

Rewiring Chronic Stress and Nourishing the Nervous System

PART 1: The Basics of Stress

Basic Terms:

- Stress: A real or anticipated disruption of homeostasis or threat to well-being.
- Stressor: The stimulus that moves an organism out of homeostasis
- Stress response: What the body does in an attempt restore balance. Under significant or prolonged stress, the responses can become self-perpetuating and detrimental.

Stress and its Causes

- Stress is perceived from systemic or psychogenic stimuli. The brain judges a situation based on sensory input and past experience, and initiates a response.
- Types of stressors: Eustress vs. Distress
 - Positive stressors are motivating and can help us re-organize our physiology or psychology for the better.
 - *Ex- learning, positive life changes, intermittent fasting, cold or heat stress, moderate exercise*
 - Negative stressors involve a demand that depletes or exceeds our resources to cope
- What kinds of circumstances trigger stress responses?
 - Mental or emotional strain, psychosocial stress
 - Changes in CO₂/oxygen levels, changes in blood volume/pressure, glucose balance, extreme temperatures
 - Pain or injury
 - Inflammation, including from stealth infections, microbiome imbalances, gastrointestinal disorders or other chronic diseases
 - Toxic exposures, including pollution, chemicals, mold illness
 - Sleep deprivation
 - Poor nutrition, nutrient deficiencies
 - Lifestyle issues such as sedentary lifestyle, addictive behavior or substances
 - Hormonal changes
 - Genetic or epigenetic contributions
 - And other “functional” causes

The Limbic System: the Emotional Nervous System

- The limbic system is a complex of structures in the brain involved with both emotional and behavioral responses, especially those related to survival.
 - The limbic system collects neuro-sensory information and assigns significance to what we feel. It determines our level of safety, and helps us react accordingly. It is also involved with memory formation and learning.

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- The limbic system is comprised of several structures in the brain including:
 - The Amygdala, which plays a central role in appraising our environment for safety, assigns emotional value to sensed experiences, and influences the hippocampus to form memories.
 - The Hippocampus, which is essential for the consolidation of memory and learning
 - The Hypothalamus, which controls both the autonomic nervous system, and the endocrine system (producing hormones that regulate mood, hunger, thirst, reproduction.). It is also a key regulator of the immune system.
 - The Cingulate Gyrus, which coordinates smell and sights with memories, induces emotional reactions to pain, and helps regulate aggression
 - The Thalamus, which relays and enhances integration of sensory information (except olfactory)

The Stress Response

- Autonomic Nervous System:
 - engagement of sympatho-adrenal medullary system and catecholamine release
 - parasympathetic modulation tends to oppose the effects of the sympathetic pathways
- Hypothalamic Pituitary Adrenal (HPA) Axis:
 - stimulates cortisol release, which mobilizes stored energy and potentiates sympathetic activity.
- These pathways initiate acute physiological changes to increase heart rate, blood pressure and breathing rate, alter circulation to enhance blood flow to brain and muscles (and away from extremities, GI and reproductive system), promote analgesia, dilate pupils, increase muscle tone, and intensify facial expressions. Metabolism and immune function are also impacted.
- Behavioral responses: Fight-Flight (sympathetic), Freeze-Hide (parasympathetic) and Tend-Befriend (oxytocin and endorphins)

Impacts of Chronic Stress

- Chronic stress generally increases the excitability of the limbic system, the HPA and the sympatho-adrenomedullary systems. In some cases, these pathways will remain hyper-active and other cases will be down-regulated into an “exhaustion state.”
- While acute stress seems to enhance immune function, chronic stress tends to suppress immune activity, and be pro-inflammatory.
- Symptoms and diseases associations:
 - Changes in heart rate/rhythm or blood pressure (typically increased)
 - Chronic hyper or hypo ventilation and/or thoracic breathing
 - Impaired executive function, such as difficulties with decision-making, problem solving, planning and judgment.

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- Circadian rhythm imbalances (sleep-wake disturbances), including insomnia and chronic fatigue
- Increased sensitivity to environment (sense of smell, startle reflex, chemical and electromagnetic sensitivity)
- Mental-emotional disorders especially anxiety, depression, irritability, overwhelm, OCD, PTSD, etc.
- Chronic digestive disorders (altered digestive secretions, microbiome changes, gut permeability, food sensitivities, ulcers)
- Chronic pain syndromes, including fibromyalgia, headaches, pelvic pain
- Hormonal disturbances, reproductive problems, low libido, erectile function
- Immune issues, including allergies, asthma, increased susceptibility to infections or unresolved chronic infections, autoimmunity
- Inflammatory diseases, including cardiovascular disease, metabolic diseases such as diabetes and non-alcoholic fatty liver disease, neurological diseases such as Alzheimer's and Parkinson's

Identify and Treat the Causes (whenever possible)

- Investigate underlying causes of stress, which are typically multi-factorial.
- Challenge assumptions that the cause is purely psychosocial or mental-emotional. Take inventory of potential underlying causes and get a good workup.
- With chronic-complex issues that don't respond to appropriate therapies, strongly consider limbic injury or dysfunction.
 - *Generally characterized by hyper-vigilance and heightened reactivity to increasingly diminished stimuli.*
 - *Think about limbic dysfunction especially with significant food sensitivities, environmental illness, chronic fatigue, fibromyalgia or other pain syndromes, emotional dysregulation especially anxiety, and digestive issues or stealth infections that don't resolve with appropriate treatment. Causes of limbic dysfunction- toxic exposures, mold, chronic infections, significant trauma or adverse childhood experiences*
- Remove obstacles to cure:
 - Stress almost always needs to be addressed, regardless of whether it is a cause or a consequence of illness.
 - Be mindful of the messages we send to our bodies: Challenge the assumption that we need to thoroughly explore and understand symptoms in order to heal them.
 - Addressing chronic stress patterns and creating new pathways in the brain can change the body and heal "physical" ailments.

PART 2:

Rewiring Chronic Stress Responses and Nourishing the Nervous System

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Dampen Limbic Responses: Interrupt the Circuit

- Identify the voices of the limbic system. Redirect unhelpful messages.
 - Ex: analyzing or over-thinking, negative self-talk, worrying or trying to predict the future, feeling stuck in overwhelm or despair, apathy, irritability, rushing unnecessarily, blaming, complaining, feeling a sense of over-responsibility, needing to be in control, intolerance of discomfort.
- Identify behaviors that stimulate the limbic system, and limit non-essential exposures.
 - Ex: over-use of technology, compulsive information gathering, habitual busy-ness, using substances or unhealthy foods to manage emotions, etc.
- Dialogue with your limbic system.
 - Compassionately remind it when it is exceeding its job description.

Accentuate the Positive: Neuroplasticity Practices

- Practice cultivating joy, gratitude, peace, safety, resilience.
- Absorb and enhance positive experiences
- Rehearse your happiness.
 - Spend time focusing on what feels good and create a felt sense of it in the body
- Create new associations to reframe/neutralize stressors.

Breath: Changing how you breathe can change your experience

- Acid-base balance and Oxygen delivery
 - Bohr Effect: CO₂ levels impacts blood pH which alters O₂ delivery
 - Overbreathing reduces CO₂ (and makes blood more alkaline), which impairs O₂ release.
 - Contributes to lactic acid buildup leading to tired/achey muscles and causes smooth muscles to constrict (in blood vessels, GI, respiratory tract).
 - The brain becomes accustomed to lower CO₂ and stimulates increased breathing at a lower set point, perpetuating the cycle.
- Heart rate variability
 - Heart rate naturally increases on inhale and decreases on exhale, creating heart rate variability (HRV). Promoting greater HRV will enhance parasympathetic tone.
- How to Breathe:
 - **The Important Basics: Slow, Nasal, Diaphragmatic**
- Additional Techniques:
 - **Square breathing:** *Creating equality between the inhale and exhale, supporting balance in the autonomic nervous system*
 - How to do it: Inhale to the count of four, hold for the count of four, exhale for the count of four, hold for the count of four. Typically I recommend inhaling and exhaling through the nose (although some might prefer exhaling through the mouth.)

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- **4-7-8 breathing:** *Helping to shift acute anxiety states*
 - How to do it: Inhale through the nose for the count of four seconds and then gently hold your breath for a count of seven. Then exhale for the count of eight seconds. Some prefer to exhale through the mouth, making a slight whooshing sound. I prefer a slower exhale through the nose. Do what works best for you! Repeat the cycle 3-4 times.
- **Alternate Nostril Breathing:** *Called Nadi Shodhana, this is an ancient yogic breathing exercise that nourishes the nervous system, calms the mind, and increases focus. It can help reset the nervous system when stress levels are rising or*
 - How to do it:
 - In a comfortable upright seated position, rest your left hand in your lap. Place your right hand on the lower forehead, between the eyebrows.
 - Use your right thumb to close the right nostril. Inhale slowly through the left nostril. At the top of the inhale, use your right ring finger to close off the left nostril, pausing briefly.
 - Then release your thumb and keeping the ring finger over the left nostril, exhale through the right nostril.
 - Pause and then inhale through the right nostril.
 - Close off both nostrils briefly and then releasing your ring finger, exhale through the left nostril.
 - Pause and then inhale through the left nostril.
 - Try to keep an even length between inhales and exhalations.
 - One cycle of inhaling left, exhaling right, inhaling right and exhaling left might take about 30-40 seconds.
 - Repeat this cycle of inhalation and exhalation 5-10 times.

Lifestyle Essentials

- Sleep hygiene
 - Create your curfew for activities/substances/environments that interfere with sleep
- Hydration
 - Depending on your surface to volume ratio, activity levels, habits that dehydrate (caffeine, mouth breathing, etc)
- Nutrition
 - Set the stage for digestive health (relaxed state, chewing, food that tastes good, connection)
 - Focus on foods that are easy to digest, anti-inflammatory and that promote balanced blood sugar.

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Body therapeutics: The body remembers

- Nourish, Soothe, Flow
- Go toward what feels good
 - Nature time
 - Movement and exercise
 - Bodywork, massage, etc
 - Oilation (sesame, head and feet)
 - Hydrotherapy (foot baths, “short wrap”)
 - Kidney wraps

Herbal Allies

- Herbal actions to consider:
 - Nervines, Adaptogens, Noo-tropics, Anti-inflammatories, etc.
- What do you need? Calming, nourishing, circulating, energizing, warming, cooling, moistening, etc.

Nervines:

- Skullcap, *Scutellaria laterifolia*
- Wild Oat, *Avena sativa*
- Passionflower, *Passiflora incarnata*
- Kava kava, *Piper methysticum*
- Jujube seed, *Zizyphus jujuba v. spinosa*
- Blue vervain, *Verbena hastate*
- Lavender, *Lavandula angustifolia*
- Honorable mentions:
 - Linden tree (*Tilia x vulgaris*), Lemon balm (*Melissa officinalis*), Silk tree/Mimosa (*Albizia julibrissen*), Hawthorne (*Cratageus spp.*), Damiana (*Turnera diffusa*), Valerian (*Valeriana officinalis*), St. John’s Wort (*Hypericum perforatum*)

Adaptogens:

- Reishi, *Ganoderma lucidum*
- Tulsi, *Ocimum sanctum*
- Ashwagandha, *Withania somnifera*
- Eleuthero, *Eleutherococcus senticosus*
- Schisandra, *Schisandra chinensis*
- Licorice, *Glycyrrhiza glabra*

Nootropics

- Gotu kola, *Centella asiatica*
- Bacopa, *Bacopa monnieri*
- Lion’s Mane, *Heridium erinaceus*
- Rosemary, *Rosmarinus officinalis*

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Supplements:

- Essential fatty Acids
- Key nutrients: especially magnesium and B vitamins
- Targeted therapies:
 - Digestive support
 - Addressing inflammation
 - Modulating neurotransmitters

Summary:

- Take inventory.
- A holistic approach will help create new circuits throughout the body and mind.
- Come back to the idea of eustress. Building resilience allows us to more effectively engage with solutions.

Important Disclaimers: This handout and related class content are educational and do not constitute or replace medical advice. The information contained here has not been evaluated by the FDA. Consult your healthcare provider for any interventions that might be appropriate for your personal needs and circumstances, especially if you have any medical conditions, are taking medications, or are pregnant or nursing, or if you are acutely ill. The use of the terms you, I, or we does not imply that this represents any form of advice.

Resources:

- Hopper, Annie. Wired for Healing and her program Dynamic Neural Retraining System <https://retrainingthebrain.com/>
- Hanson, Rick. Hardwiring Happiness
- Winston, David. Adaptogens, Herbs for Strength, Stamina, and Stress Relief
- Nestor, James. Breath

Relevant blogs and handouts:

- <https://drbridgetsomine.com/2020/04/04/rewiringstress/>
- <https://drbridgetsomine.com/2020/04/06/gut-and-emotions/>
- <https://drbridgetsomine.com/2019/11/01/short-wrap-2/>

Favorite Farmacopia Herbal formulas:

Disclosure: I have no financial interest in products purchased at Farmacopia.

- Feeling Easy
- In the Moment
- Nerve Nourisher
- Super Powder Adaptogen Power

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<https://www.ncbi.nlm.nih.gov/books/NBK278995/>
- Inflammation: The Common Pathway of Stress-Related Diseases
PMID: [28676747](https://pubmed.ncbi.nlm.nih.gov/28676747/) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5476783/>
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