

Psychoneuroimmunology: Mind, brain
and body linked to health.

Presented by
Gretchen Dahl Reeves, PhD, OTL, FAOTA
Eastern Michigan University
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Therapeutic Use of Self
&
Therapeutic Relationship

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Critical to therapy outcomes

- ...the conscious efforts therapists use to enhance interactions with clients and to encourage them to engage in occupations.

• Taylor, et al, 2009; Taylor 2008; 2014

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Characteristics of effective communicators

- Ability to establish rapport
- Open communication
- Empathy
- Respect
- Flexibility in adapting to client needs
- Collaboration

- Helping and caring → “connecting”

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Illness/injury/disability challenges

- Interruption of daily routines
- Changes in performance of functional tasks
- Economic demands and limitations
- Intrusion in relationships

- Can lead to anxiety, anger, sense of helplessness, pain, fatigue...
- Individual perceptions, responses, coping style to stressors can impact health.

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Psychoneuroimmunology

- Concerned with relationships among behavior, neural and endocrine processes and the immune system. (Ader, 2005)
- Bidirectional communication between brain, immune system and psychological state. (Caine, 2003)
- Threats to homeostasis, from external events or invading pathogens are handled by both the CNS and the body.

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Affective style

- Personality
- Temperament
- Coping
- Biological or genetic predispositions and life experiences carry underlying physiological differences in reactivity.

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Components of the Immune system

Stomach
Gastric acid and other secretions around the mucosal lining of the stomach and esophagus that destroy pathogens invading the gastrointestinal tract.

Peyer's patches
Gastric acid and other secretions around the mucosal lining of the stomach and esophagus that destroy pathogens invading the gastrointestinal tract.

Intestines (small, large)

Appendix
Serves as the incubator for beneficial bacteria in the intestine, which can be used to repopulate the gut.

Bone marrow
Manufactures B and T lymphocytes, B cells mature here.

Tonsils
Lymphoid tissue strategically placed to encounter pathogens as they enter the respiratory and gastrointestinal tracts.

Thymus
Manufactures site for T lymphocytes maturing from bone marrow.

Spleen
Serves as a blood filter designed to detect pathogens.

Lymph nodes
Small nodules composed of lymphocytes and dendritic cells, embedded in connective tissue and a fluid capsule. Lymph filters through these structures.

Lymphoid tissues

- Appendix
- Bone Marrow
- Lymph nodes
- Mucosal linings of stomach and intestines
- Spleen
- Thymus
- Tonsils

Skin

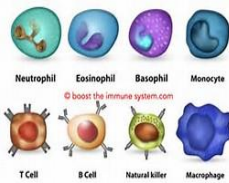
Saliva

Nasal Mucosa

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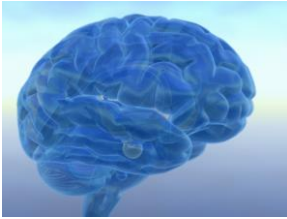
4 Major types of immune cells

- B-cells: Lymphocytes, Antibodies
- T-cells: Target specific antigens; cytokines
- Natural Killer (NK) Cells
- macrophages



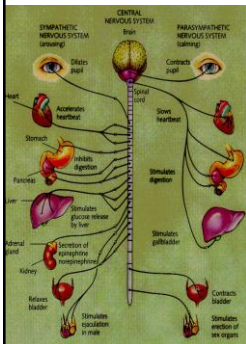
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What's the brain got to do with it?



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Autonomic Nervous System

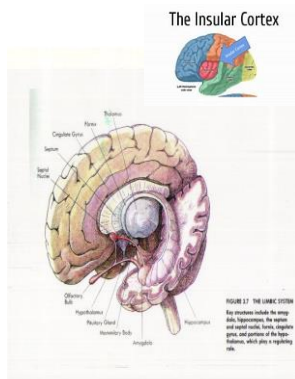


Organs of immune system are innervated by both branches of ANS.
 Immune system signals CNS through cytokines.
 Cytokines induce illness-related behaviors via the hypothalamus (reduced appetite, fever, lethargy, increased sleep...).

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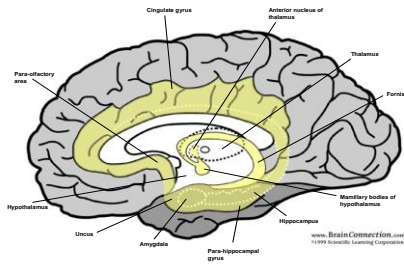
Limbic System

- Amygdala
- Hippocampus
- Thalamus
- Hypothalamus
- Septal Area
- Anterior Cingulate Cortex
- Orbitofrontal Cortex
- Insula



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Prefrontal Cortex



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Stress



Physiological response of the body to physical and psychological demands or stressors.

Majority of research in PNI

Avoidant behavior

Increased vigilance and arousal

Activation of sympathetic nervous system

• **cortisol** **Release of**

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Prolonged Chronic Stress

Stress reduces lymphocyte cytotoxicity and suppresses antibody response

- Enlarged, hyperactive adrenal cortex
- Reduced thymus, spleen, and lymph structures
- Deep bleeding ulcers

(Selye, 1956)

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Telomeres



- Noncoding DNA region at ends of chromosomes that protect from deterioration.
- Shorten each time a cell divides; when too short, cell dies.
- Replenished by an enzyme, telomerase.
- Life events and lifestyle can effect telomere length.
- Aging, chronic stress & cortisol reduce telomerase and telomere length.

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Brain Changes with Stress

- **Hippocampal volume reduced with prolonged stress in PTSD and post-abuse (Bremner, 1999).**
- **Dendrites wither, similar to effects of aging (McEwen, 2000; Sapolsky, 1996).**
- **Decreased levels of BDNF.**
- **Decreased benzodiazepine receptor binding in frontal cortex.**

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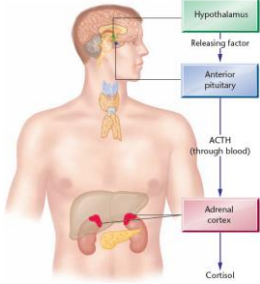
Epinephrine (adrenalin) & norepinephrine

- Epinephrine, released from adrenal medulla, acts as an endocrine messenger in the bloodstream and reinforces actions of the sympathetic ns.
- Epinephrine is a key stress hormone.
- Receptors for epinephrine are located on immune system cells
- Norepinephrine is an activator for alertness, vigilance and action.



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Hypothalamo-Pituitary-Adrenal (HPA) Axis

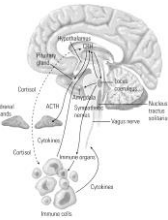


- HPA axis used to regulate immune responses.
- Cortisol is the second major stress hormone.

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Immune and Central Nervous System Communication

- Hormones regulated by brain and circulating in bloodstream
- Nerve fibers act on immune tissues
- Substance P (neuropeptide) produced in CNS & PNS moves lymphocytes to areas of inflammation and pain.
- Norepinephrine increases cell receptivity to T-cells
- Hypothalamic receptors for cytokines activate the vagus nerve.



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Risk factors

- Aging
- Poverty
- Childhood adversity
- Caring for a person in need.
- Mental illness
- Social isolation



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What's the mind got to do with it?

- Allergic reactions to non-allergen
- People who are happier have enhanced immune responses through an increase in helper T-cells and natural killer cells
- Med students at exam times show reduced lymphocytes and natural killer cells
- Divorced men more easily stressed; compromised immunity results in more illnesses
- Families with more rigidity and chaos have higher rates of flu

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Beneficial behaviors

- Attending religious services reduces inflammatory cytokines in aging adults
- Writing about traumatic events increases immune factors.
- Women with breast cancer treated in groups survive longer.
- Med students with more social supports have higher antibody responses
- Exercise increases lymphocytes and natural killer cells.
- Meditation, yoga, Tai-chi.

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Interventions: mind-body-brain

- Perceived Control
- Distraction/redirecting attention
- Self-soothing
- Social companionship and support networks
- Touch
- Engaging in meaningful occupational activities (?)



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Cautious optimism

- Stress is not the cause of all illnesses.
- Reducing stress or thinking happy thoughts not a cure.
- Understanding that the course of a health concern can be impacted in positive ways by our therapeutic relationships is fundamental to best practice.

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