Health Psychology, 6th edition
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Chapter Fourteen

Psychoneuroimmunology, AIDS, Cancer, and Arthritis

Chapter 14 Overview: Mei-ling's Semester

- Stress and problems in social support compromise Mei-ling's immunity
  - Toughest semester in college
  - Father loses job
  - Provides social support to parents
  - Must get a part-time job to pay for college
  - Boyfriend complains about not enough time with her
  - After exams: Flu for 10 days

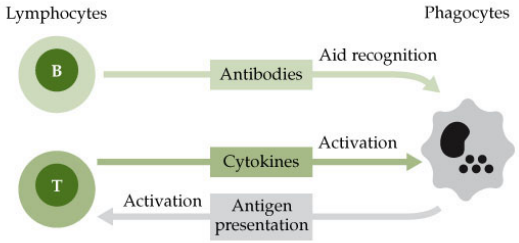
Psychoneuroimmunology: The Immune System

- The surveillance system of the body: Primary function
  - Distinguish between what is "self" and what is foreign
  - Attack and rid the body of foreign invaders
- Distinction between
  - Natural immunity
  - Specific immunity

Psychoneuroimmunology: The Immune System – Natural Immunity

- Granulocytes
  - Largest group of cells involved in natural immunity
  - Phagocytic cells that engulf target pathogens
  - Granulocytes include:
    - Neutrophils
    - Macrophages that release cytokines
- Natural killer cells
  - Involved in natural immunity
  - Recognize non-self material and lyse those cells

Figure 14.1: Interaction between Lymphocytes and Phagocytes



Psychoneuroimmunology: Specific Immunity - Humoral and Cell Mediated Immunity

B CELLS	T CELLS
Humoral-mediated immunity	Cell-mediated immunity
Protect against bacteria	T_C cells respond to specific antigens
Prevent viral re-infection	T_H cells enhance the functioning of other white blood cells

Psychoneuroimmunology: Assessing Immunocompetence

- Immunocompetence
  - The degree to which the immune system functions effectively
- Two general indicators
  1. Measuring numbers of different cells in the immune system by looking at blood samples
     - Example: Counting T, B, NK cells in the blood
  2. Assessing the functioning of immune cells
     - Activation, proliferation, transformation, and cytotoxicity of cells

Psychoneuroimmunology: Assessing Immunocompetence

- Immunocompromise
  - Indicators suggest that immune functioning
    - Has been disrupted
    - Has been reduced
- Wound-healing
  - Psychological distress impairs inflammatory responses that initiate wound repair

Psychoneuroimmunology: Assessing Immunocompetence

- Immunocompromise relates to health outcomes
  - Those under stress have lower levels of antibody titres after vaccination
  - Psychological stress interferes with
    - Healing of wounds
    - Recovery from surgery (which may be prolonged)

Psychoneuroimmunology: Stress and Immune Functioning

- Exposure of rats to stressors
  - Loud noise, electric shock, separation from mother
  - Results: Adverse effects on immune functioning
- Human research
  - Classic study (1919) of tuberculosis patients
    - When patients were excited, phagocytic activity decreased

Psychoneuroimmunology: Stress and Immunity in Humans

- Different stressors create different demands on body
  - Evolution: Sudden stress – changes in immune system take place quickly
    - To repair wounds
    - To prevent infections
    - Fight-or-flight reactions
  - Being called on in class (short-term stressor)
    - Produces the increases in natural killer cells and large granular lymphocytes
    - Decreases some measures of specific immunity

Psychoneuroimmunology: Examples of Stress Studies

- Space flight
  - Shuttle astronauts before launch, after landing
  - Space flight associated with
    - Increases in circulating white blood cells
    - Decreases in natural killer cells
  - At landing
    - Catecholamines increase
    - White blood cells increase

Psychoneuroimmunology: Examples of Stress Studies

- Hurricane Andrew
  - Changes in immune responses, primarily due to sleep problems
- Stress involving threats to self
  - Especially likely to change immune functioning
  - Writing about traumas in which participants blamed themselves
- Anticipatory stress compromises immune functions

Psychoneuroimmunology: Long Term Stress

- Three Mile Island nuclear accident
  - Lower levels of saliva IgA
  - Lower percentages of B cells, total T cells, and T_H cells
  - Lower levels of natural killer cells
  - High antibody titres to several viruses

Psychoneuroimmunology: Negative Affect

- Stress increases negative emotions
  - Depression
  - Anxiety
- Correlation
  - More depression, more compromise of cell-mediated immunity
  - Possible mediating factor: Sleep disturbances

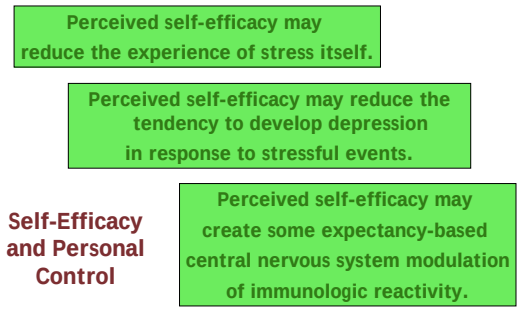
Psychoneuroimmunology: Stress and Interpersonal Relationships

- Adverse changes in immunity are associated with
  - Bereavement (especially those who have become depressed)
  - Loneliness
  - Martial disruption and conflict (including short-term conflicts)
  - Providing care for a friend or family member with a long-term illness

Psychoneuroimmunology: Coping Resources

- Optimism and active coping strategies are protective
  - Seger et al, 1998, study of law students
  - Optimistic students – less stress related distress
- Self-Efficacy/Personal Control are associated with less immunocompromise under stress

Psychoneuroimmunology: Coping Resources



Psychoneuroimmunology: Interventions to Enhance Immunocompetence

- Emotional disclosure
  - Enhances health and mood in people who have suffered a traumatic event
  - Results may be immunologically mediated
- Relaxation may mute effects of stress
  - Research with elderly shows higher NK cell activity after relaxation intervention
  - Cellular immunity enhanced

Psychoneuroimmunology: Stress and the Developing Immune System

- The developing immune system may be vulnerable to
  - Stress
  - Depression
  - Grief
- These experiences may permanently affect the immune system in ways that persist into adulthood

AIDS

- **AIDS**
  - Progressive impairment of the immune system by the human immunodeficiency virus (HIV)
  - A diagnosis of AIDS is based on the presence of one or more specific opportunistic infections
- **Human immunodeficiency virus (HIV)**
  - Virus that is implicated in development of AIDS

AIDS: A Brief History

- First appearance is unknown
  - Central Africa
  - Perhaps in the early 1970s
  - Spread rapidly through heterosexual population
    - High rate of extramarital sex
    - Low rate of condom use
    - High rate of gonorrhea
    - Medical clinics reused needles to promote vaccinations

AIDS: A Brief History

- End of 2003: Living with HIV/AIDS
  - 40 million people worldwide
    - 37 million adults
    - 2.5 million children younger than 15 years
  - 26.6 million live in Sub-Saharan Africa (66%)
- Projection for 2020
  - 65 million deaths from AIDS
  - Thus, today AIDS is still in early stages of the epidemic

Table 14.1 - How We Get AIDS: Cases by Mode of Transmission

	World	United States
Heterosexual	70–75%	31%
Homosexual	5–10	42
Homosexual and intravenous drug use		4
Intravenous drug use	5–10	22
Other	3–22	1

Source: National Center for HIV, STD & TB Prevention, 2004

AIDS: The United States

- First ***Diagnosed*** Case: 1981
- Viral agent is a retrovirus
  - Attacks immune system, especially the helper T cells and macrophages
  - Transmitted by exchange of cell-containing bodily fluids, such as semen and blood
  - Highly variable time between contracting virus and developing AIDS symptoms

AIDS: The United States

- How is AIDS transmitted?
  - Drug users
    - Needle sharing exchanges fluids
  - Homosexual men
    - Anal-receptive sex (exchange of semen)
  - Heterosexual population
    - Vaginal intercourse, with women more at risk than men

AIDS: The United States

- How HIV infection progresses
  - Mild early symptoms: Swollen glands, flu-like symptoms
  - 3 to 6 weeks: Infection abates, asymptomatic period
  - Amount of virus gradually rises: Immune system compromised
  - Opportunistic infections, such as Kaposi's sarcoma, occur
  - Common symptom for women: Gynecologic infection

AIDS: The United States

- Antiretroviral therapy
  - Dramatically improved health of those with HIV
  - Treatments are complex, adherence variable
- Who gets AIDS?
  - Early at-risk groups: Homosexual men, IV drug users
  - Low-income Blacks, Hispanics, other minorities are increasingly at risk
  - AIDS growing fastest among women

AIDS: Psychosocial Impact of HIV Infection

- Test positive for HIV, not yet AIDS
  - People live with a threatening event
  - Live with uncertainty and fear
- Initial response
  - Psychological distress
  - Sharply curtail HIV risk-related behaviors
  - Make positive changes in health
- Interventions that reduce depression are valuable

AIDS: Psychosocial Impact of HIV Infection

- Disclosure
  - Major barrier to controlling spread of HIV: Not disclosing HIV status
  - Those who don't disclose: Less likely to use condoms
  - Disclosure has benefits
    - Positive health consequences
    - More CD4 cells than non-disclosers

AIDS: Psychosocial Impact of HIV Infection

- Women and HIV
  - Lives are often chaotic and unstable
  - Getting food and shelter for families often more salient than HIV status
  - Depression more likely among those
    - With little social support
    - With avoidant coping strategies
    - With more severe HIV symptoms

AIDS: Interventions to Reduce the Spread of AIDS

- Education
  - Providing knowledge to target populations
- Health Beliefs and AIDS Risk-Related Behavior
  - One must perceive oneself as capable of controlling risk-related activity
- Targeting sexual activity
  - Behaviors become integrated into 'sexual styles'

AIDS: Interventions to Reduce the Spread of AIDS

- Cognitive-Behavioral Interventions
  - Decrease distress among HIV+ individuals
  - Buffer psychological/immunologic consequences
  - Improve surveillance of opportunistic infections
- Targeting IV Drug Use
- HIV Prevention Programs
  - School-based interventions about safe sex

AIDS: Coping with HIV+ Status and Aids

- AIDS is now a chronic disease
  - Employment
    - Men with HIV continue working
    - Unemployed may not return to work
  - Fear and prejudice
    - Many have an intense fear of AIDS
    - Many blame the victims for their disease: Especially gay and IV drug users

AIDS: Psychosocial Factors that Affect its Course

- HIV-infected gay men
  - Rapid course of disease for those with more stress
  - Slower course of disease with more social support
- Negative beliefs about self
  - Correlated with decline in helper T cells
- Writing interventions promoting optimistic thinking about the future
  - Led to greater reported adherence to medication
  - Less distress from side effects

Cancer: Overview

- A set of >100 diseases
- All cancers result from DNA dysfunction
  - Rapid cell growth and proliferation
  - Cancerous cells provide no benefits to body
  - Cancerous cells sap the body's resources
- 1900-1990 Cancer death rates climbed
- 1990-1996 Cancer death rates declined

Most of the decline occurred in lung, colorectal, breast, and prostate cancer.

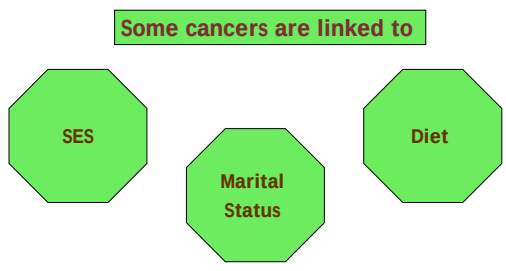
Cancer: Why is Cancer Hard to Study?

- Many cancers are species-specific
  - Some species are more vulnerable
    - Mice contract many cancers; Monkeys get few
- Develop in different ways in different species
  - Breast cancer: Quite different in dogs compared to humans
- Many cancers have long/irregular growth cycles
  - Tumors are measured in terms of doubling time
- High within-species variability

Cancer: Who Gets Cancer?

- Many cancers have a genetic basis
  - Subset of breast and colon cancers
- Some cancers are ethnically linked
  - U.S. Anglo men > bladder cancer rates
  - U.S. Anglo men > malignant melanoma rates
  - U.S. Hispanic women > cervical cancer
  - African American men > prostate cancer
  - Japanese Americans > stomach cancer
  - Chinese Americans > liver cancer

Cancer: Who Gets Cancer?



Psychosocial Factors and Cancer

- Initiation of cancer
  - Behavioral factors
    - Tobacco, occupational carcinogens
- Progression of cancer
  - Stress exposure
  - Ways of coping

What impact do stress and personality have on the initiation and progression?

Psychosocial Factors and Cancer

- Who gets cancer? Role of personality factors in developing cancer
  - No evidence that specific cancers can be tied to particular personality structures
  - Studies of cancer-prone personality traits have methodological flaws
  - Positive association between depression and cancer
  - Overall, evidence questions any general relationship between personality and developing cancer
- Link between uncontrollable stress and cancer

Psychosocial Factors and the Course of Cancer

- Course of cancer
  - Whether it progresses rapidly or slowly
- Rapid advance associated with
  - Avoidance, inability to confront the disease
  - Depression
  - Avoidant or passive coping
  - Negative expectations and pessimism about future
  - Stress

Cancer: Stress and Coping

- Psychological stress
  - Adversely affects ability of NK cells to destroy tumors
  - NK cells activity is important in survival rates for certain cancers, such as breast cancer
- Ways that patients cope with cancer stress
  - Associated with inflammatory processes that play a role in tumor progression

Adjusting to Cancer

- Coping with physical limitations
  - Pain and discomfort
  - Downregulation of immune system, vulnerability to other disorders
  - Fatigue
- Treatment-related problems
  - Cosmetic problems: Surgical removal of organs
  - Body image concerns
  - Use of prosthesis
  - Conditioned nausea and immune suppression

More than one-third of cancer victims live at least 5 years after their diagnosis

Cancer: Psychosocial Issues

- Intermittent and long-term depression
- Restriction of usual activities
- Issues involving social support
  - Married patients have better survival rates
    - How spouses provide support makes a difference
  - Young children may show fear/distress
  - Children may blame parents with hereditary cancer because it increases their own risks
- Marital and sexual relationships
  - Sexual functioning is particularly vulnerable
  - Different cancers create different problems

Cancer: Psychosocial Issues

- Psychological adjustment
  - Post traumatic stress disorder
    - Seen in some survivors of childhood leukemia
    - Rare in adult patients
- Self-presentation
  - Fear of revolting others
  - Example: Ostomy patient, concern about smell

Coping with Cancer

- The amount of psychological problems *(with the exception of depression)* experienced by cancer patients
  - Does not differ from people without cancer
  - Is significantly less than people suffering from psychiatric disorders
- Finding meaning in cancer
  - Having been made better by the experience
  - Growth in personal relationships

Cancer: Interventions

- Pharmacologic Interventions center on
  - Nausea and vomiting, anorexia and eating difficulties, emotional disorders, pain
- Cognitive-Behavioral interventions focus on
  - Stress, pain, appetite control, side effects
- Psychotherapeutic interventions involve
  - Meeting psychosocial and informational needs

Arthritis: Overview

- Autoimmunity: A condition in which the body produces an immune response against its own tissue constituents
  - Most prevalent autoimmune disorder: ARTHRITIS
  - Arthritis means “inflammation of a joint”
- Three major forms of arthritis
  - Rheumatoid, osteoarthritis, gout

Rheumatoid Arthritis

- Crippling form of arthritis believed to result from an autoimmune process
  - Usually attacking small joints of hands, feet, wrists, knees, ankles, and neck
- Primarily affects
  - 40-60 age group
  - Women
- Main complications
  - Pain, limitations in activities, need to be dependent on others

Stress may play a role

Rheumatoid Arthritis

- Treatment includes
  - Aspirin to relieve inflammation and pain
  - Rest
  - Supervised exercise
- Cognitive-behavioral interventions
  - Enhancement of perceived self-efficacy
  - Optimism
  - Relapse prevention strategies
- Juvenile RA appears between 2 and 5 years

Osteoarthritis

- Form of arthritis that results when the articular cartilage (smooth lining of a joint) begins to crack or wear away because of overuse of a particular joint
  - May also result from injury or other causes
  - Usually affects weight-bearing joints
  - Common among athletes and the elderly
- Treatment
  - Keeping weight down, exercise, aspirin

Arthritis: Gout

- A form of arthritis produced by a buildup of uric acid in the body
  - Uric acid build up produces crystals that become lodged in the joints
  - Most commonly affected area - big toe
    - Blood supply cannot carry away crystals
- Treatment
  - Avoid alcohol and certain foods; maintain proper weight, exercise, fluid intake; no aspirin since it slows uric acid removal
  - Untreated, gout can be deadly