

An Overview of Psychoneuroimmunology (PNI)

Psychosocial factors that weaken & strengthen the immune system

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Overview

1. What is psychoneuroimmunology?
2. What has it taught us?
3. Which psychosocial factors weaken or strengthen immunity? Who are more & less vulnerable?
4. Can we boost immune system to healthier levels by applying counteracting psychosocial resources?

1. What is PNI?

- Study of the interrelations between the endocrine, central nervous system and the immune system (Cohen & Herbert 1996)
- More specifically: Drawing on psychology & medicine, study of how emotional & mental states & social conditions (psychosocial factors) reciprocally link, through nervous & endocrine systems, to immune system & ultimately to immunological health & disease

2. What has PNI taught us?

1. Commonplace personal experiences of > immune-related illness following stress/emotional trauma, now explicable at biomolecular level. (neural-immune links: Felten et al., 1987; endocrine-immune links: Blalock, 1984)

2. What has PNI taught us?

Helps to explain clinical experiences like:

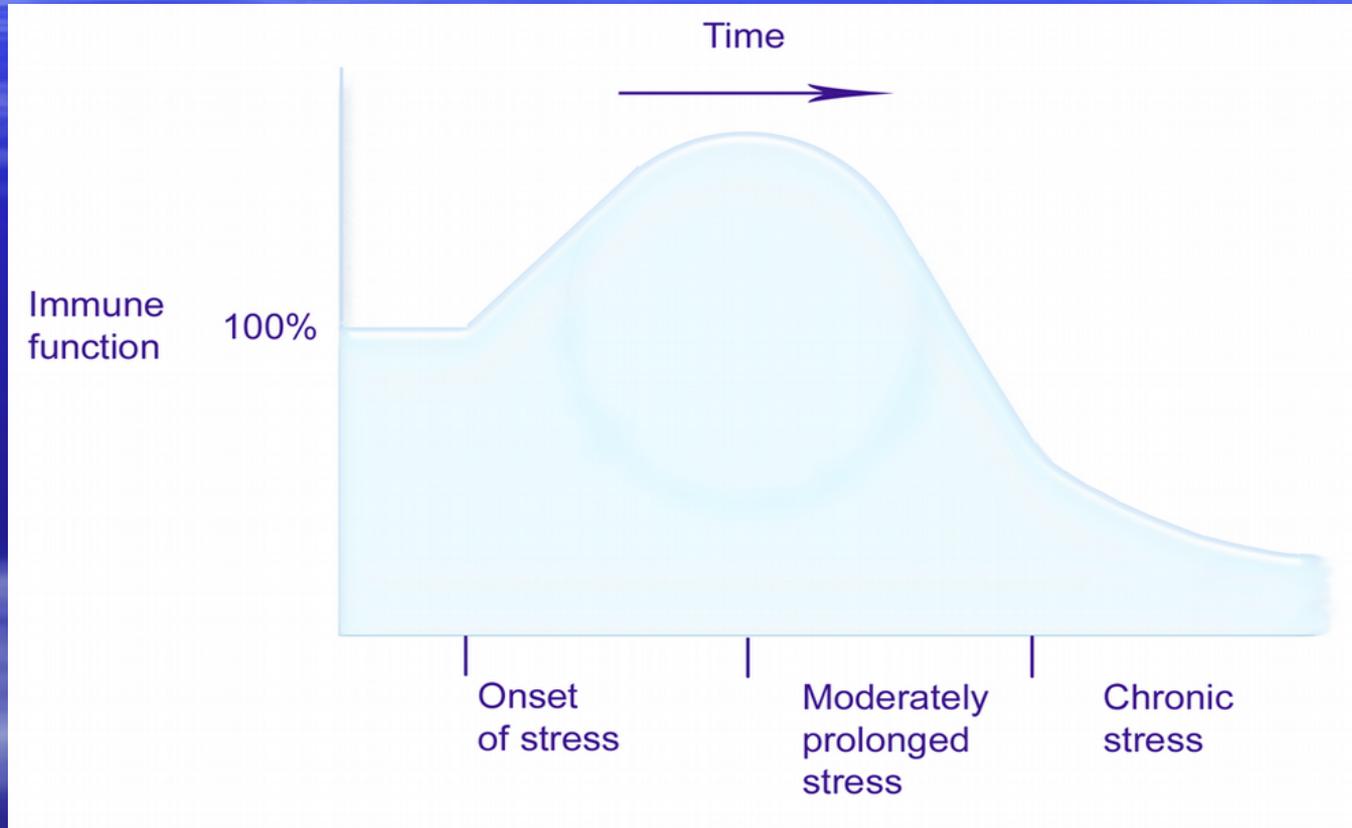
I see a lot of people with so-called problems relating to dysfunctional immune systems. Things like recurrent coldsores, recurrent infections, even hayfever, other allergies. These nearly always occur on a background of stress.

Dr. David Isaacs, Sydney suburban GP, 2000

2. What has PNI taught us?

2. Neuroendocrinological system research points to chronic stress as important contributor in range of immune-related conditions.
 - Both children & adults show increased vulnerability to infectious diseases: including colds, flus & herpes virus infection, chickenpox, mononucleosis, & Epstein-Barr virus (Cohen & Herbert, 1996; Kiecolt-Glaser and & Glaser, 1987)

2. What has PNI taught us?



Variable impact of stress on immune system
(Adapted from Robert Sapolsky in Merson, 2001)

2. What has PNI taught us?

3. Certainly no experimental evidence, as yet, that mind can cure immune system diseases (Reiman & Angell, 2002)
4. Evidence suggests psychosocial variables may alter susceptibility, progress & recurrence of these (Taylor, 1999) as well as how well pts cope/QOL

3. Psychosocial factors modulating immunity

Problems that can beset immune system

- Age
- Genetic disorders
- Infectious diseases
- Nutrition
- Chemotherapy
- Irradiation
- Allergies
- Stress = focus of PNI

3. Psychosocial factors modulating immunity

a. Weakening influences

- Changes in immune system found to accompany stressful or conflictual social relationships. These include:
 - Loss of an intimate relationship from death or divorce (Bartrop et al., 1977)

Worse effects if depressed before and after the loss (Irwin et al., 1987)

3. Psychosocial factors modulating immunity

- Loneliness. Lonely people have poorer health. Amongst exam students they had more extreme immuno-compromise (Kiecolt-Glaser et al., 1984)
- Poorer marital quality for married couples - associated with latent virus antibody response (Kennedy et al., 1988)
- Caring for a terminally-ill patient (Esterling et al., 1996)

3. Psychosocial factors modulating immunity

- Job stress (Dorian, et al., 1985) & unemployment (Arnetz et al., 1987). Both linked to lowered lymphocyte reactivity to mitogen
- Tendency to ruminate during stressful events such as exam periods (Workman & La Via, 1987)

3. Psychosocial factors modulating immunity

- Academic stress can lead to immunological changes and illness. Glaser et al. (1985) assessed 40 2nd year medical students 6 wks before and during final exams. Lymphocytes, NK cells and NK cytotoxic activity and interferon levels were lower

3. Psychosocial factors modulating immunity

- Starting kindergarten can raise cortisol levels and negatively alter immune measures (Boyce et al., 1995)
- Clinical depression is associated with several alterations in immunity e.g. fewer lymphocytes in response to mitogens (chemical challenges), lowered NK cell activity and changes in WBC numbers (Herbert & Cohen, 1993)

3. Psychosocial factors modulating immunity

- Changes in the immune system have also been found to accompany stressful or conflictual social relationships. These include:
 - Loss of an intimate relationship from death or divorce (Bartrop et al., 1977)

Worse effects if depressed before & after the loss (Irwin et al., 1987)

3. Psychosocial factors modulating immunity

- Perceived severe 'daily hassles' predict lower NK cell activity (Levy et al., 1989)
- Across studies it appears that more severe & long-term were stressors, more vulnerable individuals were to health-related problems

3. Psychosocial factors modulating immunity

b. Strengthening influences

- Positive social relationships appear to act as a buffer against stress induced immune changes. (Taylor, 1999)

3. Psychosocial factors modulating immunity

- Sense of control 'social connectedness' brings, should individual be faced with difficult life challenge, appears more influential on general health than any other single physiological, lifestyle or psychological factor e.g. serum cholesterol, blood pressure, alcohol intake, smoking, exercise, obesity, SES/income/good job & active positive coping methods (House et al 1988; Syme, 1998)

3. Psychosocial factors modulating immunity

- ‘Social connectedness’ measure:
 - “Can you count on anyone to provide you with emotional support? (i.e. talk over problems or help make difficult decisions)”

3. Psychosocial factors modulating immunity

- Other factors that appear to moderate relation between stress & immune functioning:
 - Optimism about one's situation & engaging in active coping buffers against academic stress. In studies of medical & law students (Segerstrom cited in Taylor, 1999) pessimistic, avoidance coping students evidenced less NK cell cytotoxicity & fewer T cells

3. Psychosocial factors modulating immunity

- Self-disclosure/ventilation (Kiecolt-Glaser et al., 1995). 50 med students writing 20/60 daily for 1/52. Half expressed strong feelings, others: meaningless topics. At 3/12 the expressive group had fewer doctor's visits & better immune function profile than controls

3. Psychosocial factors modulating immunity

- In response to stress of medical training students using self-hypnosis as coping skill show modest effects in NK cell numbers NK cell activity (Whitehouse et al., 1996)

- Other coping strategies that may relate to the stress-immune functioning relationship:
 - exercise activates beta-endorphins which may stimulate NK cell activity and so buffer against stress-related immune changes