!

# Some Unique Plants of Belize

Rosita Arvigo, DN

*Neurolaena lobata* – Jackass Bitters (English), Tres Puntas, Mano de Lagarto (Spanish), Kayabim (Mayan)

Uses: Antimicrobial, antiviral, antiparasitic, antiamoebic, etc.; topically for skin conditions, sores, ulcers, infections

*Lippia spp.* – Spanish Thyme, Fat Oregano (E), Oregano grueso (S)

Uses: Fresh juice for earache, skin infections

*Opuntia cochenillifera* – Cochineal nopal cactus, prickly pear (E), Tuna (S) Nopa (M)

Uses: A true panacea, internally for diabetes, arthritis, inflammation; externally for burns, sores, bruises; eaten as a food

*Bursera simaruba* – Tourist Tree, Gumbo-limbo (E), Palo Ijote, Indio Disnudo (S), Chaca (M)

Uses: Internally for inflammation, infection, swelling; externally for skin conditions

*Desmodium adscendens* – Strong Back (E)

Uses: As a tea for back pain, asthma, bronchitis

*Hamelia patens* – Polly Red Head (E), Sanalotodo (S), Ax Canan (M)

Uses: All manner of skin problems as a bath, toasted wound powder

*Piper sp.* – Buttonwood, Spanish Elder (E), Cordonsillo (S); Ituit (M)

Uses: Will show three different species and discuss their uses for snakebite, baths, etc.

*Ceiba pentandra* – Kapok, Silk Cotton Tree, Cotton Tree (E), Ceiba, Kapok (M)

Uses: The cosmic tree for the Maya; will discuss cosmic/spiritual aspects

*Cryosophila stauracantha* – Give and Take Palm (E), Mis (M)

Uses: Inner bark for staunching blood on new wounds

*Hibiscus rosa-sinensis* – Chinese Hibiscus, China Rose, Shoe Flower (E), Tulipan (S), Kak chi at'sum (M)

Uses: A favorite of midwives for hemorrhage, threatened miscarriage, food source, etc.

*Kalanchoe pinnata* – Life Everlasting, Tree of Life, Mother of Thousands (E), Siempre Viva, Oja del viento (S)

Uses: Asthma, bronchitis, diabetes, herbal baths for sprains, etc.

*Dioscorea belizensis* – Mexican Wild Yam, Old Man's Beard, Fairy Stool (E), Cocolmeca, Barba del Viejo (M)

Uses: Uterine conditions, menopause, rheumatism, arthritis, anemia, toxic blood

*Smilax lanceolata* – Smilax, China root, Red Cocolmeca, Wild Sarsparilla (E), Cocolmeca Roja (S), Pu-ja (M)

Uses: Blood tonic, anemia, toxic blood, hyperacidity

*Momordica charantia* – Bitter Melon (E), Sorosi, Condiamor (S)

Uses: Infinite, but mostly for toxic blood, constipation, chronic skin conditions, parasites

*Hyptis verticillata* – John Charles (E), Oja de la Matin (S)

Uses: As a tea for pain, insomnia, anxiety; in herbal baths for spiritual healing

Key: (M) = Mexico; (S) = South America;  
(E) = English

# Withdrawal and Recovery from Celiac and Gluten Intolerance Disease

Paul Bergner

## Traditional Observations in Food Allergy

- Almost everyone with chronic disease has a food intolerance
- Most common are dairy, glutenous grains, egg, and soy. Second tier are peanuts, tree nuts, nightshades
- 3-6 weeks' elimination is necessary to assess effects, much longer for some symptoms
- Withdrawal must be complete
- Withdrawal must be permanent
- Most patients have an addictive relationship with their allergen, characterized by denial and minimization
- For the practitioner: "You can't push spaghetti uphill" (G. Patton)

## Adaptive Immunity

- Specific
  - specific to antigenic peptides, not to organisms or foods
  - peptides in organism or food may be identical to self-peptides
- Systemic
  - antibodies
  - antibody-producing immigrant plasma cells
  - activated T-cells
- Memory
  - cloning of antigen-specific B cells and T cells

## The Problem with Food Antigens: Molecular Mimicry

- Peptide fragments of proteins, released on partial digestion in the stomach, are the most common antigenic substances in food
- Some food peptides are identical to peptides in the connective and other tissues of the human body
- Antibodies to the food peptides can initiate inflammation in distant areas of the body
- Cross-reactive peptides have been identified in glutenous grains, milk, corn, soy, egg, and many nuts
- Reactivity to peptides is genetically determined, and cannot be "outgrown"

## Gluten Ataxia

% with anti-gliadin

Ataxia	antibodies
Idiopathic	32
Sporadic, familial	14
Sporadic, systemic disease	13
Sporadic, not as above	41
Control	12

Hadjivassiliou M, et al. Gluten ataxia in perspective: epidemiology, genetic susceptibility and clinical characteristics. *Brain*. 2003 Mar;126(Pt 3):685-91.

## Antigenic Peptides in Cows' Milk

At least 20 peptide epitopes have been identified in various milk proteins, including various fragments of:

- Alpha lactalbumin  
4 IgE binding and 3 IgG binding regions identified
- Beta (β)-lactoglobulin (BLG)  
7 IgE and 6 IgG binding epitopes detected
- Other: Bovine insulin (BI), Bovine serum albumin (BSA), Peptide beta (β)-casomorphin 7 (BCM-7)

Järvinen KM, Chatchatee P, Bardina L, Beyer K, Sampson HA. IgE and IgG binding epitopes on alpha-lactalbumin and beta-lactoglobulin in cow's milk allergy. *Int Arch Allergy Immunol*. 2001 Oct;126(2):111-8.

## Implications for Food Allergy Testing

- Some responses may be via the innate immune system rather than the specific
- Innate responses in the gut may induce Leaky Gut Syndrome
- Because multiple antigens and antigen-classes are involved, lab testing for antibodies may produce a high rate of false negative results

## Milk and/or Soy may also Induce Villous Atrophy

- 15 children aged 12-18, complaining of GI pain
- All had been diagnosed with cow milk allergy in childhood
- All were thought to have "outgrown" the allergy
- Celiac disease was ruled out
- "Seven of 15 patients with CMA in infancy had focal villous atrophy of the descending part of the duodenum."

Jarocka-Cyrta E, Baniukiewicz A, Wasilewska J, Pawlak J, Kaczmarek M. Focal villous atrophy of the duodenum in children who have outgrown cow's milk allergy. Chromoendoscopy and magnification endoscopy evaluation. *Med Wieku Rozwoj*. 2007 Apr-Jun;11(2 Pt 1):123-7.

## Stages of Systemic Effects with Consumption of Food Antigen

1. Cloning of antigen-specific B and T cells in villi.
2. Cloning of the clones and exponential progression but below clinical threshold.

3. Specialization of the villi and gut adaptive immunity for the food antigen.
4. Cross-reactive plasma cells migrate to sites of inflammation and, in the genetically susceptible individual, induce autoimmunity in the already-inflamed area.
5. Circulating autoantibodies trigger systemic inflammation in susceptible tissues.
6. Eventual, usually delayed, emergence of systemic symptoms.
7. Once specialized, the lymphatics may be oriented toward systemic response for months to years to decades. Even after "normalization," specialization may rapidly reoccur with reintroduction.

## Case Reports

### Case 1

- 32 y.o female with eczema
- Withdrew all dairy and milk except cream in coffee
- Eczema improved, but lingered
- Patient removed cream from coffee reluctantly
- 3 weeks later, eczema disappeared completely
- 6 months later she reintroduced the cream in the coffee
- 3 weeks later, eczema returned
- Resolution on re-withdrawal

### Case 2

"I knew there was something going on when I found myself dancing to Marvin Gaye while I fixed breakfast for my teenage sons."

## Mortality in the Stages of Celiac Disease

	Hazard Ratio	Mortality Rate #/(1000 person yrs.)
Latent	1.35	6.7
Inflammation of bowel	1.72	25.9
Villous atrophy	1.39	10.4

Ludvigsson JF, et al. Small-intestinal histopathology and mortality risk in celiac disease. *JAMA*. 2009 Sep 16;302(11):1171-8.



## Major Categories of Conditions that Usually have a Food Intolerance Component

- Connective tissue autoimmunity (100%)  
Multiple lupus cases
- Chronic URI (sinus, sore throat, bronchitis).  
(100%)
- Chronic inhalant allergies/asthma (100%)
- Chronic upper GI (GERD) 100%
- Chronic lower bowel (UC, Crohn's, IBS)  
(100%)
- Chronic UTI: (secondary to dysbiosis)
- Chronic musculoskeletal pain
- Vague neurological complaints
- Chronic anxiety/panic disorder (100%) 6 cases

## Symptomology: The Food Allergy Triangle

Gastrointestinal--Connective Tissue--Mood/En-  
ergy

### Constipation

Milk allergy may be the cause of 60-80% of cases  
of chronic constipation in children

Magazzi and Scoglio. Gastrointestinal manifestations of  
cow's milk allergy. Ann Allergy Asthma Immunol. 2002 Dec;89(6  
Suppl 1):65-8.

### Interview Process

1. Explain food allergy and possible symptoms
2. From the label of a 1940s-era blood purifying  
herbal formula at a shop in Edinburgh, Scot-  
land: "One should ascertain that food which  
immediately causes heartburn, followed by  
bloating, and ultimately by constipation or  
copious gas, and avoid it"
3. Ask if the person has a known allergy
4. Ask if the person suspects an allergy
5. Ask if patient was allergic to anything in child-  
hood
6. Ask if patient has an addictive relationship with  
common allergen

### Why Withdrawals Fail

- Withdrawal was not complete due to poor  
instructions
- Withdrawal was not complete due to covert  
foods

- Withdrawal succeeded but progress was not  
accurately assessed
- There is a second and/or third allergen in-  
volved
- Persistent intestinal dysbiosis
- Persistent leaky gut from nutrient deficiencies
- Persistent leaky gut from vitamin D defi-  
ciency

### When the Patient Agrees to an Elimination

1. Explain the need for complete withdrawal
2. Explain covert sources
3. Explain possible benefits
4. Spend 30 minutes discussing favorite foods that  
are not the allergen
5. Do a complete listing of all symptoms on the  
triangle with severity scores
6. Do a complete evaluation of objective signs,  
abdominal symptoms; range of motion, etc.

### Patient 1 Had "No Improvement"

	Joints and Muscles	
	Week 1	Week 6
Pains or aches in joints	5	2
Stiffness	4	2
Pains or aches in muscle	5	2
Weakness	4	2
Numbness	<u>4</u>	<u>1</u>
Score	22	9

### Patient 2 Had "a Little Bit" of Improvement

	Joints and Muscles	
	Week 1	Week 3
Pains or aches in joints	5	3
Stiffness	2	0
Pains or aches in muscles	3	0
Numbness	2	0
Swelling in hands or feet	<u>2</u>	<u>0</u>
Total	14	3

### Patients Reported Little or No Improve- ment after:

- Disappearance of chief complaint, hip pain  
disturbing sleep after 3 weeks
- Disappearance of panic attacks after 3 weeks
- Disappearance of deep depression after 3 weeks  
(patient was enraged)

## Vitamin D and Barrier Function

Protein and peptides of the epithelial cellular junctions are vitamin D dependent. 25(OH)D<sub>3</sub> enters cell. It is transformed to 1,2 (di-OH)D<sub>3</sub>. The molecule binds to the RXR receptor on the DNA. The cell is induced to produce the binding proteins for the junctions.

## Vitamin D and Gastrointestinal Immunity in Food Allergy

- Barriers: D deficiency weakens barriers
- Innate immunity: D deficiency weakens innate immunity
- Adaptive immunity: D deficiency promotes excessive cloning of B-cells and T-cells, resulting in excess production of migrant plasma cells, autoantibodies, antibodies
- Bottom line: Vitamin D deficiency promotes leaky gut syndrome and exaggerates the systemic effects of food intolerance.

## Therapeutics Overview

- Complete elimination of antigen
- Normalize digestion with herbs
- Wound healing herbs in gut
- Lymphatic and immunomodulating herbs
- Optimize vitamin D to 60 ng/mL
- Optimize protein, glutamine nutrition
- Optimize nucleotide nutrition
- Optimize wound-healing nutrients (zinc, vitamins C and A)
- Optimize anti-inflammatory nutrition.
- Probiotics
- Psychospiritual: flower essences, homeopathy

## Nutrition of the Gut Lining from the Lumen of the Intestine

- The fast-reproducing gut epithelium can take nutrients directly from the lumen rather than from the bloodstream or via de-novo synthesis.
- Fast replication increases the need for intake or manufacture of nucleotides.
- The primary storage of zinc is in metalloenzymes associated with DNA replication; deficiency can inhibit replication.
- Reproduction of gut epithelial cells uses large amounts of the amino acid glutamine.

## Glutamine Supplementation in Clinical Trials

- 18–30 g per day, orally
- 10 g three times per day, orally
- 0.57 g per kg (2.2 lb.) of body weight per day
- 50 g per day of dipeptide glycyl-glutamine intravenously
- 0.4 g per kg (2.2 lb.) of body weight per day of dipeptide glycyl-glutamine, intravenously
- 14 g of glutamine per day in combination with arginine and HMB for up to 24 weeks

## Ranges of Glutamine and Zinc in a Paleolithic Human Diet

	Zn	Glutamine
30 oz buffalo	50mg	38g
30 oz venison	42mg	31g
30 oz beef 95% lean	62mg	39g

## Macronutrient Considerations

- High protein diet
- Nutrient rich, protein rich meat soups and stews
- Enrich with trace elements and mineral nutrition with seaweeds, etc.

## Herbal Medicine

### Herbal Categories

- Standard
  - Bitters
  - Carminatives
  - Demulcents
  - Alteratives
- Special
  - Topical anti-inflammatories
  - Wound healing
  - Lymphatic
  - Immunomodulating
- Prefer milder herbs
- Prefer decoctions or powders in demulcent media

## Important Wound-Healing Herbs for Restoring Gut Integrity

- Plantain
  - Calendula
  - Aloe vera
- Deliver as powder in aloe juice or applesauce.

## Topical Anti-inflammatories for Gut Healing

- *Matricaria*
- *Achillea*
- *Mentha*
- *Calendula*
- *Althea*
- Aloe vera juice

Use decoctions or powders in demulcent media

## Immunomodulating Herbs

- Astragalus: Use tea (soup) or prepared extract, not tincture
- Lentinus: Add mushrooms to soup or stir-fry. Reconstitute dried mushrooms in water
- Reishi
  - Use long decoction or prepared extract
  - Must include water-extracted portion
  - Decoction tastes really bad, compliance poor
  - Brand: JHS products include water-extraction

## Basic Formula for Herbal Decoction or Powder

*Mentha* – carminative, anti-inflammatory

*Matricaria* – bitter, carminative, anti-inflammatory

*Foeniculum* – carminative, antispasmodic

*Glycyrrhiza* – demulcent, anti-inflammatory

*Plantain* – mild bitter, vulnerary, anti-inflammatory

### Formulation Modification 1

<i>Mentha</i>	1
<i>Matricaria</i>	1
<i>Foeniculum</i>	1
<i>Glycyrrhiza</i>	1
Plantain	1

If bloating and/or nausea and/or loose stool, add

*Zingiber*, *calendula*, *yarrow*, and/or *Agrimonia*; decrease

*Glycyrrhiza*

### Formula Modification 2

<i>Mentha</i>	1
<i>Matricaria</i>	1
<i>Foeniculum</i>	1
<i>Glycyrrhiza</i>	1
Plantain	1

If cold and/or dry presentation add *althea*, *ulmus*, *aloe juice*, *pimpinella*, increase *fennel* and *glycyrrhiza*

### Formula Modification 3

<i>Mentha</i>	1
<i>Matricaria</i>	1
<i>Foeniculum</i>	1
<i>Glycyrrhiza</i>	1
Plantain	1

Modifications for constitution or presentation

- If taking probiotics add *Arctium*, *Taraxacum* as decoction or powder for inulin content
- If liver involvement with dampness and heat, add *Taraxacum*, *Mahonia*

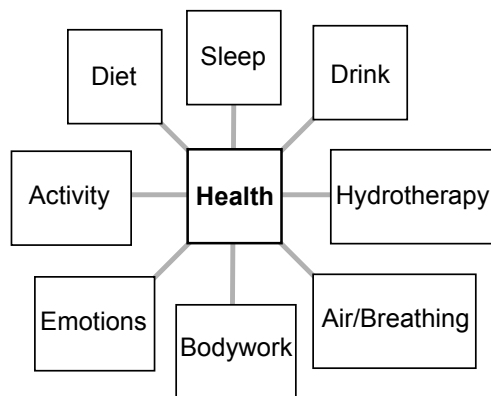
## Reevaluate Formulas Every 1-3 Weeks

- Disappearance of damp symptoms
  - Reduce or remove drying herbs
- Disappearance of heat or cold symptoms
  - Modify appropriately for warming or cooling herbs

# Emotional Healing: Herbs for the Spiritual Heart

Paul Bergner

## The Regimen of Health from Greek/Arabic Medicine



Humoral systems of medicine make little distinction between physical and emotional health. *The elements of the humoral regimen are equally as important for emotional as physical health.*

The elements of the regimen are the workhorses of healing, whether physical or emotional. Herbs may be used to support the regimen: nutritive, relaxant, tonic, adaptogenic, stimulant, sedative, etc. Attempting pharmacological cures, whether with drugs or with antidepressant or adaptogenic herbs, is irrational, will fail in the long term, and will mask the root causes of disease, allowing the disease state to progress in a covert way.

## Dietary Influences on Emotional Health

### A. Micronutrient deficiencies associated with functional emotional disturbance

Condition	Minerals	Vitamins	Other
Aggressive behavior	iron	thiamine	high sugar
	lithium	vitamin C	high cow's milk
Anxiety	calcium	pyridoxine	excess calcium
	magnesium	niacin	excess sugar
		thiamine	excess caffeine
			excess alcohol
			deficient essential fatty acids
Depression	calcium	biotin	excess caffeine
	copper	folic acid	excess sugar
	iron	pyridoxine	
	lithium	riboflavin	
	magnesium	thiamine	
	potassium	vitamin B12	
	rubidium	vitamin C	

Condition	Minerals	Vitamins	Other
Fatigue	iron	folic acid	excess sugar
	magnesium	pantothenic	excess caffeine
	potassium	pyridoxine	
	zinc	vitamin B12	
		vitamin C	
		vitamin E	
Hyperactivity	calcium	niacin	high sugar
	copper	pyridoxine	
	iron	thiamine	
	magnesium		
	zinc		

## B. Basic Macronutrient Nutrition

- The amino acids in protein are the starting point for neurotransmitters and many other substances that can affect mood.
- In a diet abundant with whole protein, all NT pathways are fed in a self-regulating and balanced way.
- Current trends among protein nutrition experts are toward a higher RDA, and up to double the RDA considered completely safe. The anthropological norm is 2.5-4 times the RDA.
- A high protein diet taken as meat also provides high amounts of magnesium, zinc, potassium, and other micronutrients.

## C. Metabolic Effects of Diet

- The primary consideration is effects on insulin and serum glucose.
- Fat is neutral.
- Carbohydrates of most types may aggravate; high glycemic carbohydrates radically aggravate.
- Protein tends to stabilize and minimize blood sugar swings.

## D. Immunogenic Effects of Diet

- Food intolerance wreaks havoc on the stress/emotion cycle.
- Emotional, mood, and energy effects are universal in food intolerance.
- Many individuals in long term therapy for depression, anxiety, panic disorder, PTSD, childhood abuse, etc., will spontaneously stop therapy after removing a food intolerance.

- The most common initial symptom journaled after rechallenge in our clinic is irritability, appearing usually before digestive or physical symptoms.

## Exercise Effects

- Appropriate physical movement has profound effect on emotions.
- 30 minutes of walking daily is more effective than antidepressant drugs for mild-to-moderate depression.
- The exercise should be pleasurable.
- Other specialized exercise—yoga, Pilates, or chi-related—is beneficial.

## Sleep Debt

- Sleep debt is an endocrine disorder characterized by elevated cortisol, disrupted cortisol rhythm, elevated insulin resistance, increased tendency to hypoglycemia, mental inefficiency, and immunodeficiency.
- This state begins to appear in some individuals when their nightly sleep falls below 8.5 hours, the anthropological and physiological norm. It appears in all individuals whose sleep falls to 7.0 hours per night.
- The endocrine imbalance can be improved or corrected with 3 sequential nights of 9.5 or more hours resting in bed. Improvements were seen in a continuous linear fashion in a group of urban male volunteers who remained in bed 12 hours per night for 30 days.
- The emotional milieu changes profoundly.

## Self-talk, Journaling, Affirmation, Directed Thinking

- Essential to changing habitual patterns
- The Amish depression cure: “Work on yourself”
- A fundamental therapeutic modality from the time of the Egyptians up through 20<sup>th</sup> century: Nature Cure (Henry Lindlahr)
- An essential part of Avicenna’s regimen in the Canon of Medicine

## Avicenna on the Sources of Joy

1. Gazing upon daylight amid cheerful people
2. Associating with those of like beliefs
3. Obtaining what it is one wishes for
4. Satisfying an intention without meeting opposition
5. Preferring to do something peaceful
6. Confidence
7. The memory of past and future joys and hopes
8. Thinking about high aspirations
9. Mutual discussion and argument with kindred minds
10. Relief from pain
11. Contact with curious, interesting, remarkable new things
12. Uplifting of the mind
13. Meeting friends and friendly surroundings
14. Overcoming deception (discovering the truth, removing an illusion) in small matters

## Avicenna on the Causes of Sadness

1. Reflecting that one’s homeland is distant
2. Pondering over many injuries already past and done with
3. Hatred and rancor
4. Bad health
5. Difficult circumstances of life
6. Thinking terrible things are going to happen in the future
7. Thinking of the necessity of death
8. Thinking about something that is disturbing to meditate upon
9. Being away from an agreeable occupation
10. Having thoughts that distract from one’s occupation

11. Distraction from that which is desired and hoped for

## “Stuck Liver Chi”

- In Chinese medicine the set of functions included under “Liver” include the smooth flow of emotions.
- Herbs to support regimen; sleep, digestion, drain/detoxify.
- Most common root causes in modern life are food intolerance, alcohol excess, and exogenous hormones.

## Western Herbs to Relax Constrained Liver Chi

<i>Rosmarinus</i>	diffusive	relaxant	hot	dry
<i>Lavandula</i>	diffusive	relaxant	warm	dry
<i>Mentha arvensis</i>				
	diffusive	relaxant	hot	dry
<i>Citrus spp</i>	diffusive	tonic	warm	dry
<i>Paeonia</i>	relaxant		cool	neutral
<i>Foeniculum</i>	diffusive	relaxant	warm	dry
<i>Rosa</i>	astringent		cool	dry
<i>Allium cepa</i>	diffusive		hot	dry

Combine well with herbs that drain heat from liver – *Taraxacum*, *Mahonia*

## Emotional Crisis and Flower Essences

- Profound emotional healers
- Useful for underlying habitual negative emotional states
- Useful for negative emotional reactions to disease states or life conditions

## The Spiritual Heart

- The *foundation* of consciousness; seat of the spirit
- Qualities: emotional and spiritual perception, steadiness, relationship, love, boundaries/protection, the seat of spiritual guidance, wisdom, knowing without logic or mental activity.
- “When the Heart is not healthy, the entire system is diseased.” --Prophet Muhammad
- Avicenna and the exhilarant herbs stimulate and uplift the vital centers, heart and brain.

### Unani Exhilarants

- *Cinnamomum cassia*, combine with *Valeriana*; heart and brain
- *Cinnamomum zeylanicum (verum)*, combine with coriander
- *Centella asiatica*, combine with coriander; all vital organs
- *Ocimum basilicum, sanctum*, combine with *Viola*
- *Hibiscus rosa-sinensis*, combine with small amount of *Piper nigrum*; heart

### The Heart School in Chinese Medicine

- Arose during a period of urbanization and the spread of Buddhism.
- Recognized heart disturbance as a pathology that blocked inner wisdom and was an obstacle to reflection and making rational changes in the regimen.
- The use of sedatives to steady the heart, in very heavy doses, was considered a temporary acute therapy.

### The Spiritual Heart in 21<sup>st</sup> Century Urban Life

*The use of low-dose botanicals: 1-3 drops*

#### Heart Centering, Relaxing:

- *Leonurus*
- *Lycopus*
- *Paeonia*
- *Verbena*
- *Pulsatilla*
- Poplar flower
- *Succinum* resin – amber (as small doses of powder)

#### Heart Protection:

- *Crataegus*
- *Rosa*
- *Oplopanax*

#### Heart Perception, Wisdom

- *Stachys betonica*
- *Scutellaria*
- *Ocimum basilicum, sanctum*
- *Centella*



# Surgery: Preparation and Recovery

Paul Bergner

## Issues Addressed in Case

- Can recovered alcoholics safely use tinctures?
- Nutritional factors for strengthening tissue integrity and wound healing
- Avoidance of blood-thinning herbs and medications before surgery
- Possible interactions between natural therapy and blood-thinning medications
- Materia medica for pre-surgical immune enhancement
- Materia medica for liver protection during general anesthesia
- Nutritional factors for pain management
- Materia medica for pain management
- Nourishing the blood-building capacity in preparation for blood donation

## Case Study

A 58-year-old male, 6'3", 200 lbs., consulted in preparation for hip replacement surgery. He had a similar operation on the other hip one year previously with no complications and a satisfactory result. The patient was scheduled to give a pint of his blood on each of May 18, May 25, and June 1 for transfusion during surgery scheduled for June 8. Patient is a recovered alcoholic and wants no alcohol tinctures.

## Strategy Prior to Surgery

- Enhance immune system
- Protect liver during anesthesia
- Promote tissue integrity and wound-healing capacity

- Fortify and nourish the blood in preparation for transfusion
- Avoid blood-thinning effects
- Minimize traumatic pain
- Minimize adverse effects of antibiotics
- Support natural anti-inflammatory mechanisms

## Strategy after Surgery

- Assist with post-anesthesia detoxification
- Promote wound healing
- Deal with pain as needed
- Avoid interactions with blood-thinning medication

## Recommended to Implement Immediately

- A nutritional formula to build the blood (Metagenics Hemagenics) containing iron, folic acid, B6, B12, and other nutrients. 4 tablets daily until 3 weeks after surgery
- 3 grams vitamin C per day in divided doses. Boosts immunity, enhances white blood cell formation, increases antibody production and interferon activity, cofactor for production of stress hormones, enhances wound healing.
- Essential fatty acid supplementation. Patient already takes flax seed oil and fish oil. Up dosage to 4 capsules of each per day.
- Proanthocyanidins (grape seed extract) 400 mg/day therapeutic dose. Increases intracellular vitamin C levels, decreases capillary fragility, antioxidant, inhibits collagen destruction.
- Discontinue vitamin E supplementation (patient

was taking 200-400 mg) to prevent blood thinning effects.

- Discontinue aspirin use to prevent blood-thinning effects.
- Discontinue NSAIDs. Block collagen synthesis and wound healing.

Note: Patient discontinued aspirin and reduced NSAID use from 4-6 per day to one per day most days (some days used none).

- L-Phenylalanine, 200-400 mg day, for pain relief
- Herbal pain formula:
  - *Cimicifuga racemosa* (black cohosh)  
35 Nervine, antispasmodic, analgesic
  - *Eschscholtzia californicum* (california poppy)  
35 Sedative, antianxiety, analgesic
  - *Pedicularis spp* (betony)  
20 muscle relaxant
  - *Lobelia inflata* (lobelia)  
10 antispasmodic
  - *Leonurus cardiaca* (motherwort)  
10 sedative, nervine, anodyneSig: 60 drops qid
- Avoid nightshades
- Avoid simple sugars. Client had difficulty doing this, but dramatically reduced sugar intake. Had previously consumed large amounts of candy, a habit acquired after stopping alcohol.
- Increase consumption of onions and garlic (in dietary amounts only, no garlic capsules)
- Reduce coffee and substitute green tea. Client did reduce the coffee, but only occasionally drank green tea.
- Introduce shiitake mushrooms into diet on a regular basis. (Client did not comply)

### Start Two Weeks Prior to Surgery

- Commercial probiotic (acidophilus plus FOS), as directed on bottle. Continue for two weeks after discontinuation of scheduled antibiotics.
- Standardized milk thistle seed extract for liver support. Continue until two weeks after anesthesia.

### Stop Five Days Before Surgery

- Onions and garlic in the diet
- Grape seed extract

### Start Five Days Before Surgery

- *Echinacea angustifolia* capsules (Nature's Way standardized product). Avoiding tincture because of alcoholism. 2 capsules 2x day. Continue for ten days after surgery
- Homeopathic arnica. 30c. 5 pellets tid under tongue. Continue 5 days after surgery
- Start diathermy. Heat from heating pad applied to hip for 20-30 minutes per day.

### Two Days Before

Professional massage to relax muscles

### Post-Surgery

(On day of arrival home)

- Standardized *Centella asiatica* product (avoiding alcohol). Promotes wound healing. 120 mg/day
- Massage oil into incision: rose hip seed oil with calendula extract and essential oils of carrot seed and geranium added.

### Outcomes

- Client lost more blood (Dr. attributed this to "better physical condition"). All 3 pints of transfusion blood was used by end of the first day; last year not all used until 3rd day.
- Client went home one day earlier
- Was on postsurgical Coumadin for five days instead of ten.
- Was on morphine prescription p.r.n. for two days instead of three.
- See photos of wound healing, comparing the two surgeries. Visibly less bruising, less inflammation, and more complete healing at day eight.

### Three Months Post Surgery

Client is in best health in years, exercising regularly in gym. Rejoined the ski patrol, which he had quit five years prior to first surgery. Snowboarding on patrol rather than skiing.

# Menopause – Always Something New to Say

Amanda McQuade Crawford

Changes that accompany menopause are no less dramatic than those we experienced at puberty.

## Common Treatments Supported by Evidence, Experience, and Safety:

Exercise; vitamins B, A, D, E, and K; calcium, magnesium; EFAs; mind-body Rx; bioidenticals; herbs, foods.

## Definitions:

Menopause occurs when the ovaries stop releasing eggs and menstruation ceases. The period called “premenopause” can begin eight to ten years before complete menopause and occurs when the normal monthly cycle of ovulation and menstruation becomes less regular. This entire period of transition is also known as the “climacteric” phase because the reproductive phase of life is reaching its “climax.” The formal term is “perimenopause” and literally means the time surrounding menopausal changes.

## When:

Premenopause is usually a gradual process, so women may not know exactly when it begins. If women are reasonably healthy and older than thirty-six, an irregular cycle may be a sign of premenopause. Premenopause commonly begins in the fourth decade of life but may start as early as the thirties or even the twenties. High-stress lifestyles, heightened economic and social worries, global pollution, rising gynecological surgeries, and other twenty-first-century factors may contribute to early onset of premenopause, even among healthy women. It was thought until fairly recently that the earlier periods

began (“menarche”), the earlier menopause would occur. Now researchers are not certain. Even if ages of women relatives at their menopause are not an exact predictor of our probable ages for menopause, talking to other women in our families can provide invaluable information. Other factors to consider are personal health history, nutrition, ethnicity, climate, economic status, and social setting—all of which influence one another.

## Treatments for Menopausal Symptoms and Post Menopausal Health

### Ginseng (*Panax ginseng*, also called Asian, Chinese, Korean, or Manchurian ginseng)

Ginseng taken at 6 grams daily for six weeks and longer works well for both cardiovascular health and to reduce the symptom of hot flashes, although it may not work equally well in all women. Other members of the ginseng family may not work as well in the short term for hot flashes, though they are often useful adaptogens.

Ginseng acts on the hypothalamus, has a sparing action on the adrenal cortex, raises plasma ACTH and cortisone in relaxed subjects, which results in a state of being alert with increased resistance to multiple stressors. Ginseng is normalizing in people with high blood sugar though it raises blood sugar during exercise, with overall benefits to muscle strength, oxygen use, lower lactic acid, quicker recovery time, and better endurance.

Some say that menopausal women should never take ginseng. Nevertheless, numerous women have told me of the benefits it gave them, and there is research to support both views. It is contraindicated in asthma, acute infections, and acute hypertension. Women who seem to react badly to ginseng are already tired but

high-strung, tense, and wound up. Women who do well with a little ginseng tend to feel, before taking the herb, emptied out, weakened in every body system, and slow to get going. The use of ginseng is easier on a woman than HRT, in my opinion. A temporary “ginseng headache” helps a woman determine that this powerful herb may not be right for her. That is not as difficult a side effect to clear up as the cancer risk associated with replacement hormones. Because of overharvesting, do not purchase or recommend endangered wild American ginseng (*Panax quinquefolium*); rather, use cultivated roots grown and harvested with ecological sensitivity of either *Panax* species required. It is helpful for reducing vaginal symptoms and cardiac risk postmenopausally. There is one case report of a postmenopausal woman taking *Panax ginseng* who had vaginal bleeding.

### **Black Cohosh: *Actaea racemosa* (was *Cimicifuga racemosa*)**

Since the 1985 open study on Remifemin showed an 80% improvement of symptoms in women after one month and complete disappearance of all symptoms in half of the women after 6-8 weeks, there have been other studies on other black cohosh products with less certain results. In my own practice I estimate 60% of women who took Remifemin had good results, but the other four out of ten needed the actual extract in combination with herbs suited to them personally, or indeed, herbs altogether other than black cohosh.

In a 2009 trial, neither red clover nor black cohosh altered hot flash frequency or severity more than placebo. Another 2009 trial concluded that a combination of Chinese herbs with black cohosh did not improve symptoms, either.

The actions are: Hormonal and utero-ovarian tonic, antispasmodic, relaxing nervine, peripheral vasodilator, antirheumatic, mild expectorant.

Its safety rating has been controversial, with adverse reports between 2002-2008. Two cases out of 42 reports investigated suggest there is a rare risk of hepatotoxicity. The Expert Committee of the U.S. Pharmacopeia's Council of Experts recommends that black cohosh products carry a cautionary label statement and that women taking the herb be advised to discontinue use and consult a health care provider if they develop a liver disorder or liver-related symptoms. In November 2004 the U.S. NIH Workshop on black cohosh concluded that though there is no evidence of harm it is recommended that women on black cohosh monitor liver enzymes. If

it does work for symptoms in 4-8 weeks, it is probably that women have not been taking it for the duration that might show effects on the liver. It is not mutagenic according to sources that cite a negative Ames Test. The AHPA Rating is 2b, 2c. High doses above 20 ml of a 1:5 tincture daily may cause mild GI disturbances and headaches, presumed due to the peripheral vasodilating action. Lower doses may be helpful in reducing cardiac risk around the time of menopause. It is contraindicated in pregnancy until near term, used by experienced midwives, herbalists, nurse practitioners, or medical doctors; and is not recommended during lactation.

The dosage of black cohosh root tea is a decoction of 1 oz.:1 pint, ½ c. bid/tid. Tincture: Fresh 1:2 or Dry 1:5 is 0.5 - 2 ml BID or TID; monitor the woman and her liver enzymes. Standardized extracts are not uniform among manufacturers, while the best researched product and dose is 1 mg triterpenes as 27-deoxyactein in a 20 mg tablet two times a day. Black cohosh root combines well with St. John's wort, especially in treating inflammation or mood change in perimenopause.

### **Sage leaf - *Salvia officinalis*, *S. species***

Sage leaf contains tannins, bitter principles (diterpenes), steroids, flavonoids, and a volatile oil rich in terpenes (including thujone and camphor). Its actions are carminative, antispasmodic, anti-inflammatory, astringent, and antimicrobial. The antispasmodic and astringent effects may explain its usefulness against excessive perspiration and hot flushes. In a recent in vitro study, sage showed an affinity to benzodiazepine brain receptors, which could explain its calming effect. A four-month study on 42 people in Tehran, Iran with mild to moderate Alzheimer's Disease showed significant improvement on 60 drops of tincture (product not specified) compared to placebo

(*Salvia officinalis* extract in the treatment of patients with mild to moderate Alzheimer's disease: a double blind, randomized and placebo-controlled trial. S. Akhondzadeh et al., *Journal of Clinical Pharmacy and Therapeutics*, Volume 28 Issue 1, Page 53-59. Published online: 28 Feb 2003).

Throughout Europe the use of sage is common for poor digestion and excessive perspiration. In an Italian clinical study of 30 women, hot flashes and night sweats disappeared completely for 20, in 6 the response was good, and in the others symptoms were reduced. The product used was a combination of sage leaf and alfalfa; dose and duration of study not given in the abstract. The researchers mention that hormone levels for estradiol,

LH, FSH, PL, and TSH were not changed. However, sensitivity to TRH was increased in 8 women whose GnRH and PL were studied after three months. The authors hypothesize a central activity without side effects.

De Leo V, Lanzetta D, Cazzavacca R et al. [Treatment of neurovegetative menopausal symptoms with a phytotherapeutic agent] [Article in Italian] : Minerva Ginecol 1998 May;50(5):207-11.

In 2001 the Swiss manufacturing company Bioforce published the results of a clinical trial using their sage extract Menopause Feminine (Menosan in Europe). During 8 weeks, 39 women taking either the extract or a placebo kept a personal diary of their symptoms. 75% of those receiving Menopause Feminine evaluated their condition as better or much better compared with 47% in the placebo group. The mean number of hot flushes reduced by 56.3% with Menopause Feminine and increased by 4.8% in the placebo group.

The dose of sage is usually in the range of 2-3 grams bid/tid.

### **Tribulus - *Tribulus terrestris***

Leaves and stems of *Tribulus*, one of the herbs marketed as horny goat weed, contain steroidal saponins (furostanols). It is indicated for maintaining normal male and female physiology and function, especially in the mature. *Tribulus* 2-4 grams taken 2-4 times a day relieves menopausal symptoms, promotes endurance and general well-being. *Tribulus* is contraindicated in pregnancy.

### **Soy – *Glycine max***

Soy is a bean, often eaten as fermented food. While its use in infant formula is now believed to be harmful, using soy as food in young children and adults does not change estrogen levels. While some people are unable to eat soy without digestive upset, it contains 38% protein, antioxidant omega-3 essential fatty acids, minerals, and the isoflavones genistein and daidzein, which are cardioprotective and reduce menopausal symptoms. In one early British study, ten grams a week of soy powder incorporated into food was found in many women to reduce hot flashes and night sweats. Using soy 2-4 times a week throughout adult life is strongly correlated to better health, including protection against breast cancer. A study of over 650 women—premenopausal, perimenopausal, and post-menopausal—published in 2007 by the American Society of Clinical Oncology, showed a marked association between higher levels of all isoflavones in the blood and lower risk for breast cancer. Other studies suggest the best effects are from regular consumption

of soy throughout the teen years and adulthood. A dose of 25 grams a day is recommended. Because soy is also a low glycemic index food, it has been shown in some studies to improve weight as well as heart health. The use of isolated isoflavones for menopause is less certain for safety long term than eating non-GMO organic soybeans, edamame, miso, tempeh, and tofu.

From the American Botanical Council reporting on Tori Hudson's recent review [Hudson T. Botanicals for managing menopause-related symptoms: state of the science. Integrative Med. December 2009/January 2010;8(6): 30-37] comes the following four:

### **Kudzu - *Pueraria mirifica*, *P. montana* var. *lobata***

Kudzu contains several phytoestrogenic isoflavones in the roots and flowers. Mixed results reported in 3 clinical studies involved symptomatic improvements, but no hormonal or lipid changes when compared to placebo or HRT. In a randomized, double-blind, placebo-controlled study of 71 postmenopausal women, *P. mirifica* produced an estrogenic effect on vaginal tissue, pointing to a potential clinical use for treating vaginal dryness and dyspareunia caused by vaginal atrophy. The dose is 20 to 100 mg daily.

### **Maca - *Lepidium meyenii***

Studies in menopausal women report improvements in anxiety, depression, and sexual dysfunction with 3.5 g/day powdered maca, as well as hot flashes and night sweats with the use of proprietary gelatinized maca. The recommended dosage of gelatinized maca extract is 1000 mg twice daily.

### **Red Clover - *Trifolium pratense***

Of six clinical trials that investigated the effect of red clover isoflavones on vasomotor symptoms, three showed benefit and three did not. A systematic review and metaanalysis in 2007 reported evidence of a statistically marginal beneficial effect of red clover isoflavones for treating hot flashes in menopausal women. The dosage is 40 mg isoflavones twice daily.

### **Rhapontic Rhubarb - *Rheum rhaponticum***

Three studies of a special extract of ERr731 (Phyto-Strol®; Chemish-Pharmazeutische Fabrik Goepingen GmbH and Co KG; Goepingen, Germany) from the roots of rhapontic rhubarb in perimenopausal and menopausal women showed overall improvement

in quality of life and anxiety after 12 weeks, as well as improvements in hot flashes, irritability, sleep problems, depression, and physical and mental exhaustion after 6 months. The dosage is a single 250 mg tablet per day containing 4 mg of ERr731.

### Formulas for Hot Flashes

**Rx: Combine these herb tinctures:**

- 2 oz. black cohosh root *Actaea racemosa*  
Reduces LH, linked to hot flashes
- 3 oz. sage leaf *Salvia officinalis*  
Directs peripheral blood to digestion, cools down vasomotor symptoms, reduces sweating
- 4 oz. peony root *Paeonia lactiflora*  
Increased conversion of adipose androgens to estrogen through aromatase effects, reducing hot flashes; possibly anti-inflammatory
- 1 ½ oz. Bacopa leaf *Bacopa monnieri*  
Cognitive benefits
- 5 ½ oz. frankincense *Boswellia carteri*  
Anti-inflammatory for joints, heart, GI tract, immunity

Total: 16 fl oz./500ml (16 fluid ounces? Yes. You might as well make a big enough batch to use for a while for best results.)

Dose: Every ten minutes take one dropper or 1/4 teaspoon diluted in 1/4 cup of room-temperature water. This remedy usually works in two to three doses, but the effect won't last long unless you take it consistently. For more permanent improvement, take 1 teaspoon three times a day for two weeks, take a few days off, then repeat for another two weeks. After that, repeat as needed.

This formula combines well with the tea described below. The overall effect of this tea is stabilizing, soothing, and moistening.

**Rx: Tea for keeping cool:**

- 2 oz. linden flower *Tilia species*  
Relaxes nerves, lowers high blood pressure
- 2 oz. borage flowers, stems, leaves *Borago officinalis*  
Moistens; nutritive
- 2 oz. hibiscus flower *Hibiscus sabdariffa*  
Cooling; for taste, heart and kidneys
- 1 oz. marshmallow root *Althaea officinalis*  
Moistens, helps water balance
- 1 oz. chamomile flower *Matricaria recutita*  
Soothes stomach, nerves

Combine 1 ounce of the mixture with 3 cups of boiling water in a teapot or container with a well-fitting lid. Let stand for fifteen minutes, then strain the tea and store it in a closed container. Allow to cool; drink at room temperature—not hot and not icy cold. During daytime hot flashes, drink 1 cup as often as needed, or, if you prefer, sip this amount of tea all day or drink two large glasses twice a day; just be sure you drink it all sometime each day. The tea is also good for sipping while you are drying off from a cool bath or shower. Drink 1/2 to 3 cups as needed after night sweats before you return to a fresh, dry bed, but remember to empty your bladder before going to sleep.

**Single herbs make fine dietary supplements for managing the symptom of hot flashes or night sweats.**

- Motherwort metabolizes fats and hormones, filters blood, and improves immunity. It is specifically helpful for heart palpitations as well as menopausal hot flashes and healthy liver function, so it may be useful in any formula taken by a woman with cardiovascular concerns. Dosage of store-bought extract ranges from 1 dropperful to 1 teaspoon every ten to twenty minutes as needed and/or three times a day for prevention.
- Licorice is a rich, affordable source of phytonutrients. Although it should be used with some caution, moderate amounts or the conservative dosages, such as 15 drops-4ml per dose, are going to be helpful to most women going through the Change.

### Supplements

Some women find that 600 to 800 I.U. of vitamin E taken daily is useful for hot flashes. For better metabolism of dosages higher than 600 I.U., add 1 to 3 grams of vitamin C (1,000 to 3,000 mg) and divide the mixture into three equal doses. For example, in the morning, at midday, and in the evening, take 200 I.U. of vitamin E with 1 gram of C. After a week reduce vitamin E to 400 I.U. daily.

**Evening primrose oil:** Evening primrose oil in capsules is also effective for hot flashes. Most research suggests the minimum dose is in the range of six to ten capsules a day. Though evening primrose oil is expensive, it may be effective as quickly as three to six weeks, so women may find it to be an affordable option.

## Heart Health

Garlic, soy or other legumes, fiber, exercise, EFAs, CoQ10.

## Cholesterol Controversy

In some of the statin trials, patients without heart disease showed no reduction in deaths or serious health events, though there was a small drop in heart attacks. The suggestion by researcher James M. Wright, of the University of British Columbia Therapeutics Initiative, is that statins might best be reserved until after a heart attack.

One of the problems with the current, continued push to prescribe statins is that this class of drugs has a high NNT, or number of people needed to treat, before benefits are clear. Side effects include muscle pain and liver disease. Statins reduce rho-kinase, leading to vaso-spasm, a potential cofactor for cardiovascular problems. Sixty cases of memory loss have been reported, whereas both soy and sage have been shown to improve the mental fog often associated with menopause. In addition, statins lower Co Q10, though they may raise Vitamin D levels. In contrast, Omega-3's and Vitamin B complex both reduce the heart risk factors C-reactive protein and homocysteine, associated with Alzheimers Disease.

A review article in the *Lancet* recommends that people take 5,000 IU Vitamin D3 instead of statins, for more benefit (Review article, *Lancet*, 2006). Though many women are advised to take calcium for bone health, calcium without Vitamin D3 increases cardiovascular risk in the elderly (*BMJ* 2008).

More importantly, from a vitalist perspective, lowered cholesterol does NOT equal lowered cardiovascular risk. A number of "Lifestyle" trials show more benefits, including exercise to reduce hot flashes and slightly fewer myocardial infarcts (heart attacks). The role of stress and cortisol rhythm, and blood sugar control all play a role in cardiovascular disease. Change of eating patterns and use of tools ranging from herbs to meditation have been shown to have general benefits beyond heart health alone.

## Osteoporosis (OP)

Note that there is a difference between osteopenia and osteoporosis. According to the National Women's Health Network ([www.nwhn.org](http://www.nwhn.org)), "women with greater economic resources and with health insurance that will pay for screening tests and drug prescriptions are being over-screened, over-diagnosed, and over-treated for osteoporosis." Women who do need screening and treatment are less likely to be identified and treated.

## Adverse effects of OP:

- 1.5 million fractures/ yr
- 250,000 hip fractures/ yr
- Mortality after hip fracture: 10-20%
- Morbidity: 50% gait assistance

## Incidence

- 13-20 million women
- 5-10 million men

## Secondary Causes

- Endocrinopathies

## OP Risk Factors

- Early menarche, early menopause
- No exercise
- Smoking
- Lifelong low calcium or Vit D intake
- High protein intake
- High saturated fat intake
- High salt > 1/10th oz./week
- Caffeine > 5c/day
- Weight
- Family history
- Caucasian ethnicity
- Steroid prescriptions, other meds

## Osteoporosis – A Nutritional Approach with Herbs

- Collagen health - (*Crataegus spp.* - Hawthorn)
- C & bioflavonoids – high dose
- Silicon, zinc
- Minerals plus:

<i>Equisetum</i>	<i>Urtica</i>	<i>Medicago</i>
<i>Bambusa</i>	<i>Trifolium</i>	<i>Avena</i>
- B6 & B12
- A & K
- Folic acid
- Flax - 1 Tbl ground seed

## Phytoestrogens

- Plant substances w/ weak estrogenic receptor activity found in: legumes, soy, apples, carrots, garbanzo beans, garlic, green beans, peas, red clover, barley, oats and rye, citrus fruits, cherries, cranberries, blueberries, bilberries, and grape skins.
- Diets rich in phytoestrogens reduce the risk of breast cancer, rectal cancer, colon cancer, and prostate cancer.



- Examples:
  - Isoflavones
    - Genistein, Daidzein metabolites
    - Soy - 60-150 grams 3/7 days
  - Formononetin
  - Biochanin A
  - Synthetic ipriflavone

### Example Osteoporosis Herb Formula

1:2 Tincture Rx

*Coleus* 2 oz

*Crataegus* 1

*Actaea* 3

*Hypericum* 2

*Urtica* 1

*Medicago* 1

Dose: 1 tsp. bid X 6 mo's

Watch for s/e, alter Rx as needed

## Sex

### Vaginal Thinning and Dryness

There are physical changes as estrogen levels decline during perimenopause. The fat cushion in the labia is reabsorbed, the smaller lips (labia minora) may eventually disappear, the vaginal canal gets a little smaller, the vaginal wall becomes thinner. The cells of the vaginal walls are also less cornified (less tough, which means more sensitive to both pleasant pressure and potential irritation). The place where the top of the vagina folds in on itself to become the cervix gets a little shallower. The size of the cervix also decreases, and the glands in the mucous membrane surfaces throughout the vaginal canal secrete lubricants less actively. These effects of decreasing estrogen happen over time and vary in degree from woman to woman.

During perimenopause and menopause, hormonal imbalance may thin or dry the lining of the vagina, causing it to become inflamed or sensitive. If women experience discomfort during intercourse or if vaginal dryness persists despite sexual desire, it may indicate atrophic vaginitis. Herbs have been used to maximize the body's existing estrogen levels from the metabolism of androstenedione produced by the adrenal glands and stored in fat under the skin. Herbal remedies can also optimize progesterone, which helps maintain the necessary balance of sex hormones to keep vaginal tissue healthy. At the same time, herbal remedies can restore the normal, helpful bacterial flora to the mucous membranes lining the vagina. Many of the plants that have this effect contain

protective essential oils or other biochemicals that reduce inappropriate microbes.

Painful intercourse caused by infections, fibroids, or loss of lubrication in the vaginal canal is also associated with menopause. Though sex helps all these conditions, it is hard to have good sex when it doesn't feel good. Many herbs are known to help women's enjoyment of sexuality by healing, toning, and calming inflamed vaginal tissue, lubricating thin walls, or relaxing taut muscles. For example, wound-healing herbs such as yarrow (*Achillea millefolium*) and calendula (*Calendula officinalis*) are toning and anti-inflammatory when used directly on vaginal tissues. They are particularly beneficial if pain is caused by dryness, infection, or irritation.

Taken internally in tea form or as extracts, many of these same herbs are also digestive bitters. This is nature's way of feeding two birds with one morsel: hormonal and digestive changes are treated together. From the inside of the body, herbs can help relieve pelvic congestion, sluggish bowels, bloating, intestinal gas, and even heavy menstrual flow. Other digestive herbs with helpful properties for improving the integrity of the vaginal walls and uterine muscle during menopause are sage (*Salvia officinalis*), licorice (*Glycyrrhiza glabra*), and chamomile (*Matricaria recutita*).

Last, but certainly not least, women can work to nourish a sense of emotional well being within themselves. Vaginal dryness interferes with sex at a time when we may especially need the intimacy of sexual contact to weather challenges to our self-image and identity. But this condition does not mean women's sex lives are over. Our hopes do not hang on estrogen alone. If you want to have sex, but you're already feeling friction or irritation, you can have a moist vagina and pleasurable intercourse long after the drop in estrogen that happens with menopause. We can protect the hormones our bodies still make, especially by stress management. Yet another stereotype to be challenged is that libido (sex drive) goes down at menopause. For many, sex becomes a new adventure of body and soul. Women may in fact find new appetites or paths to pleasure. But for many it drops before it changes and that's why a natural solution is included here.

Women find that symptoms associated with hot flashes and vaginal dryness decrease with regular sex. Using sexual energy and releasing it through orgasm, as well as having a healthy attitude toward your changing body, are your best means of controlling the physical discomforts of menopause. Both sex shared with a part-

ner and masturbation stimulate vaginal moisture and bring germ-fighting enzymes into the mucus produced by the glands in the vaginal wall. The blood flow from the head and heart all the way down to the pelvis from these movements will help restore moisture and dynamic balance in the tissues.

### Herb Tea for Libido

- 3 1/2 oz. shatavari *Asparagus racemosa*  
East Indian herb increases lubrication
- 2 oz. tribulus *Tribulus terrestris*  
Hormonal amphoteric
- 1 1/2 oz. maca root *Lepidium meyenii*  
South American food and tonic for sex drive
- 1/2 oz. licorice root *Glycyrrhiza glabra*  
Moistening; lessens inflammation, helps immunity
- 1/2 oz. organically grown rose petals  
Astringent tonic *Rosa species*

Add 1/2 ounce of the mixture to 3 1/2 cups of boiling water in a teapot or container with a well-fitting lid. Let the herb blend steep in the water, covered, for fifteen minutes before straining. Drink one cup, hot or cold, up to three times a day.

Note: The rose petals must be organic; leave them out if you do not have a reliable source. If you are sensitive to licorice or hate the flavor, leave that out.

Eight ounces will last about three weeks.

### Nutrition

There are so many books on nutrition for sex. Three main points only here:

1. Essential fatty acids, if women are not already on O-3's or fish oil for other reasons.
2. Soy foods, sprouted lentils, raw snow peas, and cooked green peas naturally increase your level of estrogen; use these according to your personal taste.
3. Add borage flowers, violet flowers, cucumber slices, and basil leaves in season to salads and sandwiches.

### Supplements

- Vitamin E, 200 to 300 I.U. (international units) three times a day. After a week, reduce the amount to 400 I.U. daily. More is not always better—do not recommend more than 1,200 I.U. daily. For women who have diabetes,

hypertension, or a rheumatic heart condition, don't use more than 100 I.U. daily. In a study of forty-seven women who were taking 500 I.U. of vitamin E per day, two-thirds were helped; half of this group who had vaginal lesions due to thinning or drying were healed. Studies show all types of E may provide benefit, but if possible, choose mixed natural tocopherols.

- Vitamin C, 1 gram three times a day, preferably with meals and your vitamin E doses.
- Zinc helps heal inflammation and tears in the vaginal wall, and it's useful for other wounds, too. Zinc is naturally high in seeds, oysters, and semen.

### Essential Oils

The use of lubricating aromatherapy as bath or massage oils for the vagina can help women get in touch with their bodies. A favorite combination is vitamin E combined with essential (volatile) oil of sandalwood, ylang ylang, fennel, or clary sage.

To allow a woman's sense of aroma to determine her massage blend, encourage her to make her own by placing a total of nine drops of one or all of the above essential oils in 1/2 ounce of vitamin E and 1/2 ounce of sesame, almond, or any other unheated vegetable oil. Fennel is best used in smaller doses; no more than 4 drops to a blend. Stir 1/4 teaspoon into a bath or apply a few drops of the blend to fingertips; massage into abdominal skin. If comfortable, try a small amount on inner thighs and genitalia. Lubricating herb mixtures shouldn't sting or irritate; don't use when skin is broken. If the oil does cause redness, it may be too strong a blend; try adding more vitamin E or vegetable oil. Also, rinse with plain cold water and wait a few days before trying again.

### Other Tips

Practice pelvic floor exercises five minutes a day to strengthen the muscles of the pelvic floor.

Sex stimulates secretion of moisture and germ-fighting enzymes in the mucous membranes of vaginal walls. If you experience discomfort in intercourse, or if vaginal dryness persists despite desire, your vagina may have an infection or the membranes may be thinning.

### Depression

Entering a new stage of life as well as coping with changing hormonal levels naturally make this a time for

reevaluating life goals—assessing past accomplishments and defining or redefining the future. You may wonder why, when you have been perfectly content with your beliefs up until now, you are suddenly questioning everything about your purpose in life and the way you have chosen to conduct it. And you feel quite alone in your observation. A study in China of over 800 women found level of education was strongly correlated to psychosocial and physical complaints of menopause, with farm workers having the least trouble. Professional women in this study described themselves as older, sadder, and lost.

Menopause does not make women “crazy,” it makes us look inside. If we don’t look inside, we will soon feel crazy. Most women experience mood swings during and after menopause, and these are usually not a major health risk. Still, women are four times more likely to have symptoms, even with no previous history of depression. (Harvard study of Moods and Cycles, 2006). It never rains but it pours: women with hot flashes are twice as likely to develop depression. Though hormones reduced this risk, it is certain now that using hormones at all increases risk of breast cancer.

### Depression – Symptoms

- Helplessness
- Anger
- Low self-esteem
- Pessimism

### Primary Factor in Diagnosis

Prominent mood of sadness uninterested in usual activities

Look for >4 of following for >2 weeks:

- Weight gain or loss of >1 lb. week
- Insomnia or oversleeping
- Energy loss
- Slowed or hyperactive behavior
- Self-reproach, worthlessness
- Indecision, lack of concentration
- Suicidal statements

### Herbal Approach to Depression

Treatment is greater than herbal antidepressants

- Exercise
- Consider hypoglycemia
- Assess nutrition
- Listen (“relationships”)
- *Eleutherococcus* - 500mg bid

- With B complex
- EPO - 1-2 grams
- *Hypericum* - 600-1200mg daily
- *Turnera* – dose ? - until you laugh
- *Melissa*

### St. John’s Wort (SJW)

- Superior to placebo in major depression
- RDBPC: N=332 X 6 wks
- Dose: 600-1200mg/day
- One of the negative clinical trials used double the therapeutic dose which may have led to increased photosensitivity in fair people to UVA/B irradiation (Kaspar et al 2006).

#### SJW Safety

- AHPA 2d
- No serious ADE at rec. doses
- Photosensitivity publicized, rare
- HDI cyclosporin, protease inhibitors

#### SJW Dosage

- 600 mg-1200mg/ day
- May be 300mg tid

### Memory

#### Herb Tea for Cerebral Circulation

- 3 oz. gotu kola leaf, herb *Centella asiatica*  
Specific tea to nourish nerves; antioxidant, anti-inflammatory
- 2 oz. skullcap herb *Scutellaria laterifolia*  
Reduces pressure, tension
- 2 oz. linden flower *Tilia species*  
Reduces high blood pressure; calms; moistens
- 1/2 oz. rosemary flower, leaf *Rosmarinus officinalis*  
Relaxes blood vessels
- 1/2 oz. sage leaf *Salvia officinalis*  
Supports hormonal balance; tonic, astringent

Combine 1/2 ounce of the mixture with 3 cups of boiling water in a teapot or container with a well-fitting lid. Let stand for five to fifteen minutes before straining. Drink 2 cups hot or cold, as needed. To improve flavor, I often add plain water or rooibos (*Aspalanthus*) herb tea to taste.

# Obesity: Beyond the Conventional Approach

Amanda McQuade Crawford

## Introduction

A current advertising campaign has a pretty, slender, blonde woman with blow-dried perfect hair standing on a huge scale with a dazzling smile of triumph, having gotten that way with the Lap-Band. The announcer intones, “Have you tried everything to lose weight and only lost hope?” In an instant all hope is transferred to a surgical technique that supposedly replaces a change of lifestyle and patterns of eating. Obesity is Big Business. But in fact, permanent weight loss begins with small changes using low-tech tools freely available, such as exercise, that can be sustained over time.

How many times have you heard, “I know I need to lose weight but something always gets in the way of my plan?” 2000 steps is a mile or 100 calories burned—about two chocolate chip cookies. Each day eating 500 calories more than you burn turns into a pound and a half of extra fat. Many people with whom we will explore health want to drop some pounds but are afraid nothing will work. Or they may feel overwhelmed by all the ads hyping the latest miracle for easy weight loss.

Travel anywhere in the U.S. and you will see not one or two large people in a crowd, but over half the crowd wearing XXXL clothes. And one of every five children today is overweight—a growing trend.

Fad diets, reasonable diets, medically supervised diets—as a cultural group we exhibit stress at two ends of the spectrum: media adoration and reviling of itty bitty girls with eating disorders carting around itty bitty dogs, or empty people filling up on sugars, salts, fats, and chemically laced foods until they cannot fit in regular chairs. If I could outlaw harmful foods that heartless corporations get rich on, I would. But it would not stop obesity anymore than outlawing drugs has stopped

people’s urge to get high. Obesity is not the fault of the dreadful food that exists in mainstream culture; it’s the attitude that allows us to think that processed garbage is food. Our job is to educate about real foods that help our clients meet their weight goals safely. Of course, every health expert recommends cutting down on food, exercising more, and drinking more water. Yet new concepts and support from the natural world can help change self-image, appetite, and metabolism safely.

## Conventional Approaches

“If you take in more calories than you burn you gain weight.” The conventional view is that biology works on a simple basis—what goes in and doesn’t get used turns to fat. But this doesn’t take into account all the factors, including the role of marketing for harmful non-foods and then the marketing for pills to take off weight.

Drugs intended for short-term use (under 3 months) are supposed to be available only from doctors but are cheap online. These are phentermine (side effect in one in ten is insomnia) and similar drugs that increase serotonin.

Increased serotonin may decrease cravings for fat or carbohydrates but studies show we cannot bank on this. Also, these drugs may not increase BMR, but may help food to be metabolized better. Antidepressant drugs that work this way (SSRIs) are also used but studies show they help weight loss at 6 months yet cannot guarantee lasting change at 1 year, and may even cause weight gain. Cholesterol lowering drugs are sometimes prescribed to decrease fat absorption, but these may interfere with nutrient absorption.

## Overweight—What is it?

Overweight is defined as a BMI of 25 kg/m<sup>2</sup>. The treatment is a VLCD (very low calorie diet) under supervision. But that doesn't happen because of the state health care and insurance is in. Obesity is 30kg/m<sup>2</sup> and gastric bypass, better than banding or other surgery, is reserved for people measuring >35-40kg/ m<sup>2</sup>.

$$\text{BMI} = \frac{\text{weight in kilograms}}{\text{height in meters, squared}}$$

## Can You Tell Without Measuring?

People routinely underestimate how much fat they carry and whether or not they have a handle on portion sizes of food. Obesity is a disease of excess storage, but it's a myth that exercise alone will cure the disease. There are genetic differences that medical science doesn't fully understand yet. It is dangerous to starve. Yo-yo diets hurt one's chances for enjoying any weight loss achieved. I encourage people to save their money instead of investing in frozen dinners, shakes, and energy bars. Living with excess weight increases risks for disease in every body system, cancer, damaged joints, and complications: medical, economic, social, and psychological.

## Caffeine is a Possible Adjuvant

One possible approach utilizes natural plant sources of caffeine. Other herbal remedies covered later are caffeine-free. In a study of overweight people, a proprietary combination like the following, taken over 45 days, led to an average weight loss of 5.1kg vs. 0.3kg in the placebo group.

Rx:

4 yerba mate (*Ilex paraguariensis*)

½ guarana (*Paullinia cupana*)

4 damiana (*Turnera diffusa*)

1 ½ green tea (*Thea sinensis*)

Increases BMR, antioxidant, anticancer; traditional use about 5 cups/day (10 oz.).

Dose: 1 Tbsp/12 oz H<sub>2</sub>O. Steep, sip up to 32 oz/day for three weeks.

Use less or none if a client is sensitive to caffeine, develops headaches, racing heart, or poor sleep. Reassure those with whom you consult that there are always other options. Though it has caffeine, yerba mate prevents stress on the heart. Preliminary suggestions report that it may repair damaged DNA, and the herb contains vitamins A, E, B complex, and C. In addition, it contains 15 different amino acids and significant amounts of mag-

nesium, calcium, iron, sodium, potassium, manganese, phosphates, zinc, niacin, sulfur, chlorophyll, choline, and inositol. Tiny amounts of some constituents are in the herb; some of those same minerals and plant chemicals are used as supplements for weight loss.

## Common OTC Products

- Chromium-based pills help with craving carbohydrates but weight loss is not huge; it's relatively safe.
- Hydroxycitric acid (HCA) interferes with carbohydrates turning into fat. Found in the herb *Garcinia*, trials on HCA have not shown great success on sustained weight loss. *Garcinia* shows promise and has a reasonable safety profile but claims for the most effective preparation and dose are mixed.
- Fiber supplements taken before meals with abundant water swell up and decrease overeating and absorption of calories, and slow down nutrient absorption. An excess can cause constipation or other symptoms of IBS. Fiber from greens, grains, fruit, seeds, and nuts have multiple benefits of lowering blood fats, balancing sex hormones in men and women, increasing the sense of fullness with relatively few calories, and have been studied as effective components of sustained weight loss programs.
- CLA got a lot of media attention when animal studies showed weight loss but that was often in growing animals when weight loss is expected anyway. Human results have been modest.
- Fat burners, lipotropics, are made in the body and can be taken as OTC drugs to increase the use of fats. Side effects of excess can be disruption of healthy metabolic pathways (ketosis, pH).

## What's Wrong with Taking a Pill?

Medical attention on losing weight focuses on the shocking failure rate of eating less, moving more, and changing behaviors. You may have no idea how many researchers care about how fat we are. Did you know it is proven scientifically that the bigger the meal the more likely we are to underestimate how big the meal is? Studies show that big servings make us less able to

judge them accurately as big servings. No pill unties that self-deception.

New pills will keep coming off the assembly line. Failing with a new product and dropping out of programs is so common, for a better path we might look to people who have succeeded in keeping fit, no matter which nutritional track they found that suited them.

## What the Scale Says

Lost body weight doesn't always mean lost fat versus lost lean muscle mass, or water, as with high protein diets. Losing weight is dull. On the other hand, gaining fitness feels like something I can enjoy for the rest of my life. The best measure of clearing obesity is loss of total body fat. Instead, we may set the stage for a client to drop out of the race to lose weight: "Start living like a healthy, thinner version of you, even if it is one gram thinner by passing up the fried food today. What else are you doing with the rest of your life? Take a chance!" Present not just the opportunity, but the support to make a permanent life change that is viable, inviting, and has some joy in it every day.

Looking at the science of weight loss we can see that natural appetite suppressants that do not kill us target the hypothalamus, encourage healthy communication between various organs, systems, and neurotransmitters such as serotonin.

## A Caffeine-Free Approach

A formula without caffeine that may serve well works on re-setting the self-governance of metabolism while initiating a gentle cleanse.

Rx:

Dandelion leaf and root  
Nettle leaf  
Banaba (*Lagerstroemia*)  
¼ cardamom  
½ cinnamon  
1 ginger root

## Ginger

Ginger may help with weight loss. Long used to improve digestion and circulation, regular use of ginger stimulates the pancreas and other digestive structures to make more enzymes. Ginger tea reduces blood fats even after eating a meal rich in fats. When a water-based extract made up 3% of the diet of rats on a high-fat diet, weight was significantly lower after two months. Long

term use of ginger in food and tea has been shown to be safe; just look at India, China, and Southeast Asia's human use for centuries.

Besides its well-known effect on reducing nausea, ginger slows gastric emptying, so the same meal makes you feel full longer and your gut has more time to extract the nutrients without spiking blood sugar.

## Hoodia

*Hoodia* is a fat-fighting herb of celebrity status. Physically lean bushmen of Africa where the succulent plant grows use it when food is scarce, but it is endangered, on the CITES list. Namibian growers have joined together to protect quality of exports and growers. Independent herbal researchers have found it is so limited as a raw supply that substitutions in the market are common. As many as 75% of the *Hoodia* products sold may have little to no *Hoodia* in them. Unscrupulous companies will sell us anything.

## Inspiration

We might look for the right way to communicate with compassion to our clients, "Don't let desperation make you gullible. Before you change the contents of your grocery cart, ask yourself if you are capable of loving yourself. If you are, baby steps count in your favor. This is not a competition, it is the time on the planet that you were given to live. Whether it's 5 lbs or 300, your past is not your potential."

## Foods to Fight Fat

- Apples: Overweight women lost more snacking on unlimited apples a day than on "weight loss" foods or oatmeal cookies. Organic apples are worth the extra pennies per apple for three big reasons: commercial apples hold on to more pesticide residue; the peel has the magnesium, Vitamin C, trace iron, and 1/2 the apple's fiber; and third, they explode with flavor instead of disappointing you with that mushy texture and boring blandness. Do you ruin exercise by overeating afterward? Carbo-loading before exercise with apples (instead of prepared products for athletes in training) keeps people from eating 75% of the calories burned up (1/2-1 cup unsprayed grapes or favorite fruit in season works, too).

- Oatmeal has some protein and plenty of the right kind of fiber to help people feel fuller longer. Advise a client to add a tablespoon of dried cherries, berries, or raisins to hot cooked cereal, let dried fruit plump up before eating, plus a drizzle of fruit juice if needed. Skip the added milk and brown sugar. Eating any cooked cereal for breakfast over time results in a lower BMI, i.e., bulgur or quinoa with almonds.
- For some mornings, recommend an egg or two instead. Studies suggest we eat up to 400 fewer calories on those days than if we started with a bagel. That adds up to about 15 pounds a year. Don't let clients pay extra for egg-whites only unless there is a genuine and compelling reason. Good quality whole eggs have vitamin E, which benefits every low-fat weight loss plan, plus omega-3 essential fatty acids. Whole eggs also contain appreciable amounts of choline, which helps one use the cholesterol in whole eggs for increased energy, which means better fat metabolism. The quality issue is not only of importance to the individual's health. There is a greater community that benefits from purchasing organic, hormone-free, cage-free eggs. The sooner we put an end to factory farming, the healthier we'll all be.
- In cooler weather clients may choose to start the day with a cup of soup or broth. Stock up for snacks and main meals, too, avoiding the cans loaded with salt and fat (to hide the lack of real flavor). Two 10-oz. servings of broth or soup a day almost double the amount of weight lost in 6 months. Clients may add brown seaweed called wakame and their own vegetables, so plain broth fills them longer, burns fat, and feeds energy reserves.
- Yogurt: The irritating ads about fitting in the bikini do not also inform us that commercial brands are loaded with corn syrup sweeteners. And that sludge of fruit at the bottom is not going to rescue anyone from a size-18 swimsuit. But calcium in plain low-fat yogurt three times a day for three months increases fat burning, especially from the middle. Add fresh berries in season for immunity and clear skin. Turn a serving of plain yogurt into salad dressing or a dip for cut vegetables like jicama, with a dash of sea salt, oregano, parsley, turmeric, ginger, cayenne, and coarse black pepper. Warming spices also turn on better fat metabolism.
- Cauliflower: Eat this non-starchy, cancer-fighting vegetable as much as you like. The folate and vitamin C may help. Steam it and mash with a clove of garlic, add a drizzle of olive oil and a sprinkle of parmesan. Broccoli and bok choy work, too. Rediscover raw radishes, sliced and soaked in ice water for five minutes to cut their sometimes harsher bite. This is more addictive than potato chips.
- Salad: Iceberg is water disguised as a vegetable. Why bother? Eating a big plate or bowl of mixed greens, vegetables, and protein is a great way to eat real food until you are full, and keep us from digging in to the basket of white flour rolls or filling up on the pasta dish.
- Vegetarian protein: Beans, lentils in soups, stews, cooked and added to salads. I add a pinch of cinnamon, epazote (from the Mexican spice aisle in your grocery store) and red pepper to reduce the gassy effects of eating beans. It may sound silly but a tablespoon of organic peanut butter with fresh alfalfa sprouts on whole grain bread is a great quick meal on the run (enzymes for protein digestion galore).
- Steamed white cod or halibut with lime or lemon is the #1 most filling food. Of course the Swedes studied this. Fish for lunch means eating 11% less at dinner. That's enough for some people to drop 15 lbs. in 8 months. Oily fish from the coldest water also satisfies us with intense flavor. If you can't eat fish or are worried about mercury pollution in our oceans, buy hormone-free chicken or turkey. You can have the occasional grass-fed organic beef dinner if you like that sort of thing. But eating much red meat hurts your plan to gain fitness as well as the remaining wild places on the planet. Give cows a break—don't eat them. We are what we eat.
- Nuts: Ten to twenty almonds, roasted unsalted peanuts, or raw cashews with a 10 oz glass



of water fills people up while providing protein, carbs and fat, with fewer calories than one might guess. Grind a tablespoon of flax seeds into protein smoothies, salad dressings, or breakfast cereal. Seeds and nuts provide the most concentrated array of health-boosting nutrients while preventing blood sugar dips that roll hungry dieters into the nearest donut shop.

### **Seeds of Transformation: Potentially Helpful Ideas for You and for Your Clients**

We have the opportunity to safeguard our clients' new way of living happily while they gain fitness. Metabolism runs according to what our bodies are used to eating recently. If you pig out and then starve, your body holds on to every speck of fat, fearing you don't have any more food coming in. Help your metabolism by eating 4 times a day; some of those meals will be just a light snack, apple, or raw vegetables for satiation from fiber, and pro-metabolism nutrients.

To rev up the engine, don't eat too predictably. Every few days switch your mix of protein, carbs, and fats. Some days one may want leftover chicken for breakfast, an egg at 11, nuts at 3, and at night several helpings of zucchini and string beans with a drizzle of balsamic vinegar, Bragg's Aminos, and olive oil. Other days that person may want to start the day with oatmeal and raisins, have a lunch of yogurt dip with carrots, and for dinner a bed of brown rice cooked in vegetable broth, covered by a cup of yellow squash, red peppers and garlic with a side dish of avocado and hummus.

If we share specific and palatable ways for our clients to eat a wide variety of real food instead of packaged convenience items they don't have to be forever calculating "glycemic index," mistakenly avoiding peas and carrots because they are starchy. Sweet potatoes, rich

in vitamins A & E, can lower blood sugar (but no little marshmallows, please). Complex carbohydrates release starch into our bloodstreams slowly, so it is the rate at which plant starches raise blood sugar that matters, not just eating lettuce and then wondering why one cannot stay on a diet. No one should stay on a diet. Everyone deserves to eat well and live happily so that their attention is free for whatever else they are motivated to pursue in life.

Give permission to your clients to get heavy with their friends and family if they sabotage a new way of getting more fit. Help them be specific: "Mom, don't bake the Splenda and cool whip pineapple upside down cake as a reward for my eating apples yesterday."

Diet soda can make you crave food afterward, and protein smoothies can be great or a trap if you drink your meal and eat one, too. Water is your best friend. If yours doesn't taste delicious to you, see to changing that.

Chemicals build up in the body fat we still have, and filters aren't expensive anymore. Start where you can. Retail diet teas may still use diuretics, laxatives, and stimulants other than ephedra (a medicinal plant herbalists never used for weight loss and a sad phenomenon of small-minded marketing).

Go out to eat with people and relax. Have a big salad and one slice of pizza loaded with every vegetable you like but do avoid the high-salt, high-fat, highly chemical-laden pepperoni, sausage or beef. If you want a glass of wine or beer, have it instead of a slice of bread, a serving of pasta or rice, or the garlic mashed potatoes.

Help your patients to avoid grasping at straws. Literally, that is all that is in some natural weight loss products. Start with walking or stretching plus satisfying amounts of even one new healthy food.

If we are willing to face ourselves as we are with love instead of shame, our innermost desire to self-heal will meet us more than halfway.

# A Poetic Tribute to Some Beloved Aromatic Plants

David Crow, LAc

## Lavender

Like serpentine waves of color undulating across the continents, the lilac hues of lavender farms weave together all that is good about us humans. For the love of beauty people flock to the cascading purple terraces of Provence, New Zealand, Himachal Pradesh, and California, drawn like the bees climbing through their miniature labyrinthine worlds of ultraviolet scent. Because somewhere in our heart and soul where the artificialities of modernity are not allowed, there still lives an innate indescribable love for nature's tender expressions, where the soft voice of lavender's gentle spirit is universally understood. Because there still abides beneath our hardened, agitated, aggressive, restless madness an inescapable vulnerability to the feminine power of the earth's compassion, lavender's soothing touch transcends our painful imagined differences, bonding us together again in the simple childlike truth that we all suffer and need comfort.

Open a bottle of fine lavender oil as if you were one of those who feel reverence because it has cured them of sorrows in ways that science could not do. Bring it slowly to your nostrils, for inside lies more than you ever realized. Can you perceive the fresh notes of rain, dewy transparent pearls rolling off silken petal and leathery leaf? Draw your attention further inward. There awaits rich earthen notes of loamy fertile soil or mineral notes of harsh wild landscapes. It is easy to get lost in the smell of purples, the sweet aquamarine notes of fruit and flower so distinct yet so indescribable, but anyone can do that. Do you sense the pungency, the soft sharpness of sunrays, the fiery acrid heat of Mediterranean summer days? How can you not notice the cool air of evening that settles on the flowing contours of color at dusk, changing the

heliotrope undertones to fuchsia, then magenta, then indigo as the plants exhale their purifying breath into the night sky?

But wait, there's more...that was only the terrain the oil came from. What has created this wonder, this sublime artistic expression like a fragrant Impressionist painting from a palette of wind, water, earth, and fire? What intelligence, what evolutionary force, what biological necessity, what inborn instinct, what genetic genius, what devil magic has mixed and melded and separated and compounded and purified and refined this alchemical gem, this elixir of healing, this infinitely valuable aromatic talisman of protection? Can we name it, or should its name not be spoken, so profound a mystery it represents? More importantly, can we smell it? We must, for its presence now permeates the cavities of the sinuses, aromatic molecules now vie for receptor sites, receptor sites now fire in unison, enzymes cascade in torrents of information converting the sheer pranic power of this supreme presence into holographic neural networks. In an instant, something that did not exist a moment ago is now manifested by the fragrance of lavender within our own unique private universe of perception.

Rest a moment and breathe. New revelations will appear. Notice how this apparently simple essential oil has, in its profound botanical wisdom and primal spirituality, covertly carried the nutrient life force of the earth, the soothing cooling touch of water, the energizing rays of sun, and the uplifting breath of air directly into the deepest recesses of our brains, our hearts, our minds.

Notice its effects.

Are the sinews not softer, the nerves somehow more translucent, the joints younger? Are the pains of

unconscious habitual contractions and chronic irritation of smoldering inflammation not receding? Is the chest not more open, the breath smoother, and the heartbeat steadier?

Notice also the effect on the intangible parts of our being. Is the mind not more clear, the mood more elevated? Can you not feel the somber cloud of collective despair and frustration, so closely entwined with the empathic fibers of our being that we can no longer perceive its weight, lifting, and in its place a simple joy that needs no cause to arise?

Give thanks. Thanks to the compassionate plant that heals a multitude of ailments without causing harm, to the ancient intelligence that enlivens it, to the soil that nourished it, to the water that moistened it, to the air it breathed, the sun that awoke it from slumber. Give thanks to the men and women who labor with love, tending their precious children until mature, and then tending them more. Give thanks to the sacred alchemical arts and sciences of distilling the essence of these beneficent beings, and the lineages of teaching and knowledge that have brought us this precious blessing in humanity's hour of need.

## Jasmine

Weathered hands gently pluck millions of tiny white stars in Madurai's sultry morning light. Smoky diesel trucks on decrepit Indian highways haul the bags of fragrant treasure to waiting bazaars. Luscious garlands of the "night queen" woven by nimble fingers lie piled among the shouting and haggling of flower markets: garlands of joy worn at weddings and festivities; garlands of thanksgiving offered to deities in their temples; garlands of desire hung over lovers' beds; garlands of beauty worn in the hair of women; garlands inflaming erotic passions in the intoxicating night air, smiles and laughter and euphoric pleasures without reason. Such are the simple things that make a culture civilized.

"No jasmine, no perfume," say the masters of the art, as they sample the finest nectars of midnight and dawn. Amorous women carry ornamented bottles of carved crystal in silk, casting spells with potent ethereal vapors. Their amorous men, willingly seduced by the mysterious chemical messengers of floral sensuality and erotic hormonal enticement, easily fall prey to the aphrodisiacal impulses befuddling their minds.

## Frankincense

Aged sentinels watching over a vast arid silence, gnarled paper-barked trees grasp bare rock with twisted roots. Sharp knives draw the milky sap. Shimmering resins fit for offering to the divine dry slowly in Bedouin caves. Merchants in bustling casbahs proclaim the virtues of their finest, largest, sweetest, rarest, most translucent drops of sunlight, the names of al luban's subtle grades roll off tongues in desert-perfumed Arabic.

Camel caravans plod across the landscape of ages and epochs, laden with wealth of spirit and healing. Greek, Persian, Chinese, Indian, and European doctors examine the latest arrivals from afar, their mortars filled with white-gold powder ready for mixing into salves and unguents and ointments and plasters. Rows of apothecary jars hold pills made with recipes passed down from grandfather to father to son, family reputations upheld by the medicaments' reliability, efficacy, and blamelessness.

Pharaohs and queens anoint themselves with regal perfumes brought from the sandy wilderness; in silent waiting tombs, sealed clay amphoras hold an eternity's worth of aromatic necessities to be enjoyed in the afterlife. The dead are transformed into crystalline relics.

Priests, monks, nuns, and yogis sprinkle the sacrament on glowing coals, fuming bowls and wafting censers of ceramic, copper, bronze, brass, and iron are presented to the local guardians, the four directions, the deities of enlightenment, the holy ones, the great mystery, the Absolute. Cathedrals, mosques, temples, and pagodas are infused with the scent of prayers echoing with supplications, devotion, and gratitude.

White-coated researchers rediscover the wisdom of old, the microscopic realms of therapeutic powers carried by the desert sentinels revealed in the light of technology. The language of molecules flows off charts and graphs, music to the minds of those seeking new drugs: *a-pinene*, *a-thuyene*, *3-carene*, *limonene*, *p-cymene*, *trans-beta-ocimene*, *octyl acetate*. From the trees' scented life blood come pharmacopeias more valuable than gold, just as the gifts once carried by the Magi: antibacterial, antiviral, antifungal, anti-inflammatory, antidepressant, antianxiety, a fountain of healing, solace, and comfort for suffering humanity. The Bedouin puts away his scarring knife, rubs the powdered resins from his seasoned hands, and knows the same.

## Rose

There was once a time when people loved cultivating roses so much that the Emperor was obliged to issue edicts limiting the use of land so the population did not go hungry. A great Mesopotamian city was once renowned far and wide for its magnificent rose gardens. Such were the challenges of life in China's Han Dynasty, and the glory of Baghdad now dwells only in the memories of those long departed.

What was it that enchanted the original horticulturists in the day of Lao Tzu? Was it a scent that no longer exists, a crimson color never seen before, as the wild flower that had lived since time immemorial in the misty mountains grew in domestic gardens for the first time?

In the beginning there were only a handful of species, but their destiny would be to spread across the earth, evolving and hybridizing into tens of thousands of new forms, colors, smells, growing habits.

More profoundly, roses would gradually become entwined with the roots of the human psyche, adorning and symbolizing the unique paradoxes our soulful species has forever struggled to reconcile, for we are indeed spiritually erotic and erotically spiritual, embodiments of love divine yet fated to endure the ordeals of passion. What could represent the human condition better than a flower of fleeting beauty, a scent enthralling yet ephemeral, and a plant both fragile and prone to sickness, yet armored with thorns and capable of thriving from the coldest forests of Siberia to the hottest deserts of India?

In cities large and towns small, Persian nobility and Arab sheiks patronized flourishing rose gardens, wonders of the world easily confused with celestial visions. Ragged Crusaders weary of battle carried home the vibrant red symbol of Christ, leaving the Muslims to cultivate their symbol of Allah. Soon Bulgarian valleys would lie awash with pink-red springtime, sunrise awakening the flowers' metabolic exuberance.

Victorian horticulturalists would propagate a rainbow palette of new varieties and cultivars, their shades and colors conveying the heart's sentimental hues: passionate romantic red, love at first sight purple, desirous coral and orange, grateful pink, chaste white, friendly and joyful yellow, mysterious blue.

Wild roses, old garden roses, China and tea roses, *alba*, *gallica*, damask, and *centifolia*, the flowers multiplied in a profusion of classes, species, varieties, and cultivars, rejoicing, apparently, at the creative touch of humans

igniting their latent artistic impulses. Ovoid, pointed, cupped and globular, they bloom in an endless variety of shapes, colors, and fragrances, unfolding, tantalizing, then evaporating. Wine-scented crimson, apricot clove, geranium scarlet, fruity lavender, phlox-pink with damask notes, creamy yellow fragrance of violet and clover. They present themselves proudly, as if knowing the names bestowed on them by their co-creators: Madam Hardy, Crimson Glory, Cardinal de Richelieu, Fragrant Cloud, Lady Hillingdon, Deep Secret, Zéphirine Drouhin, Pearl Essence.

From terraced heights of cascades and glacial vistas, Himalayan villagers carry perfumed baskets down winding trails tread for generations; toothless grinning elders pour huge bags of freshly plucked blooms into piles for cleaning. In the blazing desert where Rajas once ruled, the queen now blossoms under trees laden with mango and amla, her translucent petals moistened by sweet snowmelt flowing beneath the treasure-laden sands.

Indian, Iranian, Turkish, Moroccan: young and old, men and women labor to harvest uncountable quantities of blossoms as the seasons change to years, years fade to centuries, centuries turn to millennia, and time becomes the well-worn path from fields to carts to villages to stills. Stills of silica glass in sanitized modern labs, immense sacrilegious stills of industry, government-regulated copper stills seasoned by the decades, tiny stills in alchemist's shrines, all transforming a mountain of roses into a drop of oil.

Regal without being presumptuous, sophisticated without arrogance, sublime yet accessible, rose oil imparts its elegant graciousness upon those who bear oppressive injuries of the heart. The beauty of nature is an indispensable nutrient for the soul; could it be that simply by befriending the queen of flowers our birthright of spiritual nobility is restored?

Or do we become vicariously inebriated with euphoric freedom from care, imbibing the nectar secreted within the blossoms' conch-like folds as they swoon under the mysterious caress of the moon's rays?

Perhaps we are being blessed by the healing colors of arriving dawn, the favorite time of God and roses, as the current of solar music approaches imperceptibly from the silence of deep space, finally bursting upon the earth in a symphony of radiance. Shadows of sorrow and grief flee before such a majestic presence. In our daily battles to uphold dignity and truth, what greater protection could we ask for than an elixir of joy distilled from the sun and moon?

Like the roses' whirling galaxies of kaleidoscopic perfumed colors, so blossom the dreams and glory and folly of love, so passionately and innocently, so briefly. Here lies Cleopatra, languidly waiting on a bed of floral enticement. Here stands the Taj Mahal, monument to the moment of eternity glimpsed in the eyes of the beloved, its pools brimming with petals distilling in the midday sun. Here parade royal Persian wedding parties along paths of crimson and pink, and brides and grooms of old Rome adorned with floral crowns. Here wanders

Sappho, offering poems of intoxicated adoration, like roses strewn across altars and shrines of Aphrodite and Venus. Here, in an ecstatic vision, the Virgin Mary approaches, bestowing on St. Dominic the first "rosary" of rose-scented rosehips.

Where does the timeless Tao flow, carrying our days into memories, memories into myth, myth into mystery, like candlelit flower boats set adrift on holy rivers as spirits depart in search of love again?

# Taking Medicine to the People: *An Update on the Grassroots Healthcare Revolution*

David Crow, LAc

## Introduction

This article presents four dynamic, innovative, and revolutionary projects that are creating a new paradigm of healthcare in the U.S. and abroad. Taken together, these stories reveal a tapestry of related models that have the potential to establish a plant-based, locally available, cost-effective, nontoxic and sustainable healthcare system. In the absence of socialized medicine found in all other developed countries, this new multifaceted system offers an alternative to the ailing, toxic, inefficient, and for millions of people unaffordable insurance-based model that now dominates the U.S. system.

Two of these projects are directly related to medicinal plants, while the two others are focused on local organic food production, which is the basis of higher nutritional status and therefore improved health in communities; the reason these agricultural projects are included in this article is that they are also emerging as important venues for integrating medicinal plants into local food supplies. Inherently healing on all levels, any project involving medicinal plants also brings a multitude of other benefits to society, so we find that these stories are also about poverty alleviation, preservation of local biodiversity, protection of ethnobotanical wisdom, and many other benefits.

I have been personally involved with three of these projects: The Learning Garden, the Goldthread Farm to Pharmacy program, and the agricultural renaissance starting in Sedona, AZ. I have not been directly involved in Organic India, but have a specific interest in this company because of the indirect work with medicinal plants and Ayurvedic education that I have been involved with over the years in India.

## Restoring Agriculture and Herbal Traditions in Sedona and the Verde Valley

Sixty years ago the Verde Valley outside of Sedona, AZ, was a rich and productive agricultural region. Now, there are only a handful of growers in the area, and almost all food is brought in.

For several years a small number of individuals and organizations had pursued important goals in the area of food, plant medicine, and sustainable farming practices: some were trying to establish community and school gardens, others were interested in revitalizing Native American agricultural and local herbal traditions, others were working on eco-tourism and introducing consumers to the “green” movement, and some were addressing malnutrition by bringing locally grown vegetables to food banks.

With the political landscape dominated by corporate farming, pharmaceutical interests, community apathy about poverty and hunger and lack of financial support, what these individuals shared was a general sense of working in isolation. Loss of environmental and political battles had created skepticism within the community about the possibility of coming together to make positive and progressive change.

In November of 2008 I was invited by Ruth Hartung, founder of 7 Centers Yoga Arts in Sedona, to give a presentation on “The People’s Pharmacy.” The intention was to bring people together who had an interest in starting community gardens and a farmers market. My personal aspiration was to support the development of herbal medicine as part of this movement. What catalyzed the attention of the audience was pointing out that

any community that doesn't grow its own food and medicine is vulnerable to the fluctuations of a global economy linked to declining fossil fuels and the potentiality of food shortages in the future. This was not a theoretical or distant future to be considering: even though Sedona is a relatively affluent community, attendance at local food banks has tripled in the last year because of rising food costs and a failing economy.

The meeting was well attended, individuals and organizations started to form alliances and hold meetings, grants were written, and a spring planting festival was planned.

The Sedona / Verde Valley Spring Planting Festival took place in March of 2009. Lasting a week, it offered a diversity of events happening every day around the region, including groundbreaking for new gardens, work projects on school and community gardens, gardening education workshops, community forums, dance and music. Feather Jones, local herbalist and expert in medicinal plants of the southwest, led herb walks to introduce the community to their regional botanical pharmacy.

During the festival, members from all over the community volunteered to help with spring planting at existing school gardens. Crescent Moon Ranch community garden increased its members and expanded the number of garden plots being cultivated.

Several community meetings took place that were attended by large audiences, with panel discussions featuring politicians, local farmers, Native American Elders, water experts, business leaders, and representatives of the local Community Supported Agriculture group. The results were spectacular and long lasting, and a revival of local sustainable food and medicinal plant cultivation was launched.

With Ruth Hartung as co-founder, the first Sedona farmers market was started. In the short time since its inception, the market has had a profound effect on the community: consumers and growers are now in closer relationships, restaurants in Sedona are now working directly with growers and highlighting local food on their menus, a number of new artisan businesses linking arts and gardens have started, and the demand for organic food is driving expansion of organic farming with local growers.

Since last November, Sedona has seen a steady increase in backyard gardeners, people buying and eating locally, and support of the farmers market. There is increasing interest in plants, their nutritional and medicinal value, and the art and science of gardening. This

movement is being called the "Agricultural Renaissance of Northern Arizona."

Diane Dearmore, president of Gardens for Humanity, has taken a lead role in redefining the mission of that foundation to encompass an agricultural renaissance that would convert the region back to farmland as it was prior to World War II. The stated goal of the "Agricultural Renaissance" is to feed 120,000 people from locally produced organic food within three to five years, thereby creating an autonomous and self-sufficient food and medical security for the region. This larger vision has ignited the energy and focus of the community to work towards this exemplary revolutionary goal.

### **Farm to Pharmacy: William Siff and the Goldthread Farm and Apothecary**

The agricultural renaissance in Sedona is a model of a community working together to rapidly establish local food security; within that emerging new culture is the inherent potential to incorporate medicinal plants into a network of gardens, thereby creating the foundation for a revival of folk medicine guided by local herbalists.

A more direct approach to delivering herbal medicines to families is being undertaken by acupuncturist and herbalist William Siff. Based in the Berkshires of Western Massachusetts, William's Goldthread Farm and Apothecary is pioneering what I consider to be the most important model for grassroots healthcare in the country.

Surrounded by the highest concentration of Community Supported Agriculture (CSA) farms in the country, William had the insight that the natural evolution of this model of farming would be to include herbs and herbal products in the subscriber shares. From that insight came first medicinal plants grown on his farm used in his local apothecary and acupuncture clinic, then an herbal CSA program supplying the local families with natural medicines, and then the Farm to Pharmacy training program to train students to replicate this model in other communities. Taken together, these simple evolutionary steps represent the solution to the three most critical problems of our society: sustainable ecological agriculture for healing environmental degradation, plant-based medicines as an alternative to a costly and corrupt insurance-based healthcare industry, and training for green jobs as the basis of economic recovery.

This model also illustrates the potential that practitioners of natural medicine have to interface with their communities on a number of levels other than clinical practice alone: William utilizes herbs he has grown himself, which give them a unique healing vitality; the farm grows and manufactures the products that are then sold through the apothecary and other markets; families are linked to herb farms through a relationship with a healthcare practitioner; the growing demand for herbs stimulates planting by other farmers and community gardens; students are trained by a licensed healthcare practitioner.

The Farm to Pharmacy Internship is a unique educational opportunity that exposes students to the full spectrum of herbal medicine, from cultivation of plants to their use in clinical practice, with an emphasis on creating a sustainable, nontoxic and cost-effective community-based healthcare system.

The growing season at Goldthread begins in April. Interns start their training in the greenhouse, tending to seedlings and learning the fundamentals of propagating over one hundred species of medicinal plants. As the season progresses students learn plant identification, soil health and composition, composting strategies, maintenance and design of educational and production gardens, and harvesting and processing techniques. A special part of the program is the unique opportunity to participate in the distillation of essential oils and hydrosols over a wood-fired eighty-five gallon commercial still, including conifer oils wild-harvested from the surrounding forests and selected crops such as lavender and yarrow grown on the farm.

As the weeks progress students begin learning the skills necessary to become community herbalists. Utilizing various preparations for their own health needs, students gain a deep experiential understanding of the healing qualities of medicinal plants. The physiological actions of herbs as well as basic chemistry are taught within the context of traditional Western, Chinese, and Ayurvedic medical systems. The preparation of tinctures, syrups, elixirs, teas, salves, and oils are all introduced. In the final phase of the program students work under the guidance of William and other licensed healthcare professionals to learn the clinical uses of the herbs they have grown for common illnesses.

This educational approach combines working with living herbs in the soil, studying the academic and scientific knowledge of phytochemistry, and then utilizing

finished herbal products for practical healing purposes. In this way students gain a truly holistic understanding of the power of plants.

In response to rapidly growing interest an abbreviated version of the longer Farm to Pharmacy program that teaches all of the fundamentals of the seven-month program in three five-day intensives will be offered throughout the growing season starting in the spring of 2010. The Farm to Pharmacy intensive immersion program has been designed to offer people that live outside the community the opportunity to participate in this unique hands-on model of grassroots herbal healthcare in an intensive format. Participants will divide their time between supervised work with the herbs on the farm and classroom presentations designed to teach the most important material from the seven-month program.

The objective of the Farm to Pharmacy intensive immersion program is to provide participants with the practical skills, medical knowledge and confidence to integrate herbal medicine into the lives of their families and communities according to their personal aspirations. The program is ideal for teachers interested in integrating herbal medicine into their curriculum in school gardens, or herbalists and practitioners of natural medicine who would like to deepen their connection to the plants and increase their understanding of herbal theory. Farmers can take what they learn and integrate it into their existing agricultural projects, and community activists will gain the tools necessary to apply herbal medicine to areas of social justice, urban renewal, and healthcare reform.

## High Falls Gardens

High Falls Gardens is an example of the challenging work being done at the academic, scientific and agricultural levels on behalf of farmers, herbalists, consumers, medicinal plants and ancient traditions of their use. Understanding this work reveals the complex economic and political forces that promote exploitation of botanical resources and resist implementation of sustainable practices.

High Falls Gardens first started in 1993 as a five-acre farm in the Hudson River Valley of Upstate New York owned and operated by Jean Giblette. Inspired by meeting Jeffrey Yuen, a renowned practitioner of classical Chinese medicine, and wanting to grow and use fresh local herbs from that tradition, Jean has seen her farm grow from a project under the umbrella of a local non-profit into an independent nonprofit with an extensive network of growers, educators, and researchers.



Over the last ten years High Falls Gardens has pioneered the agricultural production of Chinese medicinal plants in the U.S. for both medical practitioners and as valuable crops for small organic farmers. I have had several opportunities to visit Jean and her farm, and I have learned an immense amount about the realities and potential of the herb industry from her. Jean was also one of the inspirations and sources for medicinal plant seeds in the early stages of The Learning Garden.

One of the first concepts that I learned was how High Falls Gardens was attempting to “decommodify” herbs. Although I had a general sense of what this meant at the time, it was not until a recent interview with Jean that the full picture began to emerge, and the implications of how important this work is to create a new and revolutionary paradigm of medicine, business, economy, and ecological management.

The global trade system in medicinal plants is commodity-based. Like other commodities, the plant materials are sourced from either wild-crafted or cultivated origins, bought cheaply by regional consolidators, held until prices rise and then sold.

Last year associates of High Falls Gardens published a paper calculating the production costs for responsibly wild-cultivated Appalachian medicinal plants such as ginseng, goldenseal, and black cohosh. It was found that no species were significantly profitable in comparison to exploitative methods; only ginseng and goldenseal recouped costs and gave a minor profit.

The reason for this situation is that regional consolidators are exploiting botanical resources by paying \$1 to \$2 per pound to local people who will harvest the herbs because of poverty.

“Wild plants are doomed until people get their act together and realize that we have to stop taking plants out of the wild everywhere,” Jean said.

Herbs such as ginseng and *Cordyceps* are being cultivated using industrial techniques, but this is not reducing the pressure on wild plants because people prefer wild plants that are not grown with toxins under artificial conditions.

“They must be cultivated with ecological methods, because that is the only thing that will yield quality comparable to wild harvested,” Jean explained. “It has been demonstrated that industrial techniques do nothing to slow the pressure on wild plants. The market wants the good stuff and will pay for that.”

High Falls Gardens is trying to break this cycle of exploiting low-cost wild herbs, partly by relying on the movement toward locally and sustainable produced food.

“The organic and local food movement is a bright spot in the economy, because people understand that without it there will not be fresh high-quality food, health of the landscape, retention of farmer knowledge in the community, guarantee of future food access in peak oil, health of the local economy, and food safety. These are powerful intangibles that come with locally produced products, and people are starting to understand and are willing to pay more money. This has withstood the economic downturn.”

In order to bring medicinal plants into local organic and wild cultivation, farmers must know how much profit will be generated before they will plant a new crop, especially if it is unusual and exotic. In general, a specialty crop cannot be introduced without the equivalent of a Master’s thesis of production research, including economic variables.

In the past, agricultural development in the US was supported by a system of land grant universities that were funded to research new crops; farmers rely on land grant universities for information about the economics of planting these or experimental crops.

In the 1860s Congress passed the Land Grant Act. This act gave land to institutions and special universities in all states, specifically for agricultural research and development; in New York the designated university is Cornell, in Massachusetts it is the University of Massachusetts in Amherst. Prior to this universities were elite, but this new system represented the world’s first people’s university. Its purpose was specifically for helping farmers, and people came from all over the world to the U.S. to study agriculture.

Industrial agriculture has prevailed globally for the last half century, and the Land Grant university system was partly how it spread around the world.

The organic agriculture movement started in the 1970s, but even until the mid 90s there was no help from the land grant universities. Since the Reagan Administration public funding for scientific research has been cut, with the gap being filled by funding from agribusiness, chemical and biotechnology corporations that dictate the research agenda.

The farmers in the High Falls Gardens network have appealed to agricultural scientists at universities such as U. Mass. Amherst. From 1998 until 2000,

through Jean's efforts, one of the first field trials of Chinese medicinal herbs in the U.S. was carried out using the protocols of agricultural science.

One of the universities most interested in this work has been New Mexico State University in Las Cruces. One of their researchers was recruited into the High Falls Gardens network in 2002, and since then several collaborative projects have been carried out. The national growers network, with the participation of NMSU, won a \$320,000 grant in 2004 to study the feasibility of direct marketing of Chinese herbs to practitioners. The study concluded that it is feasible but will take a long time, primarily because most are perennial crops that require several years to become established, and also the fact that numerous herbs are used in the classical formulas.

In 2008, NMSU received a grant to sponsor a training program for farmers interested in growing Asian medicinal plants. This kind of program is needed for the industry to develop, as many people have land and want to grow herbs but lack the knowledge and training of how to do so. The program was taught by Jean, Peggy Schafer, a successful herb farmer from California, and NMSU researcher Charles Martin, and attended by about fifty people.

Throughout the past ten years High Falls Gardens has worked with a consortium of medicinal plant growers associations representing hundreds of farms. Many growers are interested in growing Chinese medicinal plants, but only about ten entrepreneurial farms are in consistent production. High Falls Gardens and Chinese Medicinal Herb Farm in California cooperated to construct a web site, [www.localherbs.org](http://www.localherbs.org), which was launched in November of 2007 to direct-market herbs to practitioners. Currently, about three-dozen species of high-quality organic Chinese herbs are shipped directly to practitioners of traditional Chinese medicine, including *Salvia miltiorrhiza* and wild-cultivated ginseng (*Panax quinquefolius*). Because of the quality, unique nature of these herbs, and limited growers, LocalHerbs has been able to satisfy only one-tenth of the demand.

LocalHerbs pays its farmers production cost plus profit, averaging about \$25 per pound for a root crop. This is about five times higher than import prices. These crops usually represent a tiny fraction of the farmers' income, which is supported by other crops.

"Makers of herbal products are sourcing most materials abroad because the business model does not accommodate higher prices," Jean says. "There is a disparity between the makers of products and the farmers;

manufacturers do not want to pay American prices and therefore get herbs cheaper abroad. This is the idea behind direct marketing to practitioners. The practitioners who buy these herbs are using them in traditional form, which is returning to the original and most effective way of using them."

In general, the farmers growing these herbs are successful because of their diversified crops, but it is difficult to convince others to grow new medicinal plants.

"While we need participation of land grant universities with their production research and economic specialists, we also need a way to support people to plant and tend perennial plants. Agriculture in the U.S. has been export-based; to achieve local self-sufficiency we must bring forward the indigenous forms—farming with the wild, permanent agriculture, agroforestry—the way the Indians farmed.

"Big changes are on the horizon, led by our most brilliant farmers, their customers and our allies in the land-grant system. Innovative research, new forms of financing, and other shifts in social priorities will advance these trends."

Jean estimates that it will take five to ten years to start this work on a large scale. To produce all the herbs for one popular formula such as Yin Chiao, for example, requires research to resolve production and economic problems on some of the ingredients, plus several years to grow them.

"Medicinal herbs are ground zero in our changing relationship with nature," Jean said. "Do we exploit plants for their chemicals, or do we respect the integrity of the plants and utilize the amazing reservoir of knowledge represented by the Chinese tradition by learning to use the formulas and integrate them into our diet?"

"The extractors have pretended that certain biochemical constituents are the bioactive principle, but herbalists understand that it is the whole plant and the nutrition it gets from the environment where it is grown. Native Americans and the Chinese also understand that the medicine comes out of the entire natural setting.

"Corporations have gotten rich from taking resources from nature, by extracting and not putting back and externalizing the costs for pollution. The institutions appear to be very powerful and command most resources at the federal level, but this just a flare before the sun sets on them.

"Supporting local farms is the restorative antidote. Planting the herbs will benefit the environment, but how to pay people for this?"

## Organic India: Revolutionary Ecological Business

I have been following the development and work of Organic India for several years, mostly in correspondences with Prashanti de Jager, its cofounder. Now synonymous with Tulsi Tea in health food stores in the U.S., Organic India represents what is possible when a company based on compassionate principles utilizes native herbs to lift farmers out of chronic poverty, practices ecological agriculture to revitalize the soil, and preserves the spiritual dimensions of ethnobotanical traditions.

Organic India was started in 1990 as Arunachala Ayurveda, partly as a result of Prashanti seeking organic herbs to use in his clinic while in India. Now joined by Bharatmitra and Bhavani Lev, he estimates the company is the steward of around seven million acres of land, including 4,000 certified organic farms and tribal forest areas. About 150,000 farmers, tribal people, and their communities throughout India are associated directly or indirectly with the work of the company. The company has trained 30,000 tribal people in propagation and sustainable wild-crafting techniques.

The work of Organic India is based on educating Indian farmers about organic and biodynamic cultivation, harvesting and processing of Ayurvedic medicinal plants. Representatives of the company spend time in the villages where cultivation projects are being started, sometimes living with the farmers for several years to educate and motivate them.

Because of the extreme hardships created for many traditional farmers by indebtedness to multinational agribusiness companies, there has been an epidemic of farmer suicides across the country for the last several years. Organic India reaches out to the women of communities who are widowed or whose husbands are suffering from depression and alcoholism, to empower and uplift them through education and revival of traditional knowledge.

Organic India was one of the first successful organic herb companies in India. The company has been a pioneer and role model of ecological agriculture and sustainable business, and the first in India to be certified by international organizations for organic, biodynamic, and fair trade. Their herbs are sold internationally, including to top companies in the U.S.

Many of the farmers cultivating herbs for Organic India use traditional Vedic fire rituals called Agni Hotra. These rituals are performed at sunrise and sunset, using a small cow dung fire in a copper pot, offerings of rice

grains, and mantras. The solar rays are described as music flowing into and out of the landscape every morning and evening, which is concentrated and consecrated in this ritual. The results are purification of the environment, both psychically and physically; studies have confirmed that such practices reduce problems with pests and improve quantity and quality of yields. Organic India has encouraged these practices not only for these reasons, but also to restore cultural dignity about traditional ceremonies that were repressed under the British occupation.

Most of the processing of the herbs is done by hand. Rather than process whole herbs with machines, the specific medicinal part of each plant is separated by hand, such as removing the seeds of the fruits in triphala, which is generally not done commercially. Facilities are set up near farms to ensure faster processing that does not require transportation for long distances along polluted highways, one of the sources of heavy metal contamination in Indian medicinal plants.

At Azamgarh, one of the main tulsi cultivating areas, Organic India hires 1,000 women to work for four months picking the leaves of the tulsi plants (holy basil, *Ocimum sanctum*) growing under mango trees. Typically these women work at demeaning jobs or live on the streets; harvesting the tulsi is an opportunity to make more income than any other employment and to share time in natural environments with other women in a safe and clean community.

"Just being in a community that is happy and joyful and productive is a strong form of medicine itself," Prashanti says.

In 2005 a group of prominent companies in the natural product industry led by the Social Venture Network awarded Organic India, out of perhaps 30,000 companies, winner of the most socially responsible company in the industry.

"It is obvious to us that medicine is most powerful when every aspect of it is medicine," Prashanti says. "If we exploit people and destroy resources getting herbs to people, then the purity and power of that medicine wanes, and part of its effect would be the negative karma of that exploitation. Hence, the more responsible a company's presence is in the world, the more medicinal its products will be.

"According to Yoga, one of the most powerful ways to do good is by right giving." Prashanti sums this up as: giving of land and water to present and future generations of people, animals, and plants; giving of wisdom in the form of Vedic and contemporary sustainable ag-

ricultural techniques; giving of sattvic (spiritually pure) food and herbs; giving of freedom and choice.

“We have strengthened these communities in many ways,” Prashanti explains. “Before, they were eating toxic food and milk and now everything is organic, including all the animals and dairy products. We pay premium prices to the farmers for their products, and they make two to three times more money on everything they grow. They are being empowered to use their ancient ways so that they are less dependent on the West for chemicals and other imports. We are building schools in their villages. Before, there was the tendency of suicide; now there is hope. Before, they passed on dead soil to their kids, now they pass on powerful, living soil.”

Prashanti works with Ayurvedic Vaidyas offering free clinics in Indian villages. Starting at dawn, they will see patients all day who have waited in line up to six hours for a consultation and prescription of Ayurvedic herbal and/or pharmaceutical medications. Whenever possible, instead of giving herbs they teach the villagers which herbs to cultivate and harvest locally, and how to prepare and use them. They learn from the villagers about their traditional ways of using these herbs as well.

Organic India has planted a number of high-altitude herb gardens for the propagation and preservation of precious and rare medicinals that require unique mountain environments and many years to grow. These species include Himalayan spikenard (*Nardostachys jatamansi*), *Picrorhiza kurroa*, and a rare Himalayan orchid renowned for its restorative tonic properties. “I feel that the most profound herbs cannot grow in the psychic terrain of humans,” Prashanti states.

One of the most interesting projects I have heard about recently is the use of tulsi for large-scale phytoremediation. In a joint exercise being undertaken by the Uttar Pradesh Forest Department and Organic India, one million tulsi bushes are being planted in the vicinity of the Taj Mahal to protect it against the damaging effects of acid rain and air pollution.

Recently Organic India CEO Krishan Gupta reported, “Till now, nearly 20,000 tulsi saplings were planted. Saplings will be planted in nature parks near the Taj Mahal and throughout Agra.” On being asked why tulsi was chosen, Gupta said, “It is one of the best plants which purifies the environment. Its cleansing action is due to its property of releasing high amounts of oxygen, which minimizes the adverse impact of industrial and refinery emission.” It is interesting to consider this phytoremediation effect on the air element from

the standpoint of tulsi’s therapeutic actions: it is one of the most effective herbs for asthma and cleansing the respiratory system.

Looking to the future, Prashanti says, “Through biodynamics and permaculture the land gets stronger year by year. Our processing of the herbs gets better, and the genetics of our plants is always improving as we take the seeds from the best plants to use for future generations.

“There is something fundamentally profound about owning and saving your own seeds. It is the culmination of farming; it is also sustainable, as seeds are for tomorrow, for the children, for the future generations.

“Grassroots medicine is based on seed banks, but seeds are also a metaphor: seeds of knowledge and techniques from ancient and beautiful traditions that are still viable and can be stored and propagated.”

## A Brief History of Medicinal Plants at The Learning Garden

The Learning Garden was started on the spring equinox of 2001, with the ceremonial planting of a vitex tree on a 60,000 square foot plot of land at the Venice High School campus in Los Angeles. Co-founded with Julie Mann, a homeopath and parent at the school, the project was for me an opportunity to manifest a growing vision about the need to have medicinal plants in our neighborhoods as a form of grassroots healthcare. I envisioned a teaching garden with species from around the world that could be used by the patients in my clinic and students of the local acupuncture colleges, a repository of both herbs and traditional knowledge that could be propagated into the surrounding community.

For the first few years I was actively engaged in a leadership role, helping to design and build the infrastructure, plant and care for the new gardens, and raise funds. Over the years the project has grown steadily under the care of David King, Garden Master, while Julie has overseen the nonprofit foundation that runs it, and I have shifted my attention to educating people around the country about the importance of this project and what it represents for grassroots healthcare.

Now it contains plots for the high school’s horticultural program, a “people’s pharmacy” of medicinal plants, a California native plant and cactus garden, a pond with water-loving medicinal plants, a greenhouse and shade house for propagation, a large stone patio for community gatherings and outdoor classes, a sunken kiva classroom surrounded by raised beds of Chinese medicinal

plants, a rose garden, a large composting system, and a permaculture-style “food forest.” The entire garden is organically cultivated.

Along the way we have learned important lessons about the challenges inherent in creating, supporting, and maintaining a large garden in an urban setting, and specifically the challenges of bringing herbal medicine into cultivation and use by a local community.

Since the garden’s inception we have seen many successes; the most notable has been watching a previously neglected plot of land that was covered with trash become one of the country’s most successful high school gardens. Every few years at least a thousand high school students go through the organic gardening program under the instruction of horticulture teacher Diane Pollock. Simply introducing highly urbanized kids to food from a garden is a transformative experience, and when it is food they have grown themselves it is a kind of “coming of age,” as Diane says. Like urbanized students everywhere, discovering that food comes from seeds and soil and not grocery stores is often a shock; eating their first fruit or vegetable from the earth is often a major discovery and revelation.

The Learning Garden’s medicinal plant collections started as a collaborative effort with Yo San University of Traditional Chinese Medicine. The first garden was an extensive selection of important herbs used in Chinese medicine that was planted and maintained by students of the school, assisted by myself and community volunteers. The seeds for many of these plants were donated the Jean Giblette and High Falls Gardens, and were tended under the guidance of Robert Newman, L.Ac., one of the country’s foremost experts on Chinese medicinal plant cultivation. Many of the medicinals that are thriving now have been established since that time.

One of the important lessons we learned at this stage was that acupuncture colleges are not oriented to botanical studies. School curriculums are designed to meet the requirements of the state Acupuncture Board, and since the primary objective of students is to pass the board exam, neither schools nor students have time for planting, tending or harvesting. This is unfortunate, as there is no better way to learn a wide range of important subjects related to herbal medicine such as a plant’s identification, its true flavor and fragrance, and how its properties are related to the environment it grows in. Most students graduate from four-year Master’s programs in Chinese medicine without ever meeting fresh plants.

One of the key people to assist at this time was Keiko Cronin, an acupuncturist and herbalist who was Academic Dean at Yo San. She initiated a program within the herbal studies department that gave credit to students for hours spent in the garden. At any given time there were about a dozen students engaged with the plants through the seasons, and all reported that it was an invaluable addition to what was otherwise purely academic training. The program lasted for about two years and then went dormant because of changes within the faculty at the school. Taking the concept to Emperor’s College of Traditional Oriental Medicine, Keiko again initiated a new form of the program, which again flourished for some time.

One of the results that happened from acupuncture students working in the garden was that plants and seeds were carried from their classes to their own yards and gardens, and a number of families of acupuncture students found themselves caretakers of large collections of potted herbs. At this stage we learned two more important lessons. The first was that many herbs are quite happy growing prolifically in our neighborhoods, and could therefore be easily established as sources of abundant medicine. The second was realizing that simply having medicinal plants was not sufficient to create a new medical system, as no one really knew what to do with them.

The next chapter saw the expansion of the herb gardens to include a large collection of Ayurvedic and North American herbs, many supplied by Richo Cech and Horizon Herbs.

For several years the herbs received basic care from the steady stream of volunteers who spent time in the garden, but we learned that cultivating medicinals is far more complex than growing most fruits and vegetables. While some herbs thrive with neglect, many require very specific growing conditions to germinate and flourish. During this phase of the garden a number of the more sensitive species died, leaving behind the hardier ones.

About two years ago Robert Newman came back to the garden on a regular basis, bringing with him his vast knowledge and skills. In a short time a retinue of dedicated students from both Yo San and Emperor’s were reviving the gardens and expanding the collection of species. At present time there are about one hundred and twenty five species of medicinal plants flourishing at The Learning Garden, including many rare and exotic Chinese herbs. Now, both Robert and acupuncturist Ca-

mille Harris bring students from their classes and clinical practices at Emperor's.

Over the years the Learning Garden has received overwhelmingly positive local and national recognition by a wide variety of media and religious, political, and humanitarian organizations, especially for its role in improving nutrition in the public school system. Along the way, the herb gardens have gone through various cycles of flourishing and neglect and regeneration. We have learned important lessons about the bureaucracies of school districts, strengths and weaknesses of volunteer labor, the challenges of fundraising. We have learned about the scarcity of time in Los Angeles, and the seemingly unrealistic ideology of imagining that society will wake with a sudden interest in learning how to grow its own medicinal plants for prevention, vitality, and curative powers. We have also learned how little we know about medicinal plants, which reveals how much our culture has lost: we are a society that basically knows very little about how to take care of ourselves using nature's pharmacy.

"I feel our acupuncture students are getting a wonderful education and have really done an outstanding job of maintaining the garden," Julie says. "But now I want The Learning Garden to take the next step.

"How do we bridge our wonderful garden with the people of the community? How can we inspire people to take a certain herb and want to plant it in their own back yard, and use it properly? Are there herbs from which salves or teas can be made from that are good for

the masses, or simple knowledge that can be brought back to the common person that will empower them to take responsibility for their own health? Are there simple ideas in Chinese medicine that can be translated for common use?"

This spring will see a new phase of growth and activity toward this goal. Besides cultivating and tending the herbs and learning their properties, students from both colleges will now work with Camille to make medicines from fresh plants they have grown. Local doctors and healthcare practitioners are organizing to start offering regular free clinics in the garden. Seeds and cuttings will be given away to all who have an interest in propagating the plants in their neighborhood. Along with these developments, a crucial new concept has emerged for maintaining the garden in perilous economic times: it is now part of a community-wide time share program, where volunteers who work in the garden are eligible for an equal number of hours from other providers in the network. After almost ten years of growth, it appears that The Learning Garden is becoming a truly sustainable source of nutrition, medicine, education, and community in urban Los Angeles.

"The Learning Garden has always been about changing the paradigm of healthcare in our community," Julie says. "It takes time for people to make changes, or to even understand the changes they can make. I would love to see us make that shift for at least some people this year."

# Cosmic Chemistry: *The Effects of Circadian Rhythms and Ecological Factors on the Production of Medicinal Plant Compounds*

David Crow, LAc

## Introduction

This article is presented in two sections. The first introduces a macrocosmic view of life as seen through traditional Vedic philosophy. Using the language of Ayurveda, this view serves as a starting point to understanding the interrelationships among celestial rhythms of the sun and moon, planetary biospheric cycles, the growth cycles of plants, their metabolism of local environmental elements, the production of therapeutically important compounds within the plants, and how those compounds in turn produce their physiological effects in the human body in ways that reveal the underlying cosmological patterns that created them.

The second section describes how these mechanisms operate as understood by modern agriculture, phytochemistry, plant ecophysiology and other related sciences, and attempts to draw some parallels between the languages of Ayurvedic and Chinese medicine and phytochemistry.

## 1. Vedic Philosophy: Life as the Evolution of Light into Consciousness

Traditional Asian medical philosophy is based on the observation of macroelements and life-force energies within the body, and describes their functions and activities in the language of biospheric physiology. The effects of medicinal plants are therefore described according to their tastes, energetic nature and potencies, which define their resulting physiological actions in qualitative terms such as heating, cooling, drying, moistening, and so on. Therefore, medicinal plants can be described as carriers of the elements and energies present in the biosphere that in turn act on those same elements and energies within the

body. Simple examples of this include spices as vehicles of fire element, decongestant essential oils from conifer needles as vehicles of air element, sedative herbs such as valerian root as vehicles of earth element, and so on.

In the view of Vedic philosophy, life is the evolution of light into consciousness. By understanding the cosmology that this refers to, we can perceive holistically the flow of energy from sunlight through the plant kingdom into the human body and its metabolism into the nutrients that support consciousness. In this flow, the plants act first as receptacles of influences from the sun and moon, second as evolutionary beings that metabolize environmental elements according to their unique forms of intelligence, third as agents that act upon human physiology, and, finally, as the nutritional basis for supporting consciousness. While pure consciousness may ultimately transcend dependency on external factors, the functioning of ordinary consciousness in living beings rests upon celestial, botanical, and ecological foundations; it can therefore be said that Creation perceives itself.

The sun is the origin of light, which is the creative and transformative power of the fire element manifested as stellar energy. This energy streams into the atmosphere and in conjunction with the earth's rotation is the basis of circadian rhythms created by day and night, the yearly cycles of the seasons, and the monthly lunar cycles. These cycles are the primary influence on the germination, growth, fruiting, seeding, dying, and dormancy and regeneration of plants. The cycles of sun and moon, therefore, control the plant world.

The plants in turn bring their evolutionary intelligence in the form of DNA within their seeds; in Ayurvedic terms this intelligence can be described as a latent and concentrated form of *prana*, life force. If traced

back through the lineage of individual plant species, this pranic information arrives most recently from the plant species' closest ancestors, then from earlier and simpler plant forms, then from early microbial life, then from the primordial elements, and finally from the origins of cosmos. If we consider Vedic philosophy again, we learn that the physical universe is the external expression of *mahat*, "universal mind." In this view, it can be said that the genetic intelligence within plants is a microscopic form of universal intelligence, or micro-mahat.

When the celestial influences of sun and moon act upon the ancient evolutionary pranic intelligence within seeds, the cycles of germination and growth begin. As the plant grows, it metabolizes the four basic elements of its local environment, being earth nutrients, water, fire as photosynthesized sunlight, and air as the plant's respiration. These elements are circulated through the fifth element, the channels of space within the plant.

At this stage we can see that what is now present in each individual plant species is the celestial influences of sun and moon, the ancestral pranic intelligence carried within the plant's lineage, and the environmental elements metabolized by the plant. The multitude of chemical compounds found within each plant are therefore the externalized molecular forms of these underlying levels of botanical intelligence (genetics), life force (metabolism), ecological influences, and celestial energies.

Upon entering any field of organoleptic analysis of plant products, such as wine tasting, coffee and tea tasting, olfactory analysis of fragrances and so on, one discovers a language and terminology based on the elements of the environment.

Chardonnay grapes prefer soils that are rich in chalk, clay, and limestone; the metabolism of this earth element by the vines adds a flavor sommeliers describe as "minerality." Master tea tasters in China are reputed to be able to identify the region and sometimes exact farm where a specific cup of tea originated; the unique flavor notes present in the same species of *Camelia sinensis* from different places are the actual tastes of the environment it came from. In my own experience teaching about essential oils, especially in a more contemplative mode, I have found that a group of students, without being told what the species or origin of an oil is, can often come to a consensus about the environment the plant grew in: altitude, climate, soil, water, and so on.

These examples illustrate that what reaches our senses as quantitative molecular information is also the qualitative presence of the underlying ecospheric

elements that have been expressed by the pranic intelligence of each species under the overarching control of celestial circadian rhythms. The implications of this are numerous, but the most fundamental is that through the holistic macro-thinking of traditional medical philosophy we are able to develop an awareness of biological interrelatedness, which is the spiritual foundation of ecological sensitivity.

## 2. Agriculture, Phytochemistry, and Ecophysiology

Agricultural sciences are well acquainted with the implications of environmental influences on plant species, and an abundance of information on plant physiology is available in many disciplines of study. This knowledge reveals the intrinsic mandalic structures of nature referred to by Ayurvedic thinking, although scientific research is rarely concerned with this dimension. In general, the aim of agricultural research is to find ways to increase crop yields, decrease losses from diseases and pests, and increase certain traits and constituents within species.

These goals are also the aim of genetic modification of plants. In the view of Vedic science, gene splicing can be understood as penetrating ancient microscopic lineages of botanical pranic intelligence with toxic parasitic viral vectors that allow the insertion of other lineages of intelligence. While having the above stated goals, this practice is obviously motivated by interest in ownership of those new lineages.

The biotech industry is moving rapidly to create transgenic medicinal plants, and numerous articles with tantalizing titles such as "*Over-expression of Coptis japonica Norcoclaurine 6-O-Methyltransferase Overcomes the Rate-Limiting Step in Benzylisoquinoline Alkaloid Biosynthesis in Cultured Eschscholzia californica*" and "*Metabolic Engineering of Plant Alkaloid Biosynthesis*" can now be found proliferating online. In the concluding words of one such article "Such metabolically engineered plants should prove useful as breeding materials for obtaining improved medicinal components." Herbalists would be advised to consider the approaching conjunction between an exploding global market for herbal products and declining botanical biodiversity and availability, and the symbiotic relationships among biotech companies, pharmaceutical companies moving into production of nutraceuticals, and the medical profession seeking less toxic medications.<sup>1</sup>



## Secondary Compounds

An important concept in plant ecophysiology is the production of primary versus secondary metabolic products. All plants produce primary products such as carbohydrates, lipids, proteins, chlorophyll, and nucleic acids; these compounds are involved in the primary metabolic processes of building and maintaining plant cells. These primary products themselves may have nutritive or medicinal effects for humans, but the therapeutic benefits offered by medicinal plants are more typically derived from individual or synergistic combinations of secondary metabolic compounds.

To date, approximately 170,000 plant secondary metabolic compounds are known.<sup>2</sup> While secondary chemicals may not have a role in building or maintaining cells, research is now showing that they serve diverse functions such as immune protection, interplant competition, and attractants to pollinators and beneficial symbiots. They are also known to give protection against changes in environmental conditions, such as water and light levels, UV exposure and soil nutrients, and to work at the cellular level as growth regulators, modulators of gene expression and other functions. The development of these secondary metabolites is an evolutionary response to the multitude of stress factors found in a plant's environment, factors that an individual plant must confront while being immobile.

In this regard we could consider that in some cases the therapeutic use of medicinal plants is the application of secondary metabolic compounds with specific botanical functions to support or correct parallel or similar functions within human physiology. A clear example of this is the production of essential oils in aromatic plants for defensive purposes, which are then extracted and utilized for their antimicrobial functions in aromatherapy. Another example is compounds produced for neurotoxin effects against herbivores that are utilized for their neurological benefits in humans, such as St. John's Wort. In other cases a parallel cannot be made; the production of valepotriates within valerian probably does not assist the plant with insomnia.

An important aspect of botanical medicine that distinguishes it from allopathic pharmaceutical medicine is that the therapeutic actions of plants are due to synergies of compounds that act on multiple target sites and physiological functions, rather than single xenobiotic compounds. This diversity of compounds and functions originates in the role of synergistic secondary

compounds in plants, which together have a higher level of effectiveness than single compounds. Again, the example of essential oils is relevant, which are composed of hundreds of individual compounds working together to produce immunological protection, with the diversity of compounds increasing the potency of broad-spectrum antimicrobial powers and decreasing the likelihood of microbial resistance. As an example, research confirms that tea tree oil is ten times more effective as an antibacterial agent than isolated terpenen-4-ol, its primary active compound.

## Ecophysiology

There are a number of important ecophysiological factors that directly affect the production of secondary metabolic compounds in medicinal plants. When summed up it can be seen that they correlate directly with the cosmological view described earlier. These are:

- Diurnal rhythms of sunlight and heat (solar cycles, fire element)
- Oscillations of lunar cycles (subtle aspect of fire element and influence over water element)
- Germination, growth, flowering and reproductive cycles (micro-mahat and botanical evolutionary pranic intelligence)
- Antimicrobial, pesticidal, and allelopathic functions (immunological intelligence)
- Water, water stress and dehydration (water element)
- Soil nutrients and conditions (earth element)

These influences are present within and around plants from before their germination until completion of their life cycle, and are active in all parts of all plants. The practical importance of this information for herbalists or manufacturers of phytomedicines is to know optimum growing conditions, harvest times, and preparation methods to capture peak levels of therapeutic compounds. The spiritual importance is insight into how biochemical medicine is an expression and manifestation of deeper levels of celestial, biospheric, and botanical intelligence and energy. The global significance is that all systems of medicine will be irrelevant if biospheric and botanical integrity and coherence continue to deteriorate.

## Environmental Stress and the Production of Secondary Metabolites

Among traditional herbalists there has been the understanding based on empirical evidence that wild-growing plants tend to have stronger medicinal powers than those cultivated domestically. From the standpoint of plant immunity, plants growing in the wild must of necessity be hardier to survive; this higher level of vitality would be expressed as higher concentrations of immunological compounds within the plant, either antimicrobial or allelopathic, which are then utilized for human purposes. It could be said therefore that environmental stress is a primary stimulus that creates hardier plant species, and logically stated that medicines from hardier plants confer their hardiness on those who use them, either medicinally or nutritionally.

Modern agricultural research has confirmed that various forms of stress induce the synthesis of a number of secondary plant compounds. It is known, for example, that culinary herbs such as dill, fennel, parsley, and marjoram grown in the field produce higher levels of aromatic compounds than those grown in greenhouses, due to lower night temperatures; higher levels of these compounds means that the plants not only taste and smell better—revealing the presence of more chi or prana in traditional organoleptic terms—but have higher therapeutic value biochemically. This information is relevant to both the commercial production of medicinal plants, as environmental influences can be regulated to increase active constituents, and to those who wild harvest plants, as it can be a valuable guide to when, where, and what part of plants to harvest for maximum potency.

It is important to note that artificially induced stress is now a topic of interest in medicinal plant research. Like many well-intentioned scientific endeavors that lack a greater vision of planetary ecological health, some of these research projects are of questionable intelligence and wisdom, such as field trials that successfully increase production of specific compounds by stressing the plants with metallic toxins or hormonal stressors.<sup>3</sup>

## Solar Influences

Sunlight drives chemical reactions within plants. Sunlight levels are measured in lux or lumens; direct outdoor sunlight is in the range of 32,000 to 100,000 lux. Most plants require 5,000 lux and more, and cannot survive below 800, as there is insufficient energy to drive photosynthetic reactions.<sup>4</sup>

Sunlight has a direct influence on the production of medicinal secondary metabolites in a number of ways: diurnal rhythms, photoperiodicity of growth phases such as budding, flowering and fruiting times, levels of heat and light intensity, latitude, altitude, and others.

Production of medicinal compounds following diurnal cycles is the most obvious example of the effect of sunlight on secondary metabolites. Diurnal fluctuations in secondary metabolites with medicinal significance have been reported in modern research for a number of species, including saponins in *Phytolacca dodecandra*, alkaloids in *Papaver somniferum*, essential oils in numerous aromatic plants, hypericins in *Hypericum perforatum*, and others. Ethnobotanical traditions also contain such knowledge and experience about cycles of plant potencies.<sup>5</sup>

Many plants produce peak concentrations of specific compounds at noon during the highest intensity of sunlight. For example, diverse species of *Hypericum* have been found to produce maximum levels of phenolic compounds at this time of day. However, diurnal fluctuations can be expressed at any time of day, such as peak production of carvacrol in *Oreganum onites* at ten in the morning. Furthermore, even within the same species, peaks of different compounds can occur at different times, as in the peak production of thymol at midnight in the same oregano species.

While some species produce maximum levels of medicinal compounds in the full heat and light of the sun, other species require shade to thrive. For example, both the biomass of leaves and roots of turmeric increase significantly when the plant is grown in partial shade as opposed to full sun, and its curcumin content will also be much higher.<sup>6</sup> Cardamom is also a shade-loving plant that has been grown for centuries as an understory crop in old growth forests of India. Species such as these not only offer their medicinal benefits, but are also perfect examples of economically and ecologically sustainable agroforestry.

Shade-loving understory plants, however, are particularly sensitive to changes in their environments and therefore more susceptible to the effects of temperature increases from global warming than are dominant woody species. *Panax quiquefolium*, for example, had a decrease of over fifty percent in photosynthesis and a decrease of over thirty percent in root size when grown under simulated conditions of global warming at temperatures of five degrees C. over normal outside temperatures.<sup>7</sup>

Different stages of growth and development strongly influence production of maximum levels of

therapeutic compounds. For example, in *Hypericum perforatum* the hypericins, hyperforins, and flavonoids peak at different stages, making standardization of these compounds difficult.<sup>8</sup>

Budding and flowering phases in particular tend to produce maximum levels of many compounds. Iranian savory (*Satureja hortensis*), like many aromatic plants, produces maximum levels of essential oil during the flowering stage, which is further increased if the plant undergoes water stress at that time.<sup>9</sup> However, budding and flowering phases may simultaneously increase some compounds and decrease others, as in the case of *Origanum vulgare* var. *hirtum*, which increases its content of p-cymene at full flowering while decreasing its y-terpinene.

Flowering is a response to changes in the length of day and night; this photoperiodic reaction is triggered in many angiosperms by sensing changes in the solar cycle with photoreceptor proteins such as phytochrome or cryptochrome. The conjunction of sunlight activating these proteins and the internal circadian clock controlled by melatonin allows plants to perceive changes in the length of day and night, which then triggers budding and flowering.<sup>10</sup>

Diurnal peaks frequently overlap with either the budding, flowering, or fruiting phase of growth; *Hypericum* species, for example, produce maximum levels of phenolic compounds at noon, but in *H. hyssopifolium* and *H. scabrum* the peak production occurs during floral budding, at full flowering in *H. pruinatum*, and at fresh fruiting in *H. nummularioides*.

Cases such as these, while being of biochemical interest with numerous practical applications, also reveal the macrocosmic patterns articulated by holistic medicine. In some cases there are very clear elemental correspondences between macro and micro levels, such as the peak production of inflammatory compounds in spicy tasting plants at noon on a summer day in the desert. Conversely, many times these correspondences do not hold true, as in anti-inflammatory compounds from different species growing under the same conditions. What holds true in both cases, however, is that peak production of therapeutic metabolites is the expression of a conjunction between the genetic intelligence of the plant (micro-mahat) as it reaches its full pranic potential, the biospheric cycle of the season that activates that potential, and the daily levels of solar energy that maximizes that potential.

Ramakant Harlalka, an Indian chemist, agronomist, and one of my mentors once told me: "It is very important to understand the biorhythms of plants, as the sun and moon are responsible for producing sensory molecules. *Jasmine grandiflorum*, for example, starts blooming from four a.m. onward, and its maximum fragrance intensity is between thirty minutes before and fifteen minutes after the sun rises. This time is known as 'Brahma Muhurta,' or 'God's favorite time,' and it is a very special period in the life cycles of many flowers."

## Lunar Influences

The moon plays a direct but subtle role in the lives of plants, and is closely related to the water element. Various lunar effects on plants have been observed over time by different cultures, which incorporated the knowledge and experiences into ethnobotanical traditions. These effects are more pronounced closer to the equator, where the moon orbits closer to the earth than in higher latitudes.

The most basic and universal observation, now validated by modern research, is that plants draw water inward and upward as the moon waxes, and that the moisture content then decreases as the moon wanes. References from old literature indicate this was once common knowledge. The Roman writer Plinius (23-79 AD) advised farmers to harvest their fruit for market at the full moon as it would be heavier, but harvest it for their own use at the new moon, as it would preserve better.<sup>11</sup>

One universal observation common to diverse locations and cultures is that wood from trees harvested at different times of the moon's cycle has different qualities. Specifically, it was recommended that trees be felled on the new moon in the drier phase; this was an important consideration for the manufacturing of products, as it determined how well the wood aged. A number of recent studies have confirmed these practices, including analysis of wood densities and strength, heat values when burned, and other factors.<sup>12</sup>

The Central American indigenous practice of harvesting palm leaves for roof thatching according to lunar phases was recently tested in a joint research project of several US universities, which discovered a significant difference in calcium, carbon, and cellulose content and therefore durability of the leaves.<sup>12</sup>

Bamboo is traditionally harvested at the new moon rather than full moon, as its water content is lower and therefore less prone to rot and insect attack.

A biochemical explanation for this is that the phenols and other compounds of a plant's immune system become diluted as the water content increases, causing the wood harvested during the moister phase of the moon to degrade faster.<sup>11</sup>

Another example of increased water within plants during waxing moons is the vanilla orchid. Vanilla growers know that during the waxing moon the vines are more full of water, which means they should not be trained as they break more easily.<sup>13</sup>

In Sanskrit the word for lunar energy is soma; this word also has connotations of nectar, elixir, milk, and the ambrosia of immortality. The two most basic qualities ascribed to the energy of moonlight are cool and moist. This obviously does not refer to the physical moon, but to the recognized influence of the moon on the water element. The gravitational pull of the moon affects tidal changes on large bodies of water and can affect levels in wells and springs, but it is improbable that it actually pulls water into individual trees or plants such as bamboo or vanilla. What is more probable is that moonlight has some type of vitalizing effect on the growth of plants in the waxing phase, which in turn stimulates water absorption and metabolism.

One study measured the growth of various angiosperms (flowering plants) in the spring. It was of course found that their growth rates are influenced primarily by heat and cold, with warmth stimulating growth and cold slowing it; however, it was also found that some species grow more independently of temperatures during the full moon, indicating a vitalizing effect.<sup>14</sup>

About a dozen species of brown algae such as *Dictyota*, *Fucus*, and *Sargasso* have moon-related reproductive cycles. Both fresh water and marine species of green algae (*Chlorophyceae*) have similar periodicities in reproduction as well.<sup>14</sup>

Moon-related rhythms in higher plants have been regarded as empirical truth by traditional agrarian cultures, and form the basis of different systems of planting and harvesting cycles. Modern research has confirmed some aspects of this, however, reports are inconsistent, with some species growing faster during full moon, others during new moon, and others in moon-related cycles at other times; the commonality of these observations is cyclical oscillations of growth.

One possible explanation for the variability is that the moon's influence does not wax and wane only with the full and new moons, which is the synodic lunar

rhythm of the sun-moon-earth relationship, but also on the tropical rhythm of the earth-moon relationship from the geocentric point of view.<sup>12</sup>

Light intensity as low as 0.1 lux during the night can affect the photoperiodic time measurement in some plants. A full moon can reach 0.3 lux in northern latitudes, and up to 0.9 lux closer to the equator. In some species the presence of moonlight causes earlier onset and increased proliferation of flowers, while in others it inhibits flowering; some species have developed mechanisms of folding their leaves to shield themselves from moonlight, which disturbs their internal photoperiodic cycles. Since the production of medicinal compounds is strongly correlated with budding and flowering phases, it is reasonable to expect that increased or decreased flowering in response to moonlight would be accompanied by increases or decreases in levels of those compounds.

Mr. Harlalka also had this say about the moon: "The dawn of full moon days in particular is a very unique time for the development of sensory molecules in the plant kingdom, as well as a very energetic time for animals. According to Indian philosophy, the moon is responsible for creating sweetness. For this reason, people put sweets and herbal medicines under the full moon to receive a shower of nectar, and then eat them in the morning. Likewise, the formation of sweet-smelling molecules like epi-methyl jasmonate in *Jasmine grandiflorum* is the highest when the moon is in its full power. Roses also produce their maximum fragrance in the morning, especially on the full moon day of April. These types of flowers are harvested before the redness goes out of the sky at dawn, and taken directly to the processing unit to avoid losing those sweet molecules."

### Antimicrobial, Allelopathic, and other Immune Function (Botanical Pranic Intelligence)

Allelochemicals are secondary metabolites that influence the growth and development of surrounding plants and organisms, both positively and negatively. In general they function to protect the producing plant by either repelling unwanted plants or attracting beneficial organisms that assist its survival. They do this through a variety of mechanisms, such as targeting photosynthetic functions, nutrient uptake, and enzyme activities. Many important therapeutic compounds from medicinal plants are produced for allelopathic functions, including phenols, flavonoids, terpenoids, carbohydrates, amino

acids and alkaloids. Like herbal medicines in general, individual compounds are less effective than synergistic combinations.<sup>15</sup>

Allelochemicals could be described as an aspect of botanical immunity that operates in the terrain in which the plant grows. Like many other secondary metabolites, production of allelochemicals increases when plants are under stress from deficiency of water, sunlight, or other factors; when not under stress these compounds may not be produced, or produced minimally. Likewise, when target plants are stressed they become more susceptible to the effects of allelochemicals.<sup>16</sup>

Allelopathic compounds are one of the reasons that weeds and invasive species can aggressively overtake other plants in ecosystems, through suppressing germination and other mechanisms. In some cases these compounds are the source of the plant's therapeutic benefits. An excellent example is *Cyperus rotundus*, a major herb in Chinese medicine used for conditions of stagnant chi, especially of the liver. It is somewhat ironic that this herb is one of the primary ingredients in the famous formula "Free and Easy Wanderer" and also one of the most invasive plants in the world. In traditional ethnobotanical medicine, a high percentage of plants used for medicines are classified as invasive weeds; the increased use of such species as sources of medicinal compounds created for allelopathic purposes could be a viable solution for their control.

Translated to therapeutic benefits, some allelopathic functions can also be seen to operate within the terrain of the human body. For example, the essential oil produced within eucalyptus leaves, with eucalyptol (1.8-cineole) as a primary component, gives both antimicrobial protection to the tree as well as allelopathic protection when the leaves fall to the ground by discouraging the growth of other plants that would compete for water and soil nutrients.

The parallel in the human body is that eucalyptus oil has antimicrobial powers that operate both in the atmosphere when diffused as well as in the respiratory system when inhaled, where it acts as a decongestant expectorant to regulate the terrain of mucous membrane immunology by discouraging the colonization of unwanted organisms.

In some cases the functions extend beyond the immune function of the tree and its secondary parallel benefits to humans. Azadirachtin in neem leaves, for example, gives antimicrobial protection to the tree with secondary antimicrobial benefits to humans, allelopathic

protection that repels other colonizing plants, and also functions as a highly effective and nontoxic pesticide for agricultural uses.

This multitude of molecular functions reveals the profound level of mandalic intelligence that operates within nature. It specifically points to the role of plants as agents that first created the biospheric conditions for higher life forms to emerge, and now offer their evolutionary immunological intelligence to protect those forms of life through broad-spectrum immunological strategies that target a wide range of pathogenic microbes and harmful insects while protecting and promoting beneficial ones. It also points to the vast potential of known and undiscovered applications of medicinal plants, not only in the sphere of human health, but also for veterinary medicine, agriculture, industry, and other fields.

It has been found, for example, that intercropping Chinese medicinal plants such as *Atractylodes lancea* and *Euphorbia pekingensis* with food crops has strong inhibitory effects on microbial pathogens.<sup>17</sup> Other studies have found that medicinal plants can be intercropped with food crops to treat specific plant diseases, such as using *Geranium pratense* to control potato scab through the presence of antimicrobial compounds produced within the geranium roots.<sup>18</sup>

Studies such as these indicate that medicinal plants have the potential to regulate microbial communities of the soil effectively. A parallel can be easily drawn between the terrain-regulating effect of herbs in the soil and their terrain-regulating effects in the human body. Politically and ecologically, knowing that medicinal plants have the capacity to control soil microbial pathogens is revolutionary, as high levels of toxic inputs to sterilize soils is one of the basic practices of petrochemical agribusiness.

## Earth, Water, and Air

In addition to the celestial influences of sun and moon and the genetic intelligence of micro-mahat operating as each plant's pranic immunity, there are infinite variables of influences from soil, water, and air that create its medicinal compounds. What are the unique ecophysiological characteristics of high altitude plants that cause them to produce higher levels of certain constituents than when grown at lower altitudes? What effects is climate change having on medicinal plants, and how will this alter their therapeutic powers? The study of these biospheric elements within the context of herbal medicine offers the opportunity to gain vast insight into biological interrelatedness, with both medical

and spiritual relevance. (Due to lack of space, only a few representative examples will be given.)

Modern agricultural research describes the effect of dryness on plants as “water stress.” The traditional belief that plants from the wilderness were more potent than domesticated species has applied specifically to aromatic plants. It has been thought that aromatic plants from arid regions that live with chronic water stress have higher potency due to higher concentrations of aromatic compounds in comparison to moister plants with higher ratios of water to essential oils. One example of this is frankincense from the driest regions of the desert, the tears of which were referred to by traditional healers as “drops of concentrated sunlight.”

A specific example confirming this in modern research is a study that found that the concentrations of carvacrol production in Iranian savory (*Satureja hortensis*) increased dramatically when the plants were subjected to high levels of water stress.<sup>9</sup> Carvacrol is a phenol, and one of the most potent antibacterial compounds found within aromatic plants such as savory, thyme, and oregano. These oils are also more dermatotoxic and gastric irritant than many, with the presence of phenols as a primary factor. In this particular case it could be said that the increased likelihood of inflammation as a result of higher content of phenols could be described as the elemental expression of increased intensity of dryness and heat environmentally.

An opposite example is the effect of water stress on *Artemisia annua*, which reduces the production of artemisinin within its leaves. In some cases, water stress does not affect the production of primary medicinal compounds: levels of silymarin in milk thistle seeds remain relatively stable under various levels of water stress.<sup>19,20</sup>

Soil chemistry plays a direct role in the production of some types of secondary compounds in some species.

One example is triterpene saponins, collectively called ginsenosides, which are the major secondary products present in ginseng roots. Different ginseng species have different proportions of ginsenosides in root tissue that in turn give different pharmacological properties. Even within a specific species, levels of particular ginsenosides are affected by various environmental factors, including mineral nutrient supply within the soil. This is probably one of the reasons that wild ginseng is universally acclaimed as being a more powerful tonic than cultivated; the renowned old wild roots can therefore be thought of as carriers of a unique regenerative power derived partly from years of accumulating and concentrating mineral nutrients from wilderness soil.<sup>21</sup>

## Conclusion

While the study of phytochemistry is immensely important for both agriculture and medicine, my personal interest in the subject is simply as a contemplation that deepens my awareness of nature’s beauty and intelligence. The focus of my work as an herbalist and teacher at this time could be summed up as finding ways to articulate our biological interrelatedness with all beings. Without a collective dawning of direct sensory awareness of elemental interconnectedness, the likelihood of our species having a habitable world to reside in appears to be decreasing rapidly, while the awakening of the sensitivity that awareness brings represents the hope of creating a sustainable spiritual culture.

The references for this article are available on our website, [www.botanicalmedicine.org](http://www.botanicalmedicine.org). To access them, click the “references” link at the bottom of the home page. Thank you!

# Pelvic Decongestant Herbs

Deborah Frances, RN, ND

## *L. Achillea millefolium* (Yarrow)

### Asteraceae

**Parts Used:** Flowers (more aromatic for disinfectant and digestive actions) and leaves (more astringent for hemorrhage)

**Indications and Uses:** Passive or hypertonic uterine hemorrhages, emmenagogue for sluggish or slow-to-start menses. Astringent styptic for hemorrhagic menses. Astringency also useful in bleeding from the urinary or gastrointestinal tracts. Anti-inflammatory in urinary and reproductive tracts. Ovarian inflammation, chronic urinary tract infections, interstitial cystitis, fibroid tumors of the uterus, tendency to uterine prolapse.

Specifically indicated for sensitive individuals who are overly affected by their environment; yarrow empowers and builds protection. Wounded healer who feels the pain of others easily or who becomes worn down from years of listening and helping others with their pain. Brings renewed strength to the wounded warrior worn down and battered from “fighting the good fight.” (i.e., social activist, soldier, etc.)

**Other actions:** Digestive bitter, diaphoretic (hot tea), diuretic (cold infusion). A must for every first aid kit. *Achillea* acts as a styptic, disinfectant, and an anodyne when placed into a fresh wound. It will also prevent swelling and excessive extravasation of blood into the area.

## *Actaea racemosa* (Black Cohosh, *Cimicifuga*) Ranunculaceae

**Parts Used:** Roots

**Constituents:** Isoflavones, salicylic acid, triterpene glycosides, ferulic acid, isoferulic acid.

**Specific Indications:** Depression, history of sexual or physical abuse, trauma, psychic trauma or attack, history of substance abuse, “a black cloud comes over,” sudden-onset depression, gloominess, irritability. Sycotic miasm (homeopathy) with or without the depression. Patient may be loquacious.

Rheumatic pains (think joints or fibromyalgia-type aches), or spasm of smooth or skeletal muscle, especially low back pain, but can be anywhere, thoracic spine, cervical spine. Also use all month to tone uterine muscle and relieve pelvic congestion associated with menstrual cramps. Especially well indicated when menstrual pain radiates to low back or down legs. Achy sensation in legs and/or low back with menses.

Despite its general reputation as an anti-spasmodic it can be used to strengthen contractions in labor. Tonifying to uterine muscle.

Indicated as an emmenagogue for scanty or late menses or for amenorrhea. Contraindicated in first trimester of pregnancy due to threat of spontaneous abortion.

Migraines especially when associated with cycles. Menstrual headaches. (Use with feverfew.)

Pelvic congestion with dull aching.

*Cimicifuga* has been shown in multiple studies to be protective in the prevention of osteoporosis.

Often very effective for menopause, hot flashes, insomnia, depression, mood swings. May also be used intravaginally in combination with vitamin E for atrophic changes and to protect urinary bladder mucosa as well as vaginal tissues. It is thought to compete for estrogen receptor sites, thereby normalizing estrogen metabolism. Useful for hyperestrogenic conditions such as endometriosis as well as menopausal complaints.

Pelvic congestion in men with prostatitis or epididymitis. Achy pain in prostate or testicles.

Excellent musculoskeletal antispasmodic for men and women.

Has also been used for achiness of influenza, where it has some action as an expectorant and is most useful in early stages. It also can act as a bronchodilator due to relaxation of bronchioles, especially when other symptoms indicate its use.

Hypotensive due to peripheral blood vessel dilation and smooth muscle relaxation in vessel walls.

Anti-spasmodic, anti-inflammatory, nervine, hypotensive, peripheral vasodilator, tonic to female reproductive tract, decongestant. Also acts as diaphoretic, diuretic, and mild digestive aid.

**Toxicity:** First sign of toxicity is a dull frontal headache, which can produce a pounding headache if dosing is continued. I often give *Actaea racemosa* to menopausal women with serious hot flashes as a simple and tell them to dose themselves as needed to control hot flashes. I warn them to back off if the dull frontal headache shows itself.

Other symptoms of toxicity include bradycardia, hypotension, nausea and vomiting, flushed face, sensations of lightheadedness and dilated pupils.

PLEASE use farmed *Actaea racemosa* whenever practical, as this plant is very popular and therefore may be in some danger of being overharvested.

### *Angelica sinensis* (Dong Quai or Chinese Angelica) Umbelliferae

**Parts Used:** Roots

**Constituents:** Several vitamins including B12, C, E, A, and biotin. Also contains minerals including calcium and magnesium. Contains coumarins, phytosterols, ferulic acid, succinic acid, sesquiterpenes.

**Indications:** Warming blood mover, promotes circulation in pelvis, alterative/tonic/nourishing blood mover.

Antispasmodic, use as a uterine tonic all month long for menstrual cramps. Normalizes cycles.

Nourishing and purifying to the blood. Indicated for anemia and for women who feel weak and anemic during menses. Also useful as nourishing tonic for the menopausal transition.

Antihypertensive, increases peripheral circulation through vasodilation of peripheral vessels, increases coronary blood flow, increases heart contractility, decreases arrhythmias, and decreases platelet aggregation. May be

contraindicated in patients on blood thinning pharmaceuticals as it contains coumarins. Furocoumarins may also cause photosensitivity. Presence of beta-sitosterol contributes to mild action in lowering of cholesterol.

Hepatoprotective.

May be useful in asthma due to relaxation of smooth muscle of bronchioles.

May be indicated for constipation due to pelvic stagnation. Dry, hard stools. Dryness is a strong indication for *Angelica sinensis*. Constipation of old age.

Contraindicated in heavy menses. Many herbalists recommend discontinuing this herb during the menses, restarting it again once the monthly flow has stopped. Anti-inflammatory via prostaglandin modulation.

There is some suggestion in the literature that dong quai may be useful in toning immune response in influenza and preventing the cytokine storm associated with death from influenza.

### *Alchemilla vulgaris* (Lady's Mantle)

#### Rosaceae

**Parts Used:** Leaves or aerial parts when flowers are budding

**Constituents:** Salicylic acid, tannins, flavanoids, some bitters

**Indications:** Tonic to uterine, heart, abdominal and other muscles. Alleviates menstrual pain when taken regularly as a tonifying agent. Tannins lend astringency in cases with excessive uterine bleeding. More specific for laxity than hypertonicity. Tonifies where excessive wet discharges occur due to laxity of tissues. Tightens mucous membranes and repels excess fluid.

Has been used postpartum to restore tone to uterine and abdominal muscles and to breasts after months of nursing. Here it may be used as an externally applied poultice as well as taken internally.

Lady's mantle is said to be protective, and is especially well suited where a woman is in a relationship with an insensitive or abusive partner. Here I would argue that it protects and strengthens both heart and pelvic organs. It is also indicated for trauma, emotional or physical, and should be considered after miscarriage, abortion, surgery, ruptured ovarian cyst, or pelvic inflammatory disease. Regulating to the menstrual cycle.

The morning dew collects on the leaves in drop-lets that are said to have alchemical healing properties when the drop is taken by mouth, hence the name, *Alchemilla*.



Literature suggests lady's mantle may possess significant antioxidant activity due at least in part to the presence of flavonoids.

Also acts as a soothing nervine and may help relieve symptoms associated with PMS.

### ***Aletris farinosa* (True Unicorn Root)**

#### **Hemodoraceae**

Uterine tonic, often confused in the literature with false unicorn root, (*Chamaelirium luteum*). Felter feels its value is largely as a digestive aid, acting as a stomachic and appetite stimulant.

### ***Capsella bursa-pastoris* (Shepherd's Purse) Brassicaceae**

**Parts Used:** Aerial parts with fruiting "little purses." Must be used or tinctured fresh to be effective.

**Indications:** Shepherd's purse is largely used for uterine hemorrhage, but also can act as a tonic, possibly useful all month to tonify uterine tissue and prevent excessive menstrual bleeding. Also a gentle stimulant to urinary tract.

### ***Caulophyllum thalictroides* (Blue Cohosh) Berberidaceae**

**Part Used:** Roots (the berries are poisonous)

**Constituents:** Alkaloids, saponins

**Indications:** Ovarian symptoms, chronic inflammation in pelvis, or following acute PID, big congestive remedy, specific for ovaries.

Tonic to uterine muscle. Can stimulate contractions or ease spasm in hypertonic uterine muscles. For use with menstrual cramps especially when associated with heaviness in the pelvis and achiness. Best taken all month long as a tonic to prevent cramps. Also for profuse menstruation, amenorrhea. Can act as an emmenagogue for delayed or suppressed menses.

Enhances blood flow to the pelvic organs.

Contraindicated in early stages of pregnancy as it may induce miscarriage via uterine stimulant actions.

### ***Ceanothus spp.* (Red Root, Wild Lilac) Rhamnaceae**

**Parts used:** Roots or root bark. Abundant in nature, this plant likes waste areas where it makes its appearance and fixes nitrogen in the soil.

**Constituents:** Several alkaloids, resins, tannins, methyl salicylate, flavonoids, betulinic acid. Also several minerals including zinc, copper, iron, magnesium and calcium.

**Indications:** This plant gets stagnant lymph moving through the pelvis and elsewhere in the body as well. Tannins and flavonoids combine to make it an excellent medicine for excessive menstrual bleeding; astringency combining with decreased capillary fragility.

Well indicated for ovarian cysts and uterine fibroids. Very nice for premenstrual breast tenderness and fibrocystic breasts (15 drops 3 time per day all month long).

Strengthens liver and spleen function. Huge spleen remedy. I have used this remedy in material and low-potentized doses for hemolytic anemia with great success.

A specific for acute mononucleosis infection or chronic viral infection.

### ***Chamaelirium luteum/Helonias dioica* (False Unicorn Root) Liliaceae**

**Parts used:** Rhizome

**Indications:** Heavy sensation of fullness and dragging in pelvis, especially with menses. May be aching and pushing sensation with menses as well. Mental dullness with irritability, depression, low-spirited apathy. Loss of libido. Sticky leukorrhea. Anemia. Supports digestive function and increases appetite. Uterine tonic, diuretic. May be used for premenstrual breast tenderness due to cysts, but as it is a threatened species, use *Ceanothus*, which is abundant.

For men *Chamaelirium luteum* may be considered for epididymitis, prostatitis and enlarged prostate.

This plant has been listed by United Plant Savers as a threatened species so please use only when specific indications call for it; often drop doses will suffice. It can be mixed in formulas with other pelvic movers when specifically indicated, in which cases it will act as a synergist.

### ***Fouquieria splendens* (Ocotillo) Fouquieriaceae**

**Parts used:** Bark

**Constituents:** Several glucosides, resins

**Indications:** Powerful pelvic mover and lymphatic; and venous circulation gets going with ocotillo. Benign prostatic hypertrophy in men.

Enables patients to move into life from a more centered place. For the scattered patient or anyone who needs help in grounding their center to move out with definite intention and confidence.

Use judiciously: it is a desert plant protected in the state of Arizona

### ***Leonurus cardiaca* (Motherwort)**

#### **Labiatae**

**Parts used:** Leaves

**Constituents:** Several alkaloids, flavonoids, glycosides

**Indications:** Emmenagogue, stimulates bleeding when menses are delayed or sluggish. Antispasmodic, helpful for menstrual cramps, especially when menses are delayed or scanty. Water retention and tension associated with PMS.

Carminative, bitter digestive stimulant.

Nervine; calms and soothes the nerves for overworked mothers who could use some mothering themselves, also for anxiety and tension of PMS or menopause.

My top favorite choice for functional heart palpitations, also may help with atrial fibrillation if given early enough. Most patients with supraventricular tachycardia, where the heart races (i.e., 150 beats per minute; normal is 76), are told by emergency room doctors that their problem is due to stress. Motherwort recognizes and treats the nervous system but also addresses liver and digestive function, thereby addressing the source of toxemia that irritated the nervous system to begin with.

Motherwort is a useful adjunct in the treatment of hyperthyroidism.

Motherwort also contains glycosides that can contribute to lowering blood pressure.

### ***Nuphar lutea/Nymphaea odorata* (Yellow/White Pond Lily) *Nymphaea***

**Parts Used:** Roots

**Constituents:** Alkaloids, starches, tannins, flavonoids

**Indications:** The pond lilies are very specific for urinary tract inflammation (interstitial cystitis), and pelvic congestion with heat (inflammation). Pond lilies are in fact contraindicated in cold congestion. Astringency helps tonify mucous membranes where there is too copious discharge and has long been used for leukorrhea and vaginitis. Here it is an excellent medicine when taken internally, because it also keeps circulation and lymph

flowing through the pelvis, thereby addressing, at least in part, the underlying cause. Has also been used for generalized lymphatic stagnation.

Related to the East Indian lotus. The old alchemical saying, "for a tree's branches to reach to heaven, its roots must reach to hell" fits this plant very well. The doctrine of signatures of this plant reminds us that enlightenment draws its nourishment from the dark underworld journey to the depths of the soul, often a messy and painful process. The roots that nourish the lotus-like flowers must be harvested from the muck of the pond.

One species of *Nymphaea* has been shown in research to possess anti-oxidant activity due to the presence of a significant number of flavonoids.

Another species, *Nymphaea stellata*, used in Ayurvedic Medicine, has been shown to be hepatoprotective.

### ***Anemone spp.* (Pulsatilla, Windflower, Pasque Flower) *Ranunculaceae***

Pulsatilla is a prime prostate remedy and I have used it many times in formulas for older men with enlarged prostatitis or in cases of prostatitis in any aged man. It should be prescribed on specific indications and will serve best in the mild, eager to please male. Pulsatilla is also indicated for epididymitis, spermatorrhea, urethral irritation, and orchitis with dark red swelling of a very sensitive testicle.

For women pulsatilla will aid with delayed, scanty, or suppressed menses, especially when due to stress, nervous exhaustion, or from getting her feet cold and wet. Ovarian symptoms include neuralgia with a dull, nagging, achy pain that can turn more violent. There may be congestion in the ovaries, inflammation, endometriosis. It acts as a tonic to the uterus when taken all month long for dysmenorrhea. Leukorrhea, when present, will be bland, thick, white or yellowish in character. A sensation of weakness and fullness in low back and hips may accompany pelvic symptoms. Premenstrual symptoms include headaches, irritability, depression, and weepiness.

Pulsatilla is an important hepatic and digestive herb, particularly helpful if symptoms of indigestion occur after indulgence in rich creamy foods, pastries, or fatty foods. There may be bilious headaches after rich fatty foods. The tongue may have a greasy coat. There may be diarrhea alternating with constipation.

The patient generally presents as mild, yielding, and eager to please. There may be a tendency to weep, sometimes without knowing why. Gloominess with timidity and fearfulness are common symptoms. There may be marked irritability, despondency, depression, sadness.

Anxiety is a significant complaint with nervous exhaustion, debility, insomnia, and restlessness potentially presenting as part of the picture. Pulsatilla should also be considered for nervousness due to abuse of tobacco.

Venous congestions, varicosities, and hemorrhoids reflect liver congestion and the general tendency to weakness in vessels. Pale women with anemia who complain of feeling chilly and weak suggest this plant.

Pulsatilla acts as a cardiac tonic where it is used for functional heart palpitations, tachycardia from nervousness, dyspnea, and a pulse that is weak and feeble. The herb acts to slow and strengthen the heart and respiration, increase circulation to the central nervous system, and increase peripheral circulation.

The plant has been used internally for glaucoma, iritis, scleritis, and cataracts. There may be a deep-seated heavy pain in the globe of the eye. It has also been used in the treatment of conjunctivitis. Homeopathic preparations of the plant are very effective for acute conjunctivitis in patients of any age.

Pulsatilla is anti-inflammatory. Discharges tend to be bland, thick, yellow or white, but usually there is a tendency to dryness.

Doses should be kept low, as Pulsatilla has significant potential toxicity causing gastroenteritis with burning pains in mouth and throat, abdominal pain, nausea, vomiting, and bloody diarrhea. Paralysis, sensory and motor nerve depression, convulsions, coma and death are a result of toxicity to the nervous system. Cardiac symptoms of overdose include arrhythmias, feeble pulse, bradycardia, and dyspnea. The plant is contraindicated in bradycardia and acute gastrointestinal inflammation.

Pulsatilla is an excellent synergist when used in small doses to potentize a formula for treating pelvic congestion.

Dosage of 1:2 fresh whole plant tincture should not exceed 5-10 drops TID. Preparations must be made from fresh plant material to be effective.

## *Turnera aphrodisiaca/diffusa* (Damiana) Turneraceae

**Parts used:** Leaves

**Constituents:** Caffeine, arbutin, flavanoids, terpenoids, saccharides, phenolics, essential oil

**Indications:** Urinary antiseptic, tonic to nervous system and digestive tract.

Warming pelvic herb, uplifting, invigorating, antidepressant nerve. Sexual/reproductive tonic, important herb for erectile dysfunction in men where it combines well with muira puama, catuaba and Smilax. There is some thought that the plant's flavonoid content may be contributing to its ability to act somewhat as an aphrodisiac in waning sexual function, as similar flavonoids have been isolated from yohimbe.

Its anti-inflammatory activity has been shown to be higher than that of alpha tocopherol (vitamin E).

Traditional use in Brazil includes treatment of gastric ulcer, validated by recent scientific research.

## *Gossypium herbaceum, G. thurberi* (Cotton Root Bark) Malvaceae

**Parts Used:** Inner bark of fresh root or rhizome contains red resin, essential oil, and tannin

**Indications:** Emmenagogue for slow to start, sluggish menses with sensation of dragging in the pelvis and concomitant dull low back pain or discomfort.

Tonic to uterine muscle. Can work synergistically with body's oxytocin to induce or speed up labor in cases where pitocin is being considered. Helps bring uterus back to normal size and tone postpartum and can also act as a galactagogue where necessary.

Presence of astringent tannins suggest antihemorrhagic properties for excessive menstrual bleeding.

Fresh root bark was used by black slaves in the Old South as an abortifacient, and was reputed to be quite effective in this regard. (I am unaware of dosages necessary for this action.)

Scientific literature suggests the use of *Gossypium* may be of aid in treating breast cancer.

The references for this article are available on our website, [www.botanicalmedicine.org](http://www.botanicalmedicine.org). To access them, click the "references" link at the bottom of the home page. Thank you!

# Wild Indigo and the Greek Goddess of Communication

Deborah Frances, RN, ND

## *Iris versicolor* (Iris, Blue Flag)

### Iridaceae

**Parts Used:** Roots and rhizomes

**Dosing:** Potentially toxic (please use care in dosing this herb)

**Fresh herb:** 1:2, 1 to 5 drops up to 3x per day (Tilgner)

Native to wet and boggy areas of the eastern United States

We have come to expect to get all we need to know about a plant medicine from books or the written word. Traditional stories as told by indigenous people throughout the world about each plant and Medicine have given us a much larger understanding than our modern cerebral fact gathering and information sharing ever has.

Iris, the Greek Goddess of Communication, also known as the Rainbow Goddess, facilitates the transfer of messages from the Lower and Under Worlds (which may be psychologically interpreted as various levels of the unconscious) to the Upper Worlds (consciousness). The plant *Iris versicolor*, entirely too underutilized in herbal medicine, is very specific and highly effective in reducing thyromegaly (simple goiter or uncomplicated enlargement of the thyroid gland).

As a student in 1985 I had the opportunity to hear the late and highly revered Dr. John Bastyr, N.D. (1912-1995) give a lecture at Bastyr College of Naturopathic Medicine. He remarked that hypothyroidism is common among women because there is so much resistance in the culture to the voices of women. He suggested that women practice speaking against cultural resistance by “singing into the wind.”

The incidence of hypothyroidism has increased astronomically in the past few years due in part to increased toxins in our environment and, perhaps more importantly, to the meltdown of the Russian nuclear power plant, Chernobyl, over twenty years ago. The incubation period for radiation affecting thyroid function is roughly twenty years. Nineteen years after the event, thyromegaly and hypothyroidism, once the occasional clinical occurrence, has become epidemic.

*Iris versicolor* is an invaluable alterative in the treatment of thyromegaly where thyroid swelling is soft and uncomplicated by adenomatous or cystic lesions. In these cases it should be accompanied by other herbs as indicated for the condition, such as *Fucus* and kelp for hypo or euthyroid conditions, and *Lycopus*, *Melissa*, and *Leonurus* for hyperthyroidism.

As an alterative, iris is specifically indicated for liver congestion with inflammation. Its reputed success in the treatment of reactive hypoglycemia may be due to an alterative effect in the liver that allows it to produce glycogen adequately in response to changing blood glucose levels. Dr. Mitchell used it in formulae for the treatment of psoriasis with liver involvement.

Like *Ceanothus spp.*, Iris is specific for fullness and congestion of the spleen, and is an excellent lymphatic, being especially well suited for soft swelling of lymph nodes.

Iris has been used as a blood cleanser and may be indicated for the treatment of patients with a tendency toward sepsis, or for those who suffer with chronic low-grade septic conditions. These (usually) bacterial conditions generally have some level of toxemia as an underlying cause.

Some of the old writers report the successful use of iris in the treatment of acute pancreatitis, especially when accompanied by a burning sensation in the pancreas. Toxic doses can cause significant burning anywhere in the digestive tract, while low doses may be used to treat the same symptoms with success. Excessive salivation may also be an indication that iris can be of help.

Iris stimulates the flow of bile from the gall bladder and may help increase appetite by enhancing digestive function.

Toxic or sick digestive headaches as well as migraines may be helped by *Iris versicolor*. Often there is a sensation of a heavy weight at the back of the neck. The headache generally in the frontal area may be preceded by an aura of blurring in the eyes, and is generally better from slow movement and worse from rest. A concomitant low-grade depression often accompanies the headache. In these cases I have used both drop doses of the herb and homeopathic potencies with success.

Matthew Wood tells us that patients who respond to *Iris versicolor* are usually over-responsible women who are prone to become overwhelmed and depressed as a result of the burdens they carry, hence the sensation of a weight at the back of the neck.

Traditional Native American uses include as a cathartic and for the treatment of burns. Wood reports success in topical use of iris for sunburn, and another source reports using the plant in formula with *Trifolium* and *Sanguinaria* for topical treatment of skin cancer.

The plant contains triterpenoids.

**Toxicity:** Although this plant is very safe, she is dose-sensitive. Like the goddess she is named for and the women who are reclaiming the power of the spoken word, she should be treated and dosed with respect.

Toxic symptoms include nausea and vomiting (the first symptoms of toxicity in most dose-sensitive plants), burning in any area of the gastrointestinal tract, diarrhea, and, ultimately, death. Ideally this plant should be used with medical supervision.

## ***Baptisia tinctoria* (Wild Indigo)**

### **Fabaceae**

**Parts Used:** Fresh roots are generally used but Dr. Mitchell tells us the leaves can also be used for medicine.

**Dosing:** 1:1 Fresh root extract, 2 to 10 drops up to 4 times per day (Tilgner). Smaller doses may be used more frequently to good effect. Nice synergy with *Echinacea* in septic bacterial infections.

*Baptisia tinctoria* is primarily indicated for low-grade septic conditions with bluish or purplish colored skin or mucous membranes. Bright red inflammation is not present in the patient who needs *Baptisia*. Instead the inflammation is low grade and lacks the strength to bring things to resolution. Fevers are low, normal, or subnormal, certainly not what one would expect as a healthy response to severe infection. The patient's vitality is sapped. Circulation to the area is poor, with stagnation and blueness at the site of infection. There may be destruction of tissues with sloughing and foul-smelling discharges. Necrosis and gangrene are also indications for *Baptisia*.

Significant myalgia. Prostration, sick feeling, putrid-smelling discharges. Face may be swollen and the patient may have a dull tired look in the eyes, as there is often mental dullness and difficulty in thinking. Stupor, difficulty in staying awake, heavy swollen eyelids. Head feels heavy. Melancholia, apathy.

Patient is likely to be chilly or appear cold. Chills, but little to no fever despite purulent infectious process.

Anti-microbial, bacterial infections, strep, staph. Sinusitis with fetid catarrh, foul smelling coryza, and pain at root of nose.

Gingivitis with sore painful gums, ulcerated gums, foul smelling breath, burning tongue, flat, bitter taste in the mouth.

Pharyngitis with dusky red throat or purplish blue color.

Pharyngitis with pale tissues.

Sensation of constriction in throat.

Halitosis with putrid-smelling breath.

Constriction in the chest and fear of suffocation with bacterial pneumonia.

Urinary tract infections with purulent urine, pyelonephritis.

Puerperal fever, PID.

Infectious diarrhea with ulceration of mucous membranes of intestinal tract.

Persistent diarrhea with dark tarry stools. Thin, bloody diarrhea. Astringent as well as anti-microbial.

Dr. Mitchell used *Baptisia* for colitis and bacterial enteritis, where he frequently combined the plant with *Hydrastis*, *Ulmus*, and *Zingiber*.

Cellulitis, indolent ulcers with bluish purple edges.

Historically, *Baptisia* has been used to treat symptoms from typhoid vaccine, for the treatment of typhoid

disease and malaria, and as an adjunctive treatment of diphtheria.

As a cardio-active herb, *Baptisia* may be used where the pulse is intermittent, especially in elders. *Baptisia* acts to increase the strength as well as the rate of the heart. It will also increase respiratory rate, although toxic doses may lead to respiratory arrest.

*Baptisia* stimulates stagnant capillaries and lymphatics, acts as an immune modulator and antimicrobial, antibacterial agent. Bitter constituents stimulate the liver and gall bladder to function more optimally and thus deal with the toxemia that is undoubtedly an underlying factor in the development of infection. In this regard, *Baptisia* acts as an alterative, bringing function back to normal via circulatory, hepatic, and lymphatic channels.

A diluted solution of *Baptisia* may be painted on to affected areas where tissues are dusky red, bluish purple and have fetid discharges. These topical applications work best when accompanied by internal use of the herb as well.

Constituents include a number of alkaloids, sparteine isoflavonoids, and formononetin. The alkaloid cytosine is probably the constituent that gives the plant its microbial actions as well as its toxicity. Formononetin may lend some phytoestrogenic activity.

*Baptisia* is *highly toxic* when taken in excess. Low dosing is all that is needed for this plant to do its work. Symptoms of toxic overdose include severe vomiting

and catharsis, profuse salivation, gastroenteritis and, eventually, respiratory paralysis if the patient does not succumb to death by electrolyte imbalance and dehydration first.

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# Botanical Treatment of Fungal Infections

Deborah Frances, RN, ND

## *Melaleuca alternifolia* (Tea Tree Oil)

### Myrtaceae

Although they are by no means the only essential oils that are efficacious against fungi, volatile oils extracted from the leaves of *Melaleuca* have become very popular in the topical treatment of fungal infection. The oil is antibacterial, anti-inflammatory, and antiseptic as well as antifungal. It also acts as a counterirritant to encourage a vigorous and healthy inflammatory response to bring things to resolution. Because the oil is strong, it should not be used on sensitive, thin-skinned areas such as genitalia. The soft delicate skin of a baby is also not likely to respond favorably to topical applications of tea tree oil.

Tea tree oil has been shown to enhance wound healing and has been applied to decubitus ulcers (bedsores) and non-healing wounds of diabetics, two notoriously difficult problems to resolve. A 10% solution of the oil has also been used in the treatment of head lice.

It is not unwise to test an area of the skin with a small application of the essential oil to ensure tolerance, as some individuals will have a sensitivity reaction.

## *Chilopsis linearis* (Desert Willow)

### Bignoniaceae

**Parts Used:** Leaves and bark may be tinctured. Flowers are best dispensed as teas. Flowers should be harvested and dried with tender loving care as they are fragile and will store for only 6 months. Leaves and bark are tougher and will last longer.

*Chilopsis* is a desert tree that looks like a willow but in fact is not in the same family. Like the willows, however, it prefers moist areas, growing along washes

and waterways. Flowers contain anthocyanins. Leaves and bark contain a piperidine alkaloid, squalene, and alkanes.

Tincture or tea may be taken internally to enhance immune response to fungal infection. Topically it may be applied as a salve, or the powdered leaf/bark can be sprinkled liberally onto the affected area. Unlike the essential oil of *Melaleuca*, *Chilopsis* is safe for sensitive skin and the skin of infants. It is fine in salves for babies with tinea or as a powder to treat a fungal diaper rash.

Moore suggests oral doses of ¼ to ½ teaspoon of tincture or 2 to 3 ounces of a strong tea taken twice daily. Like any of these herbs, internal doses can also be used for the prevention and treatment of intestinal overgrowth of candidiasis. Patients taking antibiotics should also supplement with probiotics, including *Saccharomyces boulardii*, which should be started during treatment. Other probiotics, such as *Lactobacillus*, are best started once antibiotic therapy is finished.

## *Tabebuia* spp. (Pau d'arco)

### Bignoniaceae

**Parts Used:** Bark; Native to Brazil

Pau d'arco has a strong reputation for being a helpful agent in treatment of fungal infections; however, as there is some question about the sustainability of harvesting practices, it may be wise to select other herbs whenever possible.

In addition to being antifungal, the bark acts as an immune modulator giving it anti-inflammatory, antibacterial, antiviral, and antiparasitic activities, although antibacterial qualities appear to be limited to gram-positive species. Anti-inflammatory activity ap-

pears to be due at least in part to modulation of PGE2 (prostaglandin E2) and NO (nitric acid) pathways as well as COX2 inhibition.

The plant also has actions as a lymphagogue and astringent. One study done with mice suggests it may have antidepressant activity.

The presence of naphthoquinones confirms its folk use for cancer while another constituent, beta-lapachone, has been shown to increase wound healing.

A 1:3.5 tincture prepared from dry herb can be taken at doses of up to 50 drops four times per day. One tablespoon of dried bark can be infused overnight for use as a tea, or a decoction can be prepared. A water extraction has been used as a vaginal dose for candida vaginitis. In these cases internal dosing should also be included in the treatment plan.

### *Larrea tridentata* (Chaparral)

#### Zygophyllaceae

**Parts used:** Leaves

**Indications:** Chaparral is a complex plant with many uses. In addition to being antifungal, it is antibacterial, antiviral, antiallergic, anti-inflammatory, and contains one of the strongest antioxidants to be identified by science, nordihydroguaiaretic acid (NDGA). It is also rich in flavonoids, adding to its antioxidant and anti-inflammatory activity.

I have used this plant successfully as a topical agent for sun damaged skin and actinic keratosis. The positive effects are enhanced when 1-2 cups of tea are taken internally as well.

Asthmatic patients may obtain relief from chaparral through its activity as a lipoxygenase inhibitor and its ability to block the release of histamine, prostaglandins, and SRS-A (slow reacting substance of anaphylaxis.) The plant is also an expectorant.

Chaparral has been used for a wide variety of complaints including arthritis, rheumatism, (I would certainly consider it for fibromyalgia), asthma, allergy, autoimmune disease, respiratory infection, genitourinary symptoms including kidney infection, menstrual cramps, bronchitis, tuberculosis, neuritis, diarrhea and bowel cramping, and a variety of skin conditions. Despite a few reported cases of idiosyncratic liver inflammation attributed to the ingestion of chaparral, it has historically found use in aiding liver and digestive function.

Although chaparral has great fame as an anti-cancer agent, scientific research has been contradictory.

As an antifungal agent it may be used both internally and externally.

### *Anemopsis californica* (Yerba Mansa)

#### Saururaceae

**Parts used:** Fleshy roots. The leaves are also used but are said to be less strong. A 1:5 tincture prepared from fresh roots or a 1:2 preparation of dried root can be dosed at 30-60 drops up to 5 times day. One teaspoon of root can be decocted per cup of water for use as a tea with 1-4 cups per day being the usual dose.

**Indications:** Yerba mansa is well indicated for boggy, inflamed mucous membranes, especially when inflammation is low grade, subacute, or chronic with tissues that are pale rather than bright red. It mobilizes stagnant fluids in the respiratory tract in sinus, bronchial, or lung conditions. In the urinary tract it should be considered for use with cystitis or urethritis. In addition to being antifungal, it is antibacterial, anti-inflammatory, astringent, diuretic, and aids in the excretion of uric acid through the kidneys. It acts generally as a tonic herb for mucous membranes where there is stagnation of fluids and catarrh.

I have used yerba mansa primarily in the treatment of acute and chronic sinusitis. It is of interest that many cases of chronic sinusitis seen in modern practice are fungal rather than bacterial, perhaps from the habitual use of antibiotics. Yerba mansa serves in either case, however, encouraging the body to mobilize fluids from swollen, boggy mucous membranes and fight either microbe, bacteria, or fungi. It combines well with equal parts of horseradish for sinus infection, where the formula may be dosed at 60 drops 5-6 times per day. The dose of the two herbs in combination could quite safely be doubled although I have not found it necessary in my practice.

Yerba mansa may also be used for colds, pharyngitis, (here I would recommend gargling and then swallowing), chronic otitis media, dysentery, and for gastritis and ulcers of stomach and duodenum.

For mouth sores and inflammation of the gums, powdered herb can be applied topically. Powder can also be used topically to treat athlete's foot, tinea, and diaper rash. For the latter it combines well with powdered *Chilopsis*. Topical applications will always be helped by internal dosing of antifungal immune modulating herbs.

Be careful of your source as much of yerba mansa's habitat has been polluted by big business agriculture



(Moore). The plant likes wetland areas and is native to much of the southwest United States.

Constituents are largely warming aromatics with some tannins.

***Spilanthes acmella* (*Acmella oleracea*,  
Paracress) Asteraceae**

**Parts used:** Whole plant.

**Indications:** *Spilantes* is antiviral, antibacterial, and antifungal. Internal use stimulates wound healing, decreases allergy symptoms, and enhances immune function.

Constituents include alkylamides similar to those found in echinacea.

Dosage of a 1:1 tincture prepared from fresh plant material can go as high as up to 60 drops four times per day. A cup of infused herb prepared from 1 tablespoon of plant for each cup of water can be taken four times daily.

***Juglans nigra* (Black Walnut)  
Juglandaceae**

**Parts used:** Fresh green rinds, which are rich in the volatile oil juglone.

**Indications:** *Juglans* rind is antiseptic as well as antifungal when applied topically. It can be used for the treatment of athlete's foot or tinea (ringworm).

Internally *Juglans* acts as an excellent intestinal antiparasitic, antifungal, laxative, and liver and digestive stimulant. It has been used for pinworms, giardia, intestinal toxemia, and hemorrhoids. It should be considered as an adjunct in the treatment of intestinal dysbiosis with an overgrowth of candida.

Others herbs that may prove of help in the treatment of fungal infection include:

*Achillea millefolium* (Yarrow)  
*Allium sativum* (Garlic)  
*Arctium lappa* (Burdock)  
*Commiphora myrrha* (Myrrh)  
*Curcuma longa* (Turmeric)

*Echinacea* spp.

*Hydrastis canadensis* (Goldenseal)

*Phytolacca decandra* (Poke Root)

*Piper methysticum* (Kava)

*Thymus vulgaris* (Thyme) and Thyme essential oil topically

*Usnea* spp. (Old Man's Beard)

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# Vulneraries—Natural Care for Wounds

Cascade Anderson Geller

Vulnerary (*L. vulnerarius*): Any agent useful in healing wounds. Derived from the same Latin root word, *vulnus* meaning a wound, as the word “vulnerable.”

This list represents some of the many vulneraries that have proved useful:

## Selected Materia Medica

**Water/Aqua and Soap/Sapo:** Best cleansing agents.

**Honey/Mel** – Highly healing applied directly to wounds, burns. Helps deter scarring.

**Baptisia** *Baptisia spp.* Fabaceae – Highly antiseptic. Stimulates healing in old wounds.

**Calendula** *Calendula officinalis* Asteraceae – Highly healing, helping wounds resist infection.

**Castor oil** *Ricinus communis* Euphorbiaceae – Stimulating. Helps deter scarring. Do not apply to open wounds. Use after healing or apply with friction rub above or below the lesion.

**Cayenne** *Capsicum spp.* Solanaceae – Antiseptic styptic.

**Chamomile** *Anthemidis/Chamaemelum/Matricaria spp.* Asteraceae – Highly healing.

**Comfrey** *Symphytum officinale* Boraginaceae – Alantoin reduces healing time.

**Cottonwood/Poplar** *Populus spp.* Salicaceae – Resinous winter buds used in liquid bandage formula.

**Creosote bush** *Larrea psp.* Zygophyllaceae – Highly healing.

**Echinacea** *Echinacea spp.* Asteraceae – Disinfectant. Encourages healing of slow healing ulcers.

**Frankincense** *Boswellia sp.* Burseraceae – Resin tears used in liquid bandage.

**Geranium** *Geranium/Pelargonium sp.* Geraniaceae – Good source of tannins for precipitating proteins making a bandaging effect and encouraging healing.

**Goldenseal** *Hydrastis canadensis* Ranunculaceae – Disinfectant.

**Lavender** *Lavandula spp.* Lamiaceae – This, and many other mint family members, highly healing and disinfecting.

**Myrrh** *Commiphora sp.* Burseraceae – Resin tears used in liquid bandage.

**Oak** *Quercus spp.* Fagaceae – Good source of tannins for precipitating proteins making a bandaging effect and encouraging healing.

**Oregon grape** *Mahonia sp.* Berberidaceae – Disinfectant.

**Pine** *Pinus sp.* Pinaceae – Resin tears used in liquid bandage.

**Plantain** *Plantago spp.* Plantaginaceae – Aucubin and other constituents highly healing.

**Selfheal** *Prunella vulgaris* Lamiaceae – Well rounded vulnerary.

**Speedwell** *Veronica sp.* Plantaginaceae (formerly Scrophulariaceae) – Highly healing.

**St. John's Wort** *Hypericum sp.* Clusiaceae – Highly healing. Do not apply oil to open wounds.

**Tea** *Camellia sinensis* Theaceae – Good source of tannins for precipitating proteins making a bandaging effect and encouraging healing.

**Usnea** *Usnea sp.* Parmeliaceae – Good disinfectant and vulnerary.

**Witch Hazel** *Hamamelis sp.* Hamamelidaceae – Good source of tannins for precipitating proteins making a bandaging effect and encouraging healing.

**Yarrow** *Achillea sp.* Asteraceae – Disinfectant and highly healing.

### Formulas

#### Saline Cleansing/Soothing Solution

1-2 teaspoons non-iodized salt with no additives boiled for 5 to 10 minutes in 8-16 oz. water (optional ½-1 teaspoons baking soda)

#### Liquid Resin Antiseptic Bandage Compound

Cottonwood bud, Frankincense, Myrrh, Pine resin tears

Extracts made from high percentage alcohol (50% or more) in equal parts mixed in a small applicator bottle. Shake well before use. Paint onto cleansed wound in three applications, air-drying before each coat.

#### Slow Healing Ulcerations Vulnerary Compound

Echinacea	3 parts
Goldenseal	1 part
Baptisia	1 part

Use as liquid extracts or powdered herbs. Mix well and apply twice daily to wound. If using liquid extracts,

saturate a clean gauze fabric with the compound and apply. Powdered herbs should be thoroughly moistened with hot water, herb tea or diluted extract, to make a runny paste that can be applied directly to the wound area. To the paste, add 1 teaspoon to 1 tablespoon of honey. Either preparation should be applied only to a very clean wound. Compound should be kept moist for one to two hours for best effect. Clean before next application. For highly resistant wounds, 1 to 2 parts *Phytolacca* could be added.

#### Echinacea, Goldenseal, and Myrrh Compound

Echinacea	3 parts
Goldenseal	2 parts
Myrrh	1 part

Follow directions as for the above formula. This may also be taken internally to speed healing or to treat infection. Try 30-60 drops, taken before meals, two or more times a day.

# Calendula: Medicinal Herb, Homeopathic Remedy, Flower Essence

Rhonda M. PallasDowney, DIHom, MA, Herbalist

(Excerpt from “*The Healing Power of Flowers*”)

Herbal medicine, homeopathy, and the use of flower essences exist on a continuum. They all offer a natural method of healing and they come from the same source: plants. Plants heal in many ways, affecting us physically, psychologically, and spiritually.

## Calendula (*Calendula officinalis*)

**Primary Quality:** Calm

**Family:** Sunflower (Compositae) **Other Names:** Marybud, Pot Marigold, Holigold, Golds.

“Calendula” comes from the Latin *kalend* or *calends*, which refers to the long-flowering blooms and the fact that the plant blooms on the first day of every month. **Where Found:** Well-drained, light, sandy soil in full sun. A native of the Canary Islands through Southern and Central Europe and North Africa to Iran. Grows in most regions in the United States. **Elevation:** Most U.S. climate zones.

**Energy Impact (Chakra Correspondence):** Second and third chakras

**Key Rubrics for Positive Healing Patterns:** Soothing, peaceful, sensitive, radiant

**Key Rubrics for Symptoms and Patterns of Imbalance:** Anxiety, fear, impatience, nervousness. **Other Rubrics:** Acceptance, aggression, anger, apathy, balance, calm, clarity, comfortable, communication, confidence, creativity, depression, exhaustion, grounded, healing, inner, insecurity, insight, irritability, lack, meditation, memory, mindfulness, misunderstanding, moody, paranoia, quiet, revealing, self-empowerment, sensitivity, smooth, solar plexus chakra, sorrow, spleen chakra, tension, understanding, uneasy, vulnerable, warmth

## Traditional Use

Calendula is a versatile herb with a wide array of uses. Ancient Egyptians found the herb to be rejuvenating. Europeans used the plant to treat skin problems such as varicose veins, skin cancer, frostbite, and athlete’s foot. They also used it as a flavoring for soups and stews and to color butter and cheese. The leaves of the plant were used to treat open wounds on the battlefield in the American Civil War.

Calendula is also known to treat cuts, inflammation, bruises, cracked and blemished skin, skin ulcers, chapped lips, and minor burns and scalds. It has been used to strengthen eyesight and the heart as well as to treat digestive inflammation, gastric and duodenal ulcers, liver and gall-bladder problems, jaundice, water retention, cramps, toothaches, fever, flu, stomachaches, and viral and bacterial invasion. It is a normalizer for menstruation and, as an emmenagogue, helps bring on delayed menses.

Persians and Greeks used the bright yellow and orange petals to garnish and flavor salads and foods, while Hindus used them to decorate temple altars. Calendula is also used as an ornament, dye, and cosmetic. It brings out highlights in blond, brunette, and red hair. Used as an herb in the bathtub, it will stimulate the body.

## Homeopathic Use

Mother tincture is prepared from the flower and leaves. In the form of a cream or tincture, it is used homeopathically to promote healing. It also controls bleeding and is used for minor cuts and abrasions, burns, fissures, and after childbirth to treat perineal tears. A homeopathic tincture can also be used effectively as a

mouthwash for mouth ulcers and sore throats, and to control bleeding after tooth extractions. Calendula is used internally to treat jaundice and fever in which irritability, nervousness, and acute hearing are affected. Calendula is also used to treat skin cancer, genital warts, fright, injury to the eye, deafness, heartburn, distention, and suppressed menses.

Caution: Calendula lotions or salves prepared with alcohol can irritate the skin or cause excessive drying.

### **Calendula as a Flower Essence**

**Positive Healing Patterns:** Calendula deeply heals the emotions and mind in a soothing, calming way. Calms nervousness and brings a quiet centering to the abdomen and solar plexus, which also builds confidence. Helps those who have undergone emotional work with themselves and are already in touch with their feelings; helps us to relate to ourselves and others in a non-confrontational, soothing way.

- Promotes sensitivity and understanding with others.
- Provides an inner warmth and radiance that extends outward.

**Symptoms and Patterns of Imbalance.** Calendula may be an appropriate flower essence for those who:

- Are nervous, anxious, distressed, or fearful
- Lack confidence
- Demonstrate insensitivity toward others and have difficulty relating to others with ease
- Have a confrontational or stressful personality type (stressful to be with, and/or tending to become stressed out easily).

### **Features of the Original Flower-Essence Water**

**Odor:** Distinct, somewhat pungent, strong

**Taste:** Strong; similar to odor

**Sensations:** Feels peaceful and calm in the belly and in the temple regions above the ears. Head also feels at peace and balanced, with soothing tingling sensation.

**Water Color:** Clear

### **Physical Makeup: Root, Stem, Leaves/Leaflets, Height**

Calendula stands erect with many branching stems growing from the same root. The green, succulent, angular stems are thick and sturdy, yet flexible; they are covered with fine hairs that are slightly soft and fuzzy. The green lower leaves are paddle-shaped and the middle to upper leaves are oblong or lance-shaped with lemon-lime centered veins. They are hairy, soft, and fuzzy on both sides, and they are both basal and alternate on the stems. The leaf edge is smooth to finely toothed. The lower leaves are short-stemmed and grow to 2 <sup>3</sup>/<sub>4</sub> inches long, and the middle to upper leaves clasp the stem. The plant averages 1 to 2 feet in height. Calendula bears fruit that ripens from green to brown, shaped like a boat with yellowish seeds of various winged to curled shapes.

**Flower Color:** Golden yellow-orange

**Flowers:** The golden yellow-orange ray flowers are layered and multi-petaled with single or double flower heads. The ray florets radiate from the pronounced center golden-yellow florets, have a feathery look, and are 2 to 3 inches across. Each petal has two folds with three triangular tips. The buds are round and fuzzy and form pointed tips. The base of the flower head is held by small green petals with pointed tips. The thinner outside florets die first, and then the inside florets die. As the petals die, they become stringlike. Calendula is known for its long flowering period.

**Blooming Period:** Spring to Fall

**Doctrine of Signatures:** The colors of the flower correspond with the orange color for the abdomen, or second chakra (spleen), and yellow for the third chakra, or solar plexus chakra of the Human Energy System. They also relate to sensations and emotions in regard to one's self and others. By working with these energy centers we can release prejudice, judgments, criticism, and emotional patterns. We can also learn to take time out for ourselves by doing things that are nurturing, relaxing, and calming. The soft, fuzzy hairs on the leaves and stems represent soothing calmness and nurturance. The golden glow at the center of the plant indicates warmth and radiance. The dry, dead petals, in their string-like appearance, look like nerve endings is another indication of the plant's relationship to the nerves and calming the nerves.

## Helpful Suggestions

Imagine yourself stepping inside the golden yellow-orange center florets of calendula. Look around you. Feel the softness of her color. Breathe in the color and imagine it filling your entire body. Place your hands on the velvety petals and bring to mind a healing that you wish to take place. Take the color into your root chakra and visualize it blending there with the color red. Fill your root chakra with the energetic vibration you are experiencing. Feel your root chakra filling with warmth and radiance. Then take the color to your second chakra area and blend it with more orange. Fill your pelvic area with the energetic vibration you are experiencing. Feel your pelvis filling with warmth and radiance. Next, take the golden yellow-orange color into your solar plexus and repeat the process with yellow. Then take the color to your heart chakra, and blend the colors golden yellow-orange with green and then with pink. Fill yourself with warmth and radiance in your heart. Take the golden yellow-orange color to your throat chakra and blend it with the color blue. Observe any changes that you feel inside. Feel warmth and radiance in your throat chakra. Take the golden yellow-orange to your brow or third-eye chakra and again blend the colors, allowing warmth and radiance to be felt in your third eye. Then take the golden yellow-orange color to your crown chakra and blend it with the color white. Feel warmth and radiance in your crown chakra. Observe how you feel. Then put yourself inside the golden yellow-orange and feel its energy impact on your entire body. Stretch your arms and legs and allow the color to spread out of your extremities and into your auric field. Feel the calm yet stimulating, revitalizing effect this exercise and calendula have on you. Remember this feeling and this exercise when you take Calendula flower essence, and repeat the process as often as you can.

## Affirmations

"I fill myself with a gentle glow of orange and yellow light."

"I allow peaceful, easy emotions to emerge and be felt."

"I create positive, calm, thoughtful energy."

## Case History

My sister, Linda, at age forty-five, was a prover in a research project I conducted called Living Flower Essences Research Prover's Project. She took Calendula flower essence without knowing which one she was

taking. (All essences were unknown to provers during the time they were taken.) Linda had some reactions to Calendula, which included nervousness, depression, tiredness, emotional distress, and general unhappiness. In a follow-up phone call, Linda asked me what she had been taking that provoked these symptoms. Before I could respond, she asked if it was related to the marigold family. I found her inquiry fascinating; how did she know? She went on to tell me that she was allergic to the marigold family and that the symptoms she experienced were typical of her allergic reactions! She had taken the essence for three days and had become so exhausted and depressed that she decided to stop. I wonder if she would have experienced a healing crisis had she continued! She didn't want to take the chance.

Linda experienced all the symptoms of patterns of imbalance for Calendula. The other provers, with the exception of one who experienced symptoms similar to Linda's, all shared the positive healing traits of Calendula and nearly unanimously reported that Calendula helped them feel calm and relaxed.

I have found the Calendula flower essence to be especially helpful for children to lessen irritability and induce calmness, somewhat like Chamomile. It's a great remedy to have on hand for your child during emotional times—and for yourself as well!

## LFE's Research Provers' Project Findings

**Physical Symptoms:** Cravings: Water, yogurt, peanut-butter-and-jelly sandwiches. Sensations: Hot sensation like a heat wave; lingering sensation in mouth and tongue. Pain: None. Modalities: Inconsistent. Head: Felt physical release in head. Eyes: Vision intensity and depth perception enhanced; eyesight improved. Face: None. Ears: Increased sensory perception, more acute. Stomach: Fullness in belly; stomach "queasy." Abdomen: Fullness. Bowel condition: Good bowel movements, more frequent. Urine: Increased urination. Female: Increased sex drive. Male: None. Extremities: None. Back: Lower back sensitive. Skin: None.

**Emotional Symptoms – Patterns of Balance:** "comfortable," "balanced," "calm," "quiet inner happiness," "balanced and smooth," "peaceful," "relaxed and grounded," "creative energy," "confident," "felt balanced," "deep calmness," "released anger," "felt uplifted," "helped to release a weight I've been carrying for a long time," "felt revitalized"

**Emotional Symptoms – Patterns of Imbalance:**  
“insecure,” “more sensitive to judgment from others,”  
“nervous,” “paranoid,” “anxious,” “moody,” “uneasiness,”  
“sadness,” “tension,” “vulnerable,” “released anger.”

**Mental Symptoms – Patterns of Balance:**  
“memory improved, more clarity, anxious; worried  
about what people think of me,” “sharp, aware, peaceful  
thoughts; more relaxed mentally,” “handled increased  
demands better,” “more mindful,” “release of mental  
struggles,” “increased conscious awareness,” “helped me  
activate resources and make better use of my time”

**Mental Symptoms – Patterns of Imbalance:**  
“mentally depressed and uneasy,” “mental confusion.”

**Spiritual Reflections:** “I felt connected to an  
ancient race,” “I experienced a broader range of emo-  
tions, including calm and trust; paranoia and anxiety are  
absorbed in a deeper knowing,” “less meditation, more  
conscious activity.”

**Dreams/Nightmares:** Dreams were inconsistent,  
from being very vivid to not being able to remember  
them.

# Botanical Therapies for Asthma in Children and Adults: Weaning Patients from Pharmaceuticals

Kenneth Proefrock, ND

Asthma is an often chronic inflammatory condition of the respiratory system characterized by a hyper-reactive immune response. That is, the immune system itself is causing the inflammatory response, often toward relatively benign substances in the environment. Standard treatment is usually centered around modifying this immune response and reducing the reactivity of the tissues within the respiratory tract. I would propose that there are many ways to effectively approach this condition. The relative degree of effectiveness is dependent upon how one is able to address the underlying cause of the dysfunction.

I find that for many people asthma is ultimately a condition resulting from a compromise in the protective function of the mucous membranes within the respiratory system. Consider that an essential function of the mucous membranes that line our sinus, lung, intestinal, and urogenital tissues is to provide a sticky barrier between our tissues and the external environment. As that membrane functions properly, debris is physically trapped by the mucus and then removed through expectoration, blowing, coughing, urinating, etc. If the mucosal protective system becomes dry, patchy in its distribution, or traumatized or overwhelmed by external debris, then more of that material is able to find its way to the actual tissue level and may automatically be viewed as a foreign invader by the immune system.

There are five classes of immunoglobulins (antibodies) used by specific portions of the immune response to identify potential foreign invaders and keep them at bay. IgM and IgG are quantitatively the most dominant inside the body, IgA and IgE dominate the mucous membrane interfaces between the internal environment of the body and the external world. IgE is the immu-

noglobulin generally recognized as the beginning point in hypersensitivity diseases like asthma and allergy. All immunoglobulins have a similar Y-shaped structure consisting of a constant portion, the stem of the Y and halfway up the arms, and a hypervariable portion at the ends of the arms. The constant portion of the antibody always recognizes certain classes of antigens, the hypervariable portion accommodates to the diversity of substances within classes of antigens. It is this hypervariable portion of the antibody that actually 'sticks' to the antigen because it is able to shift its molecular structure to create a more exact fit to the antigen. In the case of IgE, this hypervariable portion of the antibody is associated with the cellular immune responders mast cells and basophils.

When an antigen is bound to IgE, it causes the membrane of the mast cell or basophil to rupture, releasing histamine, leukotrienes, eosinophil and neutrophil chemotactic substances, proteases, heparin, slow reactive substance of anaphylaxis and platelet activating factors. These substances cause a dilation of local blood vessels, an attraction of eosinophils and neutrophils into the area, increased permeability of the capillaries and loss of fluid into the tissues, damage to the local tissues by protease and induction of the complement cascade, and contraction of local smooth muscle cells—a combined effort that creates an effective barrier to further invasion. When this process takes place on an occasional basis due to the influx of foreign invaders into the system via the mucous membranes, it can be a profoundly effective way to combat disease. When it takes place all day long toward agents that will never cause infection, it creates a massive drain on the system and can permanently damage the protective tissues of the mucosal system.



One of the most important steps in effectively managing the asthmatic patient is to restore proper functioning of the mucous membranes. Simple symptomatic management will never offer the possibility of resolution if the membranes aren't able to become more competent at keeping foreign debris off of the underlying tissues. Within the bronchioles of the lungs, slow reactive substance of anaphylaxis causes a progressive spasticity within the bronchiolar smooth muscle, restricting breathing and impeding proper blood flow into those tissues. The tissues are unable to adequately heal without proper blood flow. Omega-3 fatty acids have the specific effect of reducing this constriction and facilitating better bloodflow, which is one of the mechanisms through which these compounds are able to exert an anti-inflammatory effect. It often takes 10-15 grams of a high-quality fish oil per day to accomplish this objective. The quality of the mucus produced has a dramatic effect on this process. Also, mucolytics like NAC can be wildly beneficial and will be explained in more detail later in these notes. L-glutamine as a specific driver of epithelial tissue growth dosed at 5-10 grams/day is often a very beneficial way to improve competency of mucous membranes quickly.

The modern, conventional approach to symptomatic treatment for a hyperreactive airway owes much to botanical medicine and involves chronic steroid application with both long- and short-acting bronchodilators. Systemic and inhaled corticosteroids have an immunomodulating/immunosuppressive role; they are anti-inflammatory in their effect and usually allow patients to be less reactive in the short term. The effectiveness of such agents in certain patients begs a question regarding the competency of their own adrenal response to compensate appropriately both to the onslaught of foreign material on a compromised membrane, as well as to the steroids themselves. No other dimension of pharmaceutical science has enjoyed the moniker "magic bullet" more than the array of glucocorticoid medications currently on the market.

Where antibiotics in all of their forms were the predominant quick fixes during the first half of the 20th century, corticosteroids have become that quick fix in the second half. The stressful lifestyles that we engage in within our society have created an epidemic of adrenal insufficiency. Most individuals cannot create enough cortisol to maintain their way of life for an entire lifetime; when they reach that cortisol "wall" and have a compromised membrane system, hyperreactivity of an immune system becomes inevitable. Oftentimes these

hyperreactive patients will be given a steroid preparation and immediately feel better. This is a temporary solution at best because the underlying factors have not been resolved. The cortisol receptor seems to have a plasticity that the other hormone receptors do not share in that consistent high doses of exogenous corticosteroids tend to make them less sensitive to endogenous cortisol over time—a phenomenon commonly observed in allergy and asthma patients. The incredibly important role that adaptogens can play in these people's lives cannot be overstated. *Eleutherococcus*, *Rhodiola*, *Panax*, *Aralia*, and *Oplopanax* are some that I use on a regular basis for my patients and myself.

I find that the pharmaceutical steroidal preparations are very heavy-handed and do not allow reasonable recovery of adrenal function for the patients. This is even true when these patients are tapered off of these agents. My favorite alternative is a "Licort" tincture. I produce this in my office by adding a specially prepared and micronized cortisol to a 1:1 fluid extract of *Glycyrrhiza glabra* in a 1% and 3% concentration. This produces a tincture that contains 1 mg. of cortisol per drop or per 3 drops.

According to Dr. Jeffries, the author of the text, *Safe Uses of Cortisol*, the average daily equivalent of cortisol output for most people is 25-30 mg. When a patient is given more than this quantity it can be too suppressive and disruptive to normal physiology. This is not to say that some people aren't able to produce quantities of cortisol far above this level, just that from a supplementation basis, we may not want to risk suppression or disruption in our interventions. I have found that replacing an existing steroid regimen with an equivalent dosage of cortisol tincture makes it far easier to wean the patient down later, with very little to no ill effects after discontinuation. For those patients who seem to need some kind of cortisolic augmentation, I will add the Licort tincture to their existing botanical preparation and dose it 5 to 15 drops 4 times a day. I find that it mixes quite well with any preparation that would benefit from the addition of licorice.

Several tried and tested types of botanical interventions have greatly influenced the current medical strategy toward patients with asthma. The historical efficacy of various bronchodilator botanicals like the *Ephedra* species, especially *E. sinica* and *E. equisetina*, *Ammi visnaga*, *Coleus forskohlii*, naturally occurring sources of the methylxanthines caffeine and theophylline, and the tropane alkaloid containing plants like the *Lobelias*,

*Daturas* and *Atropos* continue to provide the fundamental building blocks that modern medicine is using to create new pharmaceutical interventions. Here we discuss many of these plants as well as the mechanical strategies for employing them, and compare their use to that of their contemporary pharmaceutical analogs.

One of the earliest methods for inhaling therapeutic agents was the burning of a substance and inhaling the smoke. A botanical agent was typically dried and broken up and burned, or an extracted oil was burned, or another combustible material like charcoal was added to the medication, and burned for inhaling its resulting vapors. We have moved away from smoking things in our culture, recognizing that the smoke from any substance contains a certain carcinogenic potential, as well as a likely asthmatic response due to the influx of particulate matter. Even so, until recently an asthma cigarette, Asthador, was available by prescription in the U.S. As it was smoked, the bronchodilator constituent was exposed to the lung tissue and had a therapeutic effect. In many tobacco shops, as well as middle-eastern and Indian grocery stores, one can still find a small cigarette called a Bidi. Indian bidis are *Datura* cigarettes that are essentially made from different spices and tobacco rolled into *Datura* leaves. In fact, *Datura* has been used as the principal ingredient in asthma powders and cigarettes from the turn of the century into modern times. Rudolf Fritz Weiss describes its use and the use of other burning powders in his text, *Herbal Medicine*.

*Datura* is also known as the Holy Flower of the North Star by the Chinese because of a Taoist legend that maintains that *Datura metel* is one of the circumpolar stars, and that envoys to earth from this star carry a flower of the plant in their hands. Throughout the entire world, *Datura* has had a long history as a medicine and sacred hallucinogen. Like *Atropa belladonna*, it owes much of its physiologic potency to the presence of the tropane alkaloids hyoscyamine, atropine, and scopolamine. It shares anticholinergic and parasympatholytic effects with belladonna. Maude Grieve, in her classic text on botanical medicine, writes that *Datura* is employed in all of the conditions for which belladonna is more commonly used, but acts much more strongly on the respiratory organs. It has a special reputation as an effective agent for spasmodic asthma.

Many indigenous people use *Datura* for its visionary properties, valuing it for diagnosis, healing, and intoxication. Upon learning from these visions the cause of a particular disease, a proper prescription can be applied

to the case. In 1596, the Chinese herbalist Li Shih-Chen admitted to experimenting on himself with *Datura*. He writes, "According to traditions, it is alleged that when the flowers are picked for use with wine while one is laughing, the wine will cause one to produce laughing movements; and when the flowers are picked while one is dancing, the wine will cause dancing movements. I have found out that such movements will be produced when one becomes half-drunk with the wine and someone else laughs or dances to induce these actions."

I have used oral dosages of *Datura* at as low as 5 drops per dose and as high as 20 drops per dose with anywhere from 1 to 4 doses per day. It is a decent bronchodilator for asthma and COPD patients with a consistent antispasmodic effect. I have also had a few patients that could tolerate smoked *Datura* as a bronchodilator. It grows wild in the desert. *Datura meteloides*, once dried, burns quite well. It works well employed either way.

Inhalation therapy was a widely utilized tool in the treatment of tuberculosis at the turn of the century. In fact, in his classic text, *The Eclectic Practice of Medicine* published originally in 1870, Dr. John Scudder recommends a mixture of *Veratrum* tincture and morphine to be inhaled as needed for a persistent and harassing cough. He gives another specific recipe that I find quite intriguing:

Iodine	10 gr.
Potassium Iodide	14 gr.
Conium Fluid Extract	3 drops
Water	qs 4 ozs.

The vapor of one tbs. is inhaled after being added to a pint of hot water.

This particular recipe, Scudder tells us, will help to relieve the cough, lessen expectoration, and arrest the hectic fever and night sweats. The *Conium* is well known as a spasmolytic, acting through neurological means. The iodine is certainly having an antimicrobial effect, as well as acting as a lymphagogue.

Inhalations were more often simple solutions of volatile components, usually essential oils.

Often, Compound Benzoin Tincture was used as a carrier; a typical recipe is as follows:

Pine Oil	5 ml
Eucalyptus Oil	5 ml
Compound Benzoin Tincture	30 ml

The vapor of one teaspoon is inhaled after being added to a pint of hot water.

Other inhalations designed for addition to hot water typically contained a volatile oil, water, and light magnesium carbonate. The light magnesium carbonate was used as a dispersing agent. The volatile oil was mixed with the magnesium carbonate, which was mixed with a measured amount of hot water. This technique ensured uniform dispersion of the oil upon shaking, since the oil was distributed throughout the mixture rather than remaining as a globule. The presence of the magnesium carbonate helped shift the surface tension of the oil as well as the water so that it, in essence, had an emulsifying effect. It should be said that a true emulsification would have retarded the volatilization of the oil, as the surface tension would have increased. A ratio of 100 mg. of magnesium carbonate to 0.2 ml of oil is ideal.

An example formula:

Menthol	325 mg
Eucalyptus Oil	3.7 ml
Light Magnesium Carbonate	2 gms
Purified Water	qs 30 ml

Shake before using, add 1 teaspoon to a point of hot, not boiling, water, and inhale the vapors.

In the early 1950s the first contemporary pressurized aerosol asthma “inhaler” was introduced by Riker Laboratories, the Medihaler Epi. This consisted of epinephrine in a water and alcohol solvent with a dispersing agent, sorbitan trioleate, and a fluorinated hydrocarbon propellant. For the past fifty years and until just recently this was the preferred method of administration for most of the medications used by patients with chronic asthma. This shift in dosing strategy seems to have ushered in an interesting era of pulmonary medicine. The ease and effectiveness of the modern inhaler has allowed many patients to simply take a puff or two when needed and find tremendous relief. This has effectively stopped many of these patients from actively searching for more permanent solutions to their condition that might lie in the realms of diet, exercise, and stress reduction. Certainly, there is a large can of worms that can be opened here.

Many people might feel that the advent of the inhaler-type intervention has provided a life-preserving, even quality of life enhancing intervention for people who might otherwise have succumbed to chronic pulmonary conditions. The issue, at least from my perspective, is that these are “band-aid” and often suppressive therapies that don’t provide the patient the opportunity to break free from these agents. Often a more deeply oriented therapeutic intervention that takes into account living

conditions, eating habits, psychosocial-spiritual state, and medication regimen is typically more healing of the chronic state.

The most recent shift in this approach has been driven by a government mandate to remove chlorofluorocarbons (CFCs) from the inhalation devices in an attempt to prevent further damage to the earth’s ozone layer. These inhalers have changed to a new propellant, hydrofluoroalkane (HFA) or powder insufflation devices. This change in delivery system has resulted inadvertently in removing all generic inhalers from the market. Only proprietary (brand name) options are available currently.

Many of the devices utilized today for administration of pharmaceuticals were originally developed for botanical preparations. Many are still appropriate for botanical administration but their use has fallen from the mainstream. Some of the currently available devices include atomizers, insufflators, vaporizers, and nebulizers.

An atomizer is a device used to disperse a liquid in a fine spray. Many of the older style atomizers employed the Bernoulli principle. When a stream of air moves at a high velocity over the tip of a tube, the pressure is lowered and the liquid is drawn into the air flow. The liquid is broken up into a spray when taken up by the airstream. To produce smaller droplets, a baffle, bead, or other obstacle can be placed to interrupt flow and break up droplets further as they collide with the obstacle. Smaller droplets provide better surface area coverage within the respiratory tract. Today’s plastic spray bottles work under this principle; most nasal spray-based sinus applicators utilize such an approach. The atomizer is an excellent way to administer a quercetin nasal spray to stabilize mast cells and prevent allergy. It is also an excellent way to get any kind of warm tea into the sinus cavity for therapeutic effect.

Insufflations are powders administered through an insufflator or “puffer.” They can be as simple as a rubber bulb connected to a container and a delivery pipe, or as elaborate as a plastic accordion-shaped container with a spout on one end. As the device is squeezed, air is blown into the container causing turbulence, which causes the powder to fly around. As the air leaves the container, some of the fine particles are carried out through the delivery tube or spout.

A vaporizer is an electrical device producing a cool mist or moist steam. It is used to provide additional

humidity to one's living space and is a perfect vehicle for administering therapeutic oils.

A nebulizer is a small machine that contains an air pump that pushes air through a small tube and into a chamber filled with medication. As the air bubbles through the liquid medication, the larger particles are broken into smaller ones that are able to become aerosolized (nebulized). The aerosolized medication is then inhaled deeply into the lungs where it has its effect. This type of application tends to be less drying to the lung tissues than handheld inhalers and is by far my favorite device for delivering botanical agents to the lung fields.

There are a number of botanical agents that can be used through a nebulizer with remarkably good effect. Considerations to take into account when designing a successful intervention with a nebulizer unit include the pH of the administered solution, the osmolarity of the administered solution, and the concentration of the therapeutic ingredients. As with any new addition to the regimen for someone who suffers from a reactive airway disease, it is prudent to expose them to a very small amount of the new preparation (I will often do this in the office setting) in order to determine their tolerance for the new item.

Osmolarity is the concentration of solid constituents in a liquid preparation. Solutions that are iso-osmolar are ones that have the same amount of dissolved solids as the blood stream—roughly 280-310 milliosmoles/ml. Solutions that are relatively hypoosmolar (less than 280 mOsm/ml) tend to leave behind more of a water portion in the tissues, and can be relatively hydrating. Solutions that are relatively hyperosmolar (greater than 310 mOsm/ml) tend to pull more fluid from the tissues and leave them relatively more dehydrated. These are useful therapeutic qualities for nebulizer solutions for patients who have a chronically dry lung field. A slightly hypoosmolar solution can be a phenomenal expectorant and mucolytic all by itself.

A hyperosmolar solution can likewise be helpful in conditions of fluid accumulation in the interstitium of the lung field as might be found in granulomatous conditions, congestive heart failure, and pleural effusion. An iso-osmolar preparation commonly used in medicine is "normal saline," a preparation of 0.9% sodium chloride in water (0.9 % = 9 mg of salt in every ml of fluid, or 9000 mg of salt in a liter). This is roughly 1 tsp (7.5 grams) non-iodized salt and ¼ tsp (1.5 g) potassium or sodium bicarbonate per liter of pure water or tea.

The pH of the nebulized solution can be another therapeutically useful parameter to adjust. Qualitatively, the most important of the buffering systems in the body is the bicarbonate buffer system. This system is unique in that it remains in equilibrium with atmospheric air, thus, it is an open system with a much greater capacity to buffer bodily fluids than any closed system would be able to manage. The mechanism of this system is based on an equilibration of CO<sub>2</sub> with carbonic acid, carbonic anhydrase activity, bicarbonate ion, hydrogen ions, the respiratory rate, and the ability of the kidney to reabsorb and excrete bicarbonate and hydrogen ions into the urine.



Increasing the reactants on the left has a tendency to push the reaction to the right, i.e. an accumulation of water and CO<sub>2</sub> in the tissues of the lungs tends to increase tissue production of carbonic acid and, ultimately, bicarbonate and protons. This is the basis for breathing into a paper bag when one is hyperventilating; the rebreathing of the CO<sub>2</sub> tends to make the system initially more alkaline, which tends to have a relaxing effect on the nervous system. Purposely increasing the bicarbonate levels in the lung tissues by adding it to a nebulizer solution tends to leave the tissues more alkaline and increases CO<sub>2</sub> and water movement out of the lung tissues. This is often a very beneficial effect for patients with restricted airways.

While the lung plays a relatively acute role in managing pH, the kidney plays a similar and more long-term role by actively excreting H<sup>+</sup> or HCO<sub>3</sub><sup>-</sup> into the urine and making the urine either acidic or alkaline. A most important consideration in this process is the role the presence of adequate amounts of water plays in maintaining appropriate pH levels. Adequate potassium in the system is also a critical factor in the way that the body is able to establish an effective buffer. Potassium is a major factor in the movement of H<sup>+</sup> through the body. Intracellular potassium can be exchanged for H<sup>+</sup> in the plasma, so the intracellular protein buffering system can have access to and neutralize the plasma increases in H<sup>+</sup> concentration. This exchange often results in transient increases in plasma potassium levels with more long-term diminishment of intracellular stores of potassium, leading ultimately to a potassium deficiency. The reverse of this process is how the body deals effectively with metabolic alkalosis. That is, as the plasma levels of H<sup>+</sup> decline,

potassium in the plasma is exchanged for intracellular hydrogen ions to compensate. Another point worth stating is that albuterol sulfate, often used chronically by asthma and COPD patients, has a known side effect of reducing the potassium stores of the body.

Mucus chemistry is also a very fascinating realm of lung health that can be dramatically affected by introduction of bicarbonate through a nebulizer. Mucus is a conglomeration of the secreted protein mucin and the numerous saccharides that glycosylate it. Some of the most critical of these saccharides are the family of sialic acids. Among this family is the compound neuraminic acid. One of the mechanisms by which viral microbes are able to infiltrate the tissues of the respiratory tract is through attachment to sialic acid-containing receptors on the surfaces of the lung epithelium. Sialic acids contribute greatly to the viscosity of mucus; the more acidic the internal environment of the lung, the higher the viscosity or thickness of the mucus. Alternately, the more alkaline the internal environment, the thinner the mucus.

The acidic nature of the infectious process creates a thickening of the mucoid secretions, making them significantly more “sticky”—a measure intended to impede further infection. Moreover, the acidic environment of the airways is conducive to bronchial constriction through the vagal reflex, inhibition of histamine breakdown, and ciliary irritation. One of the reasons why the influenza family of viruses is so virulent is that it has evolved a neuraminidase enzyme that allows the viral particles to cleave through the neuraminic acid component of the mucus and infect adjacent tissues. Neutralizing the acidity in the lung field creates a looser, thinner mucus, facilitates liquefaction of the hard secretions in the airways, promotes bronchial dilation of the airways, and inactivates histamine.

Nebulizing relatively alkaline solutions into the lung field represents a decided advantage in the treatment of patients with many congestive conditions of the respiratory tract. I find that using potassium bicarbonate, where reasonable, as a buffer to bring the pH of a nebulizer solution into a slightly alkaline realm adds to the therapeutic potential.

There are a couple of amino acids I have used quite extensively in a nebulized form. The first of these agents is reduced glutathione, made as a nebulizer solution of 100 mg/ml or 200 mg/ml in sterile water. Glutathione is a tripeptide of the amino acids glycine, glutamine, and cysteine. It is heavily involved in liver detoxification

reactions, requiring selenium as a cofactor. Glutathione is one of the most versatile and important antioxidants produced by our bodies. It has a specific affinity for liver and lung tissues, where it has been shown to inhibit angiogenesis, facilitate the repair of DNA, scavenge free radicals, have antitumor activity, and is required for optimal activation of T-lymphocytes. It is generally well tolerated in the nebulizer and is dosed at 1 ml mixed with the other agents 4 times a day.

The second amino acid I have used with good success in the nebulizer is N-Acetyl-Cysteine (NAC). It comes in a ready-to-nebulize form in either a 10% or 20% solution and is known under the proprietary name of Mucomyst. NAC is used in asthma and COPD patients as a mucolytic agent, helping to make mucus have a less globular and more planar structure, making it more protective and less likely to get stuck in the smaller bronchioles of the lungs.

NAC is also a very strong free radical scavenger, inhibits angiogenesis, facilitates the repair of DNA, and is a major component of glutathione. The dosage for NAC in the nebulizer is the same as the glutathione: 1 ml nebulized 4 times a day. I have added both of these agents to the botanical mixture with good effect, the only problem being volume of fluid and the time required to nebulize it all.

The proteolytic enzyme serratiopeptidase has proven quite useful in a nebulized form as a way of initiating the complement cascade, potentially breaking down fibrotic scar tissue and allowing better penetration.

Herbal teas are quite effective when applied through a nebulizer. I generally make the tea and then try to get it to an iso-osmolar concentration by creating a 0.9% solution of sodium chloride and potassium bicarbonate (as mentioned previously, 1 measured teaspoon of salt=7.5 grams and ¼ teaspoon of potassium bicarbonate=1.5 grams). The best course of action in initiating this type of therapy is to start with dilute, weak teas and then make them stronger as the need may indicate. Some teas I have found consistently effective:

*Glycyrrhiza glabra* and *uralensis*, when administered as a tea through a nebulizer, and often nothing short of miraculous for chronic cough due to allergic and infectious conditions. It shifts the surface tension on the alveoli, thereby improving gas exchange and oxygenation of the blood. It also has a number of well-researched effects on tumor regression.

Glycyrrhizic acid is a glycosylated saponin that occurs in licorice and is believed to be the component

responsible for most of its pharmacologic effects. For some patients, I will create a 10 mg/ml solution of *Glycyrrhizinate* for inhalation to get a more dramatic result.

Licorice has been used for hundreds of years in Chinese medicine as a harmonizer in certain formulas, and on its own for its anti-inflammatory, antiulcer, antidiuretic, antitussive, hepatoprotective, antiviral, and more recently, for its antitumor effects. The mechanism by which licorice exerts these influences on the body is in part due to the effect of glycyrrhizinate on the cortisol-degrading enzyme 11-Beta-hydroxysteroid dehydrogenase (11 $\beta$ -OHSD). Licorice tea inhibits 11 $\beta$ -OHSD, which increases the serum levels of cortisol.

Cortisol has an anti-inflammatory action and inhibits the growth of leukemia and lymphoma cells by affecting glucocorticoid receptor sites on their membranes. The antiulcer effects of licorice are attributed to its inhibitory effect on 15-hydroxyprostaglandin dehydrogenase, which converts prostaglandin E2 (PGE2) to its inactive form. By inhibiting the enzyme, licorice causes an increase in local PGE2 levels. PGE2 plays a protective role by increasing mucus secretion and promoting better cell differentiation. Licorice also has been shown to stimulate NK cell activity, induces interferon production, and inhibits T-suppressor cell activity.

The initiating concentration of tea is 10 grams of licorice root boiled in 1 liter of water (makes a dilute, 1% tea), strain or filter the solution, add the salt and bicarbonate previously mentioned, and 1-3 ml can be used in the nebulizer three to four times a day. As tolerance is established and the need might present, the concentration can be increased up to a 5% solution with good effect.

*Sanguinaria canadensis*, bloodroot, is a botanical with a long history of use for cancers, specifically as a topical escharotic in skin cancers. Escharotics are substances that facilitate the breakdown and elimination of dead and dying tissues, essentially inducing a sloughing of those dead and dying tissues. For this reason it has long been a component of the "black salve" family of cancer treatments.

It also has a long history of use in lung infections, being indicated in atonic lung conditions, and as an expectorant affecting the upper respiratory tract. The active ingredients in *Sanguinaria* are largely isoquinoline alkaloids like sanguinarine, chelerythine, sanguidarine, sanguilitine, berberine, and many others. *Sanguinaria* has a relaxing effect on bronchial muscles, increases blood flow when applied topically, and is safe for use as

a snuff for nasal polyps. I have found the tea to be very well tolerated in the nebulizer and it can be added to the licorice tea previously mentioned for a synergistic effect. I find that bloodroot is outstanding for reconditioning the lung fields when cancer, chronic infections like valley fever and *Pseudomonas*, and hyperreactive allergic responses have generated a lot of dead and dying tissue that is poorly removed by the immune system on its own. This is a strong botanical; I find that 5 grams boiled in 1 liter of water is often a very effective and well-tolerated strength.

*Lobelia inflata*, Indian tobacco, is another classic plant for lung disorders. It contains a number of piperidine alkaloids like lobeline, lobelanine, isolobelanine, lovinine and withlobelanidine, as well as chelidonic acid. It has a long history as an antiasthmatic, antispasmodic, and expectorant. Interestingly, lobeline is a respiratory stimulant, increasing mucus secretion and expectoration. Isolobelanine is a respiratory relaxant that relaxes the muscles of the bronchial tree and increases blood flow through the lung fields. Ellingwood considered *Lobelia* a specific for "irritable, spasmodic and oppressed breathing" as one might find in a lung cancer patient. *Lobelia* is also well established as an effective topical agent for relaxation of muscular tissue and as an effective agent to be added to drawing poultices. I like using a lobelia tea in the nebulizer with a little sanguinaria and licorice because it has a profound effect as an anti-spasmodic, keeping the use of the nebulizer from causing a hacking, spasmodic cough. The strength of *Lobelia* for nebulizer use begins at 0.5% and can go up to 5% for some people (usually those with a higher tolerance for tobacco). *Lobelia* through a nebulizer definitely gives a systemic effect that is reminiscent of the effect of tobacco on the system.

*Datura meteloides* we talked about earlier in this discussion. I have found it to be a fairly effective bronchodilating agent for patients suffering from asthma or COPD. It doesn't work for everyone, but I have found that it can reduce a patient's reliance on albuterol, ipratropium, and tiotropium inhalers. Please remember that putting something new into the lung field of a patient with a hyperreactive airway disease is a precarious dance that requires a certain degree of mindfulness and emergency preparedness. Start with low concentrations to check for effect, keeping epinephrine or albuterol at hand for those "just in case" situations that inevitably arise. *Datura* leaves can be made into a tea at a starting concentration of 0.5% (5 grams in a liter of water) and moved up to a concentration that may be more helpful.

In many cases, creating an alkaline climate in the lung field will be therapeutic by itself and the additional botanicals a bonus to the process. I usually walk through the proper use of the nebulizer with the patient and perform the first treatment in the office to ensure that the mixture is well tolerated.

Hydrotherapy can provide a very basic and effective intervention for patients suffering from all pulmonary conditions, especially asthma. There really is no better way to directly affect blood flow into and out of any area of the body, especially the lungs. It is a core belief in the philosophy of naturopathic hydrotherapy that health, and therefore healing, is proportional to the normal flow of healthy blood.

Alternating hot and cold applications can be particularly effective for patients with asthma as a way of reducing inflammation. The idea is to increase blood flow into the area with the hot and decrease blood congestion with the cold. This allows better elimination of potentially contributory metabolic debris in the inflammatory process, also allowing for a cleaner field for the immune response to right itself. The traditional method is to always start with hot and end with cold. The degree of hot should be enough to provide an initial sting to the skin that quickly moves into the deeper structures as a relaxing warmth. This application encourages the blood into the tissues, causing a rapid increase in blood volume in the area. It is allowed to plateau for a short time and then an ice cold application causes that accumulated blood to disperse. The general rule is 4 minutes hot and 1 minute cold with at least 8-10 alternations.

Treatment with wet socks is another very simple measure that helps to encourage appropriate lymphatic flow. The treatment begins with a pair of damp cotton socks placed on the feet and a pair of thick wool socks placed over them before going to bed. The idea is that the wetness of the cotton socks encourages the body to improve blood flow into and out of the feet, which improves blood flow all over the body. The purpose of the wool socks is to keep the feet warm and to allow them to “breathe” so that by morning the cotton socks are dry. I have found this treatment to be very effective for patients with asthma.

A wet sheet pack is another hydrotherapy intervention that I have found abundantly useful for acute asthmatic attacks. It improves the role that the skin plays as a detoxification organ. The treatment requires some preparation but consists of a large blanket (preferably wool) spread out on a bed with a damp sheet over it. I

prefer a cotton flannel sheet. The patient then gets into a hot bath with 1 cup of baking soda and 1 cup of Epsom salts added and drinks copious amounts of diaphoretic tea; yarrow, ginger, and eupatorium work well. After 10-15 minutes in the bath, the patient wraps up in the wet sheet and blanket, being sure to wrap up snugly and with no drafts, and stays like this for anywhere from an hour to several hours. This treatment dramatically improves blood flow through the skin and encourages elimination of accumulated debris in the tissues below the skin, often staining the sheet in the process. Many patients will also develop a fever with this process, which is a good indicator of improved immune response.

Constitutional hydrotherapy is the name of a technique that was originally perfected by Dr. O. G. Carroll in 1923. Dr. Carroll was one of the first practitioners of naturopathic medicine in the West. He started his practice in Spokane, Washington, in 1908. His perfection of the constitutional hydrotherapy technique reflected the core belief in the “*Vis medicatrix naturae*” and is considered by many in the naturopathic medical community to be one of the most revitalizing and tonifying series of treatments that can be conducted with an individual. Nothing in the arsenal of the old-time naturopaths was more powerful than a series of six constitutional hydrotherapy sessions.

Dr. Carroll was sought out by many of the dignitaries of his time for treatment, most notably by Henry Lindlahr and Benedict Lust, and he is reported to have been able to cure John Harvey Kellogg’s wife of her asthma.

The idea of this procedure is to incorporate a wet sheet pack with alternating hot and cold to the chest and abdomen and include an application of electrical stimulus to the muscles of the back and abdomen. The patient is swaddled in a flannel sheet surrounded by wool blankets. This minimizes the patient’s getting chilled during the procedure. The pads of an electrical muscle stimulator (EMS) are placed on either side of the back just above the kidneys, or wherever the practitioner deems will provide maximum benefit. Alternating applications of hot and cold towels are administered to the chest and abdomen while the patient is bundled up in the cocoon of blankets. The idea is that as the blood is rushing into and out of the periphery of the body, the organs are being bathed in healthy blood, waste is taken away and nutrients are brought in at an unprecedented rate. The effect of this treatment is to radically “detoxify” the patient.

In addition to performing this treatment on many people, I have experienced it myself directly many times; it truly feels like nothing else. After several alternating applications of hot and cold, a cold towel is left on and the patient is bundled up for 10-15 minutes while the electrical muscle stimulator contracts muscles of the back, having a “wringing” effect on the entire torso. The patient is expected to heat this cold bath towel up to body temperature while wrapped in this cocoon. The idea is that as the patient acclimates to the increased requirement to generate a reasonable body temperature, systemic strengthening occurs. Once the body temperature rises above that of the bath towel the patient is turned prone, and a series of alternating hot and cold towels are applied to the upper back area. These end with a cold application through a bath towel similar to the previous series. The patient is expected to raise the temperature of the bath towel similar to before.

I have found that this is a phenomenally metaphorical treatment for people with lung conditions. In essence we are taking someone who is feeling like a phlegmatic caterpillar, cocooning them while we engage in transformational physical applications; then leaving them feeling lighter and fluffier, more like a butterfly. Ideally, the patient is in as safe an environment as possible, they are lulled by the massage from the EMS, the closeness of the warming towels, the security of being tucked in safely, and they are extremely suggestible at this time. Often this is the perfect setting to engage in a therapeutic technique like creative visualization, hypnosis, meditation, chanting of mantras or the saying of prayers.

The process is best conducted in a private place specially set aside for this purpose, with no interruptions. Perhaps the most amazing thing about constitutional hydrotherapy is that it is a tried and true method to help improve a person’s intrinsic strength and resistance to disease. It is an excellent treatment for whatever is going on. I have found it especially useful for pulmonary conditions. I believe it is no less than miraculous for adult patients who suffer from asthma.

A more thorough explanation of the process of constitutional hydrotherapy is given in the text *Lectures in Naturopathic Hydrotherapy* by Wade Boyle ND and Andre’ Saine, ND.

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# Effective Treatment of Patients with Hypertension: Botanicals and Pharmaceuticals

Kenneth Proefrock, ND

The Merck Manual tells us that there are more than 50 million hypertensives in the United States. It is estimated that only a third of these people are being effectively managed, and that approximately 20% are not even aware that they have the condition. The problem with this condition is that it is a silent killer. It doesn't cause any real overt pathology until a person has had it for decades. Often, this is too late to engage any kind of intervention that will allow the reversal of chronic organ damage. We recognize that there are certain lifestyles that put a person at greater risk for this condition. We also recognize that pharmaceutical or herbal interventions are poor substitutes for fundamental changes in a person's lifestyle. Appropriate diet, exercise, and stress management provide a foundation for true curative intervention.

To quote from the Merck Manual, "sedation, extra rest, prolonged vacations, admonitions not to worry, and half-hearted attempts at weight reduction and dietary sodium restriction are poor substitutes for effective anti-hypertensive drug therapies." This statement is made more ironic by the fact that drug therapies have no curative value, *per se*; they may help a person manage the condition more effectively, but at the risk of detrimental side effects.

Lifestyle modification has the advantage of being curative, as long as patients find themselves at peace with those lifestyle changes and are willing to abide by them for the remainder of their lives. Botanical interventions have the potential to be curative within the context of lifestyle change, and they have the added advantage of being an intermediate interventional step between drugs and lifestyle modification.

There are many people who find the side effects of conventional pharmaceutical intervention unacceptable and refuse to continue with that route of therapy. There are many for whom pharmaceutical intervention simply has not worked and, seeking an alternative, they come to someone who practices herbal medicine. It is the rare patient who initially begins an intervention with botanical medicine, probably because those people who have a natural inclination towards botanical therapy are already aware of the benefits of a healthy lifestyle and live accordingly, thereby placing them at lower risk for developing hypertension.

Perhaps the most straightforward approach to this subject is to discuss how the most commonly employed pharmaceutical measures work, and then compare and contrast these approaches to potential botanical interventions.

The 1988 "Report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure" advocates a "step approach" to the management of the hypertensive patient. Step 1 consists of choosing an appropriate pharmacologic agent; step 2 is to increase the dose of the first agent or add a second "first step" drug. If the patient is not responding satisfactorily to the intervention, the third step is to add a third drug of a different class and adjust the dosage of the previously prescribed agents. I am sure that you can well imagine what steps four and five look like in this model of treatment. The classes of step 1 drugs consist of diuretics (furosemide, hydrochlorothiazide), beta blockers (atenolol, labetalol), ACE inhibitors (captopril, lisinopril), calcium antagonists (diltiazem, verapamil), adrenergic inhibitors (clonidine, terazosin), and vasodilators (nitroglycerin, hydralazine).

The first step to an effective botanical intervention is the patient interview. Here we find out what sorts of interventions, if any, the patient has attempted, what worked or didn't work, and when the condition began. The practitioner also has the opportunity to explore with the patient probable causes for the hypertension and get a "feel" for where the patient's health stands and what sorts of interventions might be most acceptable. A review of the patient's lifestyle is an important aspect of establishing rapport and helps place the patient's hypertensive situation in an appropriate context.

We live in a very performance-oriented society; many people find themselves caught up in the lifestyle of "keeping up with the Joneses." We tend to push ourselves harder and harder, finding less time to prepare healthy meals, less time to sleep long enough and well enough, less time to exercise, and, possibly most importantly, less time to engage in meaningful relationships with the people around us. At some point, each of us has to ask ourselves the question, "How fast do I need to spin this rat wheel?" It becomes possible to see that a certain approach to life has reached the point of diminished returns only after it has reached that point. Often, this contextual realization can be the most profound step in the process of recovery for these patients.

Throwing natural substances at patients is not the answer any more than throwing pharmaceuticals at them. The information contained in this paper is by no means exhaustive, nor is it intended as a listing of agents that can be simply exchanged for the drugs that these patients are on. Rather, it is suggestive of potential strategies that can be relied upon to help people get off or scale back the medications they are taking, if that is their wish, or to help them better manage their situation regardless of concomitant use of medications.

Diuretic intervention is an appropriate measure for those people who have a tendency to edema. This statement belabors the obvious, but if a person has developed a tendency to edema one has to consider the reason for this. In many cases they have developed a congestive heart condition, known in eclectic times as dropsy. The idea is that the heart is not performing its function well enough to adequately move the fluid in the bloodstream, allowing it to accumulate around the heart and in the interstitium of the lungs and limbs. This is a phenomenon usually related to long-term (often several decades), of hypertension. The heart becomes damaged from pushing too hard for too long. My two favorite

agents for patients who suffer from this condition are *Convallaria majalis* and *Terminalia arjuna*.

*Convallaria majalis*, lily of the valley, grows in the deciduous forests of Asia, Europe, and the Eastern U.S. *Convallaria*'s action on the cardiovascular system is related to several cardiac glycosides: convallatoxin, convallamarin, convallarin, and convallaria acid. These agents serve to inhibit the sodium-potassium cellular pump, leading to a rise in intercellular calcium levels, which increases the contractile force and speed of the heart muscle. This phenomenon is called positive inotropy and translates as increased cardiac output, better peripheral blood perfusion, and a decrease in heart rate (negative chronotropy). Interestingly, convallatoxin is considered the primary glycoside, but it is very poorly absorbed. Many of the other constituents are believed to aid in the absorption of the more active constituents as well as serve to synergize the effects of the more biochemically active components. The effects of *Convallaria* are considered to be the same as those of *digitalis* without the toxic side effects.

*Terminalia arjuna* has been a mainstay in Ayurvedic medicine for thousands of years; used for everything from bone fractures and ulcers to anemia, exhaustion, and dysentery. This plant is a tree and the herbal preparation is derived from its inner bark. It contains several tannins, including gallotannins and ellagitannins, sterols, notably beta-sitosterol, numerous flavonoids, including arjunolone and baicalein, and several triterpenes, including arjunolic acid and its glucosides. Modern research has shown that this botanical is effective for patients with congestive heart failure that has failed to respond to any other conventional therapies. It specifically causes a reduction in blood pressure, induces bradycardia, and has a positive inotropic effect on the heart muscle. It has a very mild sedative action and can potentiate the activity of barbiturates. Mills and Bone refer to arjuna as the key Ayurvedic herb for heart conditions and add that it is of value in the treatment of angina. They also classify it as having diuretic properties.

Other reasons why a patient would have a tendency to edema include lymphatic congestion, arteriosclerosis, a sedentary existence, renal inadequacy, and hormonal issues. Not all of these conditions are dependent on hypertension and not all reasons for edema are of life threatening pathology. If one suspects lymphatic congestion, lymph movers such as *Phytolacca spp.* (poke root), *Iris versicolor* (blue flag), and *Galium aparine* (cleavers) might

be warranted. Exercise is really the best intervention for those people with arteriosclerosis and/or a sedentary existence. Renal inadequacy and hormonal imbalances lend themselves well to our classic diuretic herbs like *Taraxacum off.* (dandelion), *Arctostaphylos* (bearberry), *Urtica* (nettle), *Usnea*, and *Petroselinum sativum* (parsley).

Parsley, *Petroselinum sativum*, is easily my favorite of these diuretics. The preparation that I use includes the seed with the whole plant. A teaspoon three to four times a day is a decent dose. Parsley contains apiol, myristicin, numerous flavonoids, and vitamin C. The addition of equal parts of usnea to the parsley enhances its diuretic qualities; with a 50/50 mix, the dose is still a teaspoon three to four times a day. Usnea, a lichen, contains a series of lichenic acids, or polyketides, which include usnic acid and thamnolic acid. It adds an antimicrobial dimension to one's diuretic intervention.

Beta blockers and adrenergic inhibitors could be lumped into the same category for our purposes. Essentially, they effectively block the sympathetic nervous system effects of norepinephrine, including vasoconstriction and increased heart rate. This measure can prove most helpful for patients who present with an overload of sympathetic nervous activity. These are the high-strung and stressed-out folks as well as those who tend to worry too much. Their world has begun to be seen as an unsafe place by their nervous system. A well-placed physical agent and a change in perception can help trigger a different response toward their situation and make all the difference in their ability to handle it.

At the very heart of this adaptation, and deep in the brain stem, there is an area called the reticular activating system (RAS). This is the area of the nervous system that helps you become more aware of some potentially important aspect of your environment. If you buy a blue car, suddenly you notice all of the other blue cars on the road. A more important function of this area of the brain from an anthropological perspective is that if some large predator is stalking your village, you are noticing every shadow, every movement, as a potential attacker. As this area becomes more and more amped up, you begin treating relatively unimportant stimuli as novel and potentially threatening.

The RAS affects and is affected by an area just a little further upstream anatomically, the locus ceruleus. The locus ceruleus is a blue (cerulean blue) streak of tissue located in the pons of the brain that contains the highest concentration of catecholamine releasing neurons in the body. It can rightly be looked at as the vigilance

center of the brain; as the perception of a person's world becomes "unsafe," the locus ceruleus increases its output of norepinephrine. As norepinephrine levels increase in the brain, the hypothalamus increases output of corticotropin releasing factor (CRF), which, in turn, stimulates the release by the anterior pituitary gland of adrenocorticotrophic hormone (ACTH). ACTH stimulates the adrenal glands to increase their output of cortisol, the primary stress hormone.

This series of events is triggered by perception and constitutes the generic stress response. When it is triggered several times a day, day after day, it becomes the driving force behind many people's hypertensive conditions. The role that adrenergic inhibitors play in this process is to blockade the cardiovascular effects of this process. Unfortunately, if the process doesn't change at a very fundamental level, these people end up needing higher and higher amounts of these agents. The amino acid glycine and the herbs *Rauwolfia serpentina*, *Rauwolfia vomitoria*, *Leonurus* (motherwort), *Valerian* and *Scutellaria* (skullcap) are some of my favorite interventions in this regard.

Glycine is the simplest amino acid. It acts as an inhibitory neurotransmitter for the locus ceruleus, effectively blunting norepinephrine output in response to stressors. It tastes sweet and has a white granular appearance that reminds one of sugar. It has no side effects and is uniformly effective for overstressed kids and adults. I use it quite a bit for ADHD kids who are constantly overwhelmed by their environment, and for anxious, hypertensive patients with the same problem. A usual dose is ½ tsp (2-2 ½ grams) three times a day and 1 tsp (5 grams) before bed.

*Rauwolfia serpentina* has a very long history in Ayurvedic medicine. The Sanskrit name for *Rauwolfia* is Sarpaghandha, and this versatile plant has been used in the treatment of all sorts of mental disorders including anxiety and nervousness, headaches, tension, most forms of insanity, and even snakebites. There are more than 50 alkaloids that have been isolated from *Rauwolfia*; reserpine is the most widely researched and understood. It has been the parent compound for a wide array of antihypertensive and antipsychotic compounds that now proliferate in modern medicine. Reserpine causes an alteration of the permeability of the membrane around neurotransmitter (monoamines) storage vesicles so that the neurotransmitter leaks out and is degraded by monoamine oxidase before it ever reaches the synaptic cleft between neurons. This effectively reduces the amount

of available neurotransmitter and “blunts” the message that would have, ordinarily, been sent to the next neuron. One positive effect of this mechanism is that it effectively reduces the amount of norepinephrine that is able to course through these neurons.

The problem with reserpine is that too much of it can cause too great a depletion of neurotransmitters like dopamine and serotonin, causing depression or extrapyramidal symptoms. Ajmaline is another alkaloid found in *Rauwolfia* that has been extensively studied as an antiarrhythmic agent. Its effects are not related to altering neurotransmitter levels, rather, through modifying the conductivity of the nerves through the muscle of the heart.

Rescinnamine and deserpidine are alkaloids that, like reserpine, have been shown to deplete monoamines, although they seem to have a greater specificity for reducing norepinephrine levels in arterial smooth muscle and exert less of an effect on dopamine and serotonin levels.

Syrosingopine is the weakest of the monoamine depleting alkaloids that have been researched. It has roughly half of the norepinephrine depleting capabilities of rescinnamine and virtually no effect on dopamine levels.

Raubasine is an alkaloid from *Rauwolfia* that acts as a benzodiazepine. Like other benzodiazepines, raubasine has also been shown to have anticonvulsant activity. It has also been shown to increase arterial oxygen pressure and hemoglobin oxygen saturation at the cerebral level. Raubasine undoubtedly provides some of the sedative and even tranquilizing effects of this plant.

The pharmacology of the whole root of *Rauwolfia serpentina* demonstrates hypotensive, sedative, and tranquilizing effects. It also reduces heart rate, creates a general sense of euphoria, has antiarrhythmic effects, and stimulates intestinal peristalsis.

Weiss refers to *Rauwolfia* as the most effective hypotensive agent among the plant drugs. Its effectiveness requires some time to establish in patients, with full effect often requiring 1-2 weeks. *Rauwolfia* is safe enough to be used for extended periods of time. Weiss quotes Kuhns and Oloffs from 1971, “We have been using the *Rauwolfia* alkaloids for 20 years as a base medication for hypotensive therapy, and—despite conflicting views from many other sources—are not aware of any reason for changing our approach.” They go on to state that there are probably no other hypotensives with fewer side effects than *Rauwolfia*.

*Rauwolfia vomitoria* is *Rauwolfia serpentina*’s African cousin. I have conducted some HPLC research with this plant in my office. We find that it differs most dramatically from *serpentina* in having a substantially smaller quantity of reserpine (on the order of 1/4 to 1/3 the levels) and in having 2 to 3 times greater levels of the alkaloid raubasine. Given the particular qualities of these alkaloids, one might expect that the *vomitoria* would give a greater short term anti-anxiety, sedative, and even tranquilizing effect, without the side effects from reserpine’s depleting serotonin and dopamine levels. I have found this to be true in the people with whom I have used these plants. I find that a mixture of the two, even mixed 50-50, does an excellent job with hypertension.

*Leonurus cardiaca* is also known as motherwort. I find it perfect for those people who suffer from “over-mothering.” They worry about their children, other people’s children, their spouses, their best friend’s cousin’s mailman, really anything you could imagine, and their blood pressure goes up. It seems to be particularly effective for peri- or post-menopausal women, but I have many anxiety-ridden men that do quite well with it. This plant contains the alkaloids stachydrine and leonurine, as well as diterpenes and triterpenes like ursolic acid and the flavonoids quercetin, kaempferol, and genkwanin. It has a long history of use in dysmenorrhea with anxiety and for general nervous tension. The dose is usually 30 drops three times a day.

ACE (angiotensin converting enzyme) inhibitors are a type of vasodilator that reduces blood pressure by decreasing peripheral vascular resistance. This process begins in the vasa recta of the kidneys, where baroreceptors and osmoreceptors help to establish the relative tone of blood vessels, thereby helping to regulate the glomerular filtration rate through the kidneys. As the process unfolds normally, the vasa recta causes an increase in the output of the enzyme renin when the arterial pressure falls too low and/or fluid volume is too low. This enzyme acts on the plasma protein angiotensinogen to produce angiotensin I, a mildly acting vasoconstrictor. Angiotensin I is further acted upon by another enzyme, angiotensin-converting enzyme, to make angiotensin II, a very powerful vasoconstrictor. This is an event that occurs primarily in the lungs, as the part of the process where the ACE inhibitors play their role. Besides its vasoconstrictive effects, angiotensin II also increases arterial pressure by decreasing the excretion of water and

electrolytes, thereby increasing extracellular fluid volume and keeping the system relatively more hydrated.

I did my undergraduate research in biochemistry and zoology on the role that these agents play in hydration of desert toads. Toads don't drink water through their mouths; they have a specialized patch of skin on their pelvis that allows them to sit in the murkiest water imaginable and absorb water through this natural filter. This is a process that is absolutely determined by the relative presence of angiotensin II in the toad's system. It turns out that water-seeking behavior and ovulation are also driven by the action of this peptide in toads. It stands to reason that a human being who is chronically and relatively dehydrated will tend to increase the output of the renin-angiotensin system in an attempt to hydrate and then the secondary vasoconstrictive effects of the peptides cause blood pressure to go too high. Ironically, a lot of the patients who are put on ACE inhibitors are also given diuretics to further reduce fluid volume; an answer to the question, "How do you make a thirsty person more thirsty?" Angiotensin II also drives water-seeking behavior; when the process is truncated, the person may not even know that they are thirsty. The best course of action that I have found for these individuals is to engage in some kind of exercise regimen, increase their intake of minerals besides sodium, and hydrate, hydrate, hydrate. I recommend they start with ½ gallon of water a day and go up. The minerals and exercise regimen help avoid hyperhydration.

Calcium channel blockers are also a type of vasodilator. I have found that, in addition to hydration and exercise, diaphoretic herbs have an excellent vasodilatory effect. Hydrotherapy measures such as alternating hot and cold in the shower, constitutional hydrotherapy, and wet sheet packs also have the effect of reducing peripheral vascular resistance through vasodilation. There is no better diaphoretic than exercise. Some of my favorite botanicals for achieving this effect are *Veratrum viride* (Indian poke), *Tilia platyphyllos* (large-leaved lime), *Viscum album* (mistletoe), *Achillea millefolium* (yarrow), and *Pilocarpus jaborandi*.

*Veratrum viride* or green hellebore is a plant that was much revered by the eclectics at the turn of the century and they literally wrote volumes about it. It contains several steroidal alkaloids, including some solanidanes, isorubijervine, rubijervine, germitrin, veratrine and protoveratrine. Ellingwood says that when taken in moderate doses, *Veratrum viride* reduces the pulse rate to a marked degree and that it is specifically indicated

when the pulse is large and bounding, and the tissues are engorged, with fullness of the capillary circulation. He also goes on to say that although it is powerful poison, it is so regular and uniform in its action, and so devoid of erratic and unaccountable or uncontrollable influences, that it can be given within the limits of its maximum dosage with safety. The first signs of poisoning are sneezing, lacrimation, salivation, vomiting, diarrhea, burning of the mouth and throat, and hypotension. King's *American Dispensatory* reminds us that nausea and vomiting will occur immediately with an overdose of this plant, making death a very rare consequence.

This herb provides a consistent reduction of blood pressure and slowing of the pulse, primarily due to the action of the alkaloid germitrin. *Veratrum* seems to work on the afferent side of the nervous system causing a sensitization to the interpretation of blood pressure and a decrease in blood pressure reactivity. It is also indicated for external use as a local anesthetic and counterirritant. I personally use *Veratrum* nearly every day in clinical practice; I find it of immense benefit for hypertensive patients. It is always mixed with other botanicals like *Rauwolfia* or *Viscum* and another diaphoretic. A usual dosage of tincture is 10-20 drops twice a day. I have yet to see anyone get a toxic effect from this plant. With careful dosing and conscientious prescribing, it can be a wonderful adjunctive botanical agent.

*Tilia platyphyllos* is a wonderful and good tasting botanical diaphoretic indicated for hypertension related to arteriosclerosis. Its vasodilating potential seems to help the body compensate for the hardness of the arteries, perhaps even reducing the brittle consistency of these vessels. The flowers and leaves contain a volatile oil and numerous flavonoids, including quercetin and kaempferol as glycosides. Like many diaphoretics, it also possesses antiviral qualities and is a relaxing agent specific to nervous tension related to being overwhelmed. Some research has shown that *Tilia* is protective against stress-induced ulcers, decreases adrenal enlargement in rats, and possesses corticosteroids-sparing effects under stressful conditions. I have found it to be very useful in those people who experience palpitations and hypertension related to stress and worry. It combines profoundly well with *Leonurus* and can be dosed fairly high, 40 drops four times a day.

*Achillea millefolium*, or yarrow, is one of the oldest plants suspected of having a medicinal relationship with human beings. Remnants of yarrow bundles have been found in the burial sites of Neanderthals dating back

as far as 30,000 years ago. The native people of the southwest use it for everything from sprained ankles and bug bites to syphilis. It does show an incredible range of antimicrobial potential. It contains the sesquiterpene lactones achillin, achillicin, achillifolin, and leucodin, as well as the anti-inflammatory chamazulene and a number of flavones. As a tea and as a tincture it is profoundly diaphoretic; its effect involves improving peripheral blood flow, reducing peripheral vascular resistance, and activating the lipoprotein lipase in the peripheral arterioles, which also helps promote better conversion of LDL cholesterol to HDL cholesterol. It is dosed similarly to *Tilia* at up to 40 drops four times a day.

*Pilocarpus jaborandi* is a profound diaphoretic; the active constituent presumed to be the imidazole alkaloid pilocarpine, which has cholinergic properties. This plant has a historical use among the old-time naturopaths 'to bring out the rash in exanthematous diseases'. This botanical is extremely useful for dry mucous membranes because it increases salivation, tearing of the eyes, and sweating. The dose of this plant is very low; 2-3 drops 2-3 times a day is sufficient, which allows it to be con-

veniently added to other tinctures without dramatically increasing the amount of your preparation dosage.

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# Cellular Receptors and Botanical Agents

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Cells possess numerous different types of receptors, ion channels, pores, and other communication, transportation, and signal reception organelles. This paper will focus on the three main types of cellular receptors: cell membrane receptors, such as insulin receptors, the glycoprotein receptors, and especially the various nuclear receptors.

## Bilipid Membrane Receptors

One of the primary types of cellular receptor occurs right on the cell's surface. The receptor itself is a large coil of amino acids, where each amino acid is like a pearl in a long string. This string is coiled into a basic globular shape that extends all the way through both sides of the bilipid membrane. When a ligand such as insulin binds these receptors, the coiled protein of the receptors is able to change its conformation and shape. A portal may open in the receptor through which substances may then pass. In the case of insulin receptors, glucose may pass to the interior of the cell.

## Glycoprotein Receptors and Lectins

The glycoprotein receptors receive the glycoprotein hormones which include LH, FSH, HCG, and TSH. These glycoprotein receptors are coupled with G proteins, which assist to transfer signals to the inside of the cell. Glycoprotein receptors are particularly numerous on blood cells, both red and white, and lymphatic tissues and organs.<sup>1</sup> Platelets receive signals from fibrinogen via glycoprotein receptors. Rather than being a long coil of amino acids, glycoprotein receptors, as the name implies, are mixtures of simple sugars and amino acids and physically appear like antennae or whiskers extending outward from the surface of the cell.

Glycoprotein receptors on cell surfaces may play a role in recognition in histologic type and state of maturation and proliferation.<sup>2</sup> Carbohydrate chains extending from cell surfaces provide binding sites for endogenously produced carbohydrate-binding proteins, which appears to give the cell information on immune status. Most studied has been the immune and cytokine activity seen when endogenous lectins bind to blood cells. Like other receptors, when a ligand binds, the glycoprotein receptor's geometrical configuration is altered and intracellular responses are triggered.<sup>3</sup>

In addition to certain hormones, lectins also interact greatly with glycoprotein receptors. Lectins from the liver and the intestines, for example, have been noted to stimulate neutrophilic immune response. Lectins may liberate NO, H<sub>2</sub>O<sub>2</sub>, and other reactive oxygen species from tissues and thereby stimulate immune and inflammatory responses.<sup>4,5</sup>

Due to their sugar and protein handles, lectins may readily bind cellular receptors and affect protein synthesis, immune, and inflammatory responses at the cellular level. Lectins are naturally occurring compounds comprised of complex sugar and protein combinations, occurring in both animals and plants. An example of a disease involving glycoprotein receptors is von Willebrand disease. Von Willebrand factor is a pathologic substance produced aberrantly, which binds platelet glycoprotein receptors and is involved with acute clotting disorders and coronary disease syndromes including MLS occurring at a young age.<sup>6</sup>

Lectins occur in numerous plants and are endogenously produced by animals as well. Sugar-specific lectins are identified in human serum. This fascinating group

of natural compounds is known to interact with cellular adhesion molecules (CAMs). CAMs affect cell-to-cell adhesion, obviously, as well as cell-to-cell communication including cancer progression and metabolism. Red and white blood cells as well as vascular tissue contain a large number of lectin receptors and play a role in immune response and blood cell activity. For this reason, CAMs are sometimes classified as a type of cytokine, akin to interleukins. Some antibodies could be classified as types of lectins, and like lectins bind to glycoprotein receptors on cell membranes.

Lectins appear to affect the glycoconjugate compounds on the surface of numerous cells and affect their adherence and interaction with the same type and other types of cells, particularly blood cells. Lectins appear to enable cross linkage between sugar-containing compounds, including oligosaccharides, glycopeptides, and glycoproteins, especially those occurring as receptor complexes on cell surfaces.<sup>7</sup> For example, a mannose-binding protein occurring in human blood has been noted to play a role in bacterial and fungal pathogen recognition and defense.<sup>8</sup> A galactoside-binding protein in human placenta is noted to play a role in grooming fetal blood. The ability to affect blood cell immune response is a noteworthy characteristic of lectins.

To adequately discuss lectins, one must also discuss glycoprotein receptors in mammalian physiology. Lectins also affect the aggregation of blood cells and the subsequent release of cytokines. Endogenous lectins are not yet well understood, but are believed to play a role in the production, release, and function of blood cells, and hematopoietic tissues. In addition to affecting blood cell aggregation and reactivity, lectins may also affect cell to cell binding and communication in solid tissues.

Cell adhesion in bulk tissues and organs is affected by lectins; in particular, blood cells and immune responses are affected by lectins. Blood agglutination and flow are affected by lectins. Membrane-based as well as intracellular blood cell immune responses are affected by lectins. Bacteria are also able to adhere to animal cells and mucous membranes via fimbrial types of lectins that bind oligosaccharide-based appendages on animal tissues.

There are numerous types of lectins, each being specific for particular types of glycoproteins. Various tissues and cellular types possess glycoprotein molecules (glycosaminoglycans or GAGs) that project from the cellular membrane somewhat like bifurcated whiskers. The

precise glycoprotein is highly tissue-specific; however, similarities are seen in the types of GAG extensions found on thymus, spleen, and bone marrow cells. These glycoprotein receptors are synthesized through glycosylation of proteins. There are numerous types of glycosylation enzymes, such as various glycosyltransferases, that are specific to the type of cell. Glycosylation occurs primarily at the terminal ends of the glycoprotein chain. This enables cell-to-cell communication as cells are able to project outward. Other enzymes code for nitrogen and oxygen linked oligosaccharide chains in the nonterminal ends of the glycoprotein receptors. These enzymes are not unique to the tissue but rather ubiquitously occurring in all cells.

### Basic Lectins

- Lactose-specific lectins
- Galactose-specific lectins
- Galactoside-specific lectins
- N-acetylgalactosamine-specific lectins

### Endogenous Types of Tissue-specific Lectins

- CAMs – Cellular adhesion molecules
- VCAM – Vascular cellular adhesion molecules.
- Selectins – A family of lectins that help direct WBC homing and extravasation. L-selectin affects adhesion of WBCs to endothelial cells, E-selectin.
- Galectins – A family of lectins that have an affinity for beta-galactose containing oligosaccharides found on immune cells, such as T lymphocytes. Galectins may be involved in T cell directed apoptosis and synthesis, activation, and differentiation. Galectins are also involved in inflammatory and immune processes.<sup>9</sup> Galectins have recently been shown to also be involved in the accumulation of collagen in inflamed pancreatic tissues.<sup>10</sup>
- C-type lectins - A family of lectins involved in cellular recognition of antigens. C-type lectins are involved in antigen adhesion, presentation to T-cells, and intracellular cytosolic immune receptors and responses. May help direct responses of other cytokines.
- Calreticulins – A family of lectins that serves as the molecular chaperone of the endoplasmic reticulum. Calreticulins are involved in the receptor and transfer of metabolic substrates to enable protein synthesis. Calreticulin reduces



the tendency of non-native glycoproteins to agglutinate.<sup>11</sup>

- Pentraxins
- Calnexin

## Bacterial Lectins

Adhesins – Bacterial lectins that project fimbria which enable them to adhere to specific tissues. *E. coli*, for example, is able to adhere to urinary mucosal cells via finger-like lectins that extend from bacterial cell walls. Adhesins bind to oligosaccharide-based glycoprotein extensions on urinary epithelium, and mannose may affect this adhesion.

## Plant Lectins

Many plants contain lectins which serve their own cellular adhesion and immune responses. Plant lectins are also known to affect animal glycoprotein receptors. Plants said to affect lymph, spleen, vascular congestion, and immune response such as *Phytolacca*, *Aesculus*, and castor oil are now understood to be high in lectins. Some plant lectins are also associated with excessive immune responses, even anaphylaxis, such as the lectins in peanuts and wheat known to provoke mild to life-threatening immune and inflammatory responses. Plant lectins that promote anaphylactic-like blood responses are collected referred to as Phytohemagglutinins. Many plant lectins have been shown to restrict tumor growth and increase life expectancy, increase lymphocyte response, and enhance tumor cytotoxicity.<sup>12</sup> Many plant lectins have been noted to induce apoptosis by having affinity for cancer cell membranes and receptors, causing agglutination and the aggregation of cancer cells. Lectins may also affect the production of interleukin and the activation of various protein kinases within animal cells. Some plant lectins bind ribosomes and inhibit protein synthesis and are collectively referred to as ribosome inactivating proteins, or RIPs. Other areas of current investigation into plant lectins include inhibition of angiogenesis and downregulation of telomerase enzymes.

Lectins are not uncommon in plants and have been identified in common foods. Many plant lectins are able to resist digestion and then either bind the GI epithelia and/or enter circulation. *Erythrina cristagalli*, *Sophora japonica*, and *Lotus tetragonolobus* contain lectins that are not well understood. *Canavalia ensiformis*, *Datura stramonium*, and *Triticum vulgare* contain lectins that appear to have an affinity for binding cartilage. Lectins from *Griffonia simplicifolia* contain a type of lectin that is noted to have

a specific binding affinity for prechondral blast cells. Lectins from peas (*Pisum sativum*) and beans (*Phaseolus vulgaris*) are noted to specifically bind chondrocytes. *Sambucus nigra*, *Arachis hypogaea*, *Triticum vulgare*, and *Solanum tuberosum* are also noted to contain lectins.<sup>13</sup>

Common foods that may act as allergens due to lectin content include wheat, corn, tomatoes, peanuts, potatoes, peas, lentils, soy, and mushrooms. Many legumes have been noted to contain lectins.

## Medicinal Plants High in Lectins

- *Phytolacca* - Long known to contain lectins, specifically phytolaccin or pokeweed mitogen noted to have an affinity for leukocytes.
- *Ricinus castorus* – Castor beans contain a lectin known as ricin, not to be confused with the extremely toxic alkaloid known as ricine.
- *Viscum album* and *flavens* - Mistletoe is high in lectins noted to affect vascular tissue and immune response.
- *Aesculus hippocastanum* – Horse chestnut contains lectins that affect red blood cell response and vein and artery wall inflammatory responses.
- *Cymbidium*- agglutinin
- *Urtica dioica*- agglutinin
- *Galanthus nivalis*- agglutinin
- *Hippeastrum*- agglutinin
- *Passiflora adenata*- lectin
- *Lotus tetragonolobus*- lectin
- *Phaseolus vulgaris*- agglutinin
- *Canavalia ensiformis* (Concanavalin A) - lectin

## Nuclear Receptors

The existence of hormones, much less their cellular receptors, has only been known for the last hundred years or less, with cortisol and thyroxine being identified in the 1920s. Estrogen receptors were revealed in the 1960s, and the first BCPs and hormonal medications were developed shortly thereafter. Since that time, research on hormones and hormone-influenced diseases has exploded. In the last 50 years numerous pharmaceuticals have been developed that influence hormones and their cellular receptors. In fact a full 13% of all current FDA pharmaceuticals are nuclear receptor agonists. Numerous plant-based compounds are also noted to bind nuclear receptors.

Some 50 different nuclear receptors have now been identified along with other proteins and molecules

that can act as co-activators and co-repressors. Nuclear receptors occur in animals only and are not found in algae, fungi, or plants. There are close to 50 different nuclear receptors in humans, including estradiol (estrogen), testosterone (androgen), cortisol (glucocorticoid), T3 (thyroxine), vitamin A (retinoic acid), and vitamin D (calcitrol) and other receptors. Among these 50 are a number of receptors whose function has not yet been identified and are referred to as “orphan receptors.” Because free fatty acids and bile acids bind some of these orphan receptors, one function may be to sense the basic metabolic status in the tissues. The FXR, LXR, PPAR nuclear receptors are of this type and bind metabolic intermediates. Other orphan receptors, the CAR, PXR receptors, may sense foreign substances (xenobiotics) in the cytoplasm as they have been noted to upregulate the expression of cytochrome p450 enzymes.

Nuclear receptors are protein-based structures found on the insides of cells, as opposed to on the cellular membrane where other types of receptors are found. Steroids, thyroxine and the fat soluble vitamins D and A are lipophilic molecules shown to pass through the bilipid membrane and interact with receptors inside the cell and on the nuclear envelope. Once inside the cell, steroids may be received on the nuclear plasma membrane, at various sites in the cytosol, usually near the nucleus, directly on the nucleus, or least commonly, directly on small areas of nuclear DNA. All of these sites where the steroids and hormones bind, ultimately direct gene expression in the nucleus of the cell. Nuclear receptors direct genes that affect metabolic, developmental and homeostatic responses. Nuclear receptors play a key role in embryologic and pubertal development as hormones affect sexual maturation and expression of genes involved with sex organ development and hormonal status. Nuclear receptors have been found to play a role in a wide variety of cancers, including androgen receptors and the initiation and progression of prostate cancer; estrogen and breast and endometrial cancer; nuclear receptor activity and bone cancer; and peroxisome receptors and colon cancer.

### **Type I and Type II Nuclear Receptors**

There are several types of nuclear receptors: Type I nuclear receptors are located in the cytosol and Type II are located within the nucleus itself. When Type I nuclear receptors are bound by hormones, they cause proteins in the cell to dissociate, dimerize, and translocate. Some of these proteins are the same proteins involved with heat

shock phenomena, also referred to in the past as Colle's proteins. Type I receptors include those that receive and bind androgen, estrogen, progesterone, and glucocorticoid receptors.

Type II receptors are found at or within the nucleus itself, and usually act in tandem with a “co-regulator” or “co-repressor.” When a ligand such as T3 binds to a type II receptor, this receptor dissociates from its co-repressor and a different co-activator is drawn to the local area. The presence of the ligand plus the co-activator stimulates other proteins, such as RNA stimulating enzymes, to become active and induce transcription of DNA and RNA which then promotes the cell to respond accordingly. Type II receptors include retinoic acid, retinoid X, and thyroid hormone receptors.

Type III nuclear receptors are the “orphan receptors” whose broad functions are not yet understood. They are similar to type I nuclear receptors because they both promote dimerization before binding DNA.

Type IV nuclear receptors bind as monomers or dimers directly to a small portion of DNA, half the size of other hormone response elements (HREs) (see heading below).

### **Classification of Nuclear Receptors**

- Thyroid hormone receptors – T2, T3, T4 and related substances bind
- Retinoic acid receptors – vitamin derivative and retinoids bind
- Hepatocyte nuclear factor - fatty acids bind
- Testicular receptors
- Peroxisome Proliferator-Activator Receptors – EFAs and PGs bind and activate. Many drugs and exogenous substances bind
- Rev – ErbA – (heme binds)
- RAR-related Orphan receptors – (cholesterol binds)
- Vitamin D receptors
- Pregnane X - xenobiotics are known to bind
- Androstane receptors - androstane binds
- Estrogen alpha and beta receptors – estrogens bind, other sex hormones may bind
- Progesterone binds – progesterone and other sex hormones bind
- Androgen receptors – testosterone and other sex hormones bind
- Ketosteroid receptors
- Glucocorticoid – cortisol binds
- Mineralocorticoid - aldosterone binds

- Steroidogenic factor-like – phospholipids bind
- Nerve growth factor-like – NGF binds
- Germ cell nuclear factor-like
- Nuclear receptor co-regulators
- Co-activators and co-repressors

As has been briefly summarized, the binding of a nuclear receptor by a ligand, typically a steroid or hormone, stimulates numerous other proteins to become activated and these proteins are actually the agents which induce the transcription of genes within the nucleus. For this reason, these proteins are called transcription co-regulators. Some of these proteins promote transcription (the co-activators), while others inhibit (the co-repressors), by undergoing conformation changes that make the genes either more or less accessible, or form bridges with co-regulators and affect their activity. Collectively, the co-activators and co-repressors are referred to as “nuclear co-regulators.”

Because activity of hormones inside the cell also involves co-regulators, co-regulators are being explored as a mechanism of mitigating the effects of hormones on hormone-sensitive cancers and cells.<sup>14</sup> All steroids also involve zinc in the transcription process and thus zinc deficiency can result in altered hormonal responses, especially to glucocorticoids and progesterone. Zinc atoms are held in the protein-based receptor complex in the domain directly involved with binding to DNA.

Some sources use the term “ligand-binding pocket” to refer to the primary agonist and antagonist-binding domains. Additional sites have been referred to as “zinc fingers” which directly bind the DNA and the “coactivator binding groove” which assists in interaction of binding domains with co-regulators.<sup>15</sup>

## Nuclear Receptors for Reproductive Hormones

Nuclear receptors for hormones having four physical “domains” – morphological areas on the receptors that have various roles. One region or domain is where ligands bind, another domain may then bind the DNA directly and influence transcription, and another domain changes conformation to interactions with co-regulators.

After steroids bind to steroid receptors’ domain, the whole molecular conglomerate changes its morphologic shape. Proteins are liberated that typically dimerize and direct genetic transcription by initiating messenger RNA activation. The mRNA exits the nucleus, interacts with cellular ribosomes, and the cell responds by syn-

thesizing specific proteins to carry out tasks initiated by the original hormonal ligand.

The main four nuclear receptor domains

- The A/B domain is ligand-independent, located on the N terminus of a receptor protein complex.
- The C domain contains zinc fingers which bind directly to various genes on locales referred to as hormone response elements.
- The D domain is sometimes referred to as the “hinge,” as it is the site of the physical change in conformation of the entire receptor’s shape. The D domain is the site of physical flexure.
- The E/F domain is the site where ligands physically bind. The E/F domains of peroxisome receptors (PPARs) are quite large compared with other nuclear receptors, and PPARs interact with a large list of ligands, and endogenous and exogenous compounds including xenobiotics and drugs.

## Plant Compounds that Bind Nuclear Hormonal Receptors

One group of researchers examined 150 of the leading medicinal herbs for an ability to bind progesterone and estrogen nuclear receptors in human breast cancer cells and reported numerous plants that were active. They reported that soy, *Glycyrrhiza*, *Trifolium*, *Thymus*, *Curcuma*, *Humulus*, *Verbena*, *Origanum*, and *Damiana* were the most powerful plants of those tested.<sup>16</sup>

One animal study examined possible mitigating effects of estradiol supplementation of two different phytoestrogens in comparison to a control of tap water on the endometrium of ovariectomized rats. Both endometrial histology and the expression of alpha estrogen receptors was examined following the concomitant use of estradiol with one of two phytoestrogens or water. The two phytoestrogens, isoflavones from *Trifolium pratense* or deoxyactein from *Actae racemosa* (*Cimicifuga*) appeared to mitigate estradiol, as no proliferative effects on the endometrium were seen, while the group receiving the water placebo demonstrated significant proliferative effects on the endometrium. Yet *Trifolium* isoflavones were shown to increase alpha estrogen receptors’ expression.<sup>17</sup> Other researchers have reported that in some circumstances phytoestrogens from soy and *Trifolium* may have proliferative and agonist effects on estrogen sensitive

breast cancer cell lines, while *Actaea* had an agonist and antiproliferative effect.<sup>18</sup>

*Actaea racemosa* compounds, particularly the lipophilic fractions, have been shown to bind in alpha estrogen receptors in humans but elicit weaker effects than endogenous B estradiol.<sup>19</sup> Interestingly, agonism could be demonstrated; proliferative effects on the uterus could not. Furthermore, with *Actaea*, administered sensitivity of the uterus to oxytocin, bradykinin, and prostaglandins was diminished. Because these endogenous substances may promote uterine pain, inflammation, and hyperexcitability, *Actaea* may reduce such uterine pathologies.

### Alpha and Beta Estrogen Receptors

The two different estrogen receptors, alpha and beta, and their subtypes help fine-tune the response of different cells to the various estrogens. The ratios of the alpha and beta receptors have been found to differ from ovary to uterus, testis, pituitary, kidney, adrenal, prostate, bladder, bone, brain, and other organs.<sup>20</sup>

Liquiritigenin from *Glycyrrhiza* has been found to bind estrogen receptors and activate beta estrogen receptor activity, more so than alpha estrogen receptor activity.<sup>21</sup> No proliferative effects on the uterus or breast cancer cells were found by these same researchers.

### Hormone Response Elements on DNA

Nuclear receptors commonly bind or affect particular sequences of DNA within the nucleus. These portions of DNA are sometimes referred to as “hormone response elements.” Once the DNA is bound, other proteins involved with transcription processes are activated and direct cellular responses occur to the presence of these nuclear receptor agonists. Because these nuclear receptors direct transcription within the nucleus, they are also sometimes called transcription factors.

When a ligand such as estrogen or thyroxine binds a nuclear receptor, a conformational change in those proteins occurs and specific genes are upregulated.

### The Mechanism of Genetic Effects at Nuclear Receptors

The most common mechanism occurring at nuclear receptors involves the binding of some physical aspect of the nuclear receptor itself to a hormone response element on the DNA strand described briefly above. Agents that induce DNA transcription are referred to as transactivators, and agents that deactivate transcription

or other agents involved in transcription are referred to as transrepressors.

Because the number of steps involved in eliciting the genomic responses is numerous, it can generally take several hours to fully evoke hormonal responses on cells. This is in contrast to receptors found on the outer cellular membrane, such as the more rapid insulin receptors, even though they are not within the nucleus. Cells possessing cAMP “second messengers” can be particularly rapid.

When an agonist binds a nuclear receptor, the shape of that receptor is altered as the proteins undergo a conformation change which causes it to then have an affinity for its co-activator. Histone transferase enzymes are often involved in this process and enzymatically cleave DNA histone, contributing to the transcription process.

When an antagonist binds a nuclear receptor, the shape of the receptor undergoes a conformational change which lends it a binding affinity for its co-repressor. In this case histone deacetylases are recruited which strengthen histone bonds in the DNA, serving to inhibit gene transcription.

### Endocrine Disruptors

There has been much attention given to “endocrine disruptors” in recent decades. Endocrine disruptors are exogenous hormonal or chemical agents that are able to act as ligands to nuclear receptors and affect gene expression in a manner that it is harmful for the organism. Ambiguous genitalia in amphibians, for example, may occur due to the presence of endocrine disruptors in the environment. Altered balance in the reproductive hormones and susceptibility to hormonal cancers is another result of endocrine disruption.

Examples of drugs known to bind estrogen receptors are the agonist diethylstilbestrol, a known horrific endocrine disruptor, and the antagonist tamoxifen, a drug used to block estrogenic activity in cases of ER-positive cancers such as breast cancer. The drug dexamethasone binds glucocorticoid receptors and acts as an agonist while mifepristone binds these receptors and acts as an antagonist.

### SRMS and Inverse Agonists

Other phenomena occurring at nuclear receptors include selective responses and inverse agonism.

## Inverse agonists

Some nuclear receptors are capable of directing gene transcription even in the absence of specific agonist binding. Inverse agonism is the phenomena whereby synthetic ligands bind and block the ongoing low level of genetic transcription happening at these sites.

## Selective Response Modifiers

Another phenomenon is the capacity of specific ligands to act as agonists in some cells, and antagonists in others. Estrogen and the myriad of natural phytoestrogens are grouped in this category and referred to as SERMs – selective estrogen response modifiers. The term SRM is roughly equivalent to the long-held herbal concept of “amphotericism.” Soy isoflavones, coumestans, numerous flavonoids and other naturally occurring compounds are known to bind directly to nuclear receptors, especially estrogen, and both agonize and antagonize in different tissues and circumstances. This selective activity has many possible clinical benefits. For example, botanical compounds may increase bone density via agonism on the bones, but not increase endometrial hyperplasia, as do many pharmaceutical estrogens. The concomitant use of botanical SERMs and pharmaceutical agents may also mitigate the effects of drugs, both positive and negative side affects.

The most research has been on selective estrogen response modifiers, but selective progesterone modifiers – SPRMs – are also being identified. The variable agonism and antagonism of these compounds may occur via a number of mechanisms. Research on nuclear receptors reports that either co-repressors or co-regulators dominate in certain cells, and that SRMs may alter the conformation of the receptor itself to alter that balance. In cells where co-activators dominate, co-repressors may become more active and vice versa.

A tangential mechanism being explored is that many nuclear receptors display a low level of agonism even in the absence of a ligand.

## Retinoid Receptors

Retinoids appear to act as co-regulators at nuclear receptors and play important roles in immune response, basic cellular metabolism, and a variety of circadian rhythms. As a result of very recent research in the 1990s and early in this century, alpha, beta, and gamma types of retinoid receptors are revealed to be involved in general embryologic development, maturation of retinal photoreceptors, and lymphatic tissue and organs such as

the thymus gland development. Some leukemias have been found to be influenced by vitamin A derivatives and activity via retinoid receptors. Thyroid activity is co-regulated by retinoid receptors. Diverse diseases including autoimmune pathologies, osteoporosis, asthma, obesity, and some cancers appear to involve retinoid receptors, and drug research is investigating possible therapies that act via these receptors.

Vitamin A and its numerous derivatives are capable of binding the retinoids. Retinoids include vitamin A derivatives retinol, retinal, retinoic acid (also known as tretinoin or Retin A), and isotretinoin (also known as Accutane).

## Thyroid Hormone Receptors

Both retinoic acid and thyroid hormone receptors bind specific hormone response elements as well as stimulate auxiliary proteins that bind hormone response elements.<sup>22</sup>

Iodine deficiency has been reported to greatly increase the anti-thyroid or “goitrogenic effects” of soy compounds, and thus iodine might act as a thyroid receptor co-regulator. Genistein, one of the main isoflavones in soy and other legumes, is reported to inactivate thyroid peroxidase enzymes (TPOs) as well as their activity where these enzymes are produced.<sup>23</sup> Therefore, the reports by some authors that soy is harmful to the thyroid is misleading and not an absolute. Any suppressive effects of soy on the thyroid are likely to involve defects in hormone synthesis and preexisting iodine deficiency.

One of the binding domains on the thyroid hormone receptor that is TH independent has been noted to interact with other steroid receptors and affect pituitary feedback loops between the brain and the peripheral tissues.<sup>24</sup> Target tissue resistance to thyroid hormone is one type of hypothyroidism and is associated with metabolic syndrome, obesity, hyperlipidemia and polycystic ovarian syndrome. It is believed to be an inheritable disorder involving impaired feedback between thyroid hormones and pituitary TSH production. Genetic mutations related to these disorders have been identified that alter thyroid hormone beta receptors.<sup>25</sup> The mutant receptors that result alter the pituitary-thyroid axis.

## Interaction Between Sex and Thyroid Hormones

Activity at estrogen receptors has been found to be affected by complex interactions with T2 and T4 orphan receptors. T2 and T4 receptors are present in

the prostate and are also noted to inhibit activity at androgen receptors. In the prostate T2 and T4 affect the activation of PSA. Therefore, T2 and T4 receptors are being explored as playing roles in balancing or mitigating the stimulating effects of estrogens and androgens on hormone sensitive cells.

### **Progesterone Receptors**

Progesterone binds cytoplasmic progesterone receptors; the entire progesterone-receptor complex moves towards the nucleus and binds progesterone response elements, thus acting as a specific transcription factor. Some cells possess other types of progesterone receptors within the cell's bilipid membrane and are coupled with G proteins allowing for a more rapid response to progesterone than progesterone acting on nuclear receptors. Progesterone bondage to a progesterone receptor dimerizes differently than other nuclear receptor-hormonal ligand complexes and thus might be more resistant to binding by exogenous substances than estrogen and other hormones. Its structure and behavior might be more similar to the ketosteroid receptors than the other sex steroids.<sup>26</sup>

Like SERMS, SPRMs also exist where a specific progesterone may act as both agonist and antagonist in different cells, tissues, and situations. A and B subtypes of progesterone receptors have been identified and reported to have variable responses in the secretory and proliferative phases of the menstrual cycle within endometrial cells.<sup>27</sup>

Synthetic progesterones, referred to as progestins, include common birth control pills such as norgestrel and levonorgestrel, and some types of hormone replacement therapy such as norethindrone. There are presently several hundred different progestins.

Progestins bind progesterone receptors and affect gene transcription. RU-486 is a synthetic progestin that blocks the action of progesterone, acting as a progesterone antagonist. This agent is occasionally used as emergency birth control as it will halt an embryo from implanting and developing properly and is a chemical method of inducing a very early abortion.

### **Aldosterone Receptors**

Aldosterone receptors occur on the plasma membrane and affect electrolyte channels including Na and K, particularly in the kidneys, colon, and sweat glands.

### **Peroxisome Receptors**

Peroxisome-proliferator-activated receptors (PPARs) were named because they were first noted to increase the number and size of peroxisomes in the cells. Fatty acids and prostaglandins have been found to bind PPARs. Some peroxisome proliferator-activated receptors appear to co-regulate androgen receptors and are thereby being explored for new prostate cancer therapies.<sup>28</sup>

Peroxisome proliferator-activated receptors occur in at least 3 subtypes distributed differently in various tissues, playing roles unique to that cell type. Maturation and differentiation of keratinocytes is affected by PPARs. These cells are upregulated to assist in wound healing and play roles in a variety of inflammatory conditions of the skin. In particular, PPARs appear to be key regulators in atopic dermatitis, wound healing, and acne.<sup>29</sup> PPARs appear to dimerize with retinoid receptors and act in tandem. Thus vitamin A and its derivatives are also important in skin diseases and many vitamin A-related substances have been found to be therapeutic in numerous dermatologic conditions.

Many exogenous compounds and xenobiotics stimulate PPARs. These receptors are important regulators of cellular proliferation, differentiation, and inflammation.

### **Androgen Receptors**

Anabolic steroids such as androgen are known to have possible downstream estrogenic effects because they can be aromatized into estrogens. Androgens, however, have also been shown to have estrogen blocking effects by inhibiting aromatization and interfering with estrogen receptors acting as co-repressors.<sup>30</sup> Thus, androgens and estrogens do not have distinct actions in the body, rather the entire milieu and balance of the various hormones can affect the overall hormonal balance in the body.

Differentiation of fat cells has been shown to be controlled in part via androgen nuclear reception and the resultant effect on genes that control leptin and adipogenin expression.<sup>31</sup>

### **Pregnane Receptors**

Pregnane X receptors upregulate P-glycoprotein pumps, one of the main drug export pumps in the body and components of the blood-brain barrier responsible for excluding numerous drugs and exogenous substances from the brain. Because many pharmaceutical drugs are active via pregnane X and CYP3A enzymes systems,

natural plant compounds that are active at these same sites could theoretically affect the activity of pharmaceutical agents. Peroxisome receptors play a large role in lipid and glucose metabolism. Synthetic peroxisome receptors ligands have been developed and are being explored in the treatment of diabetes and hyperlipidemia. The synthetic fibrate group of drugs are presently used for hyperlipidemia, such as fenofibrate, and most affect the alpha subtype of peroxisome receptor. The glitazones and thiazolidinediones are synthetic peroxisome receptors ligands developed as possible anti-diabetic agents that most affect the gamma receptor subtype.

Guggul sterones from the guggul tree, *Commiphora wightii* (*mukul*) is reported to interact with farnesoid X receptors which activate transcription factors. These lipids in guggul also activate estrogen, progesterone, and pregnane X receptors. When guggulsterones bind pregnane X receptors, CYP3A genes are activated in human hepatocytes which may be one mechanism whereby this plant improves lipid metabolism. One small human DBPCR trial on guggul lipids evaluated the effects of 2160 mg of guggul compared to placebo over a 12-week period in regards to blood lipids. Lipid parameters in the group receiving guggul were significantly decreased compared to controls.<sup>33</sup>

*Coleus forskohlii* has also been found to have activity at pregnane X receptors and also induce CYP3A expression. This mechanism, combined with a known ability to upregulate adenyl cyclase and thereby increase cAMP effects, are biochemical explanations for the folkloric reputation of this plant for treating obesity, hyperlipidemia, hypothyroidism, and a variety of inflammatory diseases including psoriasis, heart, and respiratory diseases. Forskolin has demonstrated both of these effects, while its analogue dideoxyforskolin induces pregnane receptors only.

Other natural compounds reported to act at peroxisome receptors include the diterpenes carnosic acid and carnosol, both present in the Labiatae family plants

*Salvia* and *Rosemarinus*. There have been reports that cinnamon bark compounds may bind peroxisome alpha receptors in renal cells.<sup>34</sup>

One group of researchers tested 52 different plants for possible activity at peroxisome receptors and found half to be active, including *Alisma plantago aquatica* (ze xie/european water plantain), *Catharanthus roseus* (madagascar periwinkle), *Acorus calamus* (sweet calamus), *Euphorbia balsamifera* (balsam spurge), *Jatropha curcas* (Barbados nut), *Origanum majorana* (marjoram), *Zea mays* (corn silk), *Capsicum frutescens* (chili pepper) and *Urtica dioica* (stinging nettle).<sup>35</sup> The results of the present study provide a possible rationale for the traditional use of many herbs as antidiabetics.

Isohumulones from hops, *Humulus lupulus* has been reported to activate alpha and gamma peroxisome receptors and thereby reduce insulin resistance. One clinical trial involving men and women with type 2 diabetes examined the ingestion of 80 mg of isohumulones versus placebo twice a day for 12 weeks. The study reported that the group receiving the isohumulones demonstrated improved glucose control compared to placebo, as based on blood glucose and insulin levels. Isohumulones have also been found to upregulate genes involved with fatty acid oxidation in the liver via activity at peroxisome receptors. Hypertrophy of adipose tissue in the liver has been demonstrated with isohumulones and involves effects on peroxisome-regulated adipocyte and lipid processing genes. Furthermore, isohumulones have been found to induce apoptosis of adipose cells.

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# Medicinal Uses of *Opuntia* (Prickly Pear)

Jill Stansbury, ND

**Common Names:** Tuna, Prickly Pear Cactus, Indian Fig, Nopales, Beles

**Latin Names:** *Opuntia ficus-indica*, *vulgaris*

**Family:** Cactaceae

**Other Species:** *Opuntia basilaris*, *Opuntia erinacea*, *Opuntia humifusa*, *Opuntia phaeacantha*, *Opuntia stricta*, *Opuntia streptacantha*, *Opuntia wilcoxii*, *Opuntia versicolor* – species in the Sonoran Desert, *Opuntia violacea*, *Opuntia lindheimeri*, *Opuntia microdasys*, *Opuntia macrorhiza*, *Opuntia leptocaulis* – Christmas cactus

*Opuntia* has been cultivated and domesticated not only for the edible prickly pear fruit but also for the cochineal insect, which frequently infests the leaf pads and is a valuable magenta dye. Worldwide interest in natural foods and products has led industries to search out natural food colorants. *Opuntia* has been investigated as source of natural red dyes and companies have perfected techniques to purify the betalains.<sup>1,2</sup> *Opuntia* has also been fermented into wine and research is ongoing to determine the best methods.<sup>3</sup>

The fruit is frequently referred to as “nopal” in Mexico. In South America it is called “tuna,” a word which is said to be of Haitian origin that entered the Spanish language in the 1500s. The fruit is also referred to as “beles” in Ethiopia, “ficodinnia” in Italy, “bajtra” in Malta, “tungi” in St. Helena, and “makino” in Japan. In Latin America “naranjo” is the name for the ficus-indicus species.

In ideal conditions the plant can grow to 15 or more feet tall and will flower in 3 different colors of the various hybrids of *Opuntia*: red, yellow, and pink. The sweet juicy pulp is eaten from out of the tougher, inedible

rind. The fruit also contains many small, hard, inedible seeds that most people simply swallow whole without chewing. *Opuntia* is also suitable for preparation in jams and jellies, as it is cheap and abundant at certain times of the year. An *Opuntia* liqueur is also produced in Italy and is marketed as both an aperitif and a medicine under the name of Ficodi, and another liqueur produced in Malta goes by the name “Bajtra.”

In some arid regions of the world where *Opuntia* is abundant, it is also used as an impenetrable fence, as the plant becomes large and the profuse spines deter any and all passages through thick plantings. Cattle are able to nibble the fruits of the plant, providing much nutrition, but are not able to pass through the *Opuntia* “fence.” As this fence requires no watering and no maintenance, it is increasingly popular on large ranches. Those farmers who grow *Opuntia* commercially recommend a certain pruning style early in cultivation to foster the greatest quantity of fruits possible. During times of drought the mother nopales pads will not produce daughter pads, technically referred to in botany as “cladodes,” as it uses resources and worsens the effects of the drought on the plant.<sup>4</sup>

The pads of *Opuntia* are also sometimes eaten in Mexico and in the southwestern U.S. The spines are removed and the cactus is then grilled or barbecued. Cactus pads are frequently referred to as nopales and are thought most delicious when young and the spines are somewhat flexible. They are frequently roasted and served with eggs, beans, and chili peppers. Spines on cactus species can of course help the succulent plants reduce predation but researchers are also reporting that the tiny spines help to shade the cactus flesh a bit and



reduce photosynthetic light interception in high-intensity sunny locales.<sup>5</sup>

## Chemical Constituents

### The Betalains and other Flavonoids

Some of the bright magenta flavonoids are the betalains and include betacyanins and betaxanthins found in beets and *Opuntia ficus-indica*. Though all *Opuntia* species contain betalain, *Opuntia robusta* is reported to have the highest betalain content of the ten species tested.<sup>6</sup> The same study reported both yellow and red betalains, including 18 betaxanthins and 6 betacyanins. These betalains include betanin, isobetanin, and betamic acid. One study reported them to be more stable to digestion when in a whole food matrix than when consumed in isolation in purified form.<sup>7</sup> Betalains are water-soluble and thus have excellent bioassimilation. Betalains have powerful antioxidant potential.

Beta carotene and lutein are also found in the *Opuntia*.<sup>8</sup> Flavonoid glycosides in *Opuntia* include kaempferol, isorhamnetin glucoside, and isorhamnetin rutinoside, dihydrokaempferol, quercetin, narcissin, eriodictyol, terpenoids, glucopyranosides, corchoinoside.<sup>9,10</sup>

### Minerals

Nopal pads have also been shown to have a good mineral content including calcium and phosphorous.<sup>11</sup> Calcium in *Opuntia* mostly occurs in the form of oxalate, which is not the most bioavailable type of calcium.<sup>12</sup> As a mineral source, nopales would need to be cooked or prepared in a manner that helps liberate the calcium bound by oxalate; however, other research reports that the calcium oxalate in *Opuntia* occurs in the form of “wed-dellite crystallites,” which are extremely small—around the size of 1 micron.<sup>13</sup> Thus, they may actually be somewhat absorbable. Due to its ready uptake of numerous minerals, *Opuntia* is being used in bioremediation for its ability to sequester chromium from mining sites.<sup>14</sup>

### Amino Acids

Free amino acids and amines are the precursors to the betalains. *Opuntia* contains the amino acids proline, hydroxyproline, taurine,<sup>15</sup> and tyrosine.<sup>16</sup> Proline is reported to be the most abundant free amino acid in *Opuntia*.<sup>17</sup> This finding of taurine in *Opuntia* is of interest, as taurine was previously thought rare in plants except for a few algae and fungi.

### Volatile Oils

Steam distillates of the leaves, flowers and fruits of *Opuntia lindbeimeri*, *Opuntia microdasys*, and *Opuntia macrorhiza* have revealed volatile oils with antifungal activity.<sup>18</sup>

### Pyrones

Alpha-pyrones have also been identified in *Opuntia dillenii* and named opuntioides I, II, and III.<sup>19</sup>

### Sterols

Two sterols named opuntisterol and opuntisteroside have been identified in *Opuntia dillenii*<sup>20</sup> and another group of sterols, the daucosterols are also found in *Daucus carota*. Another steroidal glycoside, oxypregnane, has also been identified. The plant also contains the relatively common beta-sitosterol, taraxerol, friedelin, methyl linoleate, oxositosterol, hydroxystigmastene, daucosterol, methyl eucomate, and eucomic acid.

### Alkaloids

*Opuntia* contains the alkaloid opuntin.

### Monosaccharides and Polysaccharides<sup>21</sup>

The skin of *Opuntia ficus-indica* contains the polysaccharide arabinogalactan.<sup>22,23</sup> Young fresh shoots of *Opuntia* reportedly may contain a small amount of mescaline, and biothiols, taurine flavonols, tocopherols, carotenoids and betalains.<sup>24</sup> *Opuntia* seeds are rich in polyunsaturated fatty acids including a good amount of linoleic acid.<sup>25</sup> Gomphrenin-I, methionine-betaxanthin in *Opuntia ficus-indica*.

### Miscellaneous Compounds

Isorhamnetin, megastigmadien, glucopyranosides,<sup>26</sup> hydroxybenzoic acid, malic acid, ferulic acid.<sup>27</sup> *Opuntia dillenii*, a species that occurs in China, is reported to contain an alpha-pyrone and vanillic acid, rutin.<sup>28</sup> The spines of *Opuntia* are composed of arabinan cellulose fibers lying parallel to one another. The cellulose itself is in a crystalline form around 5 nm in size embedded in an arabinan matrix.<sup>29</sup>

## Medicinal Aspects of *Opuntia*

Some old sources have reported *Opuntia* to be a hangover cure, which may have some validity as the plant has numerous anti-inflammatory and glucose metabolizing effects. In addition to dehydration, some of the symptoms of a hangover result from impaired liver

uptake of glucose. Due to vitamin C content, *Opuntia* fruits, like citrus, were sometimes stocked on ships set for long voyages to prevent scurvy. The fresh fruits, like all brightly colored fruits and vegetables, are antioxidant-rich.

### Mucosal Protective Effects

Prickly pear fruits contain ascorbic acid and ferulic acid, and the flavonoids rutin and isorhamnetin derivatives, which showed antiulcerogenic activity against ethanol.<sup>30,31</sup> This mucosal protective effect has been credited to antioxidants and mucilaginous agents.<sup>32,33</sup> Mucilaginous monosaccharides in *Opuntia* appear to interact with animal membrane phospholipids in the gastric mucosa, particularly phosphatidylcholine and phosphatidylethanolamine.

### Anti-toxic Effects

Zearalenone (ZEA) is a synthetic estrogenic compound that has cytotoxic and genotoxic effects. *Opuntia ficus-indica* is reported to protect hormone sensitive mouse tissue from DNA damage following exposure to Zearalenone.<sup>34</sup> *Opuntia* was also shown to protect animals from nickel chloride toxicity, protecting the liver from enzyme elevations, glutathione depletion, and SOD activation.<sup>35,36</sup> Other studies have shown liver protection from hepatotoxic organophosphate pesticides,<sup>37</sup> and ethanol-induced ulcers in rats. *Opuntia* protects the liver from carbon tetrachloride toxicity.<sup>38</sup>

### Metabolic Effects

Metabolic Syndrome, an epidemic and worldwide problem, appears to have its origins in childhood or even in utero nutrition coupled with genetic predisposition. The pathology involves elevations in all lipids and glucose plus a resistance to insulin and abnormal carbohydrate metabolism. *Opuntia* has been used folklorically for all of these complaints and some modern research is emerging to confirm age-old reports.<sup>39,40</sup> Many species of *Opuntia* have demonstrated an overall hypoglycemic action.<sup>41</sup> The Middle Eastern species of *Opuntia dillenii* has been used folklorically as an antidiabetic and anti-inflammatory. A hypoglycemic action of *Opuntia streptacantha* has been demonstrated in diabetic animals.<sup>42</sup>

One French company has patented a dehydrated leaf pad preparation from *Opuntia* and markets it under the name NeOpuntia. French researchers have reported NeOpuntia to improve lipid parameters in human

metabolic syndrome patients including lowering of total cholesterol, HDL, LDL, and triglycerides within 14 days.<sup>43</sup>

One mechanism of improved lipids has been reported to be via the ability of *Opuntia* glycoproteins to inhibit oxidation of lipids and improve overall plasma lipid profiles.<sup>44</sup> Even the seeds of *Opuntia* have been found to lower cholesterol, improve HDL, and improve glucose uptake and glycogen utilization by liver and skeletal muscle.<sup>45</sup> A pyrone glycoside named opuntioside was shown to have hypotensive effects.<sup>46,47</sup> One study showed an *Opuntia* powder product to lower serum lipids.<sup>48</sup> One small human study demonstrated lipid-lowering effects in a familial hypercholesterolemic population.<sup>49</sup> Researchers reported increased LDL uptake by the liver as well as increased metabolism in circulation, with less pronounced effects on HDL and triglycerides.

A side note of interest is that the plant *Hoodia gordonii* is a relative of *Opuntia* and has also been reported useful for syndrome X due to appetite suppression and other effects. Oxypregnane, a steroidal glucoside, is reportedly an appetite suppressant in *Opuntia*.<sup>50</sup> *Opuntia ficus-indica* has been shown to have a stabilizing effect on heart rate variability in high performance athletes.<sup>51</sup>

### Immune and Anti-cancer Effects

Polysaccharides with immune modulating activity are also reported in *Opuntia polyacantha*.<sup>52</sup> These polysaccharides may act in part via nuclear factor kappaB mechanism.<sup>53</sup>

One study also showed *Opuntia ficus-indica* betanin, one of the principle betacyanin pigments, to decrease proliferation of an in vitro myeloid leukemia cell line. Electron microscopy has revealed protection of DNA as evidenced by less fragmentation, chromatin condensation, and cell shrinkage.<sup>54</sup>

*Aspergillus terreus* is a fungus that occurs in the rhizosphere of *Opuntia versicolor* and has shown anticancer activity.<sup>55</sup> Terrecyclic acid in the fungus is credited with an ability to form adducts with certain proteins and promote tumor cell cytotoxicity.

*Opuntia* polysaccharides may affect erythrocyte function and be part of an anti-tumor mechanism of action.<sup>56</sup> Researchers reported that the polysaccharides were able to improve the fluidity of erythrocyte membranes and affect cross-linking proteins.<sup>57</sup> Human studies show *Opuntia ficus-indica* to enhance ionically active calcium channels on T cells in a manner that reduces cell proliferation.<sup>58</sup>

## Anti-inflammatory

The betalains, being brightly colored flavonoids, are of course potent antioxidants and anti-inflammatories.<sup>59</sup> Betalains, like other purple and red pigments, have been shown to protect the endothelium from cytokine-induced inflammation.<sup>60</sup> The antioxidant protective abilities of *Opuntia* are greater than those of vitamin C.<sup>61</sup> *Opuntia humifusa* showed potent antioxidant activity including inhibition of inflammatory cytokines.<sup>62</sup>

*Opuntia* has also been reported to have neuroprotective activity via inhibition of reactive oxygen species, including reducing nitric oxide when overproduced.<sup>63</sup> *Opuntia* has been shown to have a neuroprotective effect in a variety of excitotoxins and ischemic situations.<sup>64</sup>

*Opuntia ficus-indica* has been reported to have an anti-inflammatory and chondroprotective effect suggesting utility of this plant for arthritic disorders.<sup>65</sup>

One study showed *Opuntia* to protect from the harmful effects of elevated interleukins in a manner greater than that of hyaluronic acid.

Polysaccharides from numerous plants have demonstrated immune and skin and mucous membrane healing effects. Polysaccharides from *Opuntia* were shown to promote healing with topical use. Researchers reported accelerated reepithelization, enhanced cell-matrix interactions, and laminin deposition.<sup>66</sup>

The references for this article are available on our website, [www.botanicalmedicine.org](http://www.botanicalmedicine.org). To access them, click the "references" link at the bottom of the home page. Thank you!

# Therapeutic Use of Selected Prescription Botanicals

Jill Stansbury, ND

Editor's note: *The botanicals described in this article have toxic properties and should only be used under the guidance of an experienced health care practitioner.*

## *Aconitum napellus* (Monkshood, Aconite, Wolfsbane) Ranunculaceae Family

**Background and history:** The word “aconite” may have been derived from the Greek word “akon,” meaning dart, or javelin, as this is one of the most toxic plants in all of Europe. The plant juice was at one time employed as a deadly poison on arrow tips. The alkaloid aconitine is one of the most potent nerve poisons known.

**Active constituents:** 3 alkaloids, unusual in that they are steroidal alkaloids: aconitine, benzaconine, benzoylaconine. All very toxic, aconitine is considered most toxic; 1/300th of a grain can produce symptoms.

**Dosage:** Very small; great toxic potential. The Eclectic physicians would typically prepare a medicine using 5-10 drops aconite tincture in 4 oz. water, dispensing 1 tsp. every 4 hours.

Modern herbalists might recommended a 1:10 tincture at a dosage of no more than 1 gram or 4 ml per week (~0.5 ml/day, which is just a few drops). German prescription medications are standardized to aconitine content. A typical dosage is 0.05 to 0.20 mg.

**Actions and Indications:** This traditional European garden plant has been used topically as an anodyne in very small cautious applications only, as the alkaloids are readily absorbed.

Acts as a febrifuge, anti-inflammatory, stimulant, anodyne, vagal nerve tonic or stabilizer.

**Indications:** Neuralgic pain, pharyngeal pain, sinus pain, musculoskeletal pain. Also has been used as a febrifuge for influenza, respiratory infections, and tonsillitis. R.F. Weiss found aconite to be valuable for facial neuralgia, especially of the trigeminal nerve. An early-1920s Lloyd Bros. publication claimed aconite to relieve irritation of vagal nerves, including cardiac irritation, and classified aconite as a cardi tonic.

**Specific indications:** Small rapid pulse, fear, and restlessness. Not usually indicated for septic situations, rather for cold deficiency states. In Chinese medicine, aconite is considered one of the most warming herbs, a kidney yang tonic useful for deficiency states.

**Toxicity:** Therapeutic dosage is 1/3 to 1/2 drop (Felter), 5 gtt per day maximum, also dilutions and homeopathic preparations. Toxic dosage 10 drops. Fatal dosage 5 ml tincture, equiv. to 1 gm plant, or 2 mg aconitine. Early signs of toxicity include numbness and tingling. Progressing sensory paralysis can lead to death due to diminished cardiac activity. Bradycardia is an early sign of cardiotoxicity.

**Treatment of toxicity:** Charcoal and GI lavage, or tannic acid with emetics and cathartics. Digitalis for arrhythmias. Lloyd Brothers recommended using a mustard or ipecac emetic followed by large amounts of warm water, and then black tea or coffee.

## Formulas Using Aconite

**Anodyne Liniment:** One traditional formula was to combine 1 part aconite tincture with 2 parts 3% camphor as a topical liniment for relief of rheumatic and

neuralgic pain. May also combine with *Capsicum* and *Filipendula* in an ointment base. **Remember that the alkaloids are absorbed through the skin and toxic levels can be easily reached. Use great caution to apply only a few actual drops of aconite.**

**Neuritis:**

Rhus tox	10 gtt
Bryonia	5 gtt
Aconite	4 gtt
Elixir Lact. Pepsin	q.s. 4 oz.
SIG:	1 tsp q2h.

## ***Atropa Belladonna* (Deadly Nightshade)**

### **Solanaceae Family**

**Background and history:** This prescription-only botanical is indigenous to Europe and may be cultivated in the U.S. The word belladonna comes from two Italian words “bella” meaning beautiful and “donna,” meaning woman. The term comes from the practice of women putting drops of plant juice into their eyes to dilate them. This was thought to enhance beauty. The term *Atropa* is from one of the 3 Fates. As the Celtic legend goes, an individual’s fate is controlled by a trinity of goddesses. Clotho, the young virgin, spins the thread of life, Lachesis, the fertile mother, measures its length, and Atropos, the wise crone, cuts the thread. The Solanaceae family name is derived from the Latin solanum meaning “I ease,” as plants of this family were frequently used as anodynes. The Solanaceae or nightshade family members include many powerful plants, common foods, and tobacco. The more powerful and well-known species were referred to as hexing herbs in Medieval Europe, as they were common ingredients in witches and sorcerers’ flying potions or green ointments. The ointment was applied to the skin—often the genitals or other areas with rich circulation—to produce hallucinations. The Solanaceae-induced visions often produce the sensation of flight and lycanthropy (the sensation that one has been changed into a wild animal—often a wolf). Belladonna has been listed in the U.S. Pharmacopoeia since the 1820s.

**Active constituents:** Atropine, hyoscyamine, and scopolamine are 3 tropane alkaloids that compete with acetylcholine. Tropane alkaloids have a sympathomimetic effect due to their competition with acetylcholine for postganglionic binding sites. May be used as an antidote to cholinesterase inhibition, such as occurs with organophosphate or physostigmine toxicity.

Both the sympathetic and the parasympathetic divisions of the autonomic nervous systems release

acetylcholine in preganglionic synapses. The parasympathetic system releases acetylcholine into the postganglionic synapses as well, and postganglionic fibers in the parasympathetic system are considered cholinergic. Norepinephrine is released from sympathetic postganglionic fibers, which are considered adrenergic. When the tropane alkaloids compete with acetylcholine for binding sites they ultimately diminish parasympathetic activity and enhance sympathetic activity. Sympathomimetics have an adrenergic effect, serving to dilate pupils, increase HBR, dilate bronchioles, decrease salivary and intestinal secretions.

**Dosage:** A therapeutic dose of belladonna should not exceed 7 ml of 1:10 tincture per week, or 1 ml per day. More commonly, 5 ml of belladonna tincture could be placed in a 2-oz. bottle of water, or possibly with 2 oz. of *Valeriana* or *Matricaria* or *Filipendula* extract, depending on the situation. This is then dispensed at a dosage of 10-30 drops 3 times per day. Used among early American Eclectic physicians in greatly diluted, near homeopathic dosages internally. A typical therapeutic dosage is 5-10 drops belladonna tincture in 4 oz. and dispensed from 5 drops to a tsp at a time.

**Action and indication:** Belladonna’s action is, in general, said to be strong, rapid, and long lasting. *Atropa belladonna* acts as an anodyne, relaxant, antilactagogue, antisecretory, antidiuretic, mydriatic, and antispasmodic.

*Atropa belladonna* is indicated in intestinal spasm, irritable bowel, colic, spasm of cardiac sphincter, excessive secretions, spastic colon with mucus and diarrhea, muscle spasm, trauma, contusions, sprains, nervous spasms, tremors, hypermotor disorders.

Belladonna is still listed in the USP and has a recent history of use in ophthalmology, bradycardia, Parkinson’s, epilepsy, pertussis, relief of GI, kidney, and gallbladder pain, and as an antidote to opium overdose. Has been used topically and internally for all types of pain and inflammation and spasm. Topically, lotions comprised of 5-10% belladonna are applied in cases of pain, spasm, or inflammation. Indicated for arthritic inflammation, abscesses, hemorrhoids, acute mastitis, congestion, stasis of blood, congestive headache and throbbing, neuralgia, and dysmenorrhea. Weiss considered it unsurpassed as a GI antispasmodic, and recommends it for biliary dyskinesia, proctitis, and general spasms in the gut. Belladonna infusions may be administered via enemas for these conditions.

Belladonna also has a powerful effect on the CNS. Belladonna is said to be useful in the treatment of Parkinson's, encephalitis, senile tremors, and abnormal motor functions.

**Specific indication:** Dull, expressionless face with dilated pupils; tired but unable to sleep; red or bluish skin that blanches to pale with pressure; soft, slow pulse, cold extremities, and copious dilute urine.

The Eclectic physician, F. Ellingwood, recommended belladonna for pain relief in cases where pain was due to fullness of circulation. This is consistent with the homeopathic indication of throbbing pain. Ellingwood also recommended belladonna for spasms of hollow organs.

### Solanaceae Family Members

*Atropa belladonna* - Deadly Nightshade

*Hyoscyamus niger* - Henbane

*Mandragora officinarum* - Mandrake

*Datura stramonium* - Jimsonweed

*Lycopersicon esculentum* - Tomatoes

*Solanum tuberosum* - Potatoes contain tropane alkaloid solanine

*Nicotiana tabacum* - Tobacco contains tropane alkaloid nicotine

### Formulas Using Belladonna

(gtt = drops, j = jiggers)

**Pertussis** (from W.L. LeBoy MD)

Belladonna	5 gtt
Lobelia	15 gtt
Drosera	20 gtt
Passiflora	1 dm
QSAD	4 oz

SIG: 1 tsp q 2 hrs for children 4-8 yrs old

**Chronic prostatitis and cystitis**

Belladonna	x gtt
Thuja	3j
QSAD	iv M

**Antispasmodic tincture**

Belladonna tincture	10 ml drops
Valerian tincture	58 ml
Peppermint essential oil	2 ml

### Suppositories

Powdered belladonna is stirred into melted cocoa butter and poured into suppository molds for use with proctitis and rectal spasm.

### Flying ointment

Fresh belladonna leaves are macerated in olive or other oil and shaken every day for a period of weeks. The leaves are pressed out and fresh leaves added, and the entire process is repeated 3 or more times to get the oil as strong as possible. For every cup of the resulting oil, an ounce of beeswax is added to prepare a solid ointment.

**Toxicity:** Therapeutic dosage atropine sulfate, 1/200 - 1/60 grain; tincture 1-20 drops.

Fatal dosage - 3 berries in a child.

Belladonna will stimulate pulse, respiration, and blood pressure followed by onset of incoordination, delirium, and finally depressed cerebral and neural activity, resulting in death from respiratory paralysis.

**Treatment of toxicity:** Physostigmine 2 mg IV.

## *Bryonia alba* (Bryony)

### Cucurbitaceae Family

**Active constituents:** Glycosides bryonin, bryonidine, bryonidin, and bryoamarid

**Dosage:** Around 10 ml *Bryonia* tincture per week is a therapeutic dose.

**Action and indication:** *Bryonia* was considered indispensable to early Eclectic physicians who used it to treat pain and debility from acute inflammations of the serous membranes. Lloyd Bros. publications claim *Bryonia* to be THE remedy for pleurisy, pneumonia, and sharp, painful coughs. *Bryonia* is indicated for inflammation of serous membranes such as chest colds, pleurisy, peritonitis, pericarditis, mastitis, orchitis, and ovaritis.

The general actions of *Bryonia* are as an anti-inflammatory, analgesic, and for inflammation of joint capsules.

**Specific indication:** Pain from serous inflammation, pain worse with motion; headache extending from forehead to occiput; weak, perspiring, and irritable; tissues warm and tender to pressure; weary and apathetic; too tired to think but very alert.

## Formula Using Bryonia:

Influenza with myalgia (from Rudolph Wagner MD)

*Bryonia* 10 gtt

*Gelsemium* 10 gtt

*Eupatorium* 3j

Macrotys 3j

QSAD iv oz

SIG: 1 tsp q 2 h

**Constipation:** In Germany, beer was at one time poured into the hollowed-out roots of bryonia and taken by the teaspoonful.

**Toxicity:** Whole fresh plant can cause contact dermatitis. Therapeutic dose is from 1/20th to 5 drops tincture. A typical Eclectic preparation was 5-10 drops in 4 oz. water dispensed by the tsp. every 1-3h for pain. Fatal dosage: 1-5 berries in a child, and 40 in an adult can be fatal. Bryony overdose can cause GI upset, weakness with diminished pulse and temperature. Delirium, collapse, and death can result.

**Treatment of toxicity:** Strong tea followed by emetic, ample water and demulcents, and cardiac support p.r.n.

## *Conium maculatum* (Hemlock)

### Umbelliferae

**Background and history:** A well used poison in medieval times, *Conium* is the famous poison to which Socrates is said to have succumbed. The juice of the fresh plant was the poison of choice among the ancient Greeks, as it was thought to be fairly humane. The victim became extremely weak followed by stupor and a slow, gentle failing of respiration, with no vomiting, contortion, or apparent pain.

**Active constituents:** Coniine, a piperidine alkaloid in fruit, stems, and leaves, is considered the most toxic constituent. Other alkaloids include coniceine, conhydrine, methyl coniine, and pseudoconhydrine.

**Action and indication:** *Conium* has been used topically to relieve the pain of cancerous growths. Indicated internally for all types of pain including rheumatism, muscle spasm, glandular swellings, breast pain, and dysmenorrhea. *Conium* was at one time used in the treatment of chorea and mania, as it acts as a motor depressant. Has been used as an antispasmodic for asthma and pertussis. *Conium* was listed in the British Herbal Pharmacopoeia in the 1885 and 1898 editions

and is often mentioned in early European herbals for pain management.

The Lloyd Brothers produced a specific medicine from *Conium* stating it to be a narcotic sedative for chorea, tetanus, whooping cough, asthma, or other conditions involving overstimulated motor responses and reflexes.

**Specific indication:** Nervous excitation and excessive motility, restlessness, mania, spasmodic cough, neuralgia, and gastric pain.

**Toxicity:** Therapeutic dosage is ~1-5 drops. Coniine acts on peripheral ganglia, depressing peripheral motor and sensory nerves. Toxic dosages will induce confusion and incoordination followed by prostration, trembling, convulsions, numbness, and possibly death from respiratory paralysis.

**Treatment of Toxicity:** Gastric lavage with potassium permanganate, charcoal with emesis; tannins and fluids; CPR, O2 for respiratory paralysis.

## *Claviceps purpurea* (Ergot)

**Background and history:** Ergot is a fungus that is parasitic on cereal grains, particularly rye, *Secale cereale*. Ergot contains over 50 alkaloids which are known to promote contractions or spasms in smooth muscle. Accidental over-ingestion of rye bread contaminated with the *Claviceps* fungus has been known to produce a poisoning state known as St. Anthony's Fire or ergotism. There were occasional mass epidemics of St. Anthony's Fire in the middle ages where victims suffered from systemic convulsions and intense burning pains in the appendages as muscles contracted and vasoconstriction led to tissue hypoxia. Gangrenous limbs were a very common result due to severe vasoconstriction.

The main medicinal use of ergot is in obstetrical practice as a hemostatic agent for postpartum hemorrhage. This practice is believed to have come from Chinese midwives who used the fungus for several centuries before introducing it to European medical practice in the 1600s. Ergot was then used as a valuable hemostatic, finally being noted in European pharmacopeias in the 1700s. Ergot eventually made its way to the USP, first being listed as a hemostatic, especially valuable in obstetrical practice in the early 19th century. The whole fungus is presently replaced by individual alkaloids. Ergonovine is administered for postpartum hemorrhage, while Ergotamine is combined with caffeine and administered rectally for migraines. Hydergine is a methanesulfonate salt of dihydroergotoxine, having vasodilatory rather

than vasoconstrictive effects, and is used in peripheral vascular disease and as a hypotensive.

**Chemical constituents:**

- 50 different alkaloids: Ergonovine is given orally for postpartum hemorrhage. Ergotomine is given IV for hemorrhage and orally for migraine.
- At least 18 different amino acids.
- Phytosterols include ergosterol, fungi sterol.

***Colchicum autumnale* (Autumn Crocus, Meadow Saffron), Liliacea Family**

**Chemical constituents:** Both the dried corm and the seeds contain from 0.2 to 0.8% colchicine, a highly toxic alkaloid (C<sub>22</sub>H<sub>25</sub>O<sub>6</sub>N).

**Background and history:** This crocus is not really a crocus at all, but a lily. Colchicine is soluble in water, alcohol, and ether, and is quite stable with drying and storage. As early as the 1930s colchicine was noted to inhibit cell division. Colchicine was first synthesized at Harvard University in 1965, but was not commercially lucrative, so the actual plant is still the source of this medicine. Severe shortages of the raw plant have occasionally occurred, causing colchicine prices to skyrocket. *Colchicum* was listed as a European medicinal as early as the 1600s in the London Pharmacopoeia.

Colchicine has been examined as a chemotherapeutic agent, as it interferes with the mitotic process, arresting cells in the metaphase. Its CNS toxicity, however, makes effective dosages difficult to achieve.

A related species, *Colchicum speciosum* has been evaluated for antileukemic activity against lymphoid leukemia in mice and nasopharyngeal carcinoma in humans.

Colchicine has also been used in genetic research and plant breeding, as it will double the number of chromosomes promoting mutations and development of new strains.

Colchicine has proven to be a valuable anti-inflammatory agent and is presently a treatment of choice in cases of gouty arthritis. Colchicine was used in eclectic and homeopathic traditions for inflammatory conditions.

**Actions and indications:** Used medicinally by ancient Greeks for gout, rheumatism, arthritis, gonorrhea, and dropsy. *Colchicum* is reported to have been a successful Egyptian therapy for Familial Mediterranean fever, a type of hereditary amyloidosis characterized by

fever and inflammation of serous membranes in people of Arabic, Armenian, and Jewish descent.

***Pilocarpus jaborandi* (Jaborandi, Pernambuco, Alfavaca)  
Rutaceae Family**

**Background and history:** At the present time, *Pilocarpus* is mostly used as a pharmaceutical in the form of one isolated alkaloid, pilocarpine. Pilocarpine is used to treat dry mouth caused by radiotherapy in people with head and neck cancer and to treat dry mouth in people with Sjogren's syndrome. Pilocarpine is in a class of medications called cholinergic agonists. It works by increasing the amount of saliva in the mouth.

**Active constituent:** Pilocarpine, an imidazole alkaloid in the dried leaf that acts as a sympathomimetic.

**Action and indication:** Pilocarpine is antagonistic to atropine, and has been used to contract the pupil and reduce intraocular pressure. Pilocarpine may improve glaucoma by raising aqueous humour outflow. *Pilocarpus* stimulates all bodily secretions including respiratory, intestinal, and lacrimal secretions, though *Pilocarpus* is slower acting and weaker than *Physostigma*.

Presently, the pharmaceutical pilocarpine nitrate or HCL is used as a cholinergic to reduce intraocular pressure in the treatment of glaucoma, and occasionally early stages of keratitis and conjunctivitis. *Pilocarpus* has been used parenterally as a potent diuretic in cases of renal edema and uremia, and in cases of nephritis and postoperative urinary retention. *Pilocarpus* has also been applied to the scalp to prevent baldness, as it has been observed to stimulate hair growth and darken the color of hair when applied topically. *Pilocarpus* has also been employed as an expectorant for asthma due to its sedative and antispasmodic action. Pilocarpine will increase pulse, peristalsis, and uterine contractions. Pilocarpine prescriptions are being employed to treat dry mouth and mucous membranes following radiation therapy to the head.

**Specific indication:** Deficient secretions, marked dryness and heat of skin and mucous membranes.

**Formula**

Hair tonic from Scudder

Sp Med Jaborandi 3j

Sp Med Polymnia 3j

QS iv Bay Rum

SIG: rub into scalp once a day



**Toxicity:** Therapeutic dosage is 1/6 to 1/12 grain pilocarpine HCL and will increase salivation, tears, sweat. Overdose will produce nausea, vomiting, diarrhea, abdominal cramping, blurred vision and weakness. Extreme toxicity can result in death due to respiratory failure or cardiac failure in those with previous heart disease.

**Treatment of toxicity:** Gastric lavage with tannic acid; tropine, digitalis p.r.n. for cardiac support.

### ***Podophyllum peltatum* (Mayapple, Mandrake) Berberidaceae Family**

**Background and history:** *Podophyllum* is a low-growing herbaceous plant inhabiting rich moist woodlands of the eastern United States and Canada. The root and rhizome are dug in the late summer and fall and are dried and powdered or fresh tinctured.

**Chemical constituents:** The plant is high in a group of resinous constituents that are collectively referred to as podophyllin. The resin is very irritating, caustic, and cathartic.

Podophyllotoxin is a potent glycosidic resin considered to be the most toxic, caustic, and purgative constituent of podophyllin. Podophyllin is typically 40% podophyllotoxin.

**Actions and indications:** *Podophyllum*, due to its caustic effect on tissues, can be used as an alternative to burning or freezing of skin tags, moles, blemishes, and hypertrophic or hyperkeratotic lesions. When the resin is diluted and fixed in tincture of benzoin, it can be safely applied topically. The surrounding skin should be protected with some sort of greasy ointment and the patient should wash the resin off completely about 4 hours after its application.

This therapy is useful for venereal warts, condyloma, and moluscum. Wait about 1 week for the exposed tissues to harden and slough away. Repeat application as needed every few days to every few weeks.

*Podophyllum* has also been used as an alternative, hepatic tonic, cholagogue, and laxative. It is said to be a slow but certain laxative requiring about 12 hours to produce an effect.

**Specific indication:** Felter lists the mayapple to be specifically indicated "by fullness of tissues, and particularly by fullness of superficial veins; oppressed full pulse (contraindicated by small wiry or sharp pulse), dirty yellowish coating of tongue, contracted skin and tongue."

### **Formula:**

One traditional medication known commonly as "Carter's Little Liver Pills" was a combination of podophyllin resin, aloin, jalap, *Hyoscyamus* extract, and dried powder of nux vomica and *Capsicum*. The resins, liquids, and powders were stirred into a paste and rolled into small round pills. These pills were used as a hepatic stimulant, cholagogue, laxative, and digestive aid. Another similar medication combined podophyllin resin with powdered *Hyoscyamus*, belladonna, aloe, and rheum. The small doses of belladonna and/or *Hyoscyamus* were added as antispasmodics to correct the griping of the strong cholagogue and purgative action of the *Podophyllum* and aloe.

### ***Rauwolfia serpentina* (Snakeroot)**

**Background and history:** *Rauwolfia* is native to deciduous forests of India, Thailand, Pakistan, and Ceylon. The rootbark of *Rauwolfia* contains the alkaloid reserpine, which has many complex pharmacological effects.

**Chemical constituents:** Contains the alkaloid Reserpine. Reserpine is known to increase serotonin and catechol levels, affect acetylcholine, antidiuretic hormones, and Substance P. Reserpine also slows respiration, stimulates peristalsis, inhibits ovulation and inhibits androgen release. Reserpine can be synthesized, but the process is expensive and not lucrative, so the actual *Rauwolfia* plant is still used as a pharmaceutical raw material.

**Actions and indication:** *Rauwolfia* has been used continuously for the last 4000 years in India to treat snake bites, insect stings, fever, chorea, epilepsy, nervous disorders, mania, as a vermifuge, and for diarrhea.

*Rauwolfia* has been used in the U.S. allopathically as a cardiovascular tranquilizer for mild hypertension since the 1950s. It has been employed as a general sedative for menopausal and menstrual disorders.

Oriental medical practitioners recommend *Rauwolfia* for elevated blood pressure and agitated depression.

The therapeutic dosage is from 3-10 drops of a 1:3 *Rauwolfia* tincture.

# Herb-Drug Interactions and Herb Toxicity: Myths, Facts and Theory

David Winston, RH (AHG)

The issue of herb-drug interactions has been given an extraordinary amount of attention over the last ten years. Based on the number of articles in the medical literature, popular press, the Internet, and the numerous books on the topic, one would assume the number of severe interactions and deaths would be quite high. The only problem with this scenario is that clinically relevant herb/drug interactions seem to be the exception rather than the rule. The overblown media hype and medical paranoia have taken a real but relatively uncommon problem and made it out to be a major medical issue. In this paper I am attempting to look at the case reports and studies (in vitro, in vivo, human and animal) and look at whether they show a real risk or an imagined one, dissect the reports and find flaws (if any exist), and put this issue into a more realistic perspective. I will also present an overview of drug interactions, drug pharmacodynamics, and pharmacokinetics and the issues of drug/drug interactions, as well as food/drug interactions. Finally, I think it is important to note that only a small number of medications seem to pose a clinically relevant risk and that more than half of the reported herb-drug interactions have positive effects (reducing toxicity, enhancing efficacy) or beneficial potentiations (may be useful for allowing a lower dose of the pharmaceutical drug).

## The Basics of Drug Interactions

### Types of Drug Interactions

1. Decreases bioavailability of medicine by decreasing absorption (Psyllium Seed, Flax Seed, Slippery Elm), enhancing metabolism (Brassicas), or enhancing elimination (Senna, Coffee, Cascara Sagrada).
2. Increases bioavailability of medicine by increasing absorption (Ginger, Cayenne, Prickly Ash, Black Pepper), decreasing metabolism (Grapefruit juice), or decreasing elimination (Licorice).
3. Potentiation of drug's effects - via a different but complementary action (Siberian Ginseng & antibiotics).
4. Potentiation of drug's effects via similar activity (Lasix & Dandelion Leaf-both are diuretics; Digoxin & Lily of the Valley-both contain cardiac glycosides).
5. Protection from adverse drug effects (Milk Thistle & hepatotoxic/nephrotoxic drugs, Licorice & corticosteroids).
6. Antagonistic or incompatible activities (laxatives & astringents, CNS stimulants & sedatives).

### Categories of Drug Interactions

1. Highly clinically significant - these are of great potential harm to the patient, are predictable or occur frequently and are well documented.
2. Moderately clinically significant - these are of moderate potential harm to the patient, less predictable or occur less frequently or lack complete documentation.
3. Minimally clinically significant - these are of little potential harm to the patient, have variable predictability or occur infrequently, and are not documented in the literature.
4. Not clinically significant - those that could occur based on theoretical grounds or the

resulting effects have very little significance or no adverse effects.

The medical literature is rife with reports of dangerous herbs and herb/drug interactions. Unfortunately, the level of evidence is often poor and the same level of evidence would be dismissed if pharmaceutical medications were being discussed. It is imperative that good data be gathered and reported on and the following criteria are necessary:

## Clinical Literature Evaluation of Adverse Drug Reports\*\*

(#1-5 are necessary for a reasonable level of evidence)

1. Positive botanical ID of the herb (& dose, form, brand, plus other ingredients).
2. Adequate description of the case [of Adverse Drug Report (ADR), patient history].
3. Plausible pharmacological timing.
4. Other possible explanations ruled out (Pharmacokinetic or Pharmacodynamic).
5. Concomitant medications noted (including dosage).

(#6-10 help to substantiate the ADR)

6. Confirmation by objective measures (e.g., serum levels of drug).
7. Pre-existing conditions not known to be ADR linked.
8. ADR event occurs on re-challenge.
9. ADR event ceases on stopping the herb.
10. A previous exposure linked to same ADR.

\* This list and the following chart are based on a lecture given by Jonathan Treasure, MNIMH, RH (AHG), July, 2001.

## Basic Pharmacodynamics are:

- The effect of herbs or medicine on the body
- Synergistic effects ( $1 + 1 = 3$ ) – Potentiation of drugs by increasing adsorption, decreasing excretion. or a duplication of activity. This can be a beneficial effect if the physician is aware of the possibility, or a concern as it can increase toxicity and side effects.
- Antagonistic effects ( $1 + 1 = 1$ ) – Decreases activity by interfering with absorption, increasing excretion, or preventing toxicity. This can be a serious concern in drugs that have a narrow therapeutic dosage level.

## Various Types of Herbs & their Pharmacodynamic Effects

Synergistic (\*), Antagonistic(Δ)

GI (Gastrointestinal) Tract Modifiers	Hepatic Modifiers	Renal Modifiers
Bitters (*) Hydrocolloids i.e., psyllium (Δ) Tannins (Δ) p/h modifiers (* or Δ) Acrid/spicy herbs (*) Transit time modifiers (* or Δ)	Bitters (*) Cholagogues (* or Δ) Choleretics (* or Δ) Hepatoprotective (* or Δ) Hepatotoxic (Δ) Laxatives (Δ)	Diuretics (Δ) Nephrotoxic ( <i>Aristolochia</i> spp.) (Δ) Nephroprotective (* or Δ) Anti-diuretics (*)

## Pharmacodynamic Management

- Herb-herb interactions are relatively rare- poly-pharmacy is normal in herbal practice. Follow the traditional rules of prescribing & synergy. Older pharmacy books list incompatible drug combinations (see Appendix A) and in TCM, the *Materia Medica* note which herbs should not be combined with other herbs (see Appendix B).
- Herb-drug interactions - use traditional knowledge of herb actions to predict and prevent

possible synergies, or antagonisms with prescription drugs. A recent study of St. John's wort showed that its ability to provoke a herb/drug interaction was dose-dependent. In traditional herbal medicine herbs are usually used in formulas, thus reducing the amount of any one herb ingested.

- Take herbs & drugs separately (by 2-3 hours).
- When adding herbs to already established drug regimens, start at a low dose and gradually

increase the dose. Monitor patients carefully throughout this process.

- Avoid starting or stopping medications and herbs suddenly. Subtle changes may not create a problem but substantial changes may trigger a significant response.
- Avoid red flags - Warfarin interacts with over 200 foods and drugs. Other problematic drugs include protease inhibitors, Cyclosporine, Lithium, and Digoxin/Lanoxin. Use care combining herbs, drugs, or supplements with medications that have a narrow therapeutic index.
- Many herb-drug interactions are positive and a knowledgeable practitioner can use these interactions to prevent adverse effects from medications (cardiotoxicity, hepatotoxicity, nephrotoxicity), to enhance efficacy of drugs, to reduce dosage of potentially toxic medications and to increase blood levels of medications that are poorly absorbed. In a paper on CYP450 metabolism (Lynch & Price, 2007), the authors note that “drugs may be intentionally combined to take advantage of CYP450 inhibition. Ritonavir, a protease inhibitor and potent CYP3A4 inhibitor, is added to Lopinavir to boost serum levels in patients with HIV”. Herbs or foods could possibly be used to do this also with a lower potential for adverse effects.

### **Drug Disposition – Basic Pharmacokinetics & ADME**

- Pharmacokinetics is the effect of the body on medications or herbs
  - Absorption
  - Distribution
  - Metabolism
  - Excretion

### **ADME & Pharmacokinetics**

- There is very limited information concerning the pharmacokinetics of herbs since relatively few herbs have known active constituents. When the active con-

stituents are unknown it is very difficult to determine which chemicals should be studied.

- The blood thinner Warfarin is a good example of how minor pharmacokinetic differences can result in major changes in bioavailability of a medication – Warfarin is 99% protein bound – a 1% change in binding can cause up to a 100% increase of bioavailability.

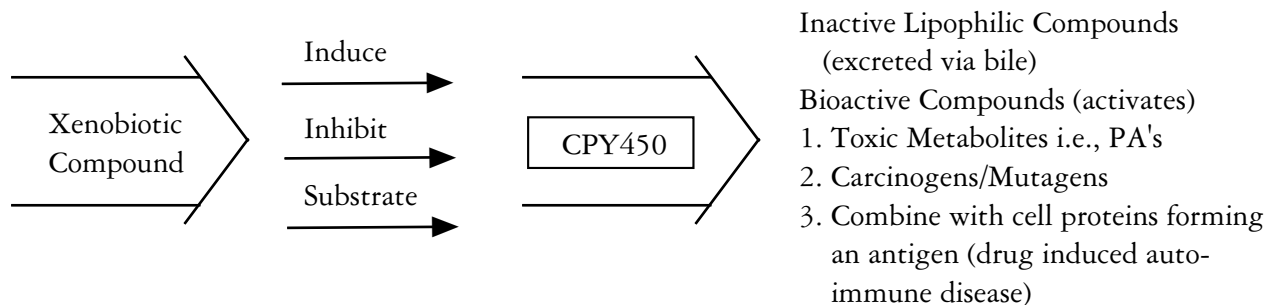
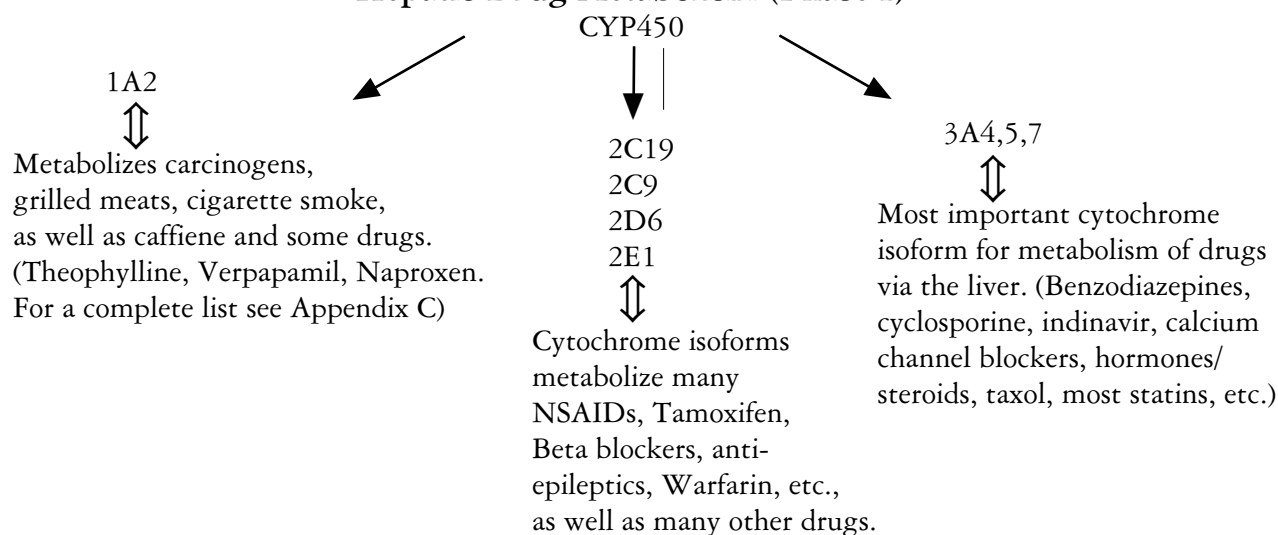
### **Hepatic Drug Metabolism**

Metabolism (Biotransformation) makes toxins more easily excreted so they can be eliminated via the urine or bile. The process involves making the toxin (drug, xenobiotic, etc.) more polar (water soluble). There are two types of hepatic biotransformation known as Phase I and Phase II. The first, Phase I, usually involves oxidation and reduction reactions via the microsomal enzymes (CYP450). This process is highly reactive and generates free radicals and in some cases increases the toxicity of the substrate (i.e., pyrrolizidine alkaloids). Phase II reactions involve the bonding of a highly polar (water soluble) endogenous chemical (sulfates, glycine, glucuronic acid, or glutathione) with the Phase I reactive substance. This creates a more water soluble and less toxic material which can be easily excreted by the liver or kidneys.

A third process for drug metabolism involves **P-glycoprotein (Pgp)**, an inducible membrane transport protein in the kidney, bowel, and brain. This mechanism was discovered by cancer researchers looking at the multi-drug resistance protein membrane pumps in cancer cells. Bacteria and cancer cells use this system to get rid of intercellular toxins.

Quercetin and other flavonoids such as Tangeritin, Diosmin from Rosemary – strongly induce intestinal Pgp, as do furanocoumarins (found in Citrus Peel, Angelica, Dang Gui, Ligusticum). There is an interesting phenomenon that has been discovered with many plants. They have developed secondary compounds to help protect themselves against bacteria and viruses by inhibiting their Pgp. Berberine containing plants work better than pure Berberine HCL because they have flavonoids that inhibit Pgp in bacteria, thus preventing excretion of the antibacterial alkaloid, Berberine.

## Hepatic Drug Metabolism (Phase I)



A substantial number of variables can cause significant variations in Phase I detoxification

These include whether the person is male or female, has preexisting liver problems, age, is an extensive or deficient metabolizer, ethnic differences, alcohol and drug use, smoking, and various diseases can also impact Phase I detoxification.

## Hepatic Drug Metabolism (Phase II Reactions)

Conjugation reaction	Examples of Drug Substrates
1. Glucuronidation. . . . .	Acetaminophen, digitoxin, morphine, lorazepam
2. Sulfate conjugation . . . . .	Acetaminophen, estrone
3. Glycine conjugation . . . . .	Salicylates
4. Acetylation . . . . .	Sulfonamides, procainamide
5. Glutathione conjugation . . . . .	Metabolites (epoxides, pyrrolizidine alkaloids)

Chart from Bone, K., 2001

Phase II Detoxification can be affected by increased or decreased Glutathione (GSH) levels and inhibition of beta-glucuronidase.

To maintain GSH levels for effective Phase II Detoxification, supplements such as N-Acetyl-Cysteine, L-Glutamine, Milk Thistle, Turmeric, Schisandra, and Alpha-lipoic acid are useful.

## Food/Drug Interactions

The problem of herb/drug interactions is real, but we need to put the issue into perspective. Food/drug interactions are probably more common, as we eat regularly and consume substantially greater quantities of foods than we do herbal medicines.

Many foods affect drug absorption. Grapefruit juice inhibits CYP3A4 activity and can increase serum levels of many drugs including calcium antagonists (Felodipine, Nifedipine), HMG-CoA reductase inhibitors (Lovastatin), Sildenafil (Viagra), Benzodiazepines (Midazolam, Triazolam) & antihistamines (Terfenadine). A furanocoumarin, Bergamottin, is believed to be the most potent CYP inhibitor in grapefruit juice. Cranberry juice is reported to inhibit CYP450 and there are 12 reports of suspected interactions with Warfarin. A recent human study found no significant inhibitory effects between Cranberry juice and Warfarin, Tizanidine, and Midazolam. The authors did note some minor changes in the elimination half-life of Warfarin and recommended patients consuming large amounts of the juice and this drug; have regular INR's to be sure there is no interaction.

Milk - interferes with absorption of Tetracycline by 50-90%. Ca<sup>+</sup> ions in milk bind with the drug. Other foods or medicines (antacids) with polyvalent minerals (Ca, Fe, Mg, Zn, Al) can also interfere with cycline and mycin antibiotics.

Green vegetables and Warfarin - many green leafy vegetables (spinach, cabbage, beet greens, broccoli rabe, watercress, kale) as well as broccoli, peas, & cucumbers, can alter coagulation.

Instead of eliminating these beneficial vegetables, maintaining a steady rate of consumption makes more sense. Herbs with Vitamin K such as Spirulina, Shepherd's Purse, Alfalfa, & Nettles should not be added to the diet in large amounts if taking blood thinners.

Brassicas (including broccoli, brussels sprouts, kale, cabbage, bok choy, kohlrabi, mustard greens, turnip greens, cauliflower, watercress, wasabi) stimulate Phase II detoxification and thus may increase drug excretion as well as detoxify Phase II activates (which may account for brassicas' "anticancer" activity).

Common spices including cloves, ginger, oregano, sage, thyme, turmeric, and garlic, as well as black tea (Darjeeling, Earl Grey, English Breakfast tea, Orange Pekoe), and soy beans all showed the ability to have significant but variable inhibition of four different CYP450 enzyme systems. This study indicates that any substance

containing secondary plant metabolites is likely to be active and all plant foods have some potential to affect drug metabolism (PE).

*Foster, B.C., Vandenberg, S., et al, In vitro Inhibition of Human Cytochrome P450, Medicated Metabolism of Marker Substrates by Natural Products, Phytomedicine, 2003;10:334-342.*

## Drug/Drug Interactions

Drug/drug interactions are even more common and problematic than food/drug interactions. "Once a patient is on 6 or more medications the chances of drug/drug interactions are almost 100%."

Zubrina Mawji, MD, Internist Lehigh Valley Hospital, 1998.

Not only are most pharmaceutical medications much stronger than herbs, there are no studies on the concurrent use of more than 2-3 medications. There is an almost cavalier attitude about mixing multiple pharmaceuticals (most of which are unstudied in such combinations), while adding herbs provokes unreasonable fear. Responsible clinicians will look at the data and conclude that, while caution is appropriate, the excessive fear caused by the use of "unknown" herbs is mostly due to ignorance, not facts.

Many common pharmaceutical medications strongly affect CYP450 activity. Some common examples include:

<u>Inhibitors</u>	<u>Inducers</u>
Fluconazole (CYP2CP)	Tegretol (CYP1A2)
Prozac (CYP2CP)	Phenobarbitol (CYP1A2)
Flagyl (CYP2CP)	DilantinPhenytoin(CYP2C9)
Tagamet (CYP1A2)	Carbamazepine (CYP3A4)
Ciprofloxacin (CYP1A2)	Phenobarbitol (CYP3A4)
Benadryl (CYP2D6)	Rifampin (CYP3A4)
Paxil (CYP2D6)	
Lamisil (CYPsD6)	
Ketoconazole (CYP3A4 or 5)	
Verapamil (CYP3A4 or 5)	
Cardizem (CYP3A4 or 5)	
Erythromycin (CYP3A4 or 5)	

One of the most potent substances affecting CYP450 activity is tobacco smoke. Tobacco smoke (cigarettes, cigars) decreases blood levels of acetaminophen, B-12, amobarbitol, benzodiazepines, heparin, tricyclic antidepressants, vitamin C, phenylbutazone-estrogen, and theophylline. It blocks the action of Cimetidine and reduces effectiveness of furosemide (Lasix), Propranolol, Phenothiazines, and Propoxyphene.

## The Question of Perspective

### Are herbs dangerous? Let's compare the statistics:

Causes of Death/American Fatalities/Year-Compiled by J. Duke, Ph.D & D. Winston, RH (AHG)

- Pharmaceuticals: 140,000-218,000. Pharmacy Today, 7(3):1-10, 2001
- Hospital Infections: 103,000. AP, July 20, 2002
- Rollover Crashes: 100,000. NBC News, Jan. 9, 2001
- Medical Errors: 40,000-90,000. CDC
- Firearms: 35,000. CBS, July 15, 1999
- Over the Counter Medications: 17,000. MS-NBC/Reuters, Jan. 30, 2003
- NSAID Related GI Bleeding: 16,500. Am. Jrl. Med, 105(1B): 31S-8S, 1998
- Food Poisoning/Allergic Reactions: 5,000-9,000 per year, CDC
- Vioxx: approximately 6,000 deaths per year from sudden cardiac deaths (approximately 30,000 from 1999-2003). Dr. David Graham, Testimony, Senate Finance Committee, Nov. 18, 2004
- Drowning: 1,500. TV news, CA 2001
- Road Rage: 1,500. TV news, CA 2001
- College Binge Drinking: 200. CBS AM News, July 16, 1999
- Nuts: 125. Science News, 155:213, 1999
- Huffing: 100. Fox Channel 5, Mar. 21, 2002
- Herbs: <37. Washington Post, Mar. 19, 2000
- Skiing Accident: 30. Chan. 4 NBC, Jan. 3, 2001
- Dog Bite Deaths: 15-20. NBC News, Feb. 2, 2000

## Herb/Drug Interactions

Herb/drug interactions can and do occur. According to Dr. Adriene Fugh-Berman, MD, "Drug/herb interactions are a lot less common than drug/drug interactions." She also states that "the risk of serious herb/drug psychotropic reactions is low, even compared to herb/drug interactions in general." A paper (Butterweek, Derendorf, et al, 2004) looking at adverse effects from botanicals and herb-drug interactions presents a balanced view of the issue, without the media hype and exaggerated herb-phobia now often found in the orthodox medical literature. The authors examined the

current literature and found that many of the reported "interactions" are "based on invalidated case reports, theory, or in-vitro studies of limited relevance." To this I would add numerous reports are based on single case reports that lack the necessary information to make any type of legitimate connection between the ingestion of an herb and any unusual or adverse effects. Single case reports may also show possible allergic or idiosyncratic response to an herb. This type of response can occur with any drug, food, botanical, cosmetic, or supplement and has little or no relevance to the general population. The authors of the study also suggest that adverse events or herb-drug interactions are most often benign and the case for serious adverse effects is overestimated in the current literature. They cite 3 groups of medications where risks are significant – immunosuppressive agents such as Cyclosporine, anticoagulants such as Warfarin, and Protease inhibitors used for treating HIV/AIDS. Two other types of medications, Digoxin/Lanoxin and Lithium, also have narrow therapeutic indexes and are more likely to be problematic. A Canadian study of elderly patients taking pharmaceutical medications and herbs showed a low incidence of potentially significant interactions (Edmundson, 2006).

While the data shows a relatively low risk for serious adverse reactions from combining herbs and pharmaceuticals, the practitioner still needs to be cautious, especially when treating patients taking multiple prescription medications and then adding herbs to the mixture. It is a good idea to slowly add herbs to an established medical protocol to allow the body to adjust to any changes without provoking a serious reaction. Preventing problems is the best option and that requires knowledge, patience, and experience. For those clinicians who casually ignore this issue because they have never seen such reactions in their practice, it is estimated that a practitioner would need to see 9,600 cases to see adverse effects that occur in only 2% of patients (DeSmet, 1997).

## Level of Evidence for Interactions

- AS = Animal Study (in vivo) \*\*
- CHT = Controlled Human Trial \*\*\*
- CS = Cohort Study \*\*
- MCR = Multiple Case Report \*
- PE = Pharmacological Evidence \*\*
- LR = Literature Review (Systematic Review) \*\*
- SCR = Single Case Report \*
- TC = Traditional Contraindication \*\*

- TH = Theoretical Interactions \*
- TU = Traditional Use \*\*
- IV = In vitro Study \*
- ES = Epidemiological Study \*\*
- \*\*\* highly useful evidence
- \*\* moderately useful evidence
- \* inadequate evidence

#### **Alfalfa** (*Medicago sativa*)

- Alfalfa contains substantial amounts of Vitamin K which may antagonize the effects of anticoagulant drugs. (PE) Check PT & INR.
- May increase CYP-450 activity and stimulate drug metabolism. (AS)
- Alfalfa seeds, sprouts, and to a lesser degree alfalfa herb, contain an amino acid, L-canavanine, which inhibits arginine absorption and utilization. There are two reported cases of alfalfa seed causing lupus-like symptoms. (MCR)

#### **Aloe** (*Aloe vera*)

- In two case reports aloe vera is indicated as the cause of hepatitis in one (SCR) and hypokalemia in the other (SCR). Neither report has adequate data to show causality. Nor is it clear whether the product was *Aloe vera* or the more problematic socotrine aloes.

#### **American Ginseng** (*Panax quinquefolius*)

- In a recent trial, high doses of American Ginseng altered Warfarin metabolism in 20 healthy patients. (CHT)

Yuan, C.S., Ewi, G., et al, Brief Communication: American Ginseng Reduces Warfarin's Effect in Healthy Patients: A Randomized, Controlled Trial, *Ann. Intern Med.*, July, 2004;141(1):23-27

- In a human trial (CHT) American Ginseng was given concurrently with the protease inhibitor Indinavir. The researchers were looking to see if *Panax* would prevent Indinavir-induced insulin resistance. The results showed no major benefit for reducing Insulin resistance (some minor improvement was seen), but also found no negative interaction between the herb and drug.

Andrade, A.S., et al, Pharmacokinetic and Metabolic Effects of American Ginseng in Healthy Volunteers Receiving Indinavir, *BMC Complement Altern Med.*, 2008;8(1):50

#### **Andrographis** (*Andrographis paniculata*)

- In vitro studies suggest that this herb can inhibit CYP3A4 activity. The clinical relevance of this is unknown as many in vitro studies of herb metabolism via the CYP450 pathways have been found to be incorrect in vivo.

#### **Artemisinin** (*Artemisia annua*)

- Artemisinin is a powerful anti-malarial extract isolated from Sweet Annie (*A. annua*). In a recent case report, a man taking this phytopharmaceutical for unidentified protozoans (100 mg per capsule, 2 capsules TID) developed hepatitis. Upon discontinuing the drug, his liver issues resolved. Although this substance is "natural" it is very powerful and it should not be used with hepatotoxic medications, and monitoring of patients' liver function is advised.

Marano, N., Sejvar, J.J., et al, Hepatitis Temporally Associated With an Herbal Supplement Containing Artemisinin, *JAMA*, 2009; 302(13).

#### **Ashwagandha** (*Withania somniferum*)

- There are several reports of Ashwagandha causing a hyperthyroid condition. It is probably wise to avoid concurrent use of this herb with patients taking synthroid or levoxyl and with hyperthyroid conditions.
- In animal studies Ashwagandha was able to ameliorate metformin-induced hypothyroidism.

Jatwa, R., Kar, A., Amelioration of Metformin-Induced Hypothyroidism by Withania somnifera and Bauhinia purpurea Extracts in Type 2 Diabetic Mice, *Phytother. Res.*, 2009, 23:1140-1145.

#### **Asian Ginseng** (*Panax ginseng*)

- Concurrent use with caffeinated beverages increases the likelihood of side effects. Do not use concurrently if anxiety, insomnia, or hypertension occur. (MCR)
- Ginseng has a mild effect on platelets and concerns have been raised that it may increase bleeding if taken concurrently with Warfarin or other anticoagulants. (SCR) A human trial (CHT) of patients who had ischemic strokes and taking white Ginseng (1.5 g per day) and Warfarin found no interactions.



### Asian Ginseng (continued)

- In a second human trial (CHT), patients with cardiac valve replacement taking Warfarin and Red Ginseng had slight changes in their INR. The study's authors state that red Ginseng (1 g. extract per day) can be taken concurrently with this drug as long as they are carefully monitored.

Lee, S.H., Ahn, Y.M., et al, Interaction Between Warfarin and Panax Ginseng in Ischemic Stroke Patients, *J Altern Complement Med.*, 2008;14(6):715-721.

Lee, Y.H., Lee, B.K., et al, Interaction Between Warfarin and Korean Red Ginseng in Patients With Cardiac Valve Replacement, *Int J Cardiol*, 2009, Nov. 11.

- May potentiate the action of steroids. (MCR) Use cautiously together.
- Use caution with antidiabetic medications as a result of hypoglycemic activity. May potentiate effects. (SCR, AS, PE)
- Increases side effects of monoamine oxidase inhibitors, such as headache, tremor, mania. (SCR, TH) Avoid concurrent use.
- Decreased the therapeutic effect of Lasix. (SCR)
- Reduced effects of opiates in animal studies. (AS)
- May have caused a manic episode in a depressed patient taking Phenelzine. (SCR)
- A study of *P. ginseng* showed no significant effects on CYP450 activity. (IVT)

Gurley, B.J., Gardner, S.F., et al, Cytochrome P450 Phenotypic Ratios for Predicting Herb-Drug Interactions in Humans, *Clin. Pharmacol Ther.*, Sept., 2002;72(3):276-87.

- An analysis of all research on Ginseng and all reports of adverse events has shown that Ginseng is rarely associated with adverse effects or drug interactions. Those reported are similar to placebo and are usually mild and transient. (LR)

Coon, J.T., Ernst, E., Panax ginseng: A Systematic Review of Adverse Effects and Drug Interactions, *Drug Safety*, 2002;25(5):373-44.

- Asian Ginseng polysaccharides, combined with Taxol, increased life span and tumor regression, compared to Taxol by itself in animal studies. (AS)

Shin, H.J., Kim, et al, Enhancement of Antitumor Effects of Paclitaxel (Taxol) in Combination With Red Ginseng Acidic Polysaccharide (RGAP), *Planta Med.* 2004;70:1033-1038.

### Bilberry Fruit (*Vaccinium myrtillus*)

- Anticoagulants and other anti-platelet drugs (TH) - minimal potential for increased bleeding; concentrated preparations are unlikely to interact with medications. Normal food quantities are safe.

### Bitter Melon (*Momordica charantia*)

- Use cautiously with all antidiabetic drugs because of the increased likelihood of hypoglycemia. (MCR, AS, PE)

### Black Cohosh (*Cimicifuga racemosa*, syn. *Actaea racemosa*)

- There have been concerns (TH) about concurrent use of *Cimicifuga* & estrogen replacement therapy. Studies have clearly shown Black Cohosh does not contain the phytoestrogen formononetin nor is it estrogenic.

Kennelly, E.J., Baggett, S., et al, Analysis of Thirteen Populations of Black Cohosh for Formononetin, *Phytomedicine*, July, 2002;9(5):461-7.

Liske, E., Hanggi, W., et al, Physiological Investigation of a Unique Extract of Black Cohosh (*Cimicifuga racemosa* rhizoma): A 6-Month Clinical Study Demonstrates On Systemic Estrogenic Effect, *Jrl. Women's Health & Gender Based Medicine*, 2002; 11(2):163-174.

- There have been concerns about the use of Black Cohosh in patients with estrogen sensitive breast cancers. Studies have now shown that *Cimicifuga* inhibits the growth of breast cancer, rather than promote it as some researchers believed. (AS, IVT)

Freudenstein, J., Dasenbrock, C, Nisslein, T., Lack of Promotion of Estrogen-dependent Mammary Gland Tumors in vivo by an Isopropanolic *Cimicifuga racemosa* Extract, *Cancer Research*, June 15, 2002;62(12):3448-52.

Hostanska, K., Nisslein, T., et al, *Cimicifuga racemosa* Extract Inhibits Proliferation of Estrogen Receptor-Positive and Negative Human Breast Carcinoma Cell Lines by Induction of Apoptosis, *Breast Cancer Res Treat.*, March, 2004;84(2):151-160.

- May have an additive effect with antihypertensives. (TH, TC) Use carefully together.
- There are 42 case reports of alleged Black Cohosh-induced hepatotoxicity, one with fulminant liver failure after only 1 week of use. Thorough reviews of the cases in question have failed to find causality between the use of Black Cohosh and hepatotoxicity.

Teschke, R., Schwarzenboeck, A., Suspected Hepatotoxicity by *Cimicifugae racemosae* rhizoma (Black Cohosh, Root): Critical Analysis and Structured Causality Assessment, *Phytotherapy* 2009, 16(1):72-84.

Mahady, G.B., Low Dog, T., et al, United States Pharmacopeia Review of The Black Cohosh Case Reports of Hepatotoxicity, 2008, 15(4):628-638.

- A followup study of 107 women who took Black Cohosh (500-1000 mg per day) for 12 months or more found no evidence of liver damage.

Firenzuoli, F., Gori, L., et al, Black Cohosh Hepatic Safety: Follow-up of 107 Patients Consuming a Special *Cimicifuga racemosa* Rhizome Herbal Extract and Review of Literature, *eCAM*, 2008

- A small human trial found no interactions between Digoxin and Black Cohosh. (CHT)  
Gurley, B.J., Barone, G.W., et al, Effect of Milk Thistle (*Silybum marianum*) and Black Cohosh (*Cimicifuga racemosa*) supplementation on Digoxin Pharmacokinetics in Humans, *Drug Metab Dispos*, January 2006;34(1):69-74.

#### **Burdock** (*Arctium lappa*)

- Niu Bang Zi/Burdock seed prevented acetaminophen-induced liver damage in animal studies.

Chen, T. & Chen, T., Chinese Medicinal Herbology & Pharmacology, City of Industry, CA, 2004.

#### **California Poppy** (*Eschscholtzia californica*)

- May have additive effect in combination with sedatives, analgesics, or antispasmodics. (TH)  
Adjust medication dosage if necessary.

#### **Cat's Claw** (*Uncaria tomentosa*, *U. guianensis*)

- May potentiate activity of antihypertensives. (TH) Use cautiously together.
- Although there is no research to confirm these beliefs, European physicians recommend against using this herb with insulin, hormone therapies, or vaccines (TH).
- Tannins precipitate alkaloids, reducing bioavailability. (TC)
- Tannins bind with iron, decreasing absorption. (TC, PE)

#### **Cayenne** (*Capsicum spp.*)

- May increase metabolism of drugs. (TU)

#### **Celandine** (*Chelidonium majus*)

- Also known as Greater Celandine, is a powerful cholagogue, antiviral agent, and hepatic stimulant. Traditionally, it is used in small amounts for short periods of time for biliousness, clay-colored stools, and hepatic torpor. Over the last decade its use in Europe has increased as a long-term remedy for biliary dyskinesia and IBS. Several cases of hepatotoxicity are associated with chronic use of this herb (MCR).

Stickel, F., Poschl, G., et al, Acute Hepatitis Induced by Greater Celandine (*Chelidonium majus*) Scan, *Jrl. Gastroenterology*, May, 2003;38(5):565-568.

#### **Chai Hu** (*Bupleurum chinensis*)

- There are several reports of patients taking Xiao Chai Hu Tang, a *Bupleurum* based formula, and Interferon developing hepatitis. This has prompted warnings about concurrent use of Chai Hu and Interferon. It is unclear whether *Bupleurum* is the problem, the formula itself, another ingredient, or possible adulteration. (MCR)

#### **Chamomile** (*Matricaria recutita*)

- A case report of increased bleeding caused by oral use of Chamomile taken concurrently with Warfarin is so full of errors that it can not be taken seriously. The patient was taking a medication (amiodarone) known to interact with Warfarin, they report the patient drank a tea of Chamomile "leaves", nor did the physicians query the patient about possible dietary changes.

Segal, R., Pilote, L., Warfarin Interaction With *Matricaria chamomilla*, *CMAJ*, 2006;174;1281-1282

#### **Chaste Tree** (*Vitex agnus-castus*)

- Many clinicians do not use *Vitex* concurrently with hormone replacement therapy or birth control pills. No clinical reports confirm this belief. (TH)
- Dopamine receptor antagonists (Haloperidol) may weaken or block the effects of *Vitex*. (PE, TH)
- Progesterone creams - may potentiate activity, leading to elevated progesterone levels. (MCR)

### Coffee (*Coffea arabica*)

- Inhibits iron absorption. (PE)
- Excessive coffee taken with MAOI's can trigger a hypertensive crisis. (MCR)
- Coffee and other caffeine containing herbs (Cola, Guarana, Mat ) used concurrently with Ephedra or Ephedrine can exacerbate side effects - insomnia, agitation, hypertension. (MCR)
- Oral contraceptives and Cimetidine increase the effects of caffeine. (MCR, PE)

### Cranberry (*Vaccinium macrocarpon*)

- Cranberry juice and possible interactions with Warfarin (see Food/Drug interactions, page 4).
- Do not use Cranberry juice with Uva Ursi as the juice acidifies the urine and prevents conversion of arbutin into the active antibacterial hydroquinones (PE).
- Cranberry proanthocyanadins sensitize platinum-resistant ovarian cancer cells to paraplirin. (IV)

Singh, A.P., Singh, R.K., et al, Cranberry Proanthocyanidins are Cytotoxic to Human Cancer Cells and Sensitize Platinum-Resistant Ovarian Cancer Cells to Paraplirin, *Phytother*, 2009, 23:1066-1074.

### Dan Shen (*Salvia miltiorrhiza*)

- May potentiate the actions of barbiturates (AS), blood-thinning medications -Warfarin, Heparin (MCR, AS), and cardiac glycosides-Digoxin. (TH) Do not use concurrently with blood thinning medications.

### Dong Quai (*Angelica sinensis*)

- Possible interaction with blood thinners-use cautiously together. (TH) Check PT & INR to rule out possible interactions.

### Echinacea (*E. purpurea*, *E. angustifolia*)

- Immune suppressants may oppose activity. (TH)
- Is Echinacea hepatotoxic? Some articles have suggested Echinacea may cause hepatotoxicity because it contains trace amounts of pyrrolizidine alkaloids (PA). The authors of these reports haven't done their homework. There are two basic types of PA's - the non-toxic saturated PA's and potentially hepatotoxic un-

saturated PA's. Echinacea's trace PA content is of the non-toxic saturated type.

- The idea that Echinacea loses activity or isn't effective after 7-10 days is based on a mis-translation of a German study. The Eclectic physicians who introduced Echinacea felt that long-term use of this herb was more effective than short-term use. (TU)
- May cause asthma in patients sensitive to ragweed pollen; Echinacea products made from the flower could provoke allergic asthma. Root or leaf products are less likely to be a problem. (MCR)

Winston, D., Echinacea and Cross-Reactivity With Foods, *The Integrative Medicine Consult.*, April, 2002:4(4).

- Contraindicated for Cancer/AIDS/Autoimmune diseases. (TH) Some clinicians believe that as a surface immune stimulant, Echinacea is inappropriate for treating immuno-suppressive conditions such as HIV or cancer. English and Australian herbalists routinely utilize this herb in protocols for these conditions without any adverse response. Herbalists in the UK and Australia also believe that Echinacea is an immune amphoteric and it can be used for autoimmune conditions as well. In the U.S., a clinical survey has revealed a small number of autoimmune exacerbations (RA, Lupus, Glomerulonephritis) associated with Echinacea use. Based on this data, this herb should be used cautiously in patients with these conditions. (MCR)

Bergner, P., Cautions With Echinacea In Autoimmune Disease? *Medical Herbalism*, 1997:9(2):17, 20.

- Preliminary studies indicate Echinacea is safe if used during pregnancy. (CHT)

Gallo, M., Sarkar, M., et al, Pregnancy Outcome Following Gestational Exposure to Echinacea: A Prospective Controlled Study, *Arch Intern. Med.*, 2000:160(2):3141-3

- Topical Echinacea combined with econazole (topical) improved outcome in patients with recurrent candidiasis by decreasing recurrence by 75%. (CHT)
- Echinacea did not affect any of the four CYP450 enzyme isoforms tested in 12 healthy adults.

Gurley, B., Gardner, S., et al, In vivo Assessment of Botanical Supplementation on Human Cytochrome P450 Phenotypes: Citrus aurantium, Echinacea purpurea, Milk

**Eleuthero/Siberian Ginseng** (*Eleutherococcus senticosus*)

- A case of elevated Digoxin levels in a 74-year-old man who was also taking Eleuthero has been reported. The capsules were analyzed and found not to contain any Digoxin or Digitoxin. Unfortunately, the herb was not authenticated, so the actual identity of the herb is unknown. It is very probable that the herb was the adulterant *Periploca*, which contains cardiac glycosides. (SCR)
- Eleuthero increases the effectiveness of "Mycin" antibiotics. (AS)
- A report of Eleuthero being implicated in causing neonatal androgenization has been discovered to be caused by the adulterant, *Periploca sepium*. Be sure that any Eleuthero product is from a reputable source and has been botanically authenticated.
- In a human trial (CHT), Eleuthero did not affect metabolism of dextromethorphen or alprazolam. These drugs are metabolized via the CYP2D6 and CYP3A4 pathway respectively. Therefore Eleuthero is unlikely to effect any medications metabolized by these phase 1 pathways.

**Eucalyptus** (*E. globulus*)

- Eucalyptus or Eucalyptol (found in cough drops) increases Cyclic P450 enzymes and increases the metabolism & clearance of Pentobarbital, Aminopyrine, Zoxazolamine, and amphetamines. (AS)
- Inhalation of the volatile oils of Eucalyptus and Cedar (*Juniperus virginiana*) increase drug metabolism. (AS, CT, PE)
- May increase the toxicity of PA containing herbs, i.e., Comfrey, Petasites, Senecios. (TH)

**Fenugreek** (*Trigonella foenum-graecum*)

- May potentiate antidiabetic medications. (AS, PE, TH) If given concurrently, monitor blood sugar levels.
- Phytoestrogens may enhance activity of ERT. (TH) This effect has never been reported in human or animal studies and is very unlikely.

- Mucilage and fiber content may interfere with drug absorption (PE).
- It has been reported that concurrent use with anticoagulants may increase risk of bleeding (SCR). Although this herb contains coumarins, they are not anti-coagulant and it is unlikely that Fenugreek will have any effect on coagulation.

Lambert, J.P., Cormier, A., Potential Interaction Between Warfarin and Boldo-Fenugreek, Pharmacotherapy Apr, 2001;21(4):509-12.

**Feverfew** (*Tanacetum parthenium*)

- May potentiate anticoagulants and increase risk of bleeding. (PE, TH) This is based on studies of isolated constituents and is unlikely to be valid in vivo.

**Garlic** (*Allium sativum*)

- Anticoagulants taken along with large doses of Garlic may increase risk of bleeding. 5-20 cloves of Garlic = 1 ASA. (PE) Use caution if using concurrently, check prothrombin time and INR.
- Antiplatelet products: may enhance their activity. (MCR, PE) Concurrent use of large doses of Garlic is not recommended.
- Decreased blood levels of the protease inhibitor Saquinavir in 9 healthy volunteers. (CHT)

Piscitelli, S.C., Burstein, A.H., et al, The Effects of Garlic Supplements on the Pharmacokinetics of Saquinavir, Clin. Infect. Dis., 2002; 34(2):234-238.

This study is bad science and incorrect reporting at its best (worst?). Not only was the study population extremely small, the drug Saquinavir is not approved by the FDA to be used by itself due to its poor absorption (average 4% bioavailability). Researchers gave it to a small number of healthy volunteers and then misrepresented the results. 1/3 (3 people) actually showed increased blood levels of the drug while taking the garlic supplements - so the study is, at best, inconclusive.

- A recent in-vitro study of Garlic showed a 39% reduction in CYP2E1 activity. (IVT)

Gurley, B.J., Gardner, S.F., et al, Cytochrome P450 Phenotypic Ratios For Predicting Herb-Drug Interactions In Humans, Clin. Pharmacol Ther., 2002;72(3):276-87.

- A second study, this one in 14 healthy humans found that Garlic had no significant effect on blood levels of Dextromethorphan or Alprazolam which are metabolized via the CYP2D6 and CYP3A4 enzyme pathways (CHT). (Markowitz, 2003)
- A single clove of Garlic combined with Vancomycin substantially inhibited Vancomycin-resistant enterococci – VRE. (IVT)

Harris, J., Cottrell, S., et al, Antimicrobial Properties of *Allium sativum* (Garlic), *Appl. Microbiol. Biotechnol.*, 2001.

- In an animal study garlic protected against acetaminophen-induced liver damage (AS)

Anoush, M., Eghbal, M.A., et al, The Protective Effects of Garlic Extract Against Acetaminophen-Induced Oxidative Stress and Glutathione Depletion, *Pak J Bio Sci*, 2009;12(10):765-771.

- In vitro studies indicate Garlic enhances the bacteriocidal effects of gentamicin.

Maldonado, P., Chanez-Cardenas, M. et al, Aged Garlic Extract, Garlic Powder Extract, S-allylcysteine, Diallyl Sulfide and Diallyl Disulfide Do Not Interfere With The Antibiotic Activity of Gentamicin, *Phytother Res.*, 2005;19:252-254.

### Ginger (*Zingiber officinale*)

- May increase absorption of all herbs & medicines (TU, PE)
- Concurrent use with anticoagulants is unlikely to cause increased bleeding, as ginger's anticoagulant effects are mild and transitory. In a human trial Ginger did not interact with Warfarin.

Jiang, X., Williams, K., et al, Effect of Ginkgo and Ginger on The Pharmacokinetics and Pharmacodynamics of Warfarin in Healthy Subjects, *Br J Clin Pharmacol*, 2005;59(4):425-432

- Some researchers suggest Ginger may cause post-surgery bleeding. (TH) Several good studies on the use of Ginger to prevent post-surgical nausea do not show any increased bleeding.

Bone, M.E., Wilkinson, D.J., et al, Ginger Root - A New Antiemetic. The Effect of Ginger Root in Postoperative Nausea and Vomiting After Major Gynecological Surgery, *Anesthesia*, 1990;45:669-71

- Cholesterol lowering drugs (statins) - may potentiate activity. (TH)

### Ginkgo (*Ginkgo biloba*)

- Several reports of standardized Ginkgo possibly causing spontaneous eye bleeds or subdural hematomas exist. A study using Ginkgo EGb761 on 50 healthy men (240 mg. p.d.) with or without aspirin showed no effect on bleeding times. A 2005 review of the world's medical literature found Ginkgo does not cause bleeding abnormalities (LR). A 2007 study of older adults who had peripheral artery disease (PAD) and were taking a high dose of Ginkgo and aspirin also found no interactions between the medications.

Gardner, C.D., Zehnder, J.L., et al, Effect of Ginkgo biloba (EGb 761) and Aspirin on Platelet Aggregation and Platelet Function Analysis Among Older Adults at Risk of Cardiovascular Disease: A Randomized Clinical Trial, 2007, Wolters Kluwer Health.

Ernst, E., Canter, P.H., et al, Does Ginkgo biloba Increase Risk of Bleeding: A Systematic Review of Case Reports, *Perfusion*, 2005;18:52-56.

Gaus, W. Westendorf, J., et al, Identification of Adverse Drug Reactions by Evaluation of a Prescription Database, Demonstrated For "Risk of Bleeding", *Methods Inf Med.*, 2005;44(5):697-703.

- Other reports caution against using Ginkgo with blood thinners. Ginkgo, especially Ginkgolide B, inhibits PAF receptors, therefore, it mildly inhibits primary blood clotting - i.e., from trauma, nosebleeds, or petechiae. It is unlikely to interact with Warfarin or Heparin because they affect secondary blood clotting (Stage II), fibrin production, and coagulation. (PE). A human trial found no interaction between Ginkgo and Warfarin. A human study (CHT) of Ginkgo taken concurrently with 2 antiplatelet drugs (Cilostazol & Clopidogrel) found no increased antiplatelet activity with either medication. The concurrent use of Ginkgo with Cilostazol did prolong the bleeding time caused by the drug.

Aruna, D., Naidu, M.U.R., Pharmacodynamic Interaction Studies of Ginkgo biloba With Cilostazol and Clopidogrel in Healthy Human Subjects, *Br J Clin Pharmacol*, 2007, 63:3, 333-338.

Jiang, X., Williams, K., et al, Effect of Ginkgo and Ginger on The Pharmacokinetics and Pharmacodynamics of Warfarin in Healthy Subjects, *Br J Clin Pharmacol*, 2005;59(4):425-432.

## Ginkgo (continued)

- MAO inhibitors: may potentiate activity and increase side effects. (PE)
- Ginkgo has been blamed for precipitating epileptic seizures in patients with controlled seizure disorders. Use cautiously in patients with history of epilepsy. (MCR)

Granger, A.S., Ginkgo biloba Precipitating Epileptic Seizures, *Age & Ageing*, 2001;30(6): 523-525.

- Does Ginkgo contain Colchicine? Reports of Ginkgo being adulterated with the toxic alkaloid Colchicine are erroneous—it seems the test equipment was contaminated. This is an excellent example of bad science, combined with an over-zealous desire to highlight the “dangers of herbs”.

Li, F., Fitzloff, J.F., et al, Evaluation of Commercial Ginkgo biloba Dietary Supplements for the Presence of Colchicine by High-Performance Liquid Chromatography, *Phytomedicine*, 2002;442-446.

- An in vitro study on Ginkgo showed no significant effect on CYP450 activity. (IVT)

Gurley, B.J., Gardner, S.F., et al, Cytochrome P450 Phenotypic Ratios For Predicting Herb-Drug Interactions In Humans, *Clin. Pharmacol Ther.*, 2002;72(3):276-87.

- In a human study (CHT) healthy volunteers who took high doses of Ginkgo (360 mg per day of EGb 761) with Tolbutamide and Midazolam had decreased levels of Tolbutamide (16%) in their blood and increased levels of Midazolam (26%). The authors suggest that this dose level of Ginkgo can induce CYP2C9 and inhibit CYP 3A4. In a second study Ginkgo did not affect Flurbiprofen, an NSAID metabolized via the CYP2C9 pathway.

Uchida, S., Yamada, H., et al, Effects of Ginkgo biloba Extract on Pharmacokinetics and Pharmacodynamics of Tolbutamide and Midazolam in Healthy Volunteers, *J Clin Pharmacol*, November 2006;46(11):1290-1298.

Greenblatt, D.J., von Moltke, L.L., et al, Ginkgo Extract Does Not Alter Clearance of Flurbiprofen, A Cytochrome P450-2C9 Substrate, *J Clin Pharmacol*, 2006;46:214-221.

- Ginkgo taken concurrently with clozapine in patients with treatment-resistant schizophrenia had reduced symptoms compared to those just taking the pharmaceutical medication. (HT)

Doruk, A., Uon, O., et al, A Placebo-Controlled Study of Extract of Ginkgo biloba Added to Clozapine in Patients

With Treatment-Resistant Schizophrenia, *Int Clin Psychopharmacology*, 2008, 23:223-227

- In a human trial patients receiving radioiodine therapy for Graves' disease were protected against radiation-induced chromosomal damage by taking Ginkgo.

Dardano, A., Ballardin, M., et al, Anticlastogenic Effect of Ginkgo biloba Extract in Graves' Disease Patients Receiving Radioiodine Therapy, *J Clin Endocrin Metab*, 2007, 92(1):4286-4289

- In an animal study Ginkgo prevented vancomycin-induced nephrotoxicity.

Celik, J., Cihangiroglu, M., et al, Protective Effects of Different Antioxidants and Amrinone on Vancomycin-Induced Nephrotoxicity, *Basic Clin Pharmacol Toxicol*, 2005, Nov;97(5):325-32

## Goldenseal (*Hydrastis canadensis*)

- May interfere with or enhance hypotensive effects of antihypertensive agents. (TH) This possible interaction is very unlikely and is based on isolated constituents, not the herb.
- Berberine, one of the major alkaloids in *Hydrastis* (also found in *Coptis spp.*, *Berberis spp.*, *Mahonia spp.*), was found to enhance the tumor-killing effect of radiation therapy in vitro and in vivo.

Peng, P.-L., Juo, W.-H., et al, Synergistic Tumor-Killing Effect of Radiation and Berberine Combined Treatment in Lung Cancer: The Contribution of Autophagic Cell Death, *Int. J. Radiation Oncology Biol. Phys.*, 2008, 70(2):529-542.

- In human studies, Goldenseal was found to strongly inhibit CYP2D6. Medications metabolized via that pathway such as Tamoxifen should not be taken concurrently with Goldenseal.

Gurley, B.J., Swain, A., et al, Clinical Assessment of CYP2D6-Mediated Herb-Drug Interactions in Humans: Effects of Milk Thistle, Black Cohosh, Goldenseal, Kava Kava, St. John's wort, and Echinacea, *Mol Nutr Food Res.*, 2008, Jul;52(7):755-63.

## Gotu Kola (*Centella asiatica*)

- Two Argentinean physicians have reported 3 cases of hepatotoxicity associated with ingestion of *Centella asiatica*. This report is problematic for several reasons. First, there is no evidence the material in question was botanically identified. This is important since

this plant has a very long history of use with no other reports of liver damage. Secondly, it is odd that two physicians in the same hospital would see the only 3 cases of *Centella* induced hepatotoxicity ever reported. Before smearing another traditionally safe herb, further investigation of the product, especially checking for adulteration, is required (MCR).

Jorge, O.A., Jorge, A.D., Hepatotoxicity Associated With The Ingestion of *Centella asiatica*, Rev. Esp. Enferm Dig., Feb., 2005;97(2):115-24

### Green Tea (*Camellia sinensis*)

- Methylxanthine components of tea decrease the absorption of Ca<sup>++</sup>. (PE) Separate by at least 2 hours.
- Tannins precipitate alkaloids decreasing absorption. (TC, PE)
- Tannins bind with iron, decreasing absorption. (TC, PE)
- In in vitro studies, tea (green or black) had a synergistic effect when combined with B-lactam antibiotics, and it reversed resistance in MRSA. Follow-up studies in mice found that green tea weakened the antibacterial effects of amoxicillin against MRSA (AS).

Peng, Q., Huang, Y., et al, Green Tea Extract Weakens the Antibacterial Effect of Amoxicillin in Methicillin-Resistant *Staphylococcus aureus* Infected Mice, Phytotherapy Research, 2010, Jan;24(1):141-5.

- Green tea polyphenols (EGCG) inhibited the antitumor effects of bortezomib in in vitro and in vivo studies. Avoid concurrent use.

Golden, E.B., Lam, P.Y., et al, Green Tea Polyphenols Block the Anticancer Effects of Bortezomib and Other Boronic Acid-Based Proteasome Inhibitors, Blood, 2010, Jan;24(1):141-5.

### Guarana (*Paullinia cupana*)

- Respiratory drugs: increased likelihood of side effects. (TC, PE) Do not use together.
- Oral contraceptives, Cimetidine, certain quinolone antibiotics, and verapamil: lowers caffeine clearance by 30-50%. (PE) Do not use concurrently.
- Benzodiazepines: may be less effective. (TH) Do not use concurrently.
- MAOI's: increased blood pressure. (PE) Do not use concurrently.

- Beta-adrenergic agonists may enhance response. (PE, TH) Monitor very carefully.
- Adenosine: may lower response. (PE, TH) Do not use concurrently.
- Lithium: Guarana may inhibit clearance of Lithium. (TH) Do not use concurrently.
- Ma Huang (Ephedra) or Ephedrine - Guarana increases the CNS effects of Ephedra and should only be used concurrently under a practitioner's supervision. (MCR)

### Guggul (*Commiphora mukul*)

- Do not use with beta-blockers and calcium channel blockers such as Diltiazem and Propranolol due to diminished efficacy. (CT)

Dalvi, SS, et al, Effect of Guggulipid on Bioavailability of Diltiazem and Propranolol, J Assoc Phys India, 1994;42(6):454-455.

- Is believed to have caused rhabdomyolysis in a patient taking it to lower cholesterol levels (SCR). While plausible pharmacologic timing exists, there are no other reports of such an effect or a proposed mechanism of causation for Guggul to cause muscle wasting. The premise is that Guggul is being used to lower lipid levels, like a statin drug. Statins can cause rhabdomyolysis, so possibly Guggul can have this effect as well. Further research is needed before any conclusion can be drawn.

Bianchi, A., Canta, P., Rhabdomyolysis Caused By *Commiphora Mukul*, A Natural Lipid-Lowering Agent, Ann. Pharmacolother., 2004;37(7-8):1222-5.

### Gymnema (*Gymnema sylvestre*)

- In patients taking hyperglycemic drugs and insulin, monitor blood sugar levels carefully so dosage of drugs can be adjusted. (AS, PE)

### Hawthorn (*Crataegus monogyna*, *C. laevigata*)

- Several authors have raised concerns about the concurrent use of Hawthorn with Digoxin. (TH) A 2003 study indicates that Hawthorn does not potentiate Digoxin and there is no serious concern about combining these two medications. (CHT)

Tankanow R, Tamer HR, et al., Interaction Study Between Digoxin and a Preparation of Hawthorn (*Crataegus oxyacantha*), J Clin Pharmacol. 2003;Jun;43(6):637-42.

- Antihypertensives, nitrates: increases risk of hypotension. Monitor blood pressure carefully. (TH) Adjust dosage of medications if necessary.
- Beta blockers: may potentiate. (MCR) Use cautiously together and adjust dosage if necessary.

#### He Shou Wu (*Polygonum multiflorum*)

- There are a number (27) of reports suggesting that two formulas (Shou Wu Pian & Shen Min) containing He Shou Wu have caused hepatitis. One of these products contains more than one herb and the possibility of adulteration also exists. He Shou Wu is processed to remove potentially hepatotoxic anthraquinones. It is possible that some products in the marketplace are using the unprocessed or inadequately processed herbs.

Dharmananda, S., Potential Rare Liver Reactions To He Shou Wu (*Polygonum multiflorum*), [www.itmonline.org/arts/hsw\\_alert.htm](http://www.itmonline.org/arts/hsw_alert.htm)

- In animal studies He Shou Wu protected against cyclophosphamide-induced thymus damage.

Wei X., Zhang, J., et al, Astragalus mongholicus and *Polygonum multiflorum*'s Protective Function Against Cyclophosphamide Inhibitory Effect on Thymus, *Am J Clin Med*, 2004;32(5):669-80

#### Holy Basil (*Ocimum gratissimum*, *syn. O. sanctum*)

- In vitro tests showed that this herb enhanced activity of ampicillin against *E. coli* and *Proteus mirabilis* and septrin against *E. coli*. It also enhanced the antifungal effects of ketoconazole and mycostatin against *Candida albicus*.

Nweze, E.I., Eze, E.E., Justification For The Use of *Ocimum gratissimum* L. in Herbal Medicine and Its Interaction With Disc Antibiotics, *BMC Comp Altern Med*, 2009, 9:37.

#### Hops (*Humulus lupulus*)

- Use cautiously with central nervous system depressants (anticholinergics, antihistamines, anxiolytics, antidepressants, antipsychotics, alcohol); may cause additive effects. (TH, AS)
- Use cautiously with drugs metabolized by the cytochrome P-450 system; may cause decreased plasma levels of these drugs. (TH)

- Avoid with phenothiazine-type antipsychotics; may cause additive effects i.e., hyperthermia. (TH)

#### Horse Chestnut (*Aesculus hippocastanum*)

- Possible interaction with blood thinners. (TH) There is no evidence that this can actually occur. Standardized Horse Chestnut products are commonly used in Europe with no reports of interactions with anticoagulants.

#### Huang Qin (*Scutellaria baicalensis*)

- Possible interaction with blood thinners. (TH) Use cautiously together. Check PT and INR to rule out possible interactions.
- Reduced Cyclosporine bioavailability in animal studies (AS). Avoid concurrent use.

Lai, M-Y, Hsiu, S-L., et al, Significant Decrease of Cyclosporine Bioavailability in Rats Caused by a Decoction of The Roots of *Scutellaria baicalensis*, *Planta Med.*, 2004;70:132-137.

- Baicalin, a major constituent of Chinese Scullcap, has shown the ability to enhance the effects of benzylpenicillin against MRSA and penicillin-resistant *Staph aureus* (PRSA). It also potentiates the effects of ampicillin, amoxicillin, methicillin, and cefotaxime. (IVT)

Liu, I.X., Durhan, D., et al, Baicalin Synergy with Betalactam Antibiotics Against Methicillin-resistant Strains of *S. aureus*, *Jrl. Pharm. Pharmacol.*, 2000;52(3):361-366.

#### Kava Kava (*Piper methysticum*)

- Anti-Parkinson's drugs and concurrent use of Kava may cause increased tremor and made Levodopa less effective. Do not use Kava in patients with Parkinson's disease. (MCR)
- Use of alcohol & Kava together may increase physical & cognitive impairment.

Foo, H., & Lemon, J., Acute Effects of Kava Alone or in Combination with Alcohol, on Subjective Measures of Impairment and Intoxication and on Cognitive Performance, *Drug & Alcohol Review*, 1997;16:147-155.

- Tranquilizers (barbiturates) & anesthetics- may potentiate. (TH, PE)
- Anxiolytics - may potentiate medications such as Xanax. (TH, PE)
- Benzodiazepines (particularly Alprazolam) – there is one case where the patient was hospitalized in a lethargic and disoriented state which "may" be an herb/drug interac-



tion. (SCR) Although the patient never lost consciousness, the title of the report says he was in a "coma".

Almeida J, et al, Coma From Health Food Store; Interaction Between Kava and Alprazolam, *Annals Intern Med*, 1996;125:940.

- **Is Kava hepatotoxic?** 30+ people in Germany and Switzerland have developed hepatitis following long-term ingestion of standardized acetone or ethanol extracts of Kava. The American Herb Products Association (AHPA) has issued the following suggestions for Kava use: Limit use to no more than 4 weeks. Avoid concurrent use with hepatotoxic medications, i.e., acetaminophen, Statin drugs, tetracycline, etc. Avoid use of Kava in people with a history of liver disease or alcohol abuse. (MCR) Careful review of all of the cases of "Kava induced hepatotoxicity" suggests that there may be several issues to be looked at. The first is that the majority of patients in one analysis (26/29) were already using potentially hepatotoxic medications (Statin drugs, acetaminophen), or had alcohol abuse issues. This prevents a clear association between Kava and liver damage. Another issue may be a specific variety of Kava, known as "two day Kava". European companies encouraged the planting of this rarely used cultivar because it grows quickly and has higher levels of the "active constituents" Kava lactones. Some authorities suggest the use of this specific type of Kava may be problematic. Researchers from the University of Hawaii believe they have found a reason for possible Kava hepatotoxicity. Many companies were buying inexpensive stem peelings which are not traditionally used to make Kava preparations. This waste product has high levels of Kava lactones plus compounds only found in trace amounts in the root. If this is true, it shows us how to make safe Kava products and the dangers of not paying attention to traditional use and preparation of herbs. A paper suggests that traditional water extracts of Kava have significantly lower levels of Kava lactones than ethanolic or acetonetic extracts and that this difference may explain why only modern standardized products have any association with liver damage.

Cote, C.S., Kor, C., et al, Composition and Biological Activity of Traditional and Commercial Kava Extracts, *Biochem Biophys Res Commun*, Sept. 10, 2004;322(1):147-152.

- A recent paper looking at Kava and hepatotoxicity concluded that Kava taken as recommended is associated with rare hepatotoxicity, but overdose, prolonged use (greater than 3 months) or concurrent use with hepatotoxic medications increased possible risk. A study of chronic Kava users in Hawaii also found increased levels of liver enzymes. (GGT, ALP)
- Brown, A., Onopa, J., et al, Traditional Kava Beverage Consumption and Liver Function Tests in a Predominantly Tongan Population in Hawaii, *Clin Toxicol*, 2007;45:549-556.
- Long-term Kava abuse in Polynesia is associated with Kava dermapathy and neurological impairment. (MCR).
  - Several kavalactones have been shown to be potent inhibitors of CYP450 enzymes (CYP3A4, CYP2C9, CYP2C10, CYP2D6, CYP1A2, and CYP4A9) in concentrations that are clinically realistic. There are few reports known of such interactions, but clinicians may want to avoid using Kava with medications known to be metabolized via these enzyme pathways (IVT). A recent human study found that Kava did not affect CYP2D6 activity. This shows that many in vitro reports are not necessarily valid in vivo.

Anke, J., Ramzan, J., Pharmacokinetic and Pharmacodynamic Drug Interactions With Kava (Piper methysticum, Forst f), *J. Ethnopharmacol*, 2004;93(2-3):153-160.

Gurley, B.J., Swain, A., et al, Clinical Assessment of CYP2D6-Mediated Herb-Drug Interactions in Humans: Effects of Milk Thistle, Black Cohosh, Goldenseal, Kava Kava, St. John's wort, and Echinacea, *Mol Nutr Food Res*, 2008, Jul;52(7):755-63.

#### **Khella (*Ammi visnaga*)**

- Khella decreased the toxicity of digitoxin in mice. (AS)
- Contains psoralens, photosensitizing agents may increase sensitivity to sun exposure or UV lamps. (TH)

#### **Lemon Balm (*Melissa officinalis*)**

- Large doses may act as a thyroxine antagonist and affect the action of medications such as Levothyroxine. (TH)

- May potentiate Pentobarbital and Hexobarbital. (AS)

#### **Licorice** (*Glycyrrhiza glabra*, *G. uralensis*)

- Diuretics: inhibits fluid loss and increases potassium loss (hypokalemia). Do not use concurrently. (MCR, PE)
- Antihypertensives: may inhibit activity. (SCR, PE) Use cautiously together.
- Digitalis: decreases effectiveness and increases side effects related to K<sup>+</sup> and Na<sup>+</sup>. (TH) Do not use concurrently.
- Corticosteroids: can potentiate effects. (MCR, PE) Use cautiously together. Dosage of medication may need to be adjusted.
- Laxatives: may increase potassium loss and cause hypokalemia, (TH) Use cautiously together.
- Decreases testosterone. A second controlled trial failed to substantiate the first report. (CHT)
- Increases blood pressure and can cause adverse effects due to hypokalemia. (MCR) Most of the issues concerning Licorice are dose dependent, with the hyperaldosterogenic effects being seen in patients consuming large quantities of real Licorice candies, chewing tobacco flavored with Licorice extract, or taking large amounts of Licorice tea. Normal therapeutic doses of Licorice are much less likely to cause serious elevations of blood pressure, hypokalemia, ventricular fibrillation, edema, or tachycardia.

Sigurjonsdottir, N.A., Franzson, L., et al, Liquorice-Induced Rise in Blood Pressure: a Linear Dose-Response Relationship, *Jrl. Hum Hypertens*, 2001;15(8):549-52.

- Oral contraceptives may increase sensitivity to Glycyrrhizic Acid. (CHT)
- Women may be more sensitive to the adverse effects of Licorice than men.
- Short-term mouse studies using two constituents of licorice showed that these chemicals could possibly prevent or reduce pyrrolizidine alkaloid toxicity. (AS, TH)

Lin, G., Nnane, I.P., Cheng, Y.Y., The Effect of Pre-Treatment With Glycyrrhizin and Glycyrrhetinic Acid on the Retrorisiner Induced Hepatotoxicity in Rats, *Toxicon*, 1999;37(9):1259-70.

- Heavy consumption of real licorice candy has been associated with a 2- to 3-fold increase in the risk of preterm birth [ $<37$  weeks]. (MCR)

Strandberg, T.E., Anderson, S., et al, Preterm Birth and Licorice Consumption During Pregnancy, *Am Journal Epidem*, 2002;156(9):803-805.

- In an epidemiological study (EP) children exposed to 500 mg or more per day of Licorice consumption prenatally had significant decreases in verbal and visuospatial abilities and increased problems with attention, rule breaking, and aggression.

Raikkonen, K., Pesonen, A.K., et al, Maternal Licorice Consumption and Detrimental Cognitive and Psychiatric Outcomes in Children, *Am J Epidemiol*, 2009 Nov 1;170(9):1137-46.

#### **Ma Huang** (*Ephedra sinica*, *E. equisetina*, *E. intermedia*)

- Caffeine and other xanthine alkaloids - increase the effects and potential toxicity. (MCR, PE)
- MAO inhibitors - increases sympathomimetic effects. (MCR, PE) Do not use concurrently.
- Cardiac glycosides - Digoxin, Lanoxin - can cause arrhythmia. (PE) Do not use concurrently.
- Guanethidine - increases sympathomimetic effect. (PE)
- Halothane - can cause arrhythmia. (PE) Do not use concurrently.
- Oxytocin - can increase hypertensive effects. (PE)
- Antihypertensive medications - can oppose therapeutic effect. (PE)

#### **Meadowsweet** (*Filipendula ulmaria*)

- Many salicylate-containing herbs are suspect due to their chemical relationship to aspirin. Neither salicin nor methyl salicylate have "aspirin-like" blood thinning activity and are unlikely to cause increased bleeding. (TH)
- Salicylate containing herbs can decrease alkaloid absorption. (PE)

#### **Milk Thistle** (*Silybum marianum*)

- Prevents liver damage caused by hepatotoxic medications including acetaminophen, Haloperidol, Halothane, Dilantin, statin drugs, & phenothizines (thorazine, stelazine). (AS, PE, MCS)
- Protects against liver damage caused by major anesthetics. (CHT)
- Prevents kidney damage caused by Cisplatin & Doxorubicin (antitumor agents) and anes

## Milk Thistle (continued)

thetics without reducing their activity. (CHT)

- A human trial (RCT) found that Milk Thistle did not affect the pharmacokinetics of Indinavir.

Mills, E., Wilson, K., Milk Thistle and Indinavir: A Randomized Controlled Pharmacokinetics Study and Meta-Analysis, *Eur J Clin Pharmacol*, 2005;61:1-7.

- A woman taking milk thistle (and acetaminophen) was found to have elevated liver enzymes and very high ferritin levels. The authors' supposition is that in cases of C282Y hemochromatosis, milk thistle may exacerbate this condition (SCR). A follow-up letter in the same journal questions the authors' reasoning and pointed out that in addition to stopping the milk thistle, the patient also stopped taking acetaminophen and colas (containing aspartame) and that the link to milk thistle was tenuous at best.

Kidd, R., Exacerbation of Hemochromatosis by Ingestion of Milk Thistle, *Canadian Family Physician*, 2008, Vol. 54(2).

- A small human study suggests that silymarin in therapeutic doses does not have a significant effect on CYP3A4 and it had only minor effects on nifedipine absorption. (CHT)

Fuhr, U., Beckmann-Knopp, S., et al, The Effect of Silymarin on Oral Nifedipine Pharmacokinetics, *Planta Med.*, 2007; 73:1429-1435.

- A small human study found no interactions between Digoxin and Milk Thistle when taken concurrently.

Gurley, B.J., Barone, G.W., et al, Effect of Milk Thistle (*Silybum marianum*) and Black Cohosh (*Cimicifuga racemosa*) Supplementation on Digoxin Pharmacokinetics in Humans, *Drug Metab Dispos*, 2006;34(1):69-74

## Passion Flower (*Passiflora incarnata*)

- Possible additive effective with CNS depressants. (TH)

## Pau d'Arco (*Tabebuia impetiginosa*, *T. ipe*)

- Use cautiously with anticoagulants; may potentiate effects. (TH) Obtain prothrombin time and INR to rule out possible interactions.

## Red Clover (*Trifolium pratense*)

- Anticoagulants (Warfarin, Heparin), antiplatelet agents (ASA, Ticlopidine): theoretical pos-

sibility of effects on platelets and an increase of bleeding. (TH) It is unlikely that properly dried Red Clover will cause any increased bleeding.

- Many authorities note a possible interaction with anticoagulants due to the coumarin content - coumarins are not anticoagulants (coumadins are), in fact they stabilize venous integrity. The process of converting coumarins to Dicoumarol requires fermentation (improper drying). (TH)

Bone, K., Mediherb Newsletter, Feb., 1988 - Melilotus and Coumarin.

- Oral contraceptives and hormone replacement therapy (HRT): there is a theoretical concern that concurrent use of the isolated Red Clover isoflavones may enhance effects. (TH) The whole herb will not interact with these medications.

## Reishi (*Ganoderma lucidum*)

- Ganoderma and other Fu Zheng herbs (Codonopsis, Astragalus, Eleuthero, Schisandra, Jiaogulan, Cordyceps, Licorice, & Panax) reduce the side effects of chemotherapy while increasing the effectiveness of the therapy. (MCR)

Mingji, P., Cancer Treatment With Fu Zheng Pei Ben Principle, 1992, Fujian Science & Tech. Pub. House.

- In vitro reports suggested Reishi could thin the blood and cause platelet inhibition. In a human trial (HCT) patients taking Reishi did not have any changes in hemostatic function. The authors conclude that *Ganoderma* is unlikely to increase risk of surgical bleeding or interact with blood thinning medication.

Kwok, Y., Ng, K.F., A Prospective, Randomized, Double-Blind, Placebo-Controlled Study of The Platelet and Global Hemostatic Effects of *Ganoderma lucidum* (Ling-Zhi) in Healthy Volunteers, *Anesth Analg*, 2005 Aug;101(2):423-6.

## Sarsaparilla (*Smilax spp.*)

- Separate from all other oral drugs by 2 hours; saponins may affect absorption. (TC)

## Saw Palmetto (*Serenoa repens*)

- A concern has been stated in the literature that *Serenoa* decreases PSA levels, preventing detec-

tion of prostate cancer. A 3-year study clearly shows this concern is not valid. (CHT)

Bach, D., Ebling, L., Long-term Drug Treatment of Benign Prostatic Hyperplasia: Results of a Three-year Multicenter Study, *Phytomedicine*, 1996;3(2):105-111.

- Did not affect any of the four CYP450 enzyme isoforms tested in a small human trial. (CHT)

Gurley, B., Gardner, S., et al, In vivo Assessment of Botanical Supplementation on Human Cytochrome P450 Phenotypes: Citrus aurantium, Echinacea purpurea, Milk Thistle, and Saw Palmetto; *Clin. Pharmacol Ther.*, Nov. 2004;75(5):428-440.

### Schisandra (*Schisandra chinensis*)

- Use cautiously with Pentobarbital and Barbitol; it may potentiate their activity. (AS)
- May antagonize the CNS-stimulatory effect of caffeine and amphetamines. (TH)
- Improves Phase I detoxification & hepatic glutathione levels preventing hepatotoxicity from many medications - including Acetaminophen. (AS, CT)
- Cardioprotective against damage caused by Adriamycin. (AS)
- *Schisandra sphenanthera* taken concurrently with tacrolimus increased bioavailability of the drug. This may mean a lower dose of the drug could be used, but careful monitoring would be required.

Xin, H., Wu, X., et al, Effects of Schisandra sphenanthera Extract on The Pharmacokinetics of Tacrolimus in Healthy Volunteers, *Brit J Clin Pharm*; 2007, 64(4):469-475.

### Shiitake (*Lentinula edodes*)

- Thyroxine and hydrocortisone inhibit the antitumor activity of lentinin. Water-soluble extracts may reduce platelet coagulation. Use cautiously with blood thinners. (TH) Normal food quantities are safe.

### St. John's wort (*Hypericum perforatum*)

- Increases cyclic P450 (CYP3A4, CYP1A2, CYP2B6, & CYP2E1) & P-Glycoprotein (Pgp) activity - St. John's wort can affect medications that are metabolized via these pathways. This data is based on both in-vitro and in-vivo research as well as case reports. Even though the results are not always con-

sistent., the data clearly shows there is a real concern. Some studies also indicate that these effects are dose dependent, and small doses used in traditional herbal formulas may not have as significant an effect.

Durr, D., Steiger, B., et al, St. John's wort Induces Intestinal P. glycoprotein/MDRI and Intestinal and Hepatic CYP3A4, *Clin. Pharmacol. Ther.*, 2000, Dec., 68(6):598-604.

Zhou, S-F, Lax, X., An Update on Clinical Drug Interactions With The Herbal Antidepressant St. John's Wort, *Cur Drug Metab*, 2008;9:394-409

Mills, E., Montori, VM., et al, Interaction of St John's wort with Conventional Drugs: Systematic Review of Clinical Trials, *BMJ*, JULY 3 2004;329(7456):27-30

- Women appear to be more sensitive to St. John's wort's effects on CYP3A4 induction. (IVT)

Gurley, B.J., Gardner, S.F., et al, Cytochrome P450 Phenotypic Ratios For Predicting Herb-Drug Interactions In Humans, *Clin. Pharmacol Ther.*, 2002;72(3):276-87.

- Protease inhibitors – One small study showed that St. John's wort can lower blood levels of Indinivir in healthy individuals. A second study with nevirapine also shows decreases in plasma levels of the drug. Avoid concurrent use with protease inhibitors. (CHT)

Piscitelli, S.C., Burstein, A.H., et al, Indinivir Concentrations and St. John's wort, *The Lancet*, 2000;355:547-548.

- Cyclosporine – there are 4 case reports of patients taking Cyclosporine to prevent tissue transplant rejection, blood levels of the drug dropped upon taking this herb. A second immunosuppressive medication, Tacrolimus, was also affected by taking 300 mg TID of standardized St. John's wort for 18 days. Co-administration of both caused a significant decrease in blood levels of the drug. Avoid using St. John's wort with immuno-suppressive medications. (CHT)

Hebert, M.F., Park, J.M., et al, Effects of St. John's wort (*Hypericum perforatum*) on Tacrolimus Pharmacokinetics in Healthy Volunteers, *Journal of Clinical Pharmacology*, 2004;44(1):89-94.

Ruschitzka, F., Meier, P.J., et al, Acute Heart Transplant Rejection Due to St. John's wort, *The Lancet*, 2000;355:548-549.

- Irinotecan, a chemotherapeutic drug used to treat colon cancer, showed substantially decreased blood levels when taken with St. John's wort. The authors of this study sug

## St. John's wort (continued)

gested other anticancer agents metabolized via the CYP3A4 enzyme system, such as Paclitaxel, may also be adversely affected by ingestion of St. John's wort. Cancer patients taking imatinib had increased elimination of the drug, but the serum levels of the active metabolite was actually increased.

Mathijssen, R., Verweij, J., et al, Effects of St. John's wort in Irinotecan Metabolism, Jrl. Nat. Cancer Institute, 2002;94:1247-9.

- Digoxin is a substrate for P-gp and there is one case of lowered serum concentrations (16%) of the drug in a patient taking St. John's wort. (SCR) Studies show a single dose of *Hypericum* added to Digoxin did not alter blood levels, but multiple doses reduced absorption of the drug. Avoid concurrent usage.

John, A., Brockmoller, J., et al, Pharmacokinetic Interaction of Digoxin With an Herbal Extract From St. John's wort (*Hypericum perforatum*), Clin. Pharmacol. Ther., 1999;66:338-45.

- A low Hypericin and Hyperforin-free St. John's wort product available in Germany shows active antidepressant activity and little or no effects on CYP3A4, CYP2E1, or P-gp activity and minimal interactions.

Arold, G., Donath, F., et al, No Relevant Interaction With Alprazolam, Caffeine, Tolbutamide, and Digoxin By Treatment With a Low-Hyperforin St. John's Wort Extract, Planta Med. April, 2005;71(4):331-337.

- Theophylline - it has been reported that a theoretical possibility of increased anxiety, nervousness, and worsening of panic disorder exists when taking both medications, plus some articles suggested *Hypericum* could lower blood levels of this drug. A careful review of the data, plus a recent study, show that there is no basis for concern with this drug. (CHT)

Morimoto, T., Kolegave, T., et al, Effect of St. John's wort on The Pharmacokinetics of Theophylline in Healthy Volunteers, Journal of Clinical Pharmacology, 2004;44(1):95-101.

- There has been concern about mixing St. John's wort with SSRI medications. Most clinicians have not seen such interactions, although there are several reported cases of serotonin syndrome reaction (sweating, agitation, tremor) in patients taking both medications.

(MCR) Use cautiously together under professional supervision only.

Gordon, JB, SSRI's and St. John's wort: Possible Toxicity?, *American Family Physician*, 1998;57(5):950.

Lantz, M.S., Buchalter, E., et al, St. John's wort and Antidepressant Drug Interactions In the Elderly, Jrl. Geriatric Psychology Neurology, 1999;12:7-10.

- *Hypericum* does not potentiate alcohol nor does it interfere with the function of anesthesia or antiseizure medication (Carbamazepine). Early reports of St. John's wort having MAOI activity are incorrect.

Burstein, A.H., Horton, R.L., et al, Lack of Effect of St. John's wort on Carbamazepine Pharmacokinetics in Healthy Volunteers, Clin. Pharm. & Ther., 2000;68:605-612.

- *Hypericum* & Photosensitivity - combining *Hypericum* with medications known to cause photosensitivity (Psoralens) is probably not a good idea. While uncommon, patients taking large doses of *Hypericum* standardized to 0.3 and 0.6% Hypericin have occasionally developed photosensitivity. (MCR)
- There are 29 reported cases of St. John's wort taken concomitantly with Warfarin (or other similar anticoagulants) causing decreased levels of anti-coagulant medications. (MCR) Avoid concurrent use.

Schultz, V., Incidence and Clinical Relevance of the Interactions and Side Effects of Hypericum Preparations, *Phyto-medicine*, 2001;8(27):152-160.

- Several articles have suggested St. John's wort may interfere with oral contraceptives. A randomized controlled study of 18 women found no changes in follicle maturation, serum estradiol or progesterone concentrations during concomitant administration of low dose oral contraceptives and *Hypericum*. There was a significant increase of intracyclic bleeding in the women taking SJW (CHT)<sup>1</sup>. Women taking a low-hyperforin St. John's wort product (Ze117) showed no interactions with low-dose oral contraceptives<sup>2</sup>.

<sup>1</sup>Pfrunder, A., Schiegger, M., et al, Interaction of St. John's wort With Low-Dose Oral Contraceptive Therapy: A Randomized Controlled Trial, Br. J. Clin. Pharmacol, 2003;56:683-690.

<sup>2</sup>Will-Shabab, L., Bauer, S., et al, 2008, St. John's wort Extract (Ze 117) Does Not Alter the Pharmacokinetics of a Low-Dose Oral Contraceptive, Eur J Clin Pharmacol, 2008.

### St. John's wort (continued)

- In an animal study, pre-treatment with St. John's wort helped prevent cisplatin-induced nephrotoxicity and it did not diminish the efficacy or blood levels of the drug.

Shibayama, Y., Kawachi, A., et al, Effect of Pre-Treatment With St. John's Wort on Nephrotoxicity of Cisplatin in Rats, Life Sciences, 2007, 81:103-108.

- In human studies St. John's wort was found to reduce blood levels of methadone, omeprazole (proton pump inhibitor), invabradine (selective sinus node channel inhibitor), glimepiride, benzodiazepines, antihypertension agents (verapamil, nifedipine, nevirapine), fexofenadine (antihistamine), voriconazole (antifungal), amitriptyline (antidepressant), and phenytoin (anticonvulsant).

Zhou, S-F., Lax, X., An Update on Clinical Drug Interactions With The Herbal Antidepressant St. John's Wort, Cur Drug Metab, 2008;9:394-409.

- Hypericum may reduce blood levels of statin drugs, but further research is needed to confirm this preliminary data (HCI).

Andren, L., Andreasson, A., et al, Interaction Between a Commercially Available St. John's wort Product (Movina) and Atorvastatin in Patients With Hypercholesterolemia, Eur J Clin Pharmacol, October, 2007;63(10):913-916.

- No interaction was found in men taking St. John's wort concurrently with prednisone, prednisolone, debrisoquine, ibuprofen, or dextromethorphen

Bell, E.C., Ravis, W.R., et al, Effects of St. John's wort Supplementation on Ibuprofen Pharmacokinetics, Ann Pharmacother, February, 2007;41(2):229-234.

Bell, E.C., Ravis, W.R., et al, Lack of Pharmacokinetic Interaction Between St. John's Wort and Prednisone, Ann Pharmacother, November, 2007;41:1819-1824.

Zhou, S-F., Lax, X., et al

- Numerous studies have confirmed that *hypericum* is as effective as SSRI's for treating depression (both are inferior to placebo). A review of multiple studies indicates it is far safer than SSRI's with none of the adverse reactions (cognitive dysfunction, sedation, sexual dysfunction, and anticholinergic reactions) that the pharmaceuticals commonly cause.

Trautman-Sponsel, R.D., Dienel, A., Safety of Hypericum Extract in Mildly to Moderately Depressed Outpatients: A Review Based on Data From Three Randomized, Pla-

cebo-Controlled Trials, J Affect Disord. October 2004, 15;82(2):303-307.

### Turmeric (*Curcuma longa*)

- Use caution administering large doses concurrently with anticoagulants; possible additive effect may cause increased bleeding. (TH) Normal food use is safe.
- May potentiate corticosteroids. (TH) Adjust medication if necessary.
- Protects the liver against damage caused by hepatotoxic medications. (AS, PE)
- The crude herb (powder, tincture, capsule) has a gastro-protective effect. The standardized product in large amounts can irritate the gastric mucosa. (MCR)
- Isolated Curcumin enhanced the antitumor effects of 5-fluorouracil and oxaliplatin in vivo (colon cancer cells).

Patel, B., Sengupta, R., et al, Curcumin Enhances the Effects of 5-Fluorouracil and Oxaliplatin in Mediating Growth Inhibition of Colon Cancer Cells by Modulating EGFR and IGF-1R, Int. J. Cancer, 2008, 122, 267-273.

- Curcumin potentiated the anti-inflammatory effects of celecoxib in vitro.

Lev-Ari, S., Strier, L., et al, Curcumin Synergistically Potentiates the Growth-Inhibitory and Pro-Apoptotic Effects of Celecoxib in Osteoarthritis Synovial Adherent Cells, Rheumatology, 2006; 45(2):171-177.

### Uva Ursi (*Arctostaphylos uva-ursi*)

- Do not use with cranberry juice; it can acidify the urine and make Uva Ursi ineffective by inhibiting conversion of arbutin to active hydroquinones. (PE)
- Tannin containing herbs decrease availability of alkaloids and iron. (TC)
- Uva Ursi is most appropriate for short-term use. Excessive use may cause irritation to the GI tract. (MCR)

### Valerian (*Valeriana officinalis*)

- May potentiate the effects of sedatives (barbiturates). (TH, AS) Adjust medication if needed. An animal study found that Valerian enhanced the effect of anesthesia, prolonging emergence time. Concurrent use should be avoided.

Chaplin, R.L., Jedynak, J., et al, The Effects of Valerian on The Time Course of Emergence From General Anesthesia in

Sprague-Dawley Rats (*Rattus norvegicus*), AANA Journal, December, 2007;85(6).

- A study of Valerian found it had minimal effects on CYP3A4 and no effect on CYP2D6. (CHT)

Donovan, J.L., DeVane, C., et al, Multiple Night-Time Doses of Valerian (*Valeriana officinalis*) had minimal effects on CYP3A4 Activity and No Effect on CYP2D6 Activity in Healthy Volunteers, *Drug Metab Dispos*, 2004;32:1333-1336.

- There is a case report of Valerian-induced hepatotoxicity (SCR) and an animal study in which very high doses of Valerian may have increased hepatotoxic effects of haloperidol. The Valerian-induced hepatitis lacks too much data to assign causality and the rat study utilized extremely high doses.

Dalla Corte, C.L., Fachinetto, R., et al, Potentially Adverse Interactions Between Haloperidol and Valerian, *Food Chem Toxicol*, July 2008;46(7):2369-2375.

#### Wild Yam (*Dioscorea villosa*)

- It has been claimed that Wild Yam contains "natural progesterone" or "natural DHEA". Both claims are untrue and it is also not effective as an herbal birth control. There have been occasional concerns about this herb interacting with pharmaceutical hormones (estrogen, progesterone, testosterone), but this is a concern based on pseudo-science and false information.
- In animal studies (4 weeks), Wild Yam was found to be pro-fibrotic in rats kidneys. There was a 10-fold increase in TGF $\beta$ 1, a marker for inflammatory cytokines and macrophage growth factors usually seen with tissue damage. Whether these results (AS) can be extrapolated to human usage is unknown. Long-term use of Wild Yam in patients with fibrotic kidney disease is probably best avoided until studies either confirm or refute these preliminary studies.

Wojcikowski, K., Wohlmuth, H., et al, *Dioscorea villosa* (Wild Yam) Induces Chronic Kidney Injury in Pro-fibrotic Pathways, *Food Chem Toxicol*, 2008, 46(9):3122-31

#### Willow (*Salix spp.*)

- Many salicylate-containing herbs are suspect due to their chemical relationship to aspirin.

Neither salicin, nor methyl salicylate have "aspirin like" blood thinning activity and are unlikely to cause substantially increased bleeding. In vitro studies show that salicylic acid, salicin, and salicortin inhibit cyclooxygenase, unlike Acetylsalicylic acid. Irreversible inhibition of thrombocytes is thus unlikely. There should be no increased interaction with blood coagulants. (Bisset, N., Wichtl, M., 1994)

- Use cautiously with nonsteroidal anti-inflammatories; may increase likelihood of GI irritation from tannins. (PE)
- Anticonvulsants - salicylate rich herbs may cause a transient potentiation of anticonvulsant drugs. (TH)
- Use cautiously in patients with known salicylate sensitivities (PE, TH). Salicylate side effects are not to be expected with the amount of salicylates derived from Willow Bark.
- Salicylate containing herbs can inhibit alkaloid absorption. (PE)

#### Yohimbe (*Pausinystalia yohimbe*)

- Phenothiazines such as Chlorpromazine increase Yohimbe's toxicity. (AS, PE) Do not use concurrently.
- Monoamine oxidase inhibitors (MAOI's); tricyclic antidepressants [12 mg Yohimbine HCL elicited hypertensive crisis in patients taking these medications (de Smet, 1997)]. Do not use concurrently.
- Antihypertensive medications (antagonizes effects of drugs such as Clonidine). (MCR, AS)

**Coumarin Containing Herbs:** Red Clover, Sweet Melilot, Alfalfa, Dang Gui, Cinnamon, Fenugreek, Celery seed

- Many authorities note a possible interaction with anticoagulants due to the Coumarin content - Coumarins are not anticoagulants (coumadin is), in fact they stabilize venous integrity. The process of converting Coumarins to Dicoumarol requires fermentation (improper drying). Animal studies which show increased bleeding are based on animals consuming silage (fermented material) or animals with multiple

stomachs (cows) in which fermentation occurs as part of the digestive process.

Bone, K., Mediherb Newsletter, Feb., 1988 - Melilotus and Coumarin.

Booth, N.L., Nikolic, D., et al, Confusion Regarding Anticoagulant Coumarins in Dietary Supplements, Clinical Pharmacology & Therapeutics, 2004, 76(6)

**Diuretic Herbs:** Uva Ursi, Juniper Berry, Green Tea, Celery Seed, Goldenrod, Horsetail

- Decrease potassium, increase the toxicity of cardiac glycosides & lithium. (PE, TC)
- Increased possibility of arrhythmias due to increased potassium excretion. (PE, TC)

**GLA Containing Supplements:** Evening Primrose, Black Currant Seed Oil, Borage Seed Oil

- Do not use concurrently with phenothiazines; may increase risk of seizures. (SCR)

#### Herbs & Surgery

- Herbs that have the potential to increase bleeding should be discontinued prior to surgery. Most herbs can be discontinued 48 hours before surgery. A few should be discontinued earlier, including St. John's wort (7 days), Ginkgo (7 days), Dan Shen- Salvia miltiorrhiza (7 days), Garlic (7 days). Combinations of herbs and supplements such as Vitamin E, fish oils, Garlic, and Ginkgo are likely to have a synergistic effect. These types of combinations are of greater concern for surgery patients and those taking blood thinners. The American Society of Anesthesiologists has recommended herbs be discontinued 2-3 weeks before surgery, but that recommendation is not based on actual data.
- Anesthesia - Milk Thistle has been shown to protect the liver against the hepatotoxic effects of major anesthetics. (CHT)
- Ginger has been shown to reduce post-operative nausea, with no indications of increased bleeding. (MCR)

Phillips, S., Ruggier, R.C., et al, Zingiber officinalis (Ginger) - An Antiemetic for Day-Case Surgery, Anesthesia, 1993;48:715-17.

Bone, M.E., Wilkinson, D.J., et al, Ginger Root - A New Antiemetic. The Effect of Ginger Root in Postoperative

Nausea and Vomiting After Major Gynecological Surgery, Anesthesia, 1990;45:669-71.

**Mucilaginous Herbs:** Aloe Gel, Slippery Elm, Psyllium Seed, Flax Seed, Marshmallow Root, Chia Seed, Okra, Oatmeal, Irish Moss, Guar Gum, Sterculia.

- Due to these herb's mucilaginous properties, they can interfere with drug absorption, especially cardiac glycosides. (TC, PE)
- Separate ingestion of these herbs by 2-3 hours from all other medications.

**Psoralen Containing Herbs:** Khella, Angelica, Celery, Lomatium, Wild Carrot, Dill, Caraway

- Psoralens (furanocoumarins) can cause photodermatitis and photosensitivity topically and orally. In combination with ultraviolet radiation therapy or with 8-methoxypsoralen they may cause increased skin sensitivity, burns or blistering of the skin. (MCR)

**Salicylate Containing Herbs:** Wintergreen, Meadowsweet, Willow Bark, Sweet Birch

- Decrease absorption of alkaloids. (PE)

**Stimulant Laxatives:** Senna, Cascara Sagrada, Buckthorn, Rhubarb, Aloes

- Increase excretion of potassium; avoid using along with Digoxin or Lanoxin, as there is an increased risk of arrhythmias. (PE, TC)
- Increase side effects of corticosteroids due to potassium loss. (PE)
- Reduced absorption of oral medications due to decreased bowel transit time. (PE)
- Abuse of Senna and Cascara Sagrada has been linked to liver failure with renal impairment and subacute cholestatic hepatitis. Occasional use for situational constipation is safe.

Vanderperren, B., Rizzo, M., et al, Acute Liver Failure With Renal Impairment Related to the Abuse of Senna Anthraquinone Glycosides, Annals Pharmacology, 2005, 39(7):1353-1357

- Have been avoided in pregnancy due to the belief that stimulant laxatives might cause uterine contractions. This is not true. In addition, a population study of pregnant women who used Senna found no increased risk of congenital abnormalities in their offspring.



Acs, N., Banhid, F., et al, Senna Treatment in Pregnant Women and Congenital Abnormalities in Their Offspring, *Repro Toxicol*, 2009; 28:100-104.

**Tannin-rich Herbs:** Oak Bark, Alum Root, Wild Geranium, Black Tea, Blackberry Root Bark, Witch Hazel Leaf or Bark, Bayberry Root Bark, Uva Ursi, Triphala, Indian Madder

- Decrease absorption of alkaloids, iron, and copper. (TC, PE)

**Thujone Containing Herbs:** Sage, Tansy, Thuja, Wormwood

- Decreases effects of antiseizure medications, thus increasing possibility of seizures. (TH, PE)

## Potentially Toxic Herbs - How Toxic Are They?

**Herbs Containing Aristolochic Acid:** Virginia Snake Rt. (*Aristolochia serpentaria*), Chinese Aristolochia, possibly Wild Ginger (*Asarum canadensis*). The Chinese species of *Aristolochia* has been linked to nephrotoxicity and renal cancer. It is unclear what levels of Aristolochic Acid are found in various species containing this chemical, and if a certain level of exposure is necessary to cause kidney damage.

Chen, J.K., *Herbalgram*, 2000;48:44-45

**Herbs Containing Pyrrolizidine Alkaloids (PA's):** Comfrey (*Symphytum officinale*), Life Root (*Senecio aureus*), Coltsfoot (*Tussilago farfara*), Gravel Root (*Eupatorium spp.*), Borage (*Borago officinalis*), *Lithospermum* and *Petasites species*. The evidence of veno-occlusive disease (VOD) in the Caribbean and Africa caused by consumption of various species of *Crotalaria*, *Senecio*, and *Heliotropium* is quite convincing. (MCR, AS) Evidence of liver damage caused by Comfrey Root or Leaf, Coltsfoot, Gravel Root, or Borage Herb is lacking in data and mostly based on animal studies with isolated alkaloids. (AS)

Short-term use of these herbs in adults not consuming alcohol or hepatotoxic medications is unlikely to cause liver damage. Long-term use should be avoided. Topical use of Comfrey is generally considered safe. Avoid internal use of herbs containing hepatotoxic unsaturated PA's in pregnant and nursing women, infants and young children.

Roder, E., *Pharmazie*, 1995.

Rode, D., *Trends in Pharmac Sci*, 2002;23(11):497-499.

**Chaparral** (*Larrea spp.*) – Is it hepatotoxic?

There are a small number of cases of Chaparral induced hepatitis. Researchers have failed to find any hepatotoxic compounds and believe these are idiosyncratic cases. The taste of this herb is vile and it is traditionally used as a tea. Common sense and its taste would suggest that usage & dosage would be limited. All cases of Chaparral induced hepatitis are associated with long-term use of encapsulated or tableted products. A recent study in a small number of patients suggests limited usage (low dose and for short-term usage) is safe, especially in patients who are not using hepatotoxic medications.

**Is Scullcap** (*Scutellaria lateriflora*) hepatotoxic?

Germander (*Teucrium canadense*), which is known as a hepatotoxic herb, has been a frequent adulterant to Scullcap in the marketplace. There is no evidence that Scullcap has any hepatotoxic effects, although “experts” consistently make reference to its supposed deleterious effects on the liver. This issue shows the importance of accurate botanical identification as safe herbs can be adulterated with toxic ones.

**Blue Cohosh** (*Caulophyllum thalictroides*) and fetal

congestive heart failure – Blue Cohosh has been used for millennia by Native Americans and the last 200 years by Eclectic physicians and herbalists to stimulate labor and as a partus preparator. In the past 5 years, 2 cases of CHF in newborns have been associated with ingestion of this herb which contains a cardiotoxic saponin. Safety concerns dictate that this herb be avoided as a partus preparator and only used by trained medical personnel once labor has commenced, if at all, during pregnancy.

**Herbs with the potential for serious toxicity**

should be avoided, including Mayapple, Bloodroot, Mistletoe, Pulsatilla, Arnica, Lily of the Valley, Wormseed, Gelsemium, Belladonna, Aconite, American Hellbore (*Veratrum*), Poison Hemlock, Water Hemlock, Foxglove, Male Fern, Bryony, and Pink root.

Appendices available at [www.botanicalmedicine.org](http://www.botanicalmedicine.org) (click “References” link on the home page):

(1) Herbs and Pregnancy, (2) Incompatibilities in Prescribing and (3) A Complete Bibliography.

# Herbal and Nutritional Treatment of Kidney Stones

David Winston, RH (AHG)

The development of urinary calculi, or kidney stones, is known as urolithiasis or nephrolithiasis. It is considered one of the most painful conditions known to man. In industrialized countries, approximately 10-12% of the population will develop kidney stones. Over the last few decades the incidence of kidney stones has increased and the age of onset has decreased. Diet and lifestyle may explain this phenomenon. Men (12%) are more likely than women (6%) to develop kidney stones and their first incidence usually occurs between 20-40 years of age. The earlier the onset of the first episode, the more likely the person will be a multiple-stone former. People of European descent are much more likely to develop stones than are Africans, African-Americans, and Native Americans. In people who have already had a kidney stone, approximately 50% will develop another stone within 5 years. Increased body mass (obesity) is also a significant risk factor for developing renal stones.

There are five primary types of stones. The most common types are **calcium oxalate or calcium phosphate stones** and they account for 80-85% of all stones. Diet (oxalate and phosphate consumption and excess sodium) may play a role in forming calcium stones, but lack of fluids and underlying metabolic problems such as hypercalciuria (excess urinary calcium), hyperoxaluria (excess urinary oxalate), and hypocitraturia (lack of urinary citrate) are most likely the primary causes.

**Uric acid stones** are usually formed in people with gout or gouty arthritis. They can also form in patients with chronic diarrhea caused by Crohn's disease and ulcerative colitis. The loss of fluids and bicarbonate causes increased uric acid precipitation. Other causes include lead poisoning, long-term fasting, binge drinking, diabetes, and insulin resistance. Uric acid stones can

often be dissolved by alkalinizing the urine (citrate or sodium bicarbonate is used), along with increased water consumption. The drug Allopurinol is also used to reduce uric acid excretion via the kidneys.

**Struvite stones** are caused by chronic urinary tract infections which elevate urinary pH, which allows for bacteria growth. Certain bacteria known as urea-splitting bacteria (*Klebsiella*, *Pseudomonas*, and *Proteus*) are the primary pathogens responsible for this type of urinary stone. Certain structural or functional abnormalities of the urinary tract can also promote the formation of struvite stones, including diverticuli, strictures of the bladder and neurogenic bladder. Women are more likely to develop this type of stone than men, and they can be very large.

**Cystine stones** are relatively uncommon. They are caused by a rare genetic abnormality known as cystinuria. This condition causes large amounts of the amino acid cystine to be excreted, and the onset of this type of stone often occurs in childhood or the early teen years. This type of stone can sometimes be dissolved and future stones prevented by drinking copious amounts of water (minimum 4 liters per day, ideally 5-7 liters per day). Two medications, 2-alpha-mercaptopyrionyl-glycine (2-alpha MPG) and penicillamine are also used to help prevent cystine stone formation.

One other type of renal stone is caused by long-term treatment with certain medications. It is believed that 1-2% of kidney stones are drug-induced. A number of pharmaceutical medications including the antiretroviral medication Indinavir, triamterene (a diuretic), sulfadiazine (an antibiotic) (Daudon & Jungers, 2004), as well as ephedrine and guaifenesin (Bennett, et al, 2004), are known to cause kidney stones.

The symptoms of kidney stones can range from asymptomatic to mild urinary frequency and discomfort to severe colicky pain in the abdomen, groin, and lower back. When stones are passing through the ureter it can cause hematuria, severe pain, nausea, vomiting, diarrhea, sweating, and tachycardia. In severe cases kidney stones can cause urinary obstruction, kidney infections, and scarring and damage to the kidneys.

Orthodox treatment of kidney stones is somewhat limited, relying on oral (Percocet, Vicodin, Percodan) or IM (Toradol, Demerol) analgesic medications to relieve discomfort as smaller stones pass. Larger stones that cannot pass are either broken up with extracorporeal shockwave lithotripsy (ESWL) or are removed via ureteroscopy or using a surgical technique known as percutaneous nephrolithotomy. There are potential risks with all of these therapies and prevention of future stones is highly desirable.

## Prevention of Kidney Stones

### Liquids

The single most important thing kidney stones sufferers can do to prevent future stones is to increase water consumption enough so that the person excretes at least 2 quarts of urine per day (approximately 10 glasses of fluids per day). Water is more effective than many other fluids and it is generally recommended that no more than one or two 8-ounce servings of cola be consumed daily (cola beverages reduced urinary citrate levels and most contain phosphoric acid which promotes stone formation). Orange juice and pomegranate juice have also been shown to be effective in preventing stone formation. Fresh tomato juice (freshly juiced with no added salt) was found to be a rich source of citrate and magnesium, while being low in sodium. It is believed that freshly made tomato juice will also inhibit stone formation (Yilmaz, et al, 2008). Research also indicates lemon juice (about ½ cup per day) helps to prevent kidney stone formation (Touhami, et al, 2007; Aras, et al, 2008). Grapefruit and apple juices actually increased risk of stone formation (one 8 oz. glass per day increased stone formation by 39-44%). In human studies, three 8-ounce cans of soda per week increased stone formation by 15%. Cranberry juice and capsules increased oxalate levels in urine so should be avoided by people with calcium oxalate stones, but because it helps prevent UTIs it should be consumed by patients who form struvite stones.

There are mixed studies on the benefits or risks associated with drinking coffee, tea, caffeinated beverages, and wine or beer. Some sources say beer should be avoided for people with uric acid stones (it is high in purines). Other sources say black tea (high in oxalates) and caffeinated beverages should be avoided. Contradicting this advice is a study in the American Journal of Epidemiology that found every 8 ounces of coffee consumed reduced the risk of stone formation by 10%, of tea 14%, beer 21%, and wine 39%. Excessive alcohol consumption, i.e., binge drinking, is associated with increased risk of developing kidney stones.

### Diet

According to numerous studies, increasing daily fluid intake and reducing salt are probably the two most important preventative measures for stone producers (Un, MD, 2002). The role of animal protein and calcium in the diet and stone formation is not entirely clear. While lowering animal protein and salt decreased stone formation, changing the diet from animal to vegetable protein had no discernable preventative effect (Taylor, et al, 2004). There is evidence that very high protein diets, such as the Atkins diet, do increase risk of oxalate and uric acid stones, and only diets almost devoid of animal protein had a significant impact on preventing stone reoccurrence.

In a 2002 study (Borghesi, et al, 2002), men with calcium oxalate stones who also had hypercalciuria (high levels of urinary calcium) who were put on a low-protein and low-sodium diet had a major reduction in the formation of new stones, compared to men who had a low-calcium diet. Reduction of sodium seems to play a much bigger role in preventing stones than the protein reduction. Dietary calcium has been shown to bind oxalates, and low calcium diets do not prevent kidney stones. Supplemental calcium (more than 2000 mg per day) was found to increase the risk of stones by 20%, but less than 1200 mg per day is actually believed to have a protective effect (Williams, et al, 2001).

When someone finds they have kidney stones, the first thing they are told is to avoid dietary oxalates (see chart). The evidence to support this is unclear and some studies suggest that when oxalates bind with calcium they actually help protect against stone formation. There is only really good evidence for avoiding oxalates in patients with chronic diarrhea causing malabsorption syndromes.

Foods High in Oxalates (*very high)		Foods with Moderate Oxalate Levels	
Beets*	Dried figs	Celery	Apples
Beet greens*	Poke greens*	Green beans	Brussels Sprouts
Swiss chard*	Endive	Scallions	Strawberries
Lamb's quarters*	Dandelion greens	Oranges	Raspberries
Amaranth	Okra	Green Peppers	Carrots
Cocoa powder	Sweet Potatoes	Chocolate	Potatoes
Purslane*	Kale	Pecans	Parsnips
Rubarb*	Peanuts	Black tea	Wheat germ
Spinach*	Sorrel*		

Increased dietary fiber, especially with grains and legumes rich in phytates, seem to help prevent crystallization of oxalate and phosphate calcium salts. This offers a protective effect against calcium stone formation. In women, higher levels of dietary phytates helped prevent kidney stones (Curhan, et al, 2004). Evidence also suggests that Eicosapentaenoic Acid (EPA) found in salmon and other deep-sea fish, may help prevent stone formation. In a Japanese study 88 men and women were given 1800 mg of EPA per day. After 18 months, test subjects had reduced urinary calcium excretion as well as lowered triglycerides, total serum cholesterol, and phospholipids (Yasui, et al, 2001 & 2008).

## Dietary Supplements and Kidney Stones

**B-6** – A dose of 50-100 mg per day of B-6 helps prevent formation of calcium oxalate stones (Marz, 1999).

**Calcium, Fish oils/EPA** – See ‘dietary prevention of kidney stones’.

**Flavonoids** – Two common flavonoids, catechin and epicatechin, strongly decreased calcium deposition in rat kidneys. The authors of the study speculate that the antioxidant activity of these substances inhibited peroxidative damage to the renal tubular membrane surface (Grases, et al, 2008).

**L-Arginine** – Oral L-Arginine increases urinary citrate and decreases urinary calcium oxalate in animal studies (Pragasom, et al, 2005). It prevented renal epithelial damage and protein oxidation in the test animals.

**Magnesium** – Men who consumed higher levels of dietary or supplemental magnesium had reduced risk of developing kidney stones (Taylor, et al, 2004). Magnesium decreases oxalate absorption and urinary excretion (DaSavaraj, et al, 2007; Marz, 1999). The

usual dose of magnesium for stone prevention is 400-600 mg per day.

**Potassium citrate** – Oral potassium citrate supplementation has been shown to help prevent kidney stone formation. Recent studies also found that epileptic children put on a high-fat ketogenic diet (it helps prevent seizures but increases risk of kidney stones) could avoid developing stones if given this supplement when starting the diet (McNally, et al, 2009). Higher levels of potassium were also associated with decreased risk of kidney stones in men (Taylor, et al, 2004).

**Probiotics** – the use of lactic acid probiotics can reduce oxalate production via their ability to metabolize oxalates (Siva, et al, 2009).

**Vitamin C** – high levels of vitamin C (1,000 mg per day) intake was associated with a greater risk of developing kidney stones than in men who took low levels of vitamin C (Taylor, et al, 2004).

**Vitamin D** – High doses of this important vitamin have been linked to increased formation of calcium kidney stones in people with hyperparathyroidism.

**Vitamin E** – in animal studies vitamin E inhibited calcium oxalate crystal formation (Huang, et al, 2006). In human epidemiological studies low levels of vitamin E were associated with a higher risk of stone formation.

**Vitamin K** – people with higher amounts of vitamin K have a lower incidence of kidney stones. Vitamin K was found to inhibit calcium oxalate formation. A dose of 2 mg per day is desirable.

## Herbs for Prevention of Urolithiasis

**Black Cumin seed (*Nigella sativa*)** – In animal studies the use of this herb significantly protected test animals against experimentally induced formation of calcium oxalate stones (Hadizadeh, et al, 2007). Dose: Tea: ½ tsp. dried seed, 8 oz. hot water, steep covered 20 minutes, take 4 oz. BID/TID.

**Chanca piedra/stonebreaker (*Phyllanthus niruri*)** is native to the tropics and has a long history of helping to prevent and pass kidney stones. In several in vitro and animal studies, daily intake of this herb helped prevent the formation of kidney stones. It also slowed the growth of already existing stones (Barrlos, et al, 2006). Dose: Tea: 1-2 tsp. dried herb, 8 oz. hot water, steep ½ hour. Take 2-3 cups per day. Tincture (1:5): 3-6 ml (60-120 gtt.) TID.

**Fagolitas** is a Spanish herbal formula containing fluid extracts of uva ursi, corn silk, *Ricinus zanzibarensis*, tincture of saw palmetto, mother tincture of buchu, glycerin, and anise essence. Animals given this formula had significantly reduced deposition of calcium in the kidneys [papillary and intratubular calcification (Grases, et al, 2008)].

**Fenugreek seed (*Trigonella foenum-graecum*)** – The seeds of this herb are commonly used in Northern Africa to prevent and treat kidney stones. In an animal study it was found that fenugreek seed significantly reduced calcification in the kidney and helped prevent kidney stones (Lasonbi, et al, 2007). Dose: Tea: 1-2 tsp. dried seed, 10 oz. water, decoct for 15-20 minutes, steep 30 minutes, take 4-6 oz. TID. Tincture (1:5): 2-4 ml (40-80 gtt.) TID.

**Gokshura fruit/root (*Tribulus terrestris*)** – This herb is an Ayurvedic rasayana, nephroprotective agent, and is commonly used in India and China to treat urinary tract disease. In animal studies it prevented the formation of kidney stones and may have even helped to reverse early-stage urolithiasis (Williamson, 2002). Dose: Powder: ½ - 1 tsp. TID.

**Jin Qian Cao herb (*Desmodium styracifolium*)** – This Chinese herb inhibits urinary calcium excretion and increases urinary citrate, significantly reducing formation of renal stones (Hirayama, et al, 1993). Dose: Tea: 2-3 tsp. dried herb, 8 oz. hot water, steep 40 minutes. Take 2-3 cups per day.

**Rose hips (*Rosa canina*)** – In an animal study, test animals were given an infusion of Rose hips, Rose hips and magnesium, or magnesium alone. Both the herb and the mineral promoted an increase in urinary citrate and reduced urinary calcium excretion (Grases, et al, 1992). Dose: Tea: ½-1 tsp. c/s Rose hips, 8 oz. hot water, steep ½ hour. Take 4 oz. TID.

**Rupture wort herb (*Herniaria birsuta*)** – In animal studies this herb inhibited deposition of CaOx crystals in the test animals' kidneys (Atmani, et al, 2004).

Dose: Tea: 1 tsp. dried herb, 8 oz. water, decoct 5-10 minutes, take 1-2 cups per day.

**Shatavari root (*Asparagus racemosus*)** – This important Ayurvedic Rasayana (rejuvenative remedy) was found to inhibit formation of calcium oxalate stones in test animals (Christina, et al, 2005). Dose: Tea: 1 tsp. dried, powdered root, 8 oz. water, decoct 10 minutes, steep 40 minutes, take 2 cups/day. Tincture (1:5): 2-4 ml (40-80 gtt.) TID.

**Varuna bark (*Crataeva nurvala*)** – Daily intake of this Ayurvedic herb reduced urinary calcium excretion and kidney stone formation. Dose: Tea: 2 tsp. dried bark, 12 oz. water, decoct 15 minutes, steep ½ hour. Take 8 oz. 2-3 times per day. Tincture (1:5): 4-5 ml (80-100 gtt.) TID.

**Water Plantain root (*Alisma orientalis*)** – The Chinese herb Ze Xie/Water Plantain root has a long history of use in TCM for treating dysuria, edema, and cystitis. In animal studies it was also able to inhibit experimentally-induced calcium urolithiasis (Cao, et al, 2003). Dose: 2 tsp. dried root, 10 oz. water, decoct 20 minutes, steep ½ hour, take 4 oz. TID.

**Wu Ling San** – This TCM formula is comprised of Water Plantain root (*Alisma orientalis*), *Polyporus umbellatus*, *Atractylodes macrocephala*, Fu Ling (*Wolfiporia cocos*), and cinnamon bark. In animal studies it effectively reduced calcium oxalate deposition in rat kidneys (Tsai, et al, 2008). Dose: Powder: 6-9 grams BID; Tablets: 4-5 tablets BID.

## Herbs for Treating Kidney Stones

Many herbs in TCM, Ayurveda, Native American medicine, Eclectic/Physiomedical medicine, and European traditions have a long history of being used to help deal with kidney stones and urinary calculi. Some are reputed to “dissolve” stones (this is unlikely), some help relax the ureters helping stones to pass, and others are useful for relieving pain and spasm caused by passing stones. Some herbs seem to possess all of these activities while others are used in formulas to achieve these effects.

**Couch grass rhizome (*Elymus repens*)** is a soothing diuretic that can be useful as part of a formula to make passing stones easier. It also promotes uric acid excretion, so can help prevent uric acid stones. Dose: Tea: 2-3 tsp. dried rhizome, 12 oz. water, decoct 30 minutes, steep 1/2 hour, take 1 cup 3x/day. Tincture: (1:4 or 1:5, 1:2.5): 3-5 ml (60-100 gtt) TID/QID.

**Goldenrod herb (*Solidago spp.*)** – Herbalists in the UK often use *Solidago* with *Pellitory-of-the-Wall* or *Parsley Piert* for helping to pass kidney stones. British herbalist Christopher Hedley, AHG, says that he has seen this simple formula “cause stones to vanish”. The patients never noticed the stone passing and upon followup ultrasound they had disappeared. Dose: Tea : 1-2 tsp. dried herb, 8 oz. hot water, steep covered, 20-30 minutes, take 2 cups/day. Tincture (1:5): 2-3 ml (40-60 gtt.) TID/QID.

**Gravel root (*Eupatorium purpureum*)** – Also known as *Queen of the Meadow*, has a long history of use for helping to make passing stones easier. It also helps relieve kidney and genito-urinary tract pain. This herb has been found to contain unsaturated pyrrolizidine alkaloids which are potentially hepatotoxic. It is unclear whether the levels found in this root are problematic. Since no one seems to have a definitive answer, I would advise short-term usage for gravel root. Dose: Tea: 1 tsp. dried root, 8 oz. water, decoct 15 minutes, steep 45 minutes, take 2 cups/day. Tincture: 1.5-2 ml (30-40 gtt.) TID.

**Horse chestnut seed (*Aesculus hippocastanum*)** – The specific indications for *Aesculus* are for throbbing pain with edema and inflammation. It is most often used for hemorrhoids, varicose veins, and trauma injuries. The analgesic and anti-inflammatory effects also help with the tensive pain caused by kidney stones and reduce swelling of the ureter, thus allowing stones to pass more easily. Dose: Tincture (1:2): 0.25-0.75 ml (5-15 gtt.) TID. Capsules: A standardized product (16-20% Escin) has been used in several studies with a dose of 300 mg. of the extract every 12 hours.

**Horsetail herb (*Equisetum arvense*)** – This herb is rich in silicic acid and helps strengthen bones, teeth, hair, skin, and nails. It also helps speed healing of minor kidney damage and hematuria caused by passing stones. In the UK, horsetail has the reputation for promoting expulsion of urinary calculi. Dose: Tea: 1 tsp. dried herb, 8 oz. water, decoct 15 minutes, steep 1 hour, take 4 oz. 3x/day. Tincture (1:5): 1-2 ml (20-40 gtt.) TID.

**Hydrangea root bark (*Hydrangea arborescens*)** – This Native American shrub is one of the most effective urinary tract analgesics. It is indicated for genitourinary tract pain and spasm and I use it with *khella*, *lobelia*, *kava*, *horse chestnut*, and *yucca root* for acute pain caused by kidney stones. Dose: Tea: ½ - 1 tsp. dried bark, 8 oz. cool water, steep 1 hour. Take 4 oz. TID. Tincture (1:5): 2-3 ml TID.

**Jin Qian Cao herbs (*Desmodium styracifolium*)** – There are three herbs known as Jin Qian Cao. Of the three, *Desmodium* and *Glechoma longituba* are believed to be more effective for helping to pass kidney stones. *Lys-machia* (also known as Jin Qian Cao) is believed by some practitioners to be more useful for treating gallstones, but it is also commonly used for helping to pass kidney stones. Dose: Tea: 2-3 tsp. dried herb, 8 oz. hot water, steep 40 minutes. Take 2-4 cups per day.

**Khella seed (*Ammi visnaga*)** – This Northern Africa plant is an effective antispasmodic, useful for relieving spasm and pain in the urinary tract, gall bladder, respiratory tract, and cardiovascular system. *Khella* is very useful as part of a protocol for helping to pass urinary calculi. Dose: Tea: 1 tsp. dried seeds, 8 oz. hot water, steep covered 30 minutes, take 4 oz. TID. Tincture (1:5): 1-2 ml TID.

**Lobelia seed/fresh herb (*Lobelia inflata*)** is primarily known as a respiratory remedy used for asthma and spasmodic coughs. It is also an effective antispasmodic for the cardiovascular, genitourinary, and musculoskeletal systems. The tincture of *lobelia seed* or the tincture of the green flowering herb is highly useful for relieving acute pain caused by stones passing through the ureters. It should be used in formulas combined with *khella*, *hydrangea*, or *horse chestnut*. Dose: Tincture: fresh herb (1:2), 0.50-1 ml (10-20 gtt) TID/QID; seed (1:5) - 0.25-0.75 ml (5-15 gtt) TID/QID.

**Marshmallow root (*Althea officinalis*)** is the most soothing and mucilaginous herbal diuretic. Consuming large quantities of the tea can help ease passage of urinary stones and relieve inflammation and tissue damage. Dose: Tea: 1-2 tsp. dried herb, 8 oz. hot water, steep covered 20 minutes, take 4-8 oz. TID.

**Kava root (*Piper methysticum*)** was introduced to western medical practice by the British explorer Captain Cook. In the U.S., the Eclectic physicians primarily used it for urinary tract pain. It helps relax the ureters, allowing stones to pass and helps diminish colicky, spasmodic pain. Dose: Tea (Decoction): 1-2 tsp. dried root, 8 oz. water, decoct 15 minutes, steep 1 hour, then blend. Take 4 oz. QID. Tincture (1:4, 1:5): 2-4 ml (40-80 gtt.) TID/QID. Capsules: Standardized (60 mg. Kava lactones) - 2-4/day.

**Pellitory of the Wall herb (*Parietaria diffusa*)** is used in the UK as a diuretic, kidney trophorestorative, and to help pass urinary calculi and stones. It is often combined with *goldenrod*, *parsley* or *parsley piert* to help prevent stones or assist in their passage. Dose: Tea: 1-2

tsp. dried herb, 8 oz. hot water, steep 30 minutes, take 4 oz. TID. Tincture (1:5): 1.5-2 ml (30-40 gtt.) QID.

**Varuna bark (*Crateva nurvala*)** - This Ayurvedic herb is used to help prevent kidney stones and is also used with banana stem (*Muse paradisiaca*) for successfully treating kidney stones. In a recent human study the authors state that this formula helped to dissolve renal calculi, facilitated their passage, and reduced pain (Patankar, et al, 2008). Dose: Tea: 2 tsp. dried bark, 12 oz. water, decoct 15 minutes, steep ½ hour. Take 8 oz. 2-3 times per day. Tincture (1:5): 4-5 ml (80-100 gtt.) TID.

**Wild Carrot seed (*Daucus carota*)** – British herbalist Anne McIntyre, FNIMH, uses Wild Carrot seed along with Parsley Piert (*Alchemilla arvensis*) for helping to expel kidney stones. Dose: Tincture (1:5): 5 mls. TID -2.5 mls. (50 gtt) of each.

**Yucca root (*Yucca spp.*)** – Alabama herbalist Phyllis Light, RH (AHG) uses Yucca root to help ease passage of kidney stones and relieve urinary tract pain. Dose: Tea: 1 tsp. dried root, 10 oz. water, decoct 15 minutes, steep 20 minutes, take 4 oz. TID. Tincture: 1-2 ml (20-40 gtt.) TID.

## TCM Formulas for Kidney Stones

Many herbs are used in TCM and Kampo traditions for helping to pass kidney stones. They are almost always used in complex formulas. The most frequently used “herbs” include Ji Nei Jin/chicken gizzard, Shi Wei herb (*Pyrrosia lingua*), Hi Jin Sha spores (*Lygodium japonicum*), Jin Qian Cao herb (*Desmodium styracifolium* or *Lysimachia christinae*), Bian Xu herb (*Polygonum aviculene*), Qu Mai herb (*Dianthus superbus*), and talc.

For kidney stones that are asymptomatic, Shi Wei San/Modified Pyrrosia Decoction is used. It can also be used for stones with mild symptoms of pain, nausea, and urinary frequency.

**Damp heat nephrolithiasis** is differentiated by constant pain in the lower abdomen, back, and waist with fever, frequent and painful urination, urinary urgency with burning, and hematuria. The pulse is slippery, wiry, and fast and the tongue has a greasy yellow coating.

**Shi Wei San/Modified Pyrrosia Decoction** - Lysimachia leaf (30-120 g), Pyrrosia leaf (6 g.), Plantago seed (9 g.), Qu Mai/Dianthus (6 g.), Dong Kui Zi/Abutilon seed (6 g.), Hi Jin Sha/Lygodium japonicum spore (30 g.), Ji Nei Jin/Chicken gizzard (9 g.), Talc (9 g.) Dose: Powder: 4-6 g. in warm water, TID.

**Niao Lu Pai Shi Tang #2/Expel urinary stones #2 decoction** – Lysimachia herb (30-120 g.), Polygonum aviculare herb (9 g.), Pyrrosia herb (9 g.), talc (12 g.), Achyranthes root (9 g.), Gardenia jasminoides fruit (9 g.), Plantago seed (12 g.), Rhubarb root (6 g.), Licorice root tips (6 g.), Zhi Shi/Citrus (9 g.), Mu Tong (6 g.) Dose: Powder: 6-9 g. in warm water, TID.

For mild cases of **damp heat nephrolithiasis**, another formula, San Jin Tang (three gold herbs decoction), is often used instead of Niao Lu Pai Shi Tang. San Jin Tang contains Desmodium herb (60 g.), Lygodium japonicum spores (30 g.), Abutilon seed (12 g.), Dianthus herb (12 g.), chicken gizzard (9 g.) and Pyrrosia leaf (9 g.). Dose: Powder: 6-9 g in warm water TID.

Another common pattern is **kidney deficiency urolithiasis**. Symptoms include chronic aching of the lower back, abdominal fullness, weak urination, with a pale tongue with scalloped edges and a weak pulse.

**Niao Lu Pai Si Tang #3/Expel urinary stones #3 decoction** – Lysimachia herb (30-120 g.), Achyranthes root (9 g.), Hi Jin Sha/Lygodium japonicum spore (15 g.), Astragalus root (15 g.), talc (12 g.), Codonopsis root (12 g.), Plantago seed (12 g.), White Peony root (12 g.), Dodder seed (12 g.), Mu Tong (6 g.), Licorice Root tips (6 g.), Spicebush root (9 g.), Chuan Lian Zi/Melia fruit (9 g.), Processed Rehmannia (12 g.), Eclipta herb (9 g.) and Psoralea seed (9 g.) Dose: Powder: 6-9 g. in warm water TID.

One other common pattern presenting with kidney stones is **nephrolithiasis with blood stagnation**. Symptoms include chronic, constant stabbing low back or groin pain, dark blood in the urine, the tongue is a purplish color and the pulse is tight and wiry. Niao Lu Pai Shi Tang #1 is used in this situation. It contains Lysimachia herb (30-120 g.), Lygodium japonicum spores (15 g.), Plantain seed (12 g.), Red Peony root (12 g.), talc (12 g.), Spicebush root (9 g.), Melia fruit (9 g.), Achyranthes root (9 g.), Mu Tong bark (6 g.) and Licorice root tips (6 g.). Dose: Powder: 6-9 g. in warm water TID.

## Herbs for Hematuria

Hematuria, or blood in the urine, is common when passing kidney stones. Small amounts of blood in the urine are typical and do not need additional treatment. If the amount of bleeding is excessive, urinary hemostatic agents such as Yarrow (*Achillea millefolium*), Tienqi Ginseng (*Panax notoginseng*), Shepherd's Purse (*Capsella bursa-pastoris*), Japanese Thistle (*Cirsium japoni-*

*cum*), or Cogon grass (*Imperata cylindrica*) can be added to a protocol.

### Herbs to Help Prevent Damage Caused by Lithotripsy

Extracorporeal shock wave lithotripsy (ESWL) is the most common procedure for treating large (>8mm) kidney stones. The shock waves shatter the stone, thus allowing smaller fragments to pass. Most people only experience minor renal tubular damage with some hematuria, pyuria, and proteinuria. In some cases there can be significant damage to the kidneys and surrounding tissue. Case reports indicate that ruptures or hematomas of the liver, spleen, pancreas, kidney, perineum, and colon have occurred in a small number of cases. Several herbs and antioxidants have been shown to minimize kidney damage caused by this therapy.

#### Andrographis herb (*Andrographis paniculata*)

– In human studies, 100 patients undergoing ESWL were given either andrographis, cotromoxazole (antibiotic) or norfloxacin (antibiotic). Patients receiving the herb had significantly less pyuria, proteinuria, and hematuria than the controls or those taking the antibiotics. Dose: Tincture (1:5): 1.5-3 ml (30-60 gtt) QID. Capsules: 1-2 (00) capsules BID.

#### Astragalus root (*Astragalus membranaceus*)

– The Chinese herbs Huang Qi showed significant nephroprotective effects in rabbits undergoing experi-

mental ESWL. The ability of the herb to protect against tubular damage was superior to verapamil and was much less than the controls (Sheng, et al, 2005). Dose: Tea: 2 tsp. dried root, 12 oz. water, decoct 20 minutes, reduce to 6 oz, steep 30 minutes, take 3 cups/day. Tincture (1:5): 2-4 ml (40-80 gtt.) TID.

**Nettle seed (*Urtica dioica*)** – The seed of nettle is one of the great kidney trophorestoratives. Combined with the leaf, it can be used to reduce damage to the kidney caused by ESWL and treat hematuria. Dose: Tincture (1:5): 1 ½ - 2 ml (30-40 gtt.) TID.

**Punarnava herb (*Boerhaavia diffusa*)** – This common Indian weed is used as a kidney restorative and to reduce inflammation. Dose: Powder: ½ - 1 tsp. TID.

**Antioxidants** – A commercial antioxidant formula containing vitamin C, E, Zinc, beta-carotene, copper, selenium, manganese, and lecithin protected patients against renal injury caused by ESWL (Al-Awadi, et al, 2008).

The references for this article are available on our website, [www.botanicalmedicine.org](http://www.botanicalmedicine.org). To access them, click the “references” link at the bottom of the home page. Thank you!



# Cholesterol, Statins, and the Truth about Cardiovascular Health and Disease

Donald Yance

Cardiovascular disease (CVD), principally heart disease and stroke, is the nation's leading killer for both men and women among all racial and ethnic groups. Almost 1 million Americans die of CVD each year—42% of all deaths. And it doesn't just kill the elderly; it is the leading cause of death for ALL Americans age 35 and older. Heart disease is the leading cause of death in women worldwide, killing around 8 million each year (more than 18 times the rate of breast cancer).<sup>1</sup>

The death toll alone is only part of the picture, as millions of individuals struggle daily with the complications of CVD. One out of every four (about 57 million) Americans has CVD. Heart disease and stroke account for almost 6 million hospitalizations each year and cause disability for almost 10 million Americans age 65 years and older.

The effectiveness of conventional medicine for early detection, treatment, and prevention of heart attacks is questionable, according to a recent study published in the journal *Circulation*, a journal of the American Heart Association. In this study, the medical records of 326 individuals who had received medical examinations within the six-month period before they died from a sudden heart attack were analyzed. Eighty-six of the 326 examinations were done within the seven-day period prior to their fatal heart attack, of which not a single one was predicted by their physicians.<sup>2</sup>

The allopathic approach is all about medication and surgery. Angiograms, bypass surgery, and angioplasty are big business, costing billions annually; but based upon extensive analysis, most of the money is wasted. Case histories show surgery to be five to ten times more deadly than the disease, and in many instances altogether unnecessary!<sup>3</sup>

Along with geographical risks (i.e., environmental pollution, lifestyle behaviors) a number of health-related behaviors contribute markedly to CVD.

## Stress and Elevated Stress Hormones

"Mental stress" that may not even be noticed, is a stronger indicator of heart attack or other severe heart event than other known risk factors including smoking, high cholesterol, diabetes, or male gender. The Mayo Clinic reported that psychological stress is the strongest risk factor for predictive future cardiac events among individuals with an existing coronary artery disease. Anger, anxiety and chronic worrying are all associated with coronary heart disease. People whose blood pressure rises during periods of "mental stress" are six times more likely to have a coronary heart disease event within six years than those who remain calm under the stress. Conscious stress and biological stress may be two different things. People's capacity, particularly men's, to openly report that they are stressed is not great.<sup>4</sup>

Research published in *Circulation* suggests that mental stress can trigger a potentially deadly slowdown in blood flow to the heart and increase the risk of death by as much as three times for people with cardiovascular concerns. Stress in those people causes the walls of blood vessels to thicken, resulting in a narrowed flow of blood to the coronary arteries. This increased pressure within the blood vessels forces the heart to work harder and causes certain portions to contract more vigorously or to bulge. Furthermore, the vascular resistance and coronary artery constriction that occur during mental stress increase blood pressure, while decreasing the amount

of blood available to the heart. This results in the heart being deprived of essential nutrients and increases its demand for oxygen.

Many studies have demonstrated the role of psychosocial and behavioral risk factors in the etiology and pathogenesis of cardiovascular disorders. Recently, a new personality construct, the type-D or 'distressed' personality, has been proposed. Type D behavior is characterized by the joint tendency to experience negative emotions and to inhibit these emotions while avoiding social contacts with others. The observation that cardiac patients with type D personality are at increased risk for cardiovascular morbidity and mortality underlines the importance of examining both acute (e.g. major depression) and chronic (e.g. certain personality features) factors in patients at risk for coronary events. Both type-D dimensions (negative affectivity and social inhibition) are associated with greater cortisol reactivity to stress. Elevated cortisol may be a mediating factor in the association between type D personality and the increased risk for coronary heart disease and, possibly, other medical disorders.

A bidirectional relationship exists between depression and cardiovascular disease. Patients with major depression are more likely to develop cardiac events, and patients with myocardial infarction and heart failure are more likely to develop depression. A feature common to both clinical syndromes is activation of proinflammatory cytokines and stress hormones, including the hypothalamic-pituitary-adrenal axis and the renin-angiotensin-aldosterone system, that are detrimental to the heart and vascular system.

### **Poor Nutrition (Elevated Glucose and Insulin, Obesity)**

Between 30-40% of the nation's adults are obese and thus have a higher risk for heart disease, high blood pressure, high cholesterol, and other chronic diseases and conditions such as diabetes. Only 27% of women and 19% of men report eating the recommended five servings of fruits and vegetables each day. I recommend 7-10 servings of vegetables and 4-5 servings of fruit. Just by increasing your vegetable, fruit and "wholegrain" intake, serum lipids can greatly improve. If, as we have been told, heart disease results from the consumption of saturated fats, one would expect to find a corresponding increase in animal fat in the American diet. In actuality,

the reverse is true. During the sixty-year period from 1910 to 1970, the proportion of traditional animal fat in the American diet declined from 83% to 62%, and butter consumption plummeted from eighteen pounds per person per year to four. During the past eighty years, dietary cholesterol intake has increased only 1%. During the same period the percentage of dietary vegetable oils in the form of margarine, shortening, and refined oils increased about 400% while the consumption of sugar and processed foods increased about 60%.

Simply lowering the percentage of energy from total fat in the diets is unlikely to improve lipid profile or reduce coronary heart disease (CHD) incidence. The same applies for treating obesity by diet; long-term clinical trials have provided no good evidence that reducing dietary fat per se leads to weight loss. There is much evidence to suggest that omega-3 fatty acids have a beneficial influence on cardiovascular disease.

Analysis from France found that the risk of CHD conditions that cause of 20% of deaths in the U.S. and 17% of deaths in Europe was cut by 4% for each additional fruit and vegetable portion consumed, and by 7% for fruit portion intake. The link between the risk of CHD and vegetable intake, however, was mixed with a more beneficial relationship observed for general cardiovascular mortality (26% risk reduction) than for the more specific fatal and nonfatal heart attacks (myocardial infarction) (5%). This meta-analysis of cohort studies shows that fruit and vegetable consumption is inversely associated with the risk of CHD.

### **Lack of Physical Activity**

People who are sedentary have twice the risk of heart disease as those who are physically active. Despite this, America remains a predominantly sedentary society. Surveys show that more than half of American adults do not practice the recommended level of physical activity, and more than one-fourth are completely sedentary. After a 17-year study on almost 9,800 Americans, the researchers concluded that expending energy through physical activity might be the key to cutting the risks of heart disease.<sup>7</sup> In another study scientists found that increasing exercise, not reducing calories, may be the best way to ward off heart disease.<sup>8</sup>

### **Tobacco use**

Smokers have twice the risk of heart attack as nonsmokers.

## Periodontal Disease

Periodontal disease is common among adults in the U.S. and is a potential source of chronic inflammation. Recent data points to an important role for chronic inflammation in the development of CHD. A recent review of all the existing data found that several studies demonstrated periodontal disease to be independently associated with increased risk of CHD and is independent of traditional CHD risk factors, including socioeconomic status.

## Cholesterol: The Lipid with a Bad Reputation

Hyperlipidemia refers to elevated blood levels of lipids (fats), including cholesterol and triglycerides. Most people with hyperlipidemia have no symptoms. However, hyperlipidemia is associated with an increased risk of CHD and can result in angina pectoris (chest pain), a heart attack, or both. It is one of many risk factors. What actually causes hyperlipidemia is a debatable issue. It is not as simple as foods that contain cholesterol elevated lipids.

An important risk factor is the oxidation of low-density lipoprotein (LDL) cholesterol caused from a lack of antioxidant-rich foods, herbs, and nutrients and/or a large intake of foods and chemicals that contains damaging free radicals. Chronic inflammation also contributes to oxidative stress and an increase in CHD. When LDL cholesterol oxidizes, it promotes atherosclerosis, particularly in the presence of stressors, like cortisol and insulin, which together cause all kinds of disruptions including an increased oxidative and inflammatory state. These are the real underlying causes of chronic disease.

The production of high levels of C-reactive protein (CRP) reflects the level of inflammatory activity deep within the body. It appears that certain conditions create a state of excessive inflammation within the circulatory system.<sup>9-12</sup>

Multiple risk markers for atherosclerosis and CVD have a proinflammatory component, which stimulates the release of a number of active molecules such as inflammatory mediators, nitric oxide, and immune cells in response to injury, among others. Nitric oxide plays a pivotal role in preventing the progression of atherosclerosis through its ability to induce vasodilation, suppress vascular smooth muscle proliferation, and reduce vascular lesion formation. Nutrients such as arginine, antioxidants (OPCs, vitamins C and E, lipoic acid, selenium,

glutathione), and enzyme cofactors (vitamins B2, B3, B6, B12, folate, zinc) help to elevate nitric oxide levels and may play an important role in the management of cardiovascular disease. Other dietary components such as DHA/EPA from fish oil, tocotrienols, vitamins B6 and B12, and quercetin contribute further to mitigating the inflammatory process.<sup>13</sup>

Within the broad range of cholesterol levels from 180 to 240 there is little evidence that this alone correlates with heart disease. Below 180 there is increased risk of hemorrhagic stroke, depression, and suicide,<sup>24,25</sup> a link to violence,<sup>26</sup> a high risk of decline and death in elderly people,<sup>27</sup> and an association between low serum cholesterol and cancer.<sup>163,164</sup> Above 240 there is increased risk of CVD and ischemic stroke. Over age 70, elevated cholesterol and cardiovascular events no longer correlate. Total serum cholesterol alone is a poor indicator of CVD. Half of all heart attack patients have normal total cholesterol levels. In the case of an elevated cholesterol level, normalizing it without drugs is one of the easiest things to do with nutritional and botanical medicine.

## Diet, Cholesterol and CHD

Cholesterol has unjustly received most of the blame for CVD. There is much confusion and many misconceptions about what foods are good to eat versus what foods are bad to eat. Foods like eggs and butter are thought to be major contributors to heart disease because of their cholesterol content, but in fact studies have shown that with a balanced diet, eggs do not increase plasma blood cholesterol. Eggs from free-range chickens that have eaten natural organic grains contain high amounts of lecithin, a phospholipid that emulsifies other fats and improves the liver's ability to break down and absorb fat properly. A Korean study found that daily consumption of 3 DHA-enriched eggs per day reduced platelet aggregation, total cholesterol, LDL cholesterol, and triglycerides. Another new study found eating an egg a day does not impact the cholesterol particles in the blood most likely to cause heart disease, debunking myths surrounding the role of eggs in the diet.<sup>14-18</sup>

An extensive study of diet and disease patterns in China found that the region in which the populace consumes large amounts of whole milk had half the rate of heart disease as several districts in which only small amounts of animal products are consumed. Butter, although a saturated fat, does not oxidize in the body nor generate free radical damage as hydrogenated polyunsaturated fats do.<sup>19</sup> A survey of South Carolina

adults found that men eating butter ran half the risk of developing heart disease as those using margarine.<sup>20</sup> Mother's milk provides a higher proportion of cholesterol than almost any other food. It also contains over 50% of its calories as fat, much of it saturated. Both cholesterol and saturated fat are essential for growth in babies and children, especially for the development of the brain.<sup>21</sup>

The ingestion of rancid fats, refined sugars, and refined starches will cause an over-oxidation of lipids, including cholesterol, and elevation of insulin levels, leading to serious damage of cardiac function, atherosclerosis, and damage to the liver, spleen, and other organs. Replacing fat with refined sugar and starch can cause hyperinsulinism, adrenal exhaustion, and obesity. Eating a diet rich in refined sugars and refined starch has shown to decrease the "good" HDL cholesterol.<sup>22</sup> The fat-free diet that many people believed to be the way to go presented many health problems including low energy, difficulty in concentration, depression, weight gain, and mineral deficiencies.<sup>23</sup>

## Abdominal Obesity

Body mass index (BMI) is far more important than lipid scores in lowering CVD risks. Yet according to the results of a new study, belly fat is a better measure than BMI, and abdominal obesity could be a greater risk factor than overall obesity. Sagittal abdominal diameter (SAD) is the distance from the back to the upper abdomen midway between the top of the pelvis and the bottom of the ribs. SAD is a more standardized measurement than waist circumference, and therefore less subject to error. Men with the largest SAD were 42% more likely to develop heart disease, and a large SAD similarly increased heart disease risk by 44% for women. Heart disease risk also rose with SAD within BMI categories, even among men of normal weight. The relationship between SAD and heart disease risk was strongest among the youngest men and women, indicating that people who develop central obesity earlier in life are more likely to have more serious problems. Obesity is associated with low HDL cholesterol, high triglycerides, and elevated CRP.<sup>256</sup>

## What Should the Diet Be?

Also just as bad is the high fat and protein diet. The diet I preach is rich in organic, undenatured, vitalizing foods, with an emphasis on vegetables, fruits, whole grains, a balanced intake of organic protein-rich foods as well as a variety of foods providing a balance of Omega 9, 6, and 3 fatty acids. This can include organic

free-range meat but doesn't have to. It should take into account the energetic nature of the person as well as the geographical location and the time of year. For example the diet during the hot summer months should have a larger intake of summer fruits, mono and saturated fat, and in the winter more root vegetables and omega 3 and 6-rich foods such as walnuts, and flax seeds. Not only is this typically more convenient, it is what your body wants and needs for optimal health and adaptation. Just by increasing vegetable and fruit intake, in particularly berries, research has concluded that serum levels of lipids normalize to a healthy range.<sup>28</sup>

The Mediterranean diet has been shown in epidemiological trials to be associated with reduced risk of heart disease. Adherence to the 11 components of the Mediterranean pyramid, specifically, increases in servings of fruits and vegetables, were associated with decreased LDL concentrations.

A recent study showed that a modified Mediterranean-style, low glycemic load diet with soy protein and phytosterols had a more favorable impact than the American Heart Association Step 1 diet on CVD risk factors. The results demonstrate that specific phytochemical supplementation increased the effectiveness of the modified Mediterranean-style low glycemic load dietary program on variables associated with metabolic syndrome and CVD. A new meta-analysis of scientific evidence for nuts' ability to lower cholesterol levels confirms that almonds, peanuts, walnuts and pecans could be useful as part of an overall heart-healthy diet.<sup>253</sup> The flavonoids, as well as the monoterpene, limonene, found in orange and tangerine peels, have the potential to lower cholesterol more effectively than some prescription drugs, and without side effects.<sup>30</sup> I often recommend the use of citrus rind in teas, fish dishes, and salad dressings.

Prolonged stress can suppress activity of antioxidant systems, increasing lipid peroxidation and inflammation. Besides important lifestyle changes that can prevent and even reverse coronary heart disease, foods rich in flavonoids, namely procyanidolic polymers, along with other phenolic compounds, present mostly in berries, possess unique pharmacological properties and unique benefits (antioxidant, anti-inflammatory, anti-thrombotic, vascular-tissue-enhancing etc.). They can maintain antioxidant function under normal conditions and can raise our antioxidant abilities when under stressful conditions. Flavonoids in general act as one-electron donors, which eliminate free radicals. The phenolic antioxidants are known to stop lipid peroxidation of

cell membranes, a prominent free radical chain reaction among unsaturated fatty acids that is carcinogenic by virtue of being both mutagenic and mitogenic.<sup>31</sup>

Carotenoids, such as dietary lycopene, found in tomatoes, pink grapefruits, and water melon, may significantly reduce the risk of heart disease, suggests new research, which found that women with the highest levels of the antioxidant in their blood had a 34% reduced risk of the disease compared to those with lower levels of the nutrient.<sup>32</sup>

## **Statin Drugs: The Good, the Bad, and the Ugly**

With half the population anticipated to take these drugs in the future, it is time that we seriously re-evaluate what we are doing with them. Just like our weight, there is an optimum cholesterol level as well. Some people believe that the lower your cholesterol, the healthier you are. Nothing could be further from the truth. If your cholesterol is too low you will have an increased risk of mood disorders, depression, stroke, violence, and even cancer.

The American College of Physicians released a recent report that stated, “regardless of cholesterol levels, most people with diabetes should be taking cholesterol-lowering medication to cut their risk of having a heart attack.”<sup>37</sup>

An estimated 25 million people worldwide are taking drugs known as statins to lower their cholesterol levels and according to “experts” 200 million could use them. Now, researchers are claiming that doubling the doses that are currently used reduces the risk of heart attack, bypass surgery, and chest pains more than “more gentle” doses. This advice will most likely put pressure on doctors to use even more aggressive and expensive doses of statin drugs. The United States already spends \$12.5 billion more on statins than any other medicine. When you consider that a starting dose of Lipitor will run you \$900 per year, while the 80-milligram dose used in the new study costs approximately \$1,400 annually, you get a good idea of how much more expensive this will be. It could mean a huge increase in health care costs because in the United States, only 11 million of the 36 million people who experts say should be taking cholesterol medication are actually taking them.<sup>38</sup>

Suppose that lowering your “bad” (LDL) cholesterol was not actually the key to lowering your risk of heart attack and heart disease? Would you still want to risk all of those statin side effects? Not to mention how

effective a combination of diet, exercise, stress management and a well developed nutritional and botanical supplement regime can be. With this approach, there is really no need for these drugs. This is what several research studies have found, raising the basic question of whether statin drugs even work to lower the risk of heart disease. A better predictor of heart disease, with respect to cholesterol, is the HDL/total cholesterol ratio, rather than total cholesterol, although there are many other risk factors that are either more important or just as important as the HDL/total cholesterol ratio.

Statin drugs do, in fact, lower bad cholesterol levels. But they do this by compromising the ability of the liver to create all types of cholesterol, including the “good” cholesterol and important hormones that the body manufactures from cholesterol. Statins may have one measurable, positive effect according to the medical charts, but they simultaneously throw off the body’s healthy physiology in a hundred other ways such as blocking your sex drive.

Clinical trials don’t pay much attention to these other effects; they’re just looking to prove one particular thing and get FDA approval to market the drug as a miracle cholesterol fighter. What other effects the drug has on the human body are largely ignored. And when clinical trial participants start showing these severe effects, they are typically “dismissed” from the trial in order to ensure that trial results look positive. In this way, extremely toxic drugs are actually approved by the FDA as “safe.”

A recent study found that lowering bad cholesterol with statin drugs might not reduce the rate at which plaque builds up in the arteries surrounding the heart. This finding flies in the face of the widespread belief that lowering LDL cholesterol levels is the best way to reduce arterial plaque. In the study, participants taking varying doses of a statin did generally lower their cholesterol. However, all the groups had an average increase in arterial plaque of 9.2 percent.<sup>39</sup>

Another study looked at the effect of statin drugs versus usual care (improving diet, exercise, etc.). While the statin group did lower their bad cholesterol levels significantly more than the usual care group, both groups had the SAME rates of death and heart disease.<sup>40</sup> Another study confirmed that a healthy diet, low in fats, refined fats, starches and sugars, was just as effective as a statin drug in lowering LDL cholesterol.<sup>41</sup>

Statin drugs induce myopathy (muscle weakness), and remember that the heart is really a muscle that never

stops working. What does that tell you? Statin-related side effects, including statin cardiomyopathy, are far more common than previously published and are reversible with the combination of statin discontinuation and supplemental CoQ 10 and other mitochondrial-enhancing nutrients and botanicals.<sup>294</sup> Statins have been shown to cause myotoxicity and rhabdomyolysis, whole-scale muscle breakdown. In most cases rhabdomyolysis occurs following the use of these drugs for at least one week. Cases of rhabdomyolysis after just a single dose of simvastatin have been reported.<sup>44</sup>

### **Rhabdomyolysis with HMG-CoA Reductase Inhibitors and Gemfibrozil Combination Therapy**

Once the fifth of the six most prescribed statins, Baycol was pulled off the market voluntarily after 31 people died of complications of severe rhabdomyolysis. In one third of the cases, the person was on a second cholesterol drug, gemfibrozil, known to increase the risk of problems.

Combination use of statins and fibrates—the family to which gemfibrozil belongs—isn't necessarily a mistake. The two types of drugs alter blood fats in different ways, and are sometimes intentionally prescribed to patients with severe cholesterol problems despite the rare risk of rhabdomyolysis, which generally reverses itself if the drugs are stopped immediately.<sup>251</sup>

Statin drugs are often combined with fibric acid derivatives to lower both cholesterol and triglyceride levels. Rhabdomyolysis is a known, rare serious side effect of statin monotherapy and of statin-fibrate combination therapy. An examination of the FDA's postmarketing database for cases of rhabdomyolysis in relation to monotherapy and combination use calculated and evaluated the number of rhabdomyolysis cases along with outcomes such as renal failure, dialysis and death. Of 866 total reported cases, 482 (56%) were associated with monotherapy and 384 (44%) related to combination therapy. More than 80% of reported cases for each drug resulted in hospitalization for renal failure and dialysis. 80 patients expired from events related directly to rhabdomyolysis. Rhabdomyolysis is a serious side effect of statin monotherapy and of statin-fibrate combination therapy. Clinicians need to remain cognizant of this potential adverse event and discuss signs and symptoms of muscle toxicity with patients in order improve the benefits-to-risks of treating dyslipidemia with statins.<sup>171</sup>

Rhabdomyolysis and the cardio-myopathy associated with statins could easily be prevented and/or treated with a few mitochondrial anabolic enhancing supplements, namely CO Q 10, magnesium creatine, carnitine, magnesium glycol glutamine, and various adaptogens with enhanced anabolic/anti-catabolic actions such as *Rhaponticum carthamoides*. These can be used even when creatine kinase levels are within normal levels on blood test.<sup>43</sup> It is downright criminal that CO Q 10 is not recommended for every person taking a statin drug. I think everyone with a risk of cardiovascular disease should be taking CO Q 10.

### **Statins Have Been Shown to Stimulate the Growth of New Blood Vessels, a Possible Increase in Cancer Risk**

Tests in human cell samples and in rabbits show that the cholesterol-lowering drug simvastatin (Zocor) seems to activate a molecule called protein kinase Akt/PKB and to produce effects on the growth of new blood vessels, a process called angiogenesis. Statins might increase the growth of blood vessels in cancerous tumors.<sup>45</sup>

This is not the first time that the cancer-causing potential of cholesterol-lowering medications has been discussed. Several studies provide some excellent information on this.<sup>46</sup> If statins act on the same pathway as VEGF, it further explains the cancer connection. A just-published study shows that VEGF plays an important role in the spread of cancer and found that survival time was diminished in patients whose cancerous tumors tested positive for VEGF.<sup>47</sup> Another study showed that VEGF plays a role in diabetic retinopathy.<sup>48</sup> Therefore, if statins act along the same pathway, this is another potential adverse effect of the drugs. Considering the fact that a high percentage of diabetics have heart disease and are probably on these drugs, this is significant.

### **Statins May Cause Cognitive Decline and Even Dementia**

Taking statin drugs also has shown to reduce cognitive function. We report two women who experienced significant cognitive impairment temporally related to statin therapy. One woman took atorvastatin, and the other first took atorvastatin, then was rechallenged with simvastatin. Clinicians should be aware of cognitive impairment and dementia as potential adverse effects associated with statin therapy.<sup>244</sup>

Another study involved 283 people—94 in the placebo group, 96 in the 10-mg simvastatin group, and 93 in the 40-mg simvastatin group. Compared with placebo, simvastatin was associated with minor negative changes in performance on several tests assessing attention, memory, and overall mental efficiency. In the team's earlier trial, 20 mg of lovastatin given every day for six months produced similar changes on these same tests.<sup>204</sup>

A survey by the MedWatch drug surveillance system of the Food and Drug Administration (FDA) from November 1997-February 2002 for reports of statin-associated memory loss identified 60 patients who had memory loss associated with statins. About 50% of the patients noted cognitive adverse effects within 2 months of therapy. Fourteen (56%) of 25 patients noted improvement when the statin was discontinued. There are no available prospective studies that show cognitive or anti-amyloid benefits for any statin, although some people are actually touting statins to be beneficial for the prevention of dementia.<sup>245</sup>

### Lipitor No Better and Often Worse

According to a German study,<sup>252</sup> Lipitor, Pfizer's cholesterol-lowering statin drug and the best-selling, most commonly prescribed drug in the world, is no more effective than similar cholesterol drugs, and in some cases may have worse side effects.

## Assessment of Lipids

### Lipid panel

- 1 (a) Total Cholesterol/ HDL ratio – Optimum goal is to be under 4.
- 1 (b) Total Cholesterol – Although most authorities state that the optimum goal is to be less than 200, even 180, it is far less relevant compared to all the other risk factors.
- 1 (c) Triglycerides – Optimum goal is to be under 140
- 1 (d) Lipoprotein A - Lp (a)
- 1 (d) Apolipoprotein (a & b)
- 1 (e) LDL particle number

**Lp(a)** consists of a particle of low-density lipoprotein cholesterol (LDL-C). Levels above 30 mg/dL are generally considered elevated.<sup>49, 50</sup>

**Apolipoprotein A1** is the major protein component of HDL cholesterol. The goal is to be above 140.

**Apolipoprotein B** is the major component of LDL cholesterol. The goal is to be below 135.

The ratio between Apolipoprotein A1 and Apolipoprotein B should be in the range of .66-1.91. Elevated apolipoprotein-B levels were strongly associated with cardiovascular disease; conclusion: apolipoprotein-B levels are a better predictor of vascular risk than are LDL levels.<sup>201</sup>

LDL Particle number, not size, is a significant predictor of CVD risk.

Other important CVD risk markers include C-reactive protein (CRP), homocysteine, fibrinogen, hemoglobin A1C, fasting insulin, DHEA sulfate, testosterone (total & free) and thyroid, including a total thyroid panel.

## More about Stress

Stress causes hormones (cortisol and insulin) to be released, which increase the susceptibility to abnormal blood clotting<sup>65</sup> and trigger a low-grade inflammatory state. They are the two main culprits causing elevated lipids and blood pressure. Cardiovascular disease can often begin with an elevation of blood pressure. Once physicians make the diagnosis they typically proceed by prescribing a drug, or drugs, to lower the high blood pressure (HBP). These drugs, being functional, will work, either by forcing the arteries to dilate, or by causing the kidneys to urinate, or by blocking calcium, or by inhibiting vascular constriction. We should first look at the possibilities of why a condition like HBP is manifesting.

When we determine what may be the root cause or causes of the condition, we can then work towards bringing about balance to the person in a rational, harmonious way. This approach will in turn enable a partnership to occur, that involves one's own self-healing to occur. A plan should then be developed to remove the causative factors through diet and life style modifications and the use of herbs and nutrients, such as hawthorn leaf, flower and berry, relaxing diaphoretics such as linden or yarrow, or a nervine relaxant like celery seed. If still the blood pressure is elevated you can combine stronger hypotensive herbs such as mistletoe (*Viscum album*) or even *Rauwolfia*.

What I typically do is compound a formulation made up of 50% primary adaptogens and companion adaptogens, along with the specific indicated herbs. I then recommend certain nutritional agents including special forms of magnesium, potassium, vitamin C, argi-

nine, carnitine and CO Q 10. When you do integrative protocols using herbs, nutritional agents, diet and life style modifications, it is amazing how effective it can be for people. Best of all is that this lowers the blood pressure, lowers their biological age and feels great. Rather than the sex life going south because of using blood pressure meds, it actually improves. This result is a by-product of getting healthy with adaptogenic remedies and other natural healing modalities. Many adaptogens, such as *Rhodiola rosea*, Eleuthero, or Reishi could easily be classified as cardiovascular tonics, but the cardiovascular effects and actions are secondary to their overall adaptogenic-neuroendocrine enhancing/normalizing abilities. Reishi extract lowers serum lipids, attenuates diastolic dysfunction and prevents irreversible cardiomyocyte damage during ischemia and heart reperfusion.<sup>336</sup>

Along with cardiovascular problems, stress can also cause muscular, respiratory, and skin problems, sexual problems, depression, gastrointestinal and eating disorders, and chemical dependence; we refer to these conditions as Stress-Related Disorders. Stress-related Disorders can lead to illness, disease, chronic disease and even death.

## Inflammation

Controlling inflammation and oxidative damage and enhancing mitochondrial energy are important keys to heart disease, cancer, and other chronic degenerative diseases. Although primary adaptogens are effective modulators of inflammation and oxidative damage it is the companion adaptogens that really excel in this area, and this is one of many reasons why I believe in combining them. Inflammation and immune activation are crucially involved in the pathogenesis of atherosclerosis and cardiovascular disease. Accordingly, markers of inflammation such as fibrinogen, ferritin, CRP, or neopterin are found in patients with vascular diseases, correlating strongly with the extent of disease and predicting disease progression.

## C-reactive Protein

CRP has been discovered to be as powerful an indicator of heart disease as high cholesterol. Linked to inflammation, it is noted that the higher the level of this protein, the greater the risk of heart attacks. In fact, some researchers have suggested CRP itself might be the culprit behind heart disease. Recently 9 systematic reviews were conducted and CRP was the best candidate for use in screening and the most rigorously studied.<sup>346</sup>

In concert with other pro-inflammatory cytokines, interferon-gamma is the most important trigger for the formation and release of reactive oxygen species (ROS). Chronic ROS-production leads to the depletion of antioxidants like vitamin C and E and glutathione, with a consequence that oxidative stress develops. Oxidative stress plays a major role in the atherogenesis and progression of cardiovascular disease, and it may also account for the irreversible oxidation of other oxidation-sensitive substances like B-vitamins (e.g., folic acid and B12). They are essential cofactors in homocysteine-methionine metabolism. Associations between moderate hyperhomocysteinemia and cellular immune activation are found in several diseases including coronary heart disease, and data indicate that hyperhomocysteinemia may develop as a consequence of immune activation. Homocysteine accumulation in the blood is established as an independent risk factor for cardiovascular disease. Homocysteine itself has the capacity to further enhance oxidative stress. Interferon-gamma appears to be a central player in atherogenesis and in the development and progression of cardiovascular disease.<sup>264</sup>

A report published in the September 13, 2004 issue of the *Archives of Internal Medicine* described the finding of Mayo Clinic researchers that high-sensitivity C-reactive protein (hs -CRP) can be a marker for heart disease in people with no disease symptoms.<sup>208-209</sup>

Research on CRP indicates that cholesterol-filled plaques in blood vessels may not pose any real danger unless they are affected by inflammation. Inflammation weakens plaques, making them more vulnerable to bursting or pinching off a clot that can then block coronary vessels.<sup>210-213</sup>

Some members of the research community have suggested that statin drugs may prevent heart disease not because of their effects on cholesterol, but because they have anti-inflammatory activity. This helps to explain why statins have been found to protect the heart regardless of their effects on cholesterol levels.<sup>214,215</sup> Although statin drugs do appear to lower CRP, there are many better and safer choices that are more effective and possess multiple other beneficial actions in our body in regard to cardiovascular disease and other age-related diseases as well. For example, to lower CRP, I combine primary endocrine enhancing adaptogens with companion adaptogens such as turmeric, ginger, Indian Gooseberry, grape seed/skin extracts together with enzymes such as bromelain, nattokinase, and/or lumbrokinase to be taken between meals 2 or 3 x daily. I combine this with



a multiple redox/antioxidant supplement that contains vitamin E succinate, vitamin C, as a mineral ascorbate, selenium, etc. and a fatty acid supplement rich in EPA/DHA fish oil, sea buckthorn oil, and pine seed oil to be taken with meals. Lastly, if cholesterol is also elevated I will use a small dosage of red yeast extract. I have found this supplement regime to be extremely effective. Remember, lower CRP is not just important for CVD, it also applies to cerebral related circulatory diseases and possibly even some cancers.

Vitamin E's ability to protect against heart disease has also been attributed to its blood-thinning effects, but recent research has shown that it lowers CRP levels considerably.

Isoflavones have shown to lower CRP and reduce CVD. A recent study demonstrated that a 12 week course of taking 80 mg. isoflavone supplement reduced serum hs-CRP and improved brachial FMD in patients with clinically manifest atherosclerosis, thus reversing their endothelial dysfunction status. These findings may have important implication for the use of isoflavone for secondary prevention in patients with CVD, on top of conventional interventions.<sup>330</sup>

One of the best ways to control inflammation is to take fish oil supplements daily. Fish oil supplements should contain both DHA and EPA. Omega-3 fatty acids incorporated into the diet have a wide spectrum of favorable effects on cardiovascular risk factors.<sup>258</sup> They demonstrate a reduction in platelet clumping by up to 11% and also significantly decrease triglycerides.<sup>259</sup> One trial reported that a 850 mg. per day supplement of EPA plus DHA was reported to reduce the risk of all-cause mortality by 21%, cardiac death by 35%, and sudden death by 45%.<sup>262</sup>

Omega-3-rich fish has a beneficial effects on heart rhythms, and is protective against fatal arrhythmias. Fish consumption is linked to improved electrical properties of heart cells (electrophysiology). People who ate five or more servings of tuna and/or other broiled or baked fish every week were found to have lower heart rates, averaging 3.2 beats per minute less than those who ate less than one portion per month. A higher resting heart rate has been linked to an increased risk of sudden death, and so lowering the heart rate is a significant health benefit.

High intake of Omega-3 rich fish was also associated with a lower likelihood of extended ventricular repolarisation – an electrical property of the ventricle part of the heart that needs to revert back to its original electrical state before the heart beats again. Abnormalities, such

as prolonged time needed to repolarise the ventricle, are important factors in developing arrhythmias (abnormal beating of the heart).

## Reducing CRP

It seems the world of conventional medicine is in a predicament: The very same anti-inflammatory drugs, known as COX-2 inhibitors (proven to increase cardiovascular risks) have been found to lower lethal CRP levels. Such contradictory properties of these drugs are merely one of the medical and ethical quandaries discovered. We cannot assume that just because something lowers CRP it's a good thing. Thus, the standard advice to achieve normal, healthy CRP levels is to:

- Maintain a healthy weight, low fasting insulin, and anabolic to catabolic ratio.
- Eat healthily and don't smoke.
- Take botanical cardio-tonic agents that help control inflammation, reduce oxidative damage, and strengthen the vascular system.
- Maintain a healthy DHEA to cortisol ratio.
- Reduce stress and take adaptogenic formulas on a regular basis. Rhodiola extract has demonstrated an ability to reduce CRP.

Low levels of DHEA have been correlated with increased CRP levels in rheumatoid arthritis (RA) patients. A low-glycemic load diet lowered CRP levels, raised DHEA levels, and improved symptom states in people with RA. Primary and many secondary adaptogens, such as *Tribulus terrestris*, (15-20% Protodioscin), and *Eurycoma longifolia* jack, are potent endocrine enhancers that have been shown to raise depressed levels of DHEA up to normal level.

## Testosterone—an Important Hormone for Cardiovascular Health

Optimal testosterone levels are of great importance in both men and woman for every aspect of health. However, I am not suggesting testosterone replacement therapy, as I am not recommending any hormone replacement therapy. You can achieve healthy testosterone levels in a gentle, harmonious way with herbal and nutritional supplementation.

The newest finding about testosterone and heart disease is very exciting. It turns out that testosterone actually dilates the coronary arteries, improving blood flow to the heart. This alone could explain the earlier finding that testosterone diminishes or eliminates angina. Angina

happens when the heart muscle is not getting enough oxygen from the blood. Maintaining healthy testosterone levels may in fact be an important treatment for heart disease, and may help prevent and treat diabetes.<sup>224</sup>

According to several recent studies, low androgen levels in men correlated with increased risk of atherosclerosis.

Normalizing free testosterone levels in men improves strength and increases protein synthesis as well as muscle mass. It has been shown to decrease body fat, particularly visceral body fat, and increase libido. Mood is also improved with testosterone, particularly in the older population. Higher endogenous testosterone has been correlated in many studies with a reduction in a number of cardiovascular risk factors; among them: lower blood pressure and total cholesterol (TC), lower LDL-cholesterol (LDL), as well as triglycerides (TG), visceral body fat, waist-hip ratio (WHR), serum insulin, fasting and postprandial glucose; higher HDL-cholesterol (HDL) and greater insulin sensitivity.<sup>226</sup>

A consistent finding in the scientific literature is that obese men have low testosterone and very high estrogen levels. Boosting testosterone levels decreases the abdominal fat mass, reverses glucose intolerance, reduces lipoprotein abnormalities in the serum, and counteracts visceral fat accumulation.<sup>227, 228, 281-290</sup>

### Erectile Dysfunction (ED)

ED is often associated with cardiovascular disease.<sup>347</sup> A recent study showed that ED is strongly predictive of subsequent atherosclerotic CV events. This is even more striking when ED presents at a younger age.<sup>348</sup>

### Sex Hormone Binding Globulin (SHBG)

SHBG is related to cardiometabolic disorders; but whether or not this relationship is purely secondary to hyperinsulinemia and/or obesity, which downregulates SHBG, is unknown. In women low plasma levels of SHBG are associated with CHD independently of insulin, obesity markers, and dyslipidemia.<sup>291</sup>

Because low testosterone increases one's risk of heart disease as well as obesity, diabetes, and other age-related diseases, supplementation with primary and many secondary adaptogens assists naturally in enhancing testosterone levels and bringing them up to a healthy normal range. *Rhaponticum carthamoides*, *Pantocrine*, *Epi-medium*, *Tribulus terrestris* and *Eurycoma longifolia* jack are particularly effective for helping to raise testosterone levels.

## Homocysteine and Cardiovascular Disease

Recent review of 26 studies found that for each 5 umol/L of homocysteine the risk of CVD increased 20% independently of traditional CHD risk factors.<sup>349</sup>

Homocysteine is created when the body uses the amino acid, methionine, for methylation. Methylation is an important reaction in the body, which leaves homocysteine as a by-product. Normally homocysteine is converted back to methionine, or used to create cysteine and other useful substances. If these conversions are blocked, homocysteine accumulates which can lead to a host of negative reactions. Abnormal metabolism and elevated blood levels of homocysteine is a condition that is highly toxic to both cellular and fibroelastic components of the vascular wall.<sup>229</sup> Homocysteine can damage blood vessels and nerves, and has been linked to heart attacks, strokes, cancer (particular colon, breast, and prostate), Alzheimer's disease and other neurological diseases, depression, birth defects, gout, cervical dysplasia, erectile dysfunction, and rheumatoid arthritis.

Homocysteine damages mitochondria, which causes cellular damage.<sup>230</sup> Homocysteine interferes with nitric oxide, a substance that relaxes blood vessels. However, this phenomenon may only happen in older people. Research has recently shown that while homocysteine impairs blood flow in people who are 50-70 years old, it doesn't typically in people 21-40 years old.<sup>231</sup>

Efficient conversion of homocysteine requires certain nutrients. These nutrients neutralize homocysteine's toxicity by transforming it into useful substances. The most well-studied of the nutrients are folic acid and vitamins B12 and B6. Choline, betaine (TMG), creatine, riboflavin, zinc, magnesium and other nutrients also help detoxify homocysteine. Folate deficiency is one of the most common deficiencies associated with homocysteine in Western populations. Studies show that folate supplements (1-5 mg/day) have a significant impact on reducing homocysteine levels. Increasing your intake of fruits and vegetables, which has numerous other benefits, and/or supplementing the B vitamins can help convert homocysteine to other amino acids that are not harmful. Homocysteine levels can rise when people eat a diet heavy in animal protein and/or few fruits or leafy vegetables. Folate is found mostly in vegetables and legumes. This would suggest that people on vegetarian diets would have higher folate and lower homocysteine. This is in fact the case. One recent study shows that a supervised vegan diet

(no animal products whatsoever, and excluding tobacco, alcohol and caffeine) lowers homocysteine 13% in one week without supplements.<sup>232</sup>

## ADMA (Asymmetric Dimethylarginine)

Asymmetric dimethylarginine (ADMA) is the principal endogenous inhibitor of nitric oxide synthetase. Thus it regulates rates of nitric oxide (NO) formation. Nitric oxide acts as a signal molecule in the nervous system, as a weapon against infections, as a regulator of blood pressure, and as a gatekeeper of blood flow to the organs. Elevated ADMA is a risk factor for hypertension, cardiovascular disease, renal failure, and erectile dysfunction. Two factors that contribute to elevated ADMA are increased oxidative challenge and folic acid insufficiency. ADMA activates homocysteine, which induces endothelial dysfunction. In a recent study high-dose antioxidant treatment prevented methionine-induced elevation of oxidized LDL and interleukin-6 but failed to prevent the increase in ADMA or endothelial dysfunction.<sup>293</sup>

## L-Arginine Lowers ADMA

There is abundant evidence that the endothelium plays a crucial role in the maintenance of vascular tone and structure. One of the major endothelium-derived vasoactive mediators is nitric oxide (NO), an endogenous messenger molecule formed in healthy vascular endothelium from the amino acid precursor L-arginine. Endothelial dysfunction is caused by various cardiovascular risk factors, metabolic diseases, and systemic or local inflammation. One mechanism that explains the occurrence of endothelial dysfunction is the presence of elevated blood levels of ADMA, an L-arginine analogue that inhibits NO formation and thereby can impair vascular function. Supplementation with L-arginine has been shown to restore vascular function and to improve the clinical symptoms of various diseases associated with vascular dysfunction.<sup>240</sup>

## Optimize Neuroendocrine and Endocrine Health

Complex changes occur within the endocrine system of aging individuals, including reduced levels of DHEA-S and free testosterone, thyroid hormone, and growth hormone, all of which strongly correlate with CVD, poor quality of life, and a shortened lifespan.<sup>312-314</sup> The neuroendocrine (HPAA), endocrine system and aging

have been the object of intense interest recently, especially DHEA-S, which is of major importance since it is distinct from cortisol and aldosterone and declining with age. The age-related decrease in DHEA-S concentrations has often been associated with the pathological processes of aging, such as osteoporosis, depression, dementia, and CVD.<sup>315</sup> Women with low DHEA-S levels have increased carotid artery atherosclerosis, obesity, and high blood pressure.

Although DHEA appears to be cardioprotective, antidiabetic, and antiobesity,<sup>321,322</sup> I am not recommending that people go out and start taking it. Adaptogens are by their very nature endocrine enhancing and modulating, and have shown to combat stress and aging, including the replenishment of lost DHEA.<sup>323</sup> Also note that during times of stress the HPAA is altered to meet the stress response and in doing so reduces the gonadal axis being consistent with conservation and redirection of valuable resources towards homeostasis during times of stress.<sup>324-327</sup> The stress system coordinates the adaptive responses of the organism to stressors of any kind, but always at a cost.<sup>328</sup> In other words, you cannot become efficient at dealing with stress and maintain a healthy anabolic-endocrine status. Because so many aspects of our health are affected by stress, a dual systems approach holds great promise by providing direct cardiovascular support and neuroendocrine support using primary, secondary, and companion adaptogens, with key nutrients, fatty acids, diet, exercise and stress modification techniques.

Adaptogens have demonstrated profound cardio-protective effects. A poly-adaptogenic formulation, made up of extracts of *Aralia mandshurica*, *Panax ginseng*, *Rhodiola rosea*, and *Eleutherococcus senticosus*, exhibited cardioprotective and antifibrillatory properties during acute cardiac ischemia/reperfusion and postinfarction cardiac fibrosis.<sup>329</sup>

## Fatty Acids

Fatty acids shown to improve lipids and lower the risk of heart disease: EPA/DHA & GLA from Omega-3 Fish/Marine Oils, Pine seed oil, carotenoids-rich Siberian Sea Buckthorn oil, and olive oil.

Omega-3 fatty acids have been associated with numerous health benefits, from brain development and preventing memory loss to suppressing tumors and cutting heart disease. EPA/DHA: Decrease triglycerides, VLDL cholesterol, and raise HDL modestly. Has additive effect with statins — no interference. Researchers found that omega-3 oils stop the buildup of fatty

deposits in the arteries, which is why oily fish and fish oils protect against heart disease and stroke. The overall cardiovascular beneficial effects of EPA/DHA omega-3 fatty acids include anti-inflammatory, anti-thrombotic, lipid-modulatory and immunomodulatory actions. Fish oil may lead to reduced clotting activity and decreased blood pressure.

### **Siberian Sea Buckthorn (*Hippophae rhamnoides*)**

Siberian sea buckthorn oil is used to promote the healing of skin problems, such as burns, sunburns, eczema, psoriasis and conditions of mucous membranes of the gastrointestinal tract. It possesses radiation protective and cardiovascular enhancing actions, antioxidative and lipid modulation. Siberian sea buckthorn concentrate added to fish oil acts to protect against the oxidative stress that can be potentially induced by taking fish oil and enhances the plasma triglyceride-lowering effect of the fish oil. Siberian Sea Buckthorn oil concentrate is the richest source of fat-soluble carotenoids. Sea Buckthorn possesses adaptogenic actions normalizing the neuroendocrine hormonal system when under stress.<sup>71-75</sup>

### **Siberian Pine Oil (*Pinus sibirica*)**

Siberian Pine Seed oil is rich in gamma linolenic acid (GLA) 20% (approximately 2 1/2 times that of Evening Primrose oil), and alpha linolenic 20%; mono-unsaturated fatty acids as oleic acid 20%, saturated fat 6-7 % make up respectively of total fat in cedar seeds; phospholipids, 1.3-1.7%. Omega 3 essential fatty acids contained in Siberian Pine oil have a very unique chemical structure, in part resembling EPA found in fish oil.<sup>76</sup>

Siberian Pine seed oil vitamin E content is about five times higher than that of olive and peanut oils, three times higher than almonds, and one and half times higher than walnut oil. Siberian Pine oil is also a good source of iodine, which is important for the health of the thyroid gland (production of T-4).<sup>77,78</sup>

A recent animal study demonstrated that Siberian pine-seed oil consumption lowers overall cholesterol, while increasing HDL and Apo A-I levels, the beneficial forms of cholesterol.<sup>79</sup> Another study found that Siberian Pine seed oil lowered VLDL and LDL cholesterol.<sup>80</sup> Siberian Pine seed oil also has a triglyceride-lowering effect in rats, an effect that is due to a reduction in circulating VLDL.<sup>81</sup>

### **Olive Oil**

The high intake of olive oil in the Mediterranean diet is associated with a low incidence of coronary heart disease. Replacing saturated fat with olive oil (rich in oleic acid) leads to a reduction in LDL cholesterol without decreasing the concentration of HDL cholesterol.<sup>82</sup>

Extra virgin olive oil is also rich in a number of phenolic compounds, which together have excellent oxidative stabilizing ability. Hydroxytyrosol, found in olive oil, is the newest phenolic compound to be gaining popularity as an antioxidant. Hydroxytyrosol can donate to free radicals repeatedly, thereby neutralizing their potential harmful effects. Another factor is that hydroxytyrosol is able to chelate metal ions, which are themselves pro-oxidant agents. Hydroxytyrosol has been shown to be a highly effective scavenger of free radicals. Both hydroxytyrosol and oleuropein protect not only against LDL oxidation but also are capable of sparing vitamin E from over oxidation.<sup>83</sup>

### **Effective Herbal Alternatives to Statin Drugs**

Twenty-five randomized clinical trials involving 11 herbal medicinal products were identified. Guggul (*Commiphora mukul*), red yeast rice, artichoke (*Cynara scolymus*) and fenugreek (*Trigonella foenum-graecum*), have been most extensively studied and have demonstrated reductions in total serum cholesterol levels of between 10% and 33%.<sup>84</sup> Lifestyle changes combined with ingestion of red yeast rice and fish oil reduced LDL-C in proportions similar to standard therapy with simvastatin. Pending confirmation in larger trials, this multifactorial, alternative approach to lipid lowering has promise for a subset of patients unwilling or unable to take statins.<sup>310</sup>

### **Guggul (*Commiphora mukul*)**

Guggul extract is derived from the mukul myrrh tree that grows in India. Guggul exerts effective lipid-lowering activity, lowering both cholesterol and triglyceride levels. Guggul lowers VLDL and LDL cholesterol while at the same time elevating HDL cholesterol, protecting against heart disease due to atherosclerosis. Guggul is traditionally used for arthritis and its anti-inflammatory activity has been confirmed. It also aids in weight loss because of this effect and may also be effective in cystic acne. Guggul extract decreases LDL and triglycerides by about 12%. Guggul works much better in combination with niacin, plant sterols, red yeast and other lipid lower-

ing agents. Guggul has also shown to decrease platelet adhesiveness, and increase fibrinolytic activity. It has shown not only an ability to prevent atherosclerosis, but also has helped regress pre-existing atherosclerotic plaque in animal studies.<sup>85,86</sup>

### Red Yeast Rice Extract

Red yeast rice is a fermented rice product that has been used in Chinese cuisine as a medicinal food to promote "blood circulation" for centuries. In Chinese medicine, red yeast rice is used to promote blood circulation, soothe upset stomach, and invigorate the function of the spleen, a body organ that destroys old blood cells and filters foreign substances. In addition, this dietary supplement has been used traditionally for bruised muscles, hangovers, indigestion, and colic in infants. Red yeast rice lowers lipids by acting as an HMG-CoA reductase inhibitor. The HMG-CoA reductase activity of the food comes from a family of naturally occurring substances called monacolins. Monacolin K is also known as mevinolin or lovastatin, which is a common statin drug used to lower cholesterol.

Red yeast contains at least nine monacolins as well as many other important substances that contribute to its lipid lowering effects, including sterols (beta-sitosterol, campesterol, stigmasterol, sapogenin), isoflavones, and mono-unsaturated fats. This herb is likely to be able to directly impact the process of atherosclerosis. New evidence shows that red yeast rice lowers cholesterol levels (2-3 grams per day dosage) compared to statin drugs, but with the added advantage of causing no adverse effects.<sup>87,88</sup> Red yeast extract reduced CVD-related death by 29% in high-risk hypertensive patients over 4.5 years in a study of 1500 elderly patients.<sup>343</sup>

Red yeast rice extract, similar to guggul, works better in combination with other natural agents such as artichoke extract, turmeric, ginger, chromium, and fenugreek.

### Artichoke (*Cynara scolymus*)

Traditional medicine has long used artichoke extracts as a hepatoprotectant, and several bioactives in artichoke extract have been identified, including chlorogenic acid, cynarin, caffeic acid, and luteolin. Consumption of encapsulated artichoke extract has been shown to result in absorption of these bioactives in humans, resulting in the production of beneficial metabolites such as ferulic acid. Ferulic acid, chlorogenic acid and cynarin provide strong antioxidant protection, which may account for

some of their health-promoting activities. Moreover, in cultured liver cells, artichoke extract not only provided antioxidant protection from a toxic chemically induced insult, but also showed diminished loss of cellular glutathione reserves.

Research has shown that ALEs are rich in various flavonoids. Globe artichokes have been used traditionally in Europe to improve digestive and urinary tract health. Artichoke leaf extracts (ALEs) are currently used in Germany and Switzerland as a remedy for indigestion, and are available in the UK as over-the-counter food supplements. Various studies have provided an evidence base for their use in conditions such as dyspepsia and irritable bowel syndrome.

### Fenugreek Seed (*Trigonella foenum graecum*)

Fenugreek is used in Traditional Chinese Medicine to warm the Kidney energy and disperse dampness and cold, and to alleviate pain. In India, fenugreek has traditionally been used for diabetes. Modern research has confirmed an anti-diabetic effect from its use. Fenugreek has a long history as a galactagogue, increasing lactation in nursing mothers, and has also been used to soothe the mucous membranes of the sinuses, lungs, and digestive tract. Externally, fenugreek is used as a soothing drawing agent.

Fenugreek seed has shown to reduce fasting and postprandials of glucose, glucagon, somatostatin, insulin, total cholesterol, and triglycerides, and increase HDL-cholesterol. Use of fenugreek seeds, or seed extracts, improves glycemic control and decreases insulin resistance in type-2 diabetics. There is also favorable effect on hypertriglyceridemia. Fenugreek contains a compound, protodioscin, that possesses anabolic, anti-cancer actions.

### Green Tea (*Camellia sinensis*)

In a Japanese study green tea consumption was significantly associated with lower levels of serum total cholesterol in both men and women while its associations with serum triglycerides and HDL cholesterol were not statistically significant. Based upon results of recent research, it is proposed that Green tea polyphenols have the inherent capacity to inhibit the development of atherosclerotic lesions.

The oxidative alterations of LDL were prevented by green tea catechins. Research demonstrates that green tea guards against cardiovascular disease by lowering total cholesterol levels, improving the cholesterol pro-

file (the ratio of LDL cholesterol to HDL cholesterol), reducing platelet aggregation, and lowering blood pressure.<sup>94-99</sup> One study showed lower C-reactive protein and decrease in the risk of CVD.<sup>353</sup>

## **Policosanol**

Policosanol is a naturally occurring component found in the wax of the common honeybee and in whole sugar cane. It has unique cholesterol lowering ability, with a different mechanism from the inhibition of HMG Coenzyme A reductase. Policosanol is composed of a combination of aliphatic long chain fatty alcohols including octacosanol, which has been shown to increase endurance and oxygen utilization during exercise. Policosanol derived from whole sugar cane contains substantially more octacosanol (about 60%) than that derived from honeybee wax, and it is the form of policosanol used in all the clinical trials, so I would recommend it over other forms. Policosanol has undergone many clinical trials, confirming its cholesterol lowering effects. It has shown equal benefits compared with statin drugs. It also has shown little to no side effects. Policosanol significantly lowers total cholesterol and LDL, appears to act through the liver, and, different from other cholesterol lowering agents, has shown libido enhancing effects.

Policosanol has beneficial effects on other parameters of cardiovascular function, such as reducing platelet aggregation and inhibiting the development of atherosclerotic lesions. Policosanol has shown in clinical trials to improve peripheral blood flow, adding to a list of other beneficial agents to be useful for intermittent claudication. Policosanol reduces the pro-inflammatory thromboxanes A2 and B2, significantly reduces platelet aggregation and increases prostacyclin levels. Furthermore, policosanol has been shown to reduce blood pressure.<sup>100,101</sup>

## **Grape Seed and Skin**

Grape seed flavonoids are responsible for giving many fruits, in particular berries, their dark purple and blue color. Their free radical scavenging effects are 20-50 times greater than vitamin C or E. They also reinforce the natural cross linking of collagen that forms the matrix of connective tissue, a very important function during any post-surgical healing, and they are anti-inflammatory in that they prevent the release and synthesis of compounds that promote inflammation such as histamines, serine proteases and prostaglandins.<sup>103, 104</sup>

A recent study confirmed that wine, and wine phenolics in particular, could have a more significant inhibitory effect on platelet aggregation and could explain, in part, the hypothesis that red wine is more protective against atherosclerosis and coronary heart disease.<sup>202</sup>

Drinking Concord grape juice significantly increased good cholesterol and significantly lowered two markers of inflammation in people with stable coronary artery disease. In addition to an increase in HDL (good cholesterol) levels, they saw a significant decrease in the production of superoxide, a free radical, and soluble CD40 ligand, an inflammatory marker that is provoking growing interest.<sup>203</sup>

Resveratrol phytoalexin, a naturally occurring plant cytokine, is found in grapes, wine, and other plant products. Its job in nature is to fight fungus during the rainy season, and it is especially prevalent in grapes used in making red wine. It has been shown to have anti-inflammatory, antioxidant, cell-repair, phytoestrogen and anti-tumor activities. The discovery of resveratrol has important implications for increasing the effectiveness of cancer therapy, with some clinical trials using resveratrol already showing encouraging results. Resveratrol also helps to control atherosclerosis, heart disease, arthritis, and autoimmune disorders. It is a potent cardioprotective agent, which may be due to a reduction of atrial natriuretic peptide and transforming growth factor-beta1, which are known to protect the heart from detrimental remodeling.<sup>337</sup>

Saponins present in grapes could be just as important as resveratrol, thought to be responsible for the so-called French Paradox—the association between red wine and decreased heart disease. While resveratrol is thought to block cholesterol oxidation (LDL oxidation) by its antioxidant action, saponins also present in the grape skin are believed to work by binding to and preventing the absorption of cholesterol. The biologically active components of seeds and skins of grapes have a significant synergistic effect with regard to inhibition of platelet aggregation, endothelial inflammation, and LDL oxidation. Red Grape juice concentrate improves lipids, lowers inflammatory biomarkers, and reduces CVD.<sup>297</sup>

## **Ginger (*Zingiber officinalis*)**

Ginger's effects on circulation would be classified as a gentle diffusive stimulant, along with having a mild relaxing effect. It is used extensively in Ayurveda to inhibit abnormal clotting, reduce cholesterol and fight arthritis. It significantly reduces serum and he-

patic cholesterol levels and possesses potent cardiogenic activity. Ginger extracts (5% gingerol) inhibited platelet cyclo-oxygenase production, thromboxane generation and platelet aggregation in a dose-dependent fashion; gingerol also inhibits thromboxane-mediated platelet aggregation. Ginger is a well-known synergistic herb that potentiates, harmonizes, and improves the deep circulation of other herbs.<sup>107-111</sup>

### Turmeric (*Curcuma longa*)

Curcumin, the natural pigment that gives the spice turmeric its yellow color, has come under the scientific spotlight in recent years, with studies investigating its potential benefits for reducing cholesterol levels, improving cardiovascular health, and fighting cancer. Norbert Nass and colleagues from the Martin Luther University in Germany report that curcumin was not toxic to the liver cells at levels above 10 micromoles and activation occurred even at low doses (2 to 10 micromoles). When the pigment was given to mice with enlarged hearts (hypertrophy), heart function was restored and scar formation reduced, report the researchers in the February 2008 edition of the *Journal of Clinical Investigation*. Lead researcher Peter Liu, scientific director at the Canadian Institutes of Health Research - Institute of Circulatory and Respiratory Health, said that curcumin might be a safe and effective means of preventing heart failure in the future, given that it is naturally occurring and readily available at a low cost. Liu cautioned that moderation is important, "the beneficial effects of curcumin are not strengthened by eating more of it."<sup>301</sup>

### Berberine

The plant compound Berberine, a compound isolated from several herbs including goldenseal, Oregon grape, and Chinese Coptis, can act as a cholesterol-lowering drug. Berberine works in a way that doesn't depend on how much cholesterol is in the cell. Like statins, the herb increases the number of cholesterol receptors on the cell surface, but it does this by stabilizing and improving the process by which the receptors are formed. The researchers screened 700 Chinese remedies in lab tests and found that berberine had the greatest effect in increasing cholesterol receptors. Further testing showed that receptor levels were increased further when the herb was used together with a statin.

The researchers then assessed cholesterol levels in 91 patients with high cholesterol who were treated with berberine or inactive "placebo" for 3 months. The

herb was well-tolerated, and lowered total cholesterol by 18% and LDL cholesterol by 20%. No effect on levels of HDL ("good") cholesterol was seen. The researchers then analyzed berberine's effect in a subset of patients who were not taking any other medications or herbs before or during the study. Among these individuals, berberine lowered total cholesterol by 29 percent and LDL cholesterol by 25 percent.<sup>191</sup>

### Herbal Adaptogens

The term adaptogens originated in Russia in late 1950 to early 1960s. It was a term given to describe the actions of certain well researched herbs with regards to their normalizing ability on all major systems of the body. Adaptogens combat the effects of stress, making stress less damaging, prevent disease (acute and chronic), including CVD, slow down the aging process, enhance health and well being, and increase adaptive energy. Adaptogens are therefore defined as any agent that increases the nonspecific resistance of an organism to stress and other environmental influences. Herbal adaptogens are nontoxic, and normalize bodily processes irrespective of the direction of the pathological changes (regulating blood glucose and blood pressure, blood lipids, etc.).

Adaptogenic formulation protects heart from damage during ischemia and reperfusion. A course administration of the complex plant adaptogenic drug tonizid, containing dry extracts of *Aralia mandshurica*, *Panax ginseng*, *Rhodiola rosea*, and *Eleutherococcus senticosus*, suggests that tonizid is an adaptogenic drug that attenuates contractile dysfunction and prevents irreversible cardiomyocytic damage during ischemia and reperfusion of the isolated heart. Tonizid exhibits cardioprotective and antifibrillatory properties during acute cardiac ischemia/reperfusion and postinfarction cardiac fibrosis.<sup>304</sup>

A short review of the adaptive effects of adaptogens with regard to high cholesterol and cardiovascular disease (cardioprotection):

- *Eleutherococcus senticosus*: Inhibits stress induced hypertension, reducing cardiovascular responses to stress in healthy subjects.<sup>112</sup>
- *Rhodiola rosea*: Cardioprotective; prevents stress-induced catecholamine activity in cardiac tissue and reduces adrenaline induced arrhythmias in animals; regulates blood pressure and heart rate.<sup>113, 114</sup>
- *Aralia mandshurica*: Prevents disorders of lipid metabolism, decreases total cholesterol and triglycerides.<sup>115</sup>

- *Panax ginseng*: Protects against the endothelial damage of thrombosis and atherosclerosis, stimulates release of nitric oxide.<sup>116-118</sup> Also, *Panax ginseng* lowers serum lipids.<sup>192-196</sup>
- *Panax quinquefolius*: antimycardial ischemic effects, improves oxygen uptake and utilization.<sup>119</sup>
- *Rhaponticum carthamoides*: Cardioprotective and cardio-anabolic (strengthens heart, useful in cardiomyopathy), decreases platelet aggregation and a pronounced anti-arrhythmic.<sup>120-123</sup>
- *Schisandra chinensis*: Cardioprotective.<sup>124</sup>
- *Ganoderma lucidum*: Hypolipidemic (cholesterol lowering – HMG co-enzyme A reductase), antiatherosclerotic, inhibits platelet aggregation, cardiovascular-tonic, hypotensive, ACE inhibition.<sup>124-126</sup>
- *Royal jelly (Apis mellifica)*: Significant reduction in total serum lipids and cholesterol levels.<sup>125</sup>
- *Ocimum sanctum*: cardiotonic, hypolipidemic and insulin-trophic.<sup>126-130</sup>
- *Glycyrrhiza glabra*: antiatherosclerotic, antihyperlipidemic.<sup>131</sup>

## Other Commonly Used Herbs with Lipid-modulating/Cardiovascular Effects:

### Yarrow

Yarrow (*Achillea wilhelmsii*) is a common, prolific and humble herb that possesses immense and diverse healing value, like so many common therapeutic herbs that are seen by many as lowly weeds, overlooked for their healing value and not given the attention they deserve.

Yarrow is rich in flavonoids and sesquiterpene lactone constituents, which have been found to be effective in lowering blood pressure and blood lipids. In a double-blind, placebo-controlled trial, blood pressure and serum lipids (total cholesterol, triglycerides, LDL-cholesterol), were significantly lower in the group treated with the yarrow extract.<sup>132</sup>

### Notoginseng

*Notoginseng*, also called *Tienchi ginseng*, is a relative of *Panax ginseng*. It is a superb blood tonic and blood cleanser when cooked. It is a powerful blood-vitalizing agent, and is believed by the Chinese to protect the heart and vascular system. It can be used externally to stop bleeding (as can yarrow). *Notoginseng* inhibits activation of platelets through multiple components and multiple

pathways, which is different from that of aspirin, which operates only through inhibition of arachidonic acid metabolism to suppress platelet aggregation. *Notoginseng* has effects of decreasing platelet superficial activation, inhibiting platelet adhesion and aggregation, preventing thrombosis and improving microcirculation, and its therapeutic effect on blood hyperviscosity syndrome is better than that of aspirin.<sup>133</sup>

## Specific Nutrients for Lipid Modulation

### Pantethine

Pantethine is the disulfide dimer of panethine, and is the active form of pantothenic acid. Pantethine converts into coenzyme (Co) A. Co A is involved in the transport of fatty acids to and from the cells, and to the mitochondria. Pantethine has significant lipid-lowering activity. Pantethine has been shown in several clinical trials to reduce serum triglycerides and cholesterol levels while increasing HDL cholesterol.<sup>165-166</sup> Pantethine also assists in modulating glucose and insulin<sup>167</sup> while improving gut flora and liver detoxification. There is also some evidence that pantethine protects against cataract formation, and has overall beneficial effects on the central nervous system and adrenal–stress system. Pantethine's liver protective effects have been demonstrated in a number of clinical trials. It has been shown to protect against carbon tetrachloride, halocarbon, acetaldehyde, ethanol, and other hepatotoxins.<sup>134</sup>

### Niacin

Niacin is one of the best-known vitamins for lowering blood cholesterol levels, and it protects against CVD. Until recently, niacin's general usage and widespread acceptance have been blunted by the need to take it 4 times a day and by the high incidence of flushing. A sustained-release formulation is easier to take and has fewer side effects. Based on several studies niacin decreases LDL by about 10%, triglycerides by about 25%. Also, it raises HDL by about 35%.<sup>135-138</sup>

Aerobic exercise is more effective than extended-release niacin in reducing postprandial triglyceride concentrations. Although niacin reduces fasting triglyceride concentrations, it appears to attenuate the postprandial triglyceride-lowering effect of exercise. Conversely, aerobic exercise may attenuate the rise in postprandial insulin concentrations after niacin administration, which suggests that the combination of exercise and niacin may be especially beneficial for people with insulin resistance. Further research will be needed for elucidation.<sup>309</sup>



### L-Arginine

L-arginine may also have anti-atherogenic activity independent of its role in the enzymatic formation of Nitric Oxide (NO). L-arginine may itself have antioxidant activity. L-arginine has been found to inhibit the oxidation of low-density lipoproteins (LDL) to oxidized LDL (oxLDL). The oxidation of LDL to oxLDL is believed to be a pivotal early step in atherogenesis. L-arginine may also scavenge superoxide anions and hydrogen peroxide (see above), as well as inhibit lipid peroxidation. L-arginine shows promise in the treatment and prevention of CVD (including atherosclerosis, hypertension, hyperlipidemia and angina pectoris), in the treatment of some forms of male infertility and some kidney disorders, and it is helpful in accelerating wound healing in some circumstances. It has demonstrated some positive immune-modulating and anticancer effects.<sup>139-141</sup>

### Creatine Magnesium Chelate

Creatine is a nonessential dietary component that, when supplemented in the diet, has shown physiological benefits in athletes, and recently in patients with various muscle, neurological and neuromuscular disease(s) including heart disease, dementia, chronic fatigue, cachexia and sarcopenia. Creatine has been called the ultimate ergogenic aid and its use as a supplement for muscle growth has become very popular in the field of sports nutrition over the years. In a study of older men (ranging from 43 to 70 years) suffering from chronic heart failure, researchers noted improvements in exercise performance and increased muscle creatine and phosphocreatine levels after ten days.

Creatine administered to 13 patients hospitalized with congestive heart failure showed after four days a reduction in heart size, reduced vascular resistance, and increased ejection fraction—all indicators of improved heart function. Creatine supplementation displays neuroprotective effects in several animal models of neurological disease, such as Huntington's disease, Parkinson's disease, or amyotrophic lateral sclerosis. Creatine supplementation has been found to reduce atherosclerosis and lower homocysteine levels as well. Elevated homocysteine is associated with an increase in CVD.

Creatine "MagnaPower" (MP), is a patented magnesium creatine chelate that provides the body with a readily available source of magnesium while also making the creatine more active by protecting it from cyclization. This patented mineral amino acid chelate contributes to

an overall positive impact on many functions including cardiovascular health.<sup>142-146</sup>

### Glutamine Magnesium Chelate

Glutamine may be suitable as a cardioprotective agent. Glutamine enhances myocardial tissue metabolism, glutathione content, and improves myocardial function. These effects may be mediated by maintenance of myocardial glutamate, ATP and phosphocreatine, and prevention of lactate accumulation.<sup>147-150</sup>

### Carnitine

Carnitine is essential in the transport of long chain fatty acids into the mitochondrial matrix and plays a key role in the oxidation of lipids. This means that carnitine improves fatty acid utilization and energy production. Several studies have demonstrated that carnitine improves angina and ischemic heart disease. Carnitine lowers triglyceride and cholesterol levels while increasing HDL levels. Carnitine also significantly lowers plasma lipoprotein(a) levels in individuals with hypercholesterolemia.<sup>151</sup>

### Chromium

Chromium is an essential micronutrient for humans. Chromium is a trace element involved in the regulation of carbohydrate and lipid metabolism. Chromium acts primarily by potentiating insulin activity and facilitating insulin sensitivity, as it functions as a cofactor in all insulin-related activities. Chromium promotes better insulin utilization, which leads to an overall decrease in serum triglycerides and total cholesterol, while increasing HDL levels and improving glucose tolerance.<sup>152</sup>

Chromium nicotinate glycinate chelate (Albion lab) is a fully reactive amino acid chelate that is far superior in bioavailability to other forms of chromium including chromium picolinate. Vanadium, another trace mineral, also possesses insulin-like anabolic-enhancing actions and works well in combination with chromium. Vanadium Chelavite (Albion Lab) demonstrates superior assimilation to other forms of vanadium.<sup>153</sup>

### Tocotrienols

Tocotrienols are a group of minor dietary constituents that are naturally occurring analogues of vitamin E. Tocotrienols are constituents of high fiber cereals and grains (barley, oats, rice, and wheat) and oils extracted from olive, pine and palm fruit. Tocotrienols appear to

possess equal to, or greater therapeutic effects than vitamin E. Tocotrienols inhibit cancer and reduce overall LDL cholesterol, and more importantly reduce LDL oxidation. Siberian Sea Buckthorn oil is a rich source of tocotrienols.<sup>154,155</sup>

### **Coenzyme Q10**

CoQ10 is a crucial component of the oxidative phosphorylation process within the mitochondria, where it converts the energy in carbohydrates and fatty acids into ATP to drive cellular function and synthesis. About 95% of cellular energy is produced from structures in the cells called mitochondria. CoQ10 can undergo oxidation/reduction reactions within the mitochondria, as well as in other cell membranes such as lysosomes. Within the mitochondria and lysosomes CoQ10 undergoes reduction/oxidation cycles during which it transfers protons across cell membranes. CoQ10 is involved in redox control of cell signaling and gene expression and can act as a direct antioxidant, or like lipoic acid, can regenerate tocopherol (vitamin E) and ascorbate (vitamin C).<sup>156</sup>

### **Vitamin D Deficiency Correlates with Increased Cardiovascular Incidences**

Vitamin D has been tagged as very important for such mechanisms as bone mineralization for a very long time, but more recently the idea emerged that it may in fact be related to cardiovascular incidences. The associated studies gathered are reviews and randomized, controlled trials. It was proven through a range of studies that there is a striking correlation between low serum 25-hydroxy vitamin D levels and different cardiovascular incidences.<sup>339</sup>

### **Serum Phosphorus and Coronary Artery Calcification (CAC)**

Higher levels of serum phosphorus and reduced kidney function independently predict CAC in young & older adults.<sup>354, 355</sup> Solution: Reduce animal protein, supplement with vitamin D, magnesium, B-6, and vitamin K, botanicals: celery seed, nettle seed, hydrangea, foods rich in antioxidant compounds.

### **Highest Ranking Antioxidant Food Sources**

- \* Fruits: Cranberries, blueberries, raspberries and blackberries
- \* Vegetables: Beans, artichokes and Russet potatoes

\* Nuts: Pecans, walnuts and hazelnuts

\* Spices & Culinary herbs: turmeric, ginger, rosemary, cloves, ground cinnamon, oregano

### **Coconut**

Coconut, which many people feel they need to avoid because of the fear (myth) that it causes serum cholesterol to increase, actually has shown to have beneficial effects with regard to cholesterol. When added to a breakfast cereal coconut flakes lowered cholesterol in subjects with moderately raised serum cholesterol. Coconut flour is a good source of both soluble and insoluble dietary fiber, and both types of fiber may have significant role in the reduction of lipid biomarkers.<sup>170</sup>

## **The Power Foods of the Mediterranean Diet**

The countries around the Mediterranean basin have different diets, religions and cultures. The diet of Crete represents the traditional diet of Greece prior to 1960. Analyses of the dietary pattern of the diet of Crete shows a number of protective substances, such as selenium, glutathione, a balanced ratio of n-6/n-3 essential fatty acids (EFA), high amounts of fiber, antioxidants (especially resveratrol from wine and polyphenols from olive oil), vitamins E and C, which have been shown to be associated with lower risk of cancer.<sup>158</sup>

The keys to maintaining a healthy heart are to 1<sup>st</sup> deal with stress by not letting stress take a toll on your health and by taking adaptogens on a regular basis, and 2<sup>nd</sup> to support your health with herbs, phyto-nutrients, and vitamins that can work to your benefit. For me to determine which herbs and nutrients should be most specific for you I apply what I refer to as my Trinitarian Model which reviews the bioenergetics of the person, the risk factor assessment based mostly on various blood tests, and the external environment assessment. A treatment plan will take all three of the areas into consideration.

There are numerous tension and stress relievers you can explore, and with a little practice they can become second nature. You can also start protecting your heart with these potent heart-friendly herbs and nutrients plus a balanced diet of nutritious food along with daily exercise. You now have the tools to help “mend” a heart before it “breaks.”

## **Final Thoughts: Prayer Improves the Heart**

Various researchers have found that religious/spiritual people are less likely to have heart disease and less likely to die from heart disease, and are more likely to have lower blood pressure, less depression, less anxiety, and less substance use and abuse than non-religious/spiritual people. Dr. Paul S. Mueller and his colleagues, from the Mayo Clinic, reviewed 1,200 studies of mental and physical health and found that, in most cases, the study participants' spirituality and religious involvement

seemed to be associated with better health outcomes. Discerning, acknowledging, and supporting the spiritual needs of patients can be done in a straightforward, ethical and non-controversial manner and may relieve suffering and facilitate recovery from illness.<sup>159</sup>

The references for this article are available on our website, [www.botanicalmedicine.org](http://www.botanicalmedicine.org). To access them, click the "references" link at the bottom of the home page. Thank you!

# The Eclectic Triphasic Medical System

## – Branch 3: *Biomarkers in Cancer Host and Tumor, Protocol Building Studies*

Donald Yance

### ETMS BRANCH 3

#### THE BIOLOGICAL TERRAIN

- ETMS Review and Protocol
- Branch 3 Focuses on “Cancer Energy” and Biomarkers
- Breast Cancer Case Studies

#### PART 1: ETMS REVIEW AND PROTOCOL

- Branch 1: Human Being
- Branch 2: External Environment
- Branch 3: Biological (Internal) Terrain

#### FUNDAMENTAL ETMS OBJECTIVES

- Strengthen Life Force
- Weaken cancer energy
- Lengthen Lifespan
- Increase quality of life

#### A SUCCESSFUL PROTOCOL ADDRESSES

- The underlying causes
- The symptomatology presented
- The energetic profile

#### HOW THE ETMS IS USED TO TREAT CANCER PATIENTS

- Casts a broader net over diagnostics
- Human Being (Branch 1)
- Environment (Branch 2)
- Biological terrain (Branch 3)

- Measures and tracks key markers and growth factors to determine cancer course and treatment results
- Applies botanical and nutritional treatments that suppress ‘cancer energy’ and increase Vital Energies
- Uses non-toxic (or low toxic), target-specific cancer suppressing agents

#### THE ENDO/EXOGENOUS COMPONENT

- Molecular profiling
- Target-specific medicine
- Alter terrain **least** hospitable to cancer
- Strengthen terrain **most** conducive to health

#### PERSONALIZED TREATMENTS

- In patients with same diagnosis: Remove non-responders and toxic responders
- Treat responders and patients not predisposed to toxicity

#### THE ETMS “WAY”

- Novel new approach and “Tool Box”
- State-of-the-art plant compounds well researched to inhibit cancer
- New pharmaceutical grade botanicals
- Traditional botanical medicine
- Capitalizes on beneficial effects of botanical medicine
- Targets cancer and accentuates innate healing abilities

- Selects drug therapies based on toxicity vs. benefit ratio
- Counters toxicity while increasing effectiveness of all tools used for healing
- Focuses on the causes and interprets the symptoms

#### THE THREE PILLARS

- Botanical Medicine
- Nutritional Medicine
- Selective Biological Medicine

#### BOTANICALS ARE MULTITASKERS

- For example, plant compounds that are synergistic with herceptin (diagram)

#### BOTANICALS WORK SYNERGISTICALLY WITH CANCER DRUGS

- Response vs. Function
- What plants can do that drugs cannot, and vice versa

Innovative approaches for predicting metastatic ability of tumors help the practitioner to become more aware of how aggressive the protocol needs to be, as well as what agents might be most useful—Donald Yance

#### PART 2: BRANCH 3 FOCUSES ON “CANCER ENERGY” AND BIOMARKERS

- Intracellular and extracellular cancer-related activity
- Energetic and physiological processes of cancer
- Processes manipulated by cancer
- Tumor-suppressor genes
- Mobilization of cancer-fighting cells for apoptosis
- Use of biomarkers
  - Indicate cancer and track malignant progression
  - Determine treatment: botanical, nutritional, chemotherapy
  - Track/Refine treatment response

#### BRANCH 3 IS ABOUT NEW RELATIONSHIPS

- Modern scientific understanding of molecular cancer biology + pharmacological influences of natural compounds
- “Cancer Energy” interacting with and affecting the individual (Branch 1) + their relationship to their environment (Branch 2)
- Interface of plants + cancer at a molecular level

#### QUESTIONING CHEMOTHERAPY

- Should chemotherapy be given?
- Which chemotherapy and what dosage?
- When and how long?
- What else should be given?
- To protect, improve recovery?
- To enhance effectiveness?
- To synergistically target related specific pathways?
- To inhibit resistance?

#### ANTINEOPLASTIC AGENTS

- Ideal antineoplastic drugs eradicate cancer cells without harming normal cells
- Chemo drugs have difficulty distinguishing malignant from normal cells
- Cancer cells divide and mutate rapidly and develop resistance
- Botanical therapeutics overcome resistance

#### BRANCH 3 WAS ENVISIONED TO FOSTER “THRIVING BEYOND SURVIVING”

- Diagnostics
- Initial protocol
- Monitor markers
- Refine protocol

#### FIVE BLOOD TEST CATEGORIES FOR ETMS

- Related to health of patient and/or organ toxicity
- Related to the specific cancer and/or angiogenesis (Tumor markers)

- Related to endogenous terrain that may contribute to cancer development, proliferation, growth and spread.
- Related to “Cancer Energy’s” ability to alter terrain to make it conducive to its survival, growth, metastatic and invasive abilities
- SNPs (Single Nucleotide Polymorphisms)

#### CATEGORY 1 BLOOD TESTS (PATIENT HEALTH & ORGAN TOXICITY)

- CBC
- Chem Profile
- Vitamin and Minerals
- Cytotoxic T-Lymphocytes
- Natural Killer cells
- Pro-inflammatory cytokines (TNF- $\alpha$  & IL)

#### CATEGORY 2 BLOOD TESTS (TUMOR MARKERS)

- General
  - CEA
  - CA 27-29
  - CA 15-3
  - Serum p53 antibodies
- ER/PR+Breast
  - Estradiol
  - Estrone Sulfate
  - Prolactin
  - SHBG
- Prostate
  - PSA
  - PAP
  - CTCs
  - Testosterone
  - DHT
- Metastatic to the bone
  - BAP (Bone-specific Alkaline Phosphatase)
  - Urinary N-Telopeptide
  - Urinary level of Alpha CTX (C-Telopeptide of collagen type)
- Lung
  - CEA
  - Serum EGF receptor
  - Serum p53 antibodies

#### CATEGORY 3 BLOOD TESTS (CANCER GROWTH)

- Hormone
- Hormone Metabolites (e.g., DHT in Prostrate C)
- Insulin
- Insulin binding proteins
- Adipose hormones (e.g., leptin)

#### CATEGORY 4 BLOOD TESTS (CANCER ADAPTATION & INVASION)

- Hypercoagulation
- Inflammation
- Glucose and Insulin
- Vitamin D
- Zinc, copper, & ceruloplasmin
- Ferritin
- Methylation: Homocysteine
- Endocrine-related factors

#### CATEGORY 5 BLOOD TESTS (SNPS)

- Variations (polymorphisms) in the genome
- Increased toxicity to a specific drug (chemotherapy – UDG and CPT-11)
- The metabolism of a drug (Tamoxifen and CYP2D6)
- Evidence for interactions between SNPs in various genes and the metabolic response to drug metabolism and diet
- BRCA breast cancer associated gene is affected by diet. It seems that a diet rich in fruits and vegetables protects a woman from the BRCA gene becoming activated.

*Nkondjoc A, Ghadirian P. Diet quality and BRCA-associated breast cancer risk. Breast Cancer Res Treat. 2006 Oct 25*

#### BLOOD TESTS RELATIVE TO CHEMOTHERAPY

- CBC/Kidney-Liver panel/insulin/HGB A1c/copper-zinc, etc.
- Markers of inflammation and hypercoagulation (Chemotherapy increases risk for VTE)
- Amplification of growth factors (Need to use targeted drug therapies before or with chemo)
- SNPs that relate to the metabolism and detoxification of the drug

#### PATHOLOGY TESTS RELATIVE TO CHEMOTHERAPY

- Mitotic index & proliferative markers - KI-67
- Mutations: Bcl-2, NF- $\kappa$ B, p53, Bcl-2, PTEN, KRAS, BRAF, GST etc.
- Growth Factor Receptors: EGFR, HER II neu, PDGF, IGF I or II, VEGF I-IV, ER, AR, etc.
- E-cadherin, uPA & PA-1
- SNPs that relate to drug metabolism and detoxification

#### CANCER CELL ADAPTATION TO CHEMOTHERAPY

- Resistance appears at various stages
- Beginning of treatment
- During initial treatment
- On re-treatment
- Regulation changes may occur rapidly
- Up regulation of resistant genes
- Down regulation in target genes

#### CHEMOTHERAPY BASED ON TARGETED DRUG SENSITIVITY AND RESISTANCE TESTING

- Evidence supports in-vitro drug testing to identify drugs that **will not** be effective
  - Fresh biopsy cancer cells are cultured then exposed to chemotherapy agents, antiangiogenic and targeted drugs
  - Agents can be selected for testing by the lab or requested by the doctor
  - Growth factor suppressing drugs and other biological agents can also be tested
- Drugs selection is enhanced
  - Eliminate inactive agents
  - Target with active agents

#### KI-67 EXPRESSION

- Excellent marker for determining the growth fraction of a given cell population
  - Strictly associated with cell proliferation
  - Present during all active phases of the cell cycle G(1), S, G(2), and mitosis
  - Absent from resting cells G(0)

- Absolute requirement for progression through the cell cycle
- Higher the percentage detected in the pathology the more proliferative the cancer.
- Higher levels associated with good response to taxanes (J Clin Oncol. 2009 Apr 20.)
- Radiation increases KI-67 expression causing surviving and newly formed cancer cells to become aggressive

#### LOSS OF P53 PATHWAY FUNCTION

- Loss of p53 pathway function can contribute not only to aggressive tumor behavior but also to therapeutic resistance

#### BCL-2 FAMILY PROTEINS AND DRUG RESISTANCE

- Bcl-2 promotes resistance to a wide range of anticancer agents and prevents p53-independent deaths.
- Down-regulation of anti-apoptotic Bcl-2 members sensitize cells to chemotherapy.
- Post-translational modifications protect cells from apoptosis induced by chemotherapeutic drugs.
- Anti-apoptotic Bcl-2 members are transcriptionally upregulated in response to survival signals.

#### PART 3: BREAST CANCER CASE STUDIES

- Small recurrent cancer
- High-grade invasive metastatic cancer

#### CASE STUDY 1: J.P.

- 70 year old woman
- Upon recurrence, sought alternative options
- ETMS management of small recurrent cancer
  - Branch 3 Assessment
  - Botanical therapeutics

#### PATIENT'S MEDICAL COMPLAINT

- Post lumpectomy for carcinoma 1999
- Lumpectomy followed by Tamoxifen therapy
- Recurrence in left breast 8/3/04

- US Dx 2cm mass left upper, outer quadrant
- J.P. refused additional surgery and sought alternative therapies

#### MEDICAL DIAGNOSIS

- Left breast mass with suspicious clinical impression and solid appearance
- Fine needle aspiration positive for malignant cells
- Cytomorphologically consistent with mammary carcinoma; low to intermediate grade
- Hypertension: 160/100, 168/106 on 5/5/04

#### CONVENTIONAL MEDICAL TREATMENT

- Diagnostic needle biopsy
- Left Breast Lumpectomy 1999
- Tamoxifen therapy
- Lopressor 12.5mg BID
- Aromasin 25mg every other day

#### CONVENTIONAL MEDICAL TREATMENT (AFTER ACCIDENT)

- Additional medications were taken for a short time post surgery due to a severe car accident
  - Duricef 500mg BID (possibly constipating)
  - Percoset 12 tabs as needed 1-4-06
  - Stool softener 100mg 3X/day
- Patient maintained stability with no disease progression irrespective of extreme trauma / injury

#### BRANCH 3 TRACKING OF BIOMARKERS

- CEA=1.1
- CRP= 0.1
- Absolute Monocytes=962H +
- Fibrinogen=356H
- Platelets=452H
- PT=29.4H
- INR=2.2H
- Eb.2/neu=neg
- p53=<1
- p27=100+ / H

- CA 27-29=20
- Fasting insulin=6.9 (<10 noted)

#### NATURAL THERAPEUTICS (2005)

- Artemis Plus 3 – Caps/Day with Iron
- Limonene Plus (CellUPRO) - 2 X 2 on Artemis off Wk
- Phosphatidyl Choline – 30 Drops BID on Artemis Wk
- Lumbrikinase – 1 Cap/Day
- Cholest – 2 Caps BID
- Taurine – 2000mg/Day
- B6 – 50 ml/day (carpal tunnel)
- BOTR – 3 caps 2x/day + smoothie
- Glycine ½ tsp. BID
- IC-1 – ¾ tsp BID
- FeSO4 – 325 mg 3x/day
- Vitamin C 500 g / day

#### NATURAL THERAPEUTICS (2006)

- CA Orotate - 2X2
- Nanogreens – 2 tsp
- Corydalis - 2-4 Caps as needed
- Hyaluronic Acid - 2X2
- Tryptophan 500mg 1X2
- Hypericum 300mg 2/Am & 1/Pm
- Glucotize 1 Cap/ Day
- Ferrachol 2/day with Artemis rotation
- Cell Guardian 3 caps/day
- MSM sulfur 850 mg 3 caps/day
- Activated Quercetin – 2/a.m. & 1/p.m.
- Conital (Inositol & magnesium glycinate) 1 tsp/day
- N-acetyl Tyrosine

#### CURRENT PATIENT STATUS

- Cancer markers remain stable with no evidence of cancer at this time
- No longer shows anemia
- Blood pressure is near 'normal'
- Lipids are greatly improved
- Good quality of life: improved sleep, mood and energy



#### CASE STUDY 1 TIMELINE

- 1999-2009
- Needle biopsy
- Lumpectomy
- Recurrence
- Chooses alternative treatments
- Botanical and nutritional therapeutics
- Biomarkers improved
- Cancer markers stable

#### CASE STUDY 2: PAULA

- 48-year-old woman
- Double mastectomy
- Upon cancer progression, sought alternative options
- ETMS collaborative treatment
  - Branch 3 Assessment
  - Botanical therapeutics
  - Targeted chemo

#### PATIENT'S CHIEF COMPLAINT

- Double mastectomy 2006
- Post surgery, no additional sites
- Elected not to do conventional treatment
- Mid-2006 found additional sites
- Offered CAT regime, radiation and hysterectomy
- Paula refused medical offerings and sought alternative therapies

#### MEDICAL DIAGNOSIS

- Late 2005 - Bilateral lobular infiltrating invasive carcinoma (2.5 cm right/4cm left)
- Mid 2006 - Swollen (left auxiliary) lymph nodes and a cancerous lesion on skin
- Biopsies confirmed cancer in chest wall and 5 of 14 nodes sampled from left side
- PET scan showed pleural nodules - patient declined dissection
- Late 2006 – High-grade invasive metastatic breast cancer, stage 4
- Early 2007 – Bone scan revealed metastases to the bones

#### BRANCH 3 TRACKING OF BIOMARKERS

- ER/PR +
- HER-2 negative
- Tubulin formation 3
- Mitotic rate 2
- p53 negative
- KI-67 19%
- Cathepsin D 3+
- Vitamin & mineral levels
- CBC
- T cells
- Cytotoxic T-lymphocytes
- NK cells
- Proinflammatory cytokines (TNF-a & IL)

#### NATURAL THERAPEUTICS

- Adaptogen tonic formula - 8 ml
- Vitamin D - 8K
- BT - 10 grams
- BEF - 5 ml
- CG - 4 Caps
- Chrysin - 4 Caps
- Melatonin - 3 mg.
- Mg. Glycinate - 2 Caps
- IC-I - 10 grams
- IC-II – 10 grams
- InflamAway - 12 caps
- Serrafazyme – 4 caps
- ALA – Lipoic 1200
- CV Res-Q – 6 caps
- Licorice 6:1 – 1 tsp.
- Zinc – 30 mg

#### NATURAL THERAPEUTICS (CONTINUED)

- Specific Herbs in Tonic:
  - Elecampane
  - Uno de gato
  - Vitex
  - Foxglove
  - Mayapple
  - Bryonia
  - Prickly ash
  - Poke
- Weekly Rotation
  - First week: IC-I – 7 grams, Phyto-Cyto 8 ml, Chaparral – 3000 mg

- Second week: Artemis Plus – 6 caps, TriQuench 6 drops, vitamin C + K-3

#### ETMS PROTOCOL EVOLUTION

- Based on conventional prognosis and ETMS experience with these types of cancers
- Aggressive nutritional and botanical protocol
- Cleansed lymphatic system
- Optimized estrogen metabolism
- Pulsed cytotoxic therapies added
- Disease stabilized and curtailed in initial sites

#### ETMS PROTOCOL EVOLUTION (CONTINUED)

- When bone scan showed metastasis to bones
  - Conducted tumor sensitivity testing
  - Resistance to Anythracyclines and Taxanes
  - Sensitive to Oxaliplatin and Avastin (high)
- Worked with Denver oncologist on targeted chemo
  - Half standard dose of Oxaliplatin
  - Standard dose of Avastin
- Continued aggressive botanical and nutritional regime
- After 3 of 6 rounds no cancer was apparent in scans

#### ETMS PROTOCOL EVOLUTION (CONTINUED)

- Worked with her oncologist to transition to an ongoing regime
- Avastin every 4 weeks
- A Lupon 1 shot every three months
- Aromacin 3 X per week
- Celebrex 200 mg daily
- Continues on this medical regime
- Continues on aggressive botanical and nutritional therapeutics

#### CURRENT PATIENT STATUS

- All tumor markers, including Circulating Tumor Cells (CTCs) are normal
- Patient enjoys a high quality of life
  - Works full time, feels well

- No signs or symptoms in over a year
  - Lupus
  - Migraines

#### CASE STUDY 2 TIMELINE

- 2006-2009
- Double mastectomy
- Recurrence
- Chooses alternative treatments
- Aggressive botanical and nutritional therapeutics
- Stable disease, breast cancer curtailment
- Bone metastasis
- Targeted chemo
- Ongoing chemo
- Clear scans

#### IDEAL COLLABORATIVE MEDICAL MODEL

- MD
- ETMS practitioner

#### THE COLLABORATIVE TEAM WORKS TOGETHER ON THE ‘RIGHT’ TREATMENT

- Weakening the “Cancer Energy”
  - Timing of surgery and other medical treatments
  - Testing for drug sensitivity and resistance for more aggressive cancers
  - Timing and type of chemo depending on patient’s chemo sensitivity
- Strengthening the patient’s constitution and immune system
  - Creating a synergistic environment that compliments medical treatment
  - Boosting the client’s vital energies
  - Neutralizing the impact of required medical treatments
  - Addressing side effects from medical treatment
  - Enhancing the patient’s quality of life and life span



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