

# Psychoneuroimmunology

# Overview of Communication/Control Systems

- Nervous System uses its “computers” (organs of CNS) and “switches” (ganglia) to send electrochemical messages via “wires” (neurons), to voluntary (skeletal muscle) and involuntary (cardiac muscle, smooth muscle, glands) effectors.

# Overview of Communication/Control Systems

- Endocrine System uses blood stream to carry its chemical effectors (hormones) to target organs.
- Hypothalamus is link between the nervous and endocrine systems
- And, there is more...

# Overview of Communication/Control Systems

- Peptides – protein molecules released by neurons, as well as by cells of the immune system, circulate in blood, lymph and cerebrospinal fluid, attaching to receptor sites on other cells and affecting their behavior. They may excite, inhibit, or merely render unusable, the cells they attach to. Some are taken into the nucleus of the cell, and affect its DNA expression.

# The PNI Communication Network

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- Candace Pert discovered endorphins in 1973
- Over the next 30 years she has been part of new research that reveals a body-wide network, including all major systems, continually communicating via “information substances” (primarily peptides), coordinating bodymind function, including consciousness, memory, digestion, and immunity.

# The PNI Communication Network

- 1986 PET (positron emission tomography) scans allowed mapping of receptors for peptides.

# The PNI Communication Network

- Nodes (concentrated areas of receptors) were found in the limbic area of the brain (deals with emotions) as well as the cerebral cortex (interprets sensory input), amygdala (rage center), hypothalamus (hunger, thirst, anger, sleep, sexual behavior).



# The PNI Communication Network

- Thus, memory, learning, and interpretation of reality are influenced by peptides. Receptors are also concentrated in the GI Tract, on endocrine glands, and white blood cells. Receptors are found on all cell membranes

# The PNI Communication Network

- Opiate Peptides (endorphin family)
  - chemically similar to morphine

produced by immune cells, GI tract, gonads, other places

can increase immune function, alpha waves (relaxation), feelings of happiness, are associated with states of expanded consciousness

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found in brains of fish, reptiles, birds, mammals, and insects

# Stress

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- Stress is our response to that event.

# Stress

- 1936, Hans Selye observed that a variety of “noxious agents” introduced into the body over time produced the same syndrome of gastric ulcers, shrinkage of the thymus gland, lymph nodes and spleen, and over-activity of the adrenal glands.



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- The crucial difference in eustress and distress seems to be control over the situation.
- When demand in the environment exceeds our control over it, eustress becomes distress.

# External Sources of Stress

- Lack of supportive relationships, change in family relations
- Divorce, death, change of living arrangement
- Unsatisfying communication, overcrowding

# Internal Sources of Stress

- Feeling of helplessness, hopelessness
- Low self-esteem, boredom, depression, fear of failure
- Unexpressed feelings (anger, resentment, hostility, grief)
- Not living up to expectations.

# The Stress Response

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- exhausting if prolonged

# The Stress Response

- First, hypothalamus triggers (via nerves) epinephrine release from the adrenals
- this increases heart rate, respiratory rate, metabolic rate, clotting ability, blood sugar, stomach acid



# The Stress Response

- Then, hypothalamus triggers (via nerves) norepinephrine release from the adrenals
- this increases blood pressure, blood flow to skeletal muscle

# The Stress Response

- The second (endocrine) phase involves release of cortisol from the adrenal cortex
- sustains high blood sugar and fat, suppresses inflammation and other immune function

# The Stress Response

- Long-term effects may include:
  - stomach ulcers, heart disease
  - diabetes, arteriosclerosis
  - sluggish immune function
  - osteoporosis

# Compounding

- A certain amount of stress is unavoidable because of the wiring of our nervous system
- Designed to:
  - create boundaries
  - stabilize (inevitable) change
  - hold onto (fleeting) pleasures and avoid pain

# Compounding

- We often tend to compound our stress by loading unnecessary suffering (berating ourselves, guilt, worry, etc.) on top of the initial stressor

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- 80% of all diseases are stress-related (Goldberg Group, 1993)

# Stress Related Disease

- Anger and hostility are highly correlated with high blood pressure and coronary artery disease



# Stress Related Disease

- Feelings of isolation are correlated with significantly higher risk of early death
- Hardy personality (sense of personal control over life events, viewing change as challenge, committed to people and activities in life) correlates with improved immune function and 60% lower risk of early death

# Managing Stress to Optimize Health and Happiness

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- We can learn to recognize signs of stress, and manage what is manageable (diet, exercise, relationships, sleep, etc.)
- We can learn to make different choices where our Thoughts and Feelings (TF) are concerned

# Managing Stress to Optimize Health and Happiness

Thoughts observe, analyze and consider. They often precede feelings. We may then have thoughts about our feelings (a cycle)

# Managing Stress to Optimize Health and Happiness

- We can learn to exercise choice over how we respond to our thoughts and feelings. This begins by observing how our mind works, and noticing our patterns.

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- Are we “choosing” to experience “unproductive” thoughts or “unpleasant” feelings?
- Are we taking things personally that may not be intended to insult us?
- Are we allowing ourselves to unnecessarily feel humiliated or offended by the actions or opinions of someone else?

# Managing Stress to Optimize Health and Happiness

- Are we projecting a negative outcome on something that has not happened yet?  
Looking to lay blame?

# Managing Stress to Optimize Health and Happiness

- We all have habitual patterns of thinking and feeling, learned long ago, which may not serve us or others, and can be replaced through repetition of more functional thoughts.
- The brain is more verb than noun, and can be changed! Activity at various synapses can be enhanced/amplified or left to diminish, depending on use

# Managing Stress to Optimize Health and Happiness

- Some cues that we are experiencing or creating stress:
  - Breath is short
  - Blood pressure is going up
  - Feeling irritable, angry, blaming, negative
  - Projecting anger out or in
  - Getting ready to complicate an interaction
  - Procrastinating

# Managing Stress to Optimize Health and Happiness

- Some strategies for making change:
- In the moment:
  - Tune into and deepen breathing
  - Ask for a break (to relax and think)
  - Relax what you can
  - Do not respond immediately
  - Try to step outside the interaction and “see” it differently

# Managing Stress to Optimize Health and Happiness

- Some strategies for making change:
- Longer term:
  - Get out of the rushing stream of events regularly
  - Breathe and relax
  - Meditate/pray (repetition of sound or movement pattern)
  - Receive bodywork

# Managing Stress to Optimize Health and Happiness

- Some strategies for making change:
- Longer term:
  - Get out in nature (water)
  - Try on different choices, try adopting new attitudes
  - Be committed to treating yourself as well as your dearest love
  - Be gentle with yourself, and persist

# Resources

- Healing Massage – A Simple Approach – Marsha and Jonathan Walker, *Thomson - Delmar Learning*
- Buddha's Brain – Rick Hanson, PhD, *New Harbinger Publications*
- Just One Thing – Rick Hanson, *New Harbinger Publications*