Trauma Informed Social Work

Module 1: Class 4
Trauma & the Stress Response System

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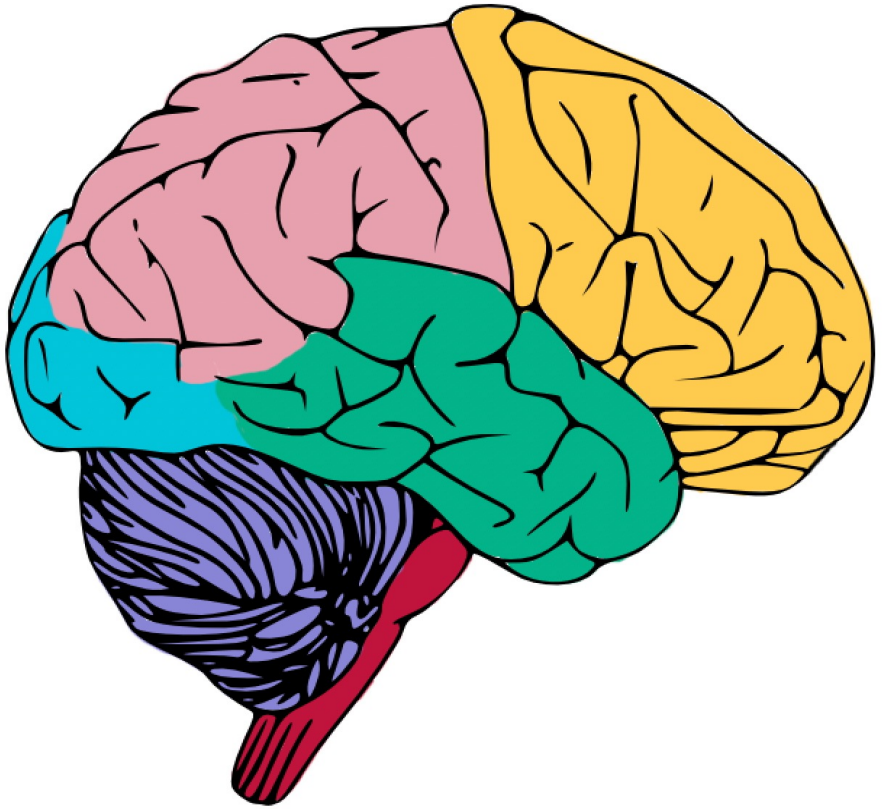
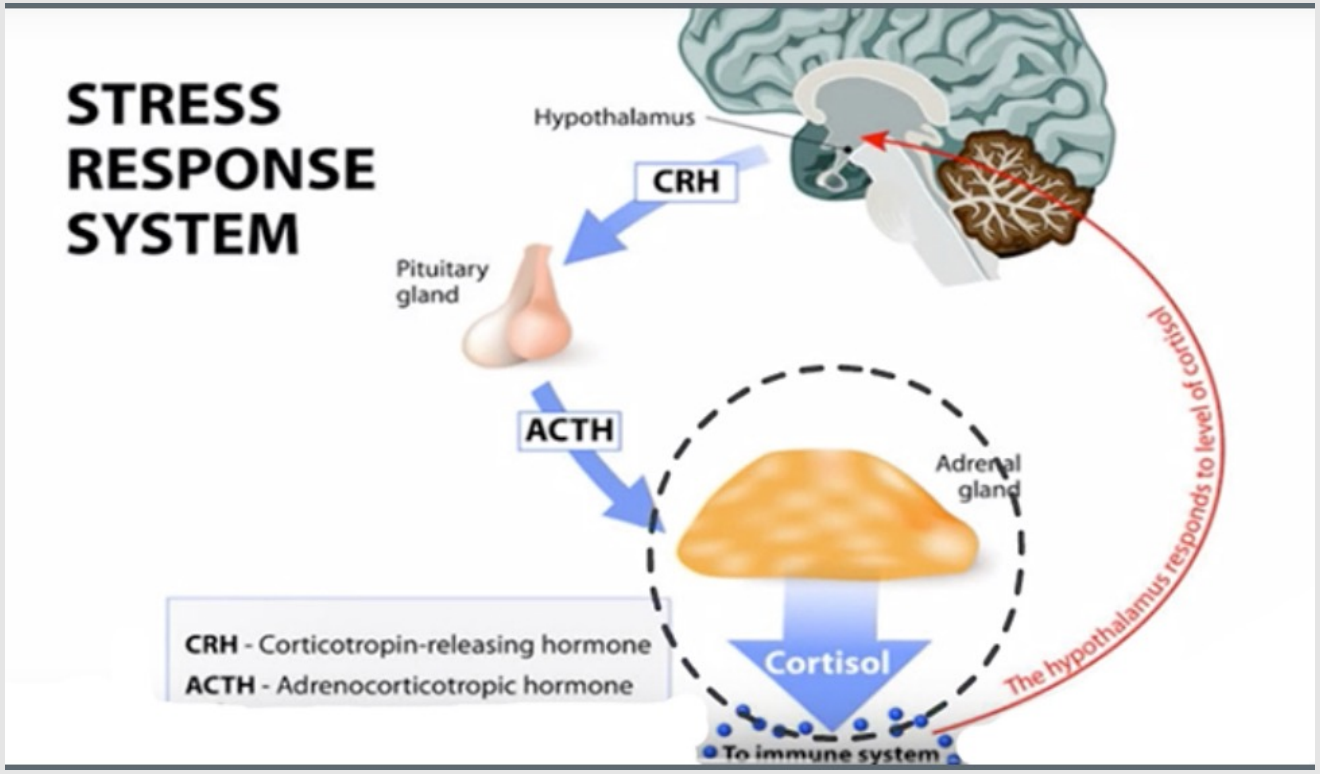


Agenda

- The HPA Axis
- Impact of chronic activation of the stress response system
- Allostatic load and epigenetics
- Neurodevelopmental mediation of early adversity

The Stress Response System: The Hypothalamic-Pituitary-Adrenal (HPA) Axis

The Stress Response System



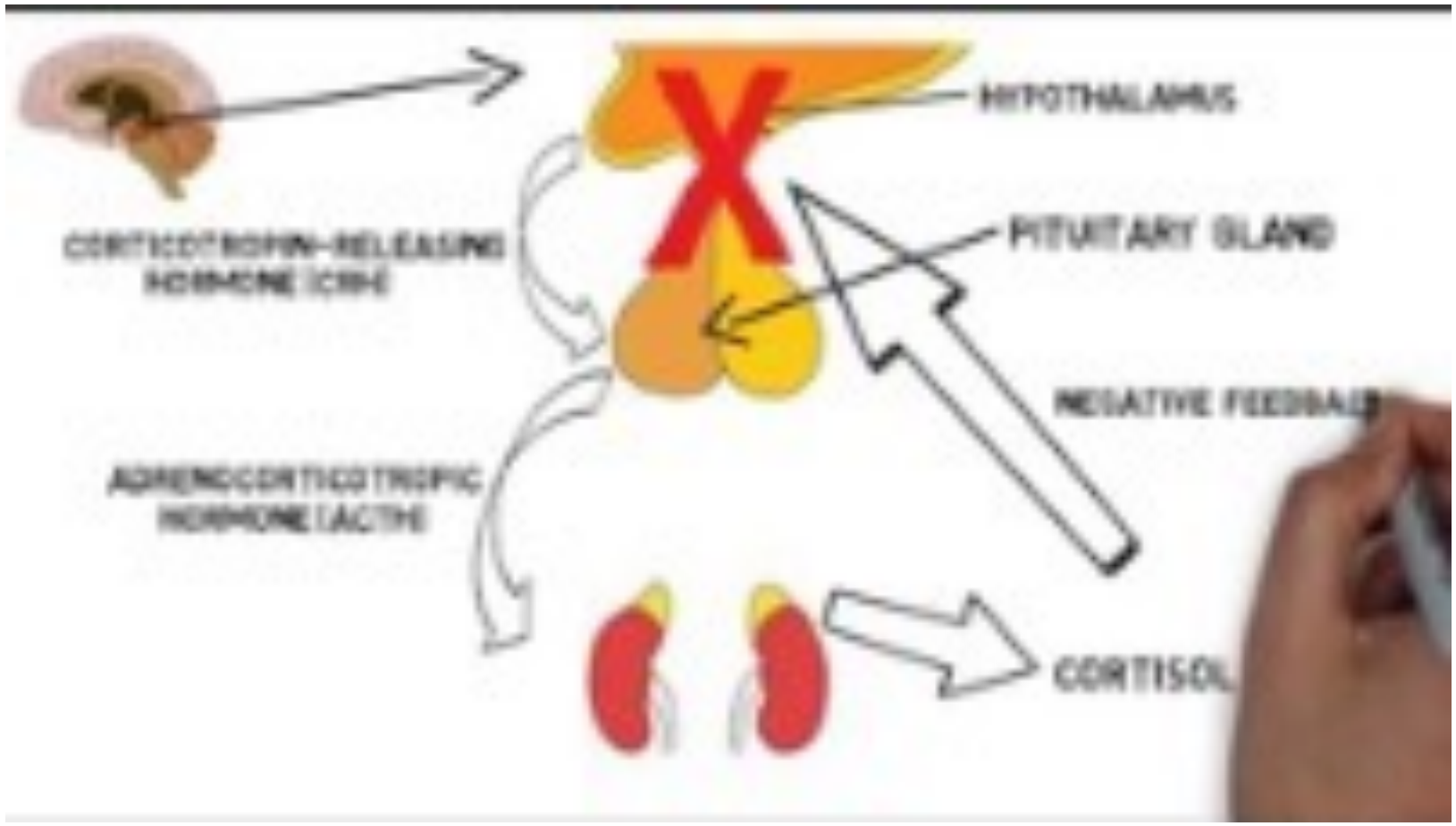
Stress response is our friend. The problem is not activation – it is when they are persistently elevated over chronic conditions!

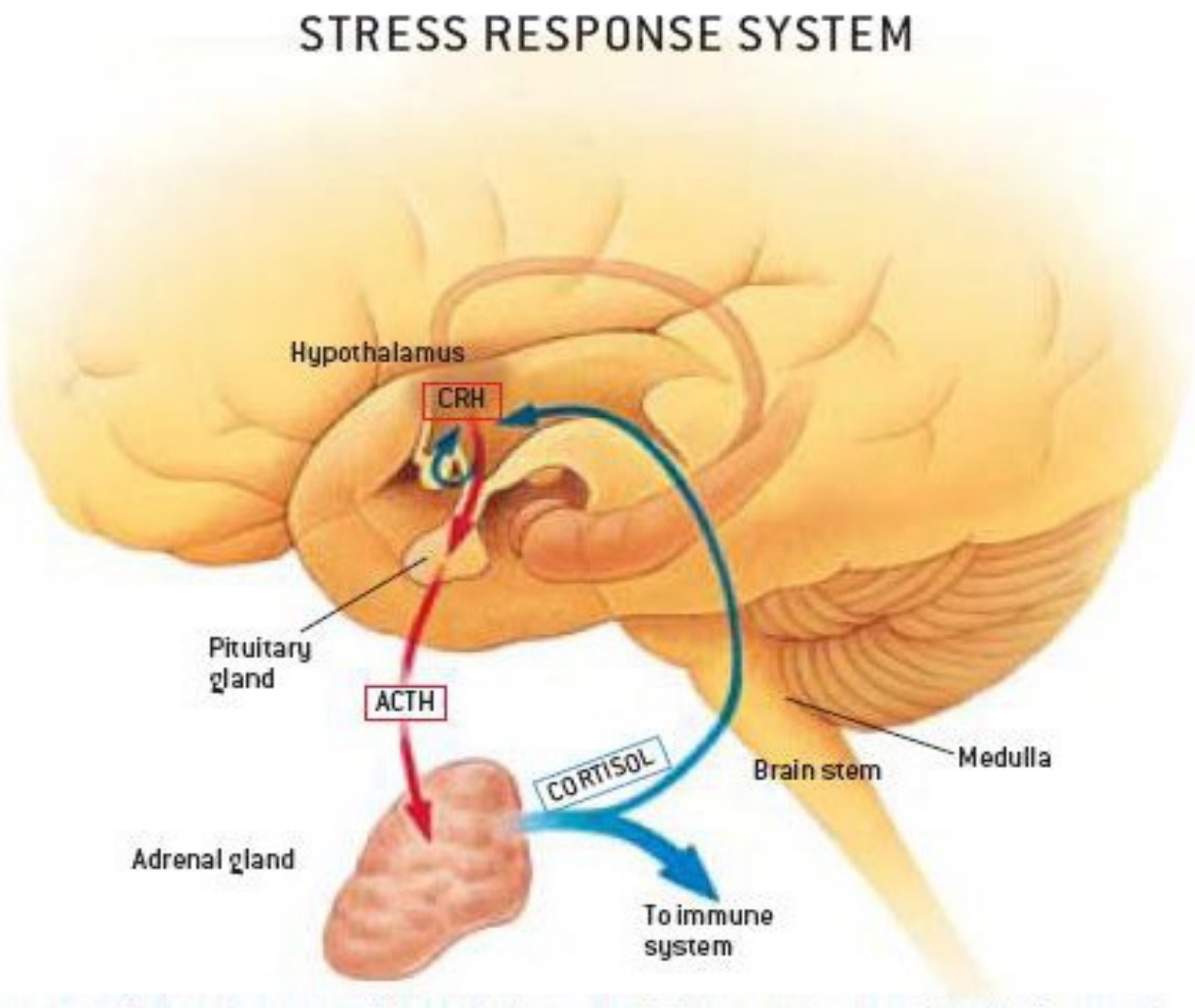
Stress response system develops early in life. Prenatal & early childhood experiences play a major role in determining sensitivity and organization of the stress-response systems!

Healthy Stress Response

Quick rise in cortisol levels, followed by a rapid decline with the termination of the stressful event

What is the HPA Axis?





The hypothalamic-pituitary adrenal (HPA) axis is a feedback loop that involves the hypothalamus, the pituitary, and adrenal glands.

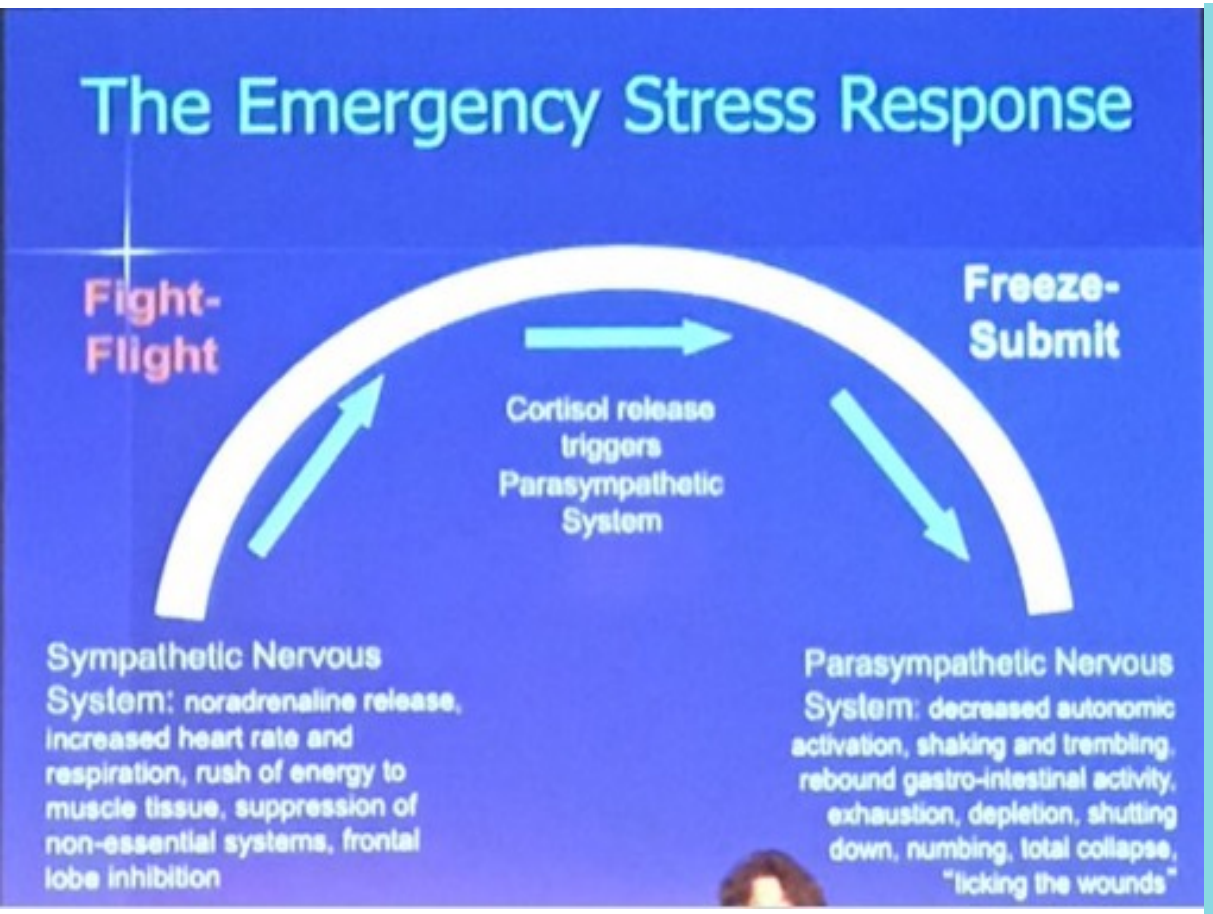
Stressful experiences alerts the brain and results in the activation of the HPA axis.

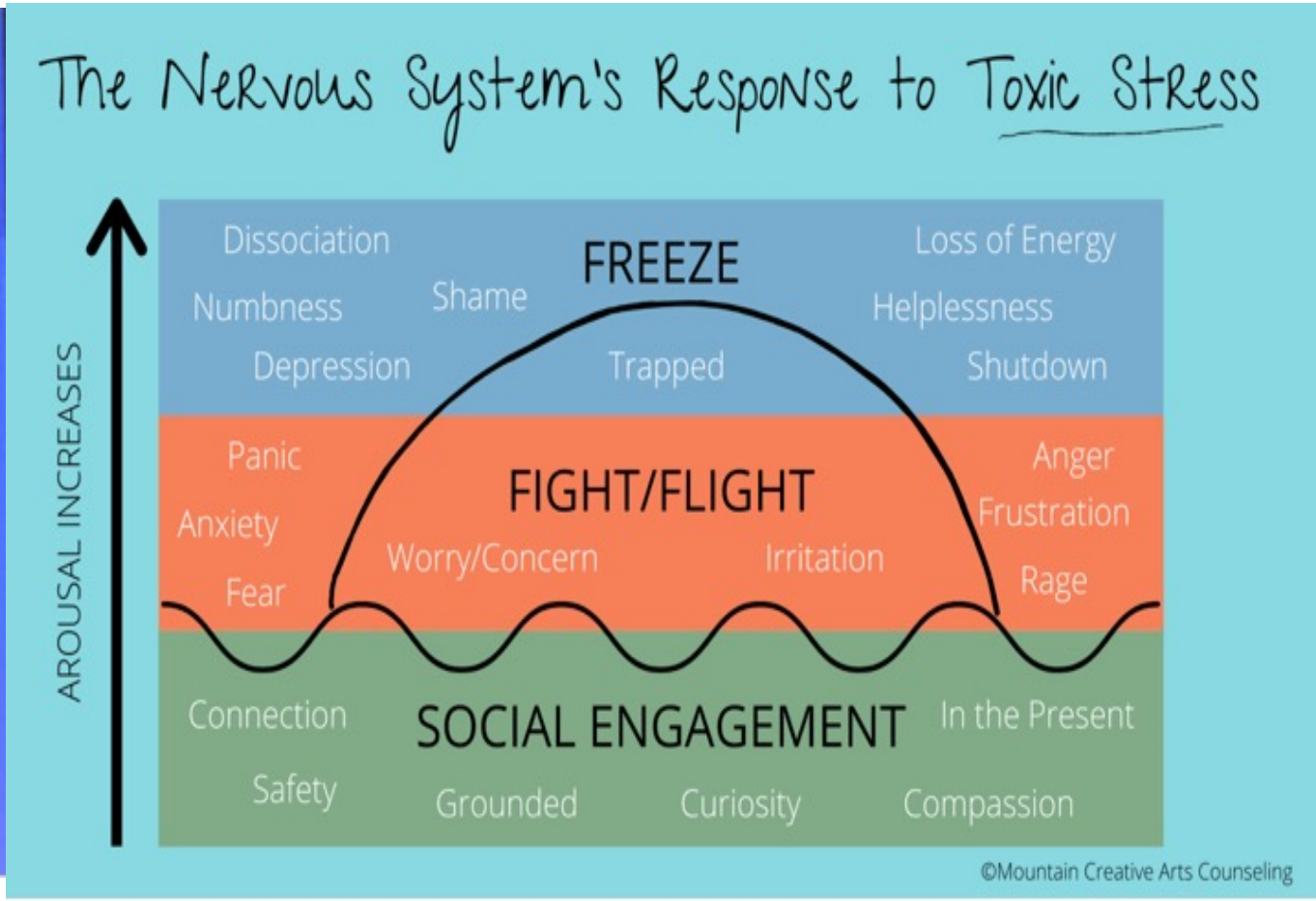
The hypothalamus then secrete corticotrophin-releasing hormone (CRH).

In the anterior lobe of the pituitary gland, CRH stimulates the secretion of adrenocorticotropic hormone (ACTH).

The cortex of the adrenal glands will then produce cortisol in response to ACTH. Cortisol will then generate a stress response.

Fight, Flight, & Freeze Response to Stress





Flight, Fight, or Freeze

Our genetics prepare us to respond with fight or flight

During chronic and prolonged trauma, adrenaline and cortisol are released and become out of balance

Too much cortisol weakens muscles and cause early aging

Too little cortisol after years of stress leaves a person jumpy, hyper-alert, and unable to relax

Allostatic Load & Epigenetics

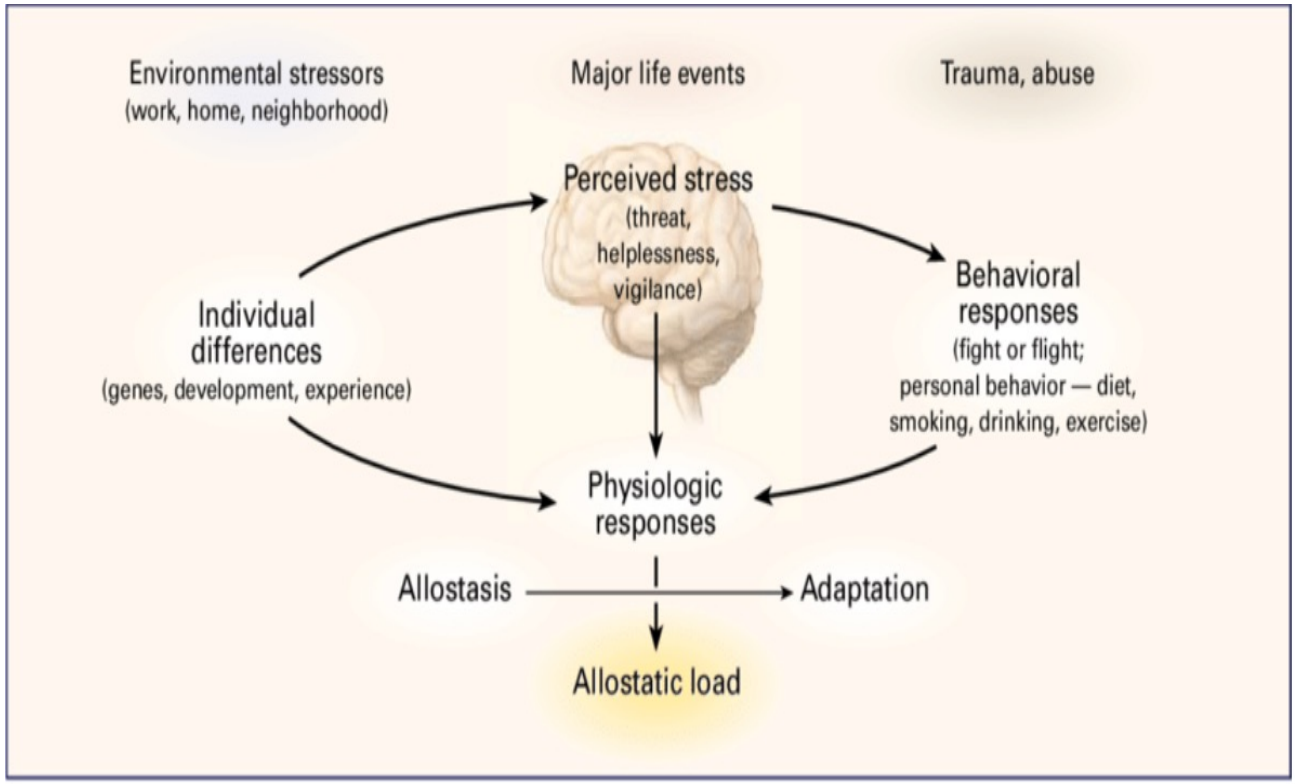
Allostasis & Allostatic Load

Allostasis= active process of adapting & maintaining stability (or homeostasis) through the production of mediators (like cortisol) that promote adaptation

Overexposure, unrelenting environments, the equilibrium set points needs to be altered to a “new normal,” which is costly to the organism

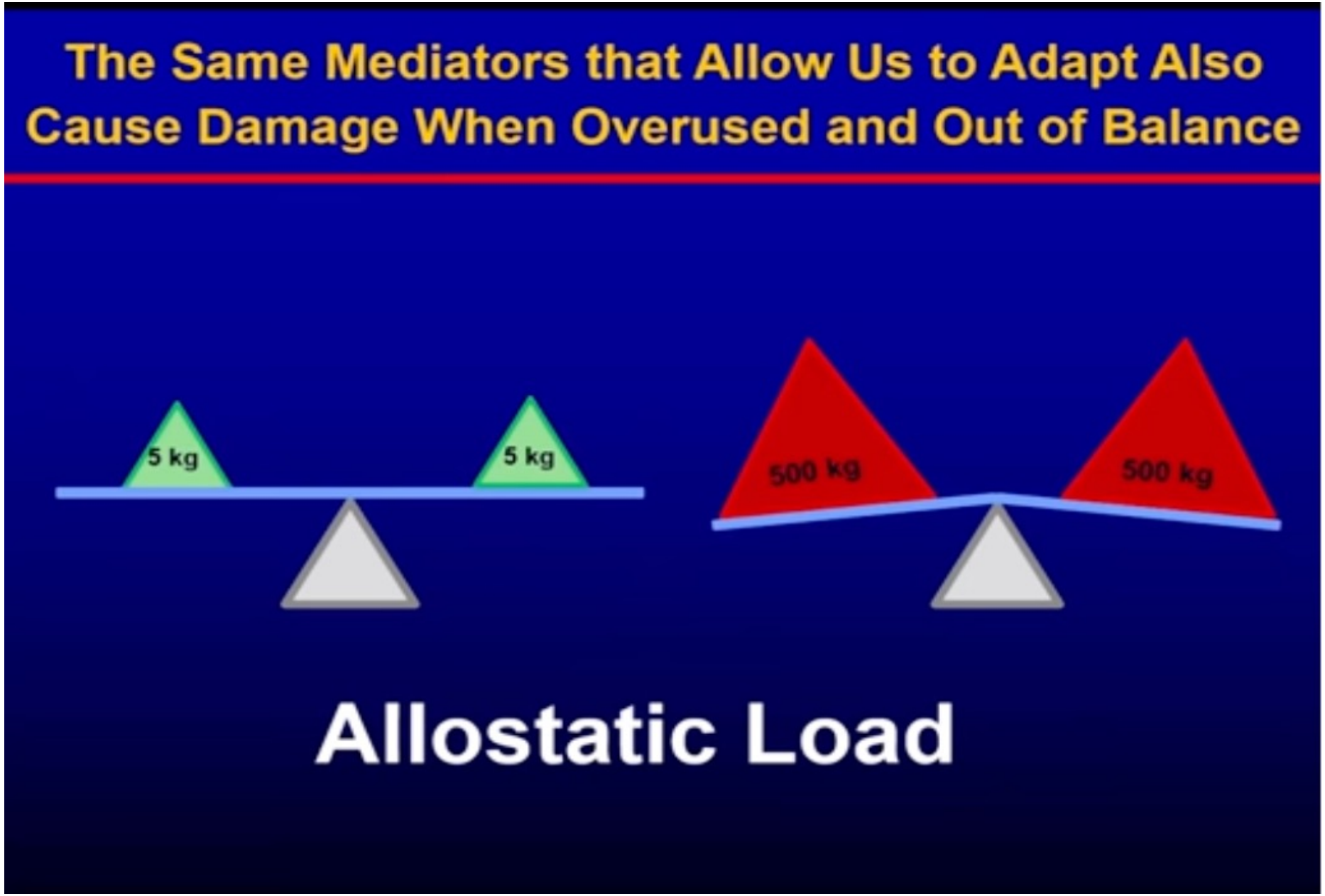
Allostatic load = the price the body pays for being forced to adapt to adverse psychosocial or physical situations (McEwen, 2000).

Allostatic Load

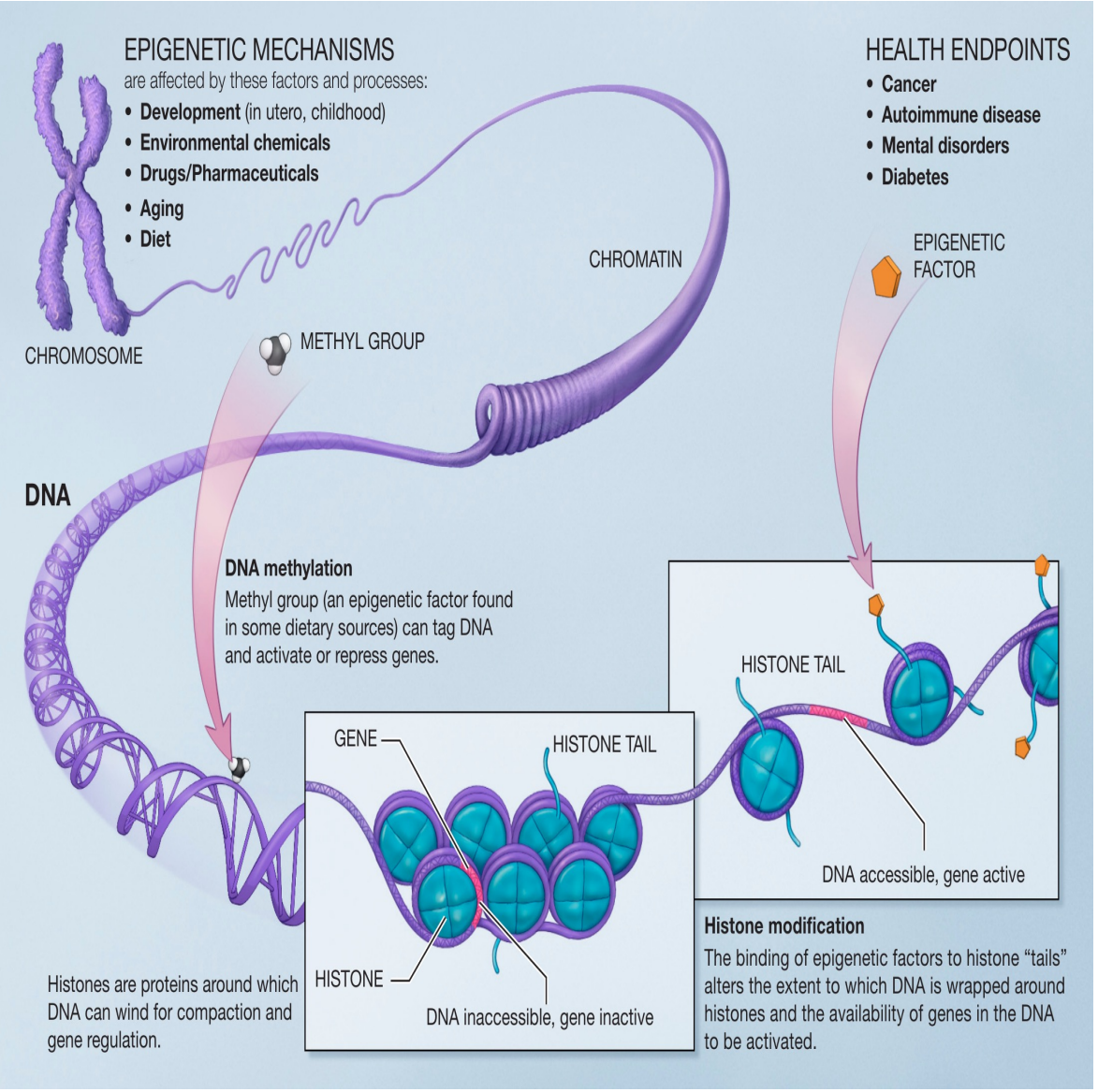


- Perceived stress is influenced by an individual's experiences, genetics, and behavior
- Experiences perceived to be stressful by the brain results in physiologic and behavioral responses
  - Leads to allostasis and adaptation
- Allostatic load can increase across the life course, resulting in overexposure to mediators of neural, endocrine, and immune stress
  - Leads to adverse effects on individuals

Source: McEwen, B.S. (1998). Protective and damaging effects of stress mediators. The New England Journal of Medicine, 338(3), 171-179


The Same Mediators that Allow Us to Adapt Also Cause Damage When Overused and Out of Balance
5 kg
5 kg
500 kg
500 kg
Allostatic Load

Epigenetics – Brief Overview

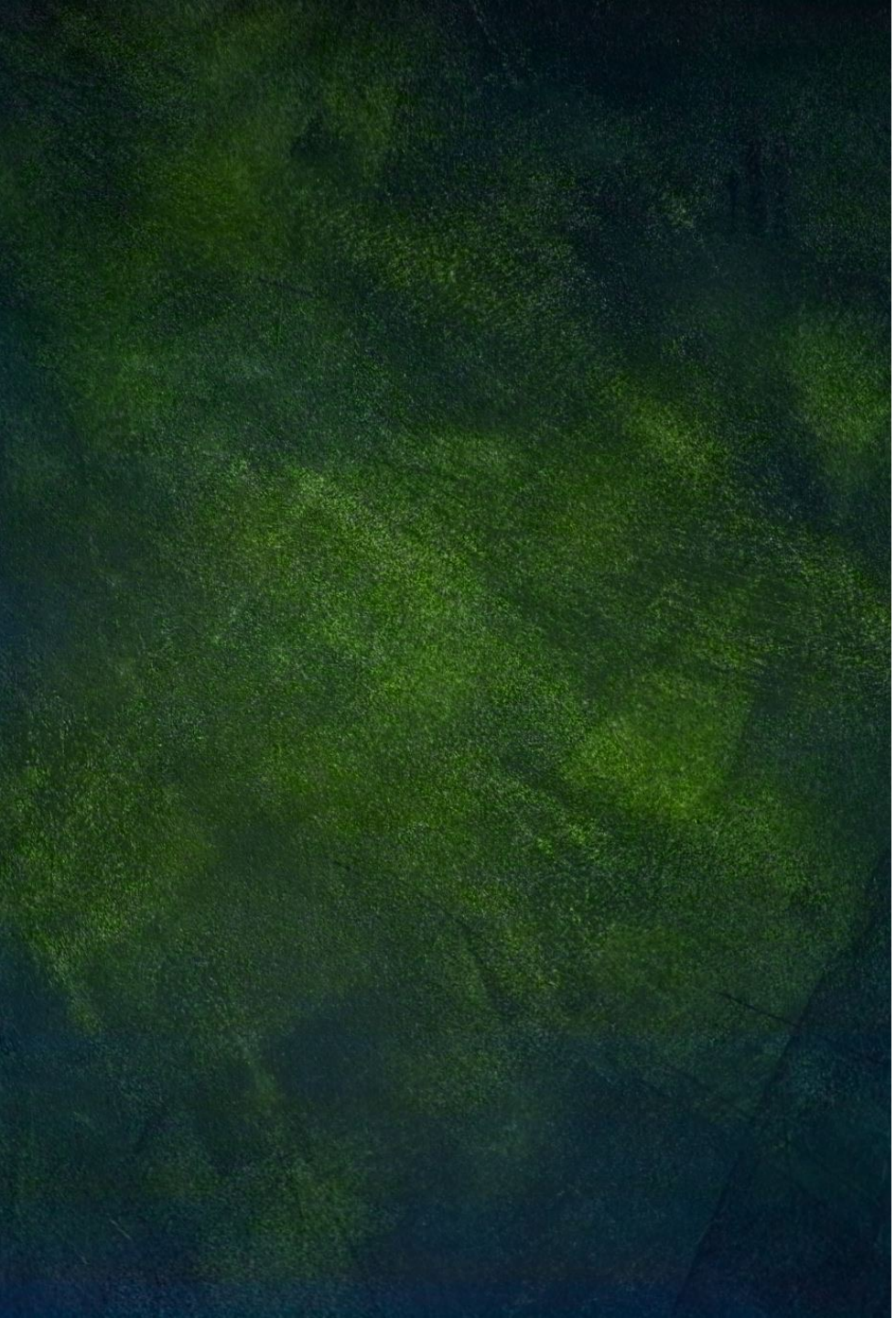


- Refers to the study of stable, long-term alterations in the heritable transcriptional potential of a cell.
- During development, the DNA that makes up our genes accumulates chemical marks that determine how much or little of the genes is expressed.
- This collection of chemical marks is known as the "epigenome."
- The different experiences children have can rearrange those chemical marks (why genetically identical twins can exhibit different behaviors, skills, health, and achievement).
- Adverse and injurious experiences before birth or early childhood are not "forgotten," but rather are built into the architecture of the developing brain through the epigenome.
- These epigenetic changes ("biological memories) can affect multiple organ systems, increase risk for poor physical and mental health outcomes, as well as future learning capacity and behavior.

Source: U.S. National Institutes of Health http://commonfund.nih.gov/epigenomics/figure.aspx

Leaving a Mark/Tag/Signature

- Epigenome can be affected by positive experiences (supportive relationships) and negative influences
- These experiences leave a “signature” on the genes – can be temporary or permanent!
- Recent research – ways to reverse certain negative changes and restore healthy functioning but requires effort, integrative care, and financial support



Epigenetics –Why is this important?

Epigenetics is critical because inheriting a gene that makes one more susceptible to being an alcoholic isn't much of a risk if that gene is never turned on

Most importantly, many epigenetic mechanisms are driven by stressful experiences

Epigenetics provides a biological link between early childhood ecology and the way the developmental blueprint is read

Advances in epigenetics demonstrate that ecology literally alters the way the genetic program is utilized, not only in the current generation, but in the next generation as well

What Does Epigenetics mean For Our Clients?

Adverse fetal and early childhood experiences can lead to physical and chemical changes in the brain that can last a lifetime. (e.g.,: malnutrition, drug exposure, toxic stress)

They are built into the architecture of developing brain through the epigenome

Epigenome can be affected by positive experiences (supportive relationships) or negative influences (toxins/stress). Can be temporary or permanent

Best strategy = support responsive relationships and reduce stress

Developmental Neuroscience – Why is This Important?

- Advances in developmental neuroscience also provide a biological link between early childhood ecology and lifelong learning, behavior and health
- Experiences in the early childhood environment are translated into neuronal activity which, in turn, influences which synapses and circuits in the developing brain are strengthened and kept (vs. those that are weakened and eventually eliminated)
- The child ecology literally sculpts the foundational architecture of the developing brain. Because the cells' plasticity declines over time, it is progressively harder to change these foundational circuits
- Significant or prolonged exposure to the mediators of the physiologic stress response (cortisol, adrenaline) can be toxic to the developing brain

Adapted from Dean J. Shapiro

Epigenetics & Developmental Neuroscience – What Do They Add?

- Recent advances in developmental science are revealing **biological mechanism** that may underlie these well-established associations between early childhood ecology and lifelong developmental outcomes.

- Epigenetics and developmental neuroscience demonstrate that **early childhood ecology is biologically embedded** within the body and continues to influence learning, behavior and health for years, even decades.

Adapted from Dean J. Shapiro

Neurodevelopmental Mediation of Early Adversity and Pathways to Resilience

Positive Epigenetic Modifications – Policy & Practice implications

- Repeated activation of brain circuits dedicated to learning and memory through interaction with the environment, such as reciprocal “serve and return” interaction with adults, facilitates these positive epigenetic modifications
- Maternal and fetal nutrition
- Positive social-emotional support of children through their family and community environments
- What are the policy and practice implications? What are obstacles?

Resilience

The ability to fight off or recover from misfortune

Associated with strong self-confidence, coping skills, and avoiding risky situations

Unique Pathways to Resilience Across Cultures (Ungar, 2007):

Access to material resources	Access to supportive relationships	Sense of personal identity	Sense of empowerment (create/impact change)

Connected to a “protective triad” of resources:

Strength of the child	Strength of the family	Strength of the school/community

Why is Neuroscience Important for Social Work Education?

- Neuroscience has the potential to enhance our understanding of the role of the brain in human development (from pre birth to older adults)
- Provides new insights into biological contributions to our multilayered biopsychosocial model. Adds to our understanding of the transactional and ecological model of human development.
- Support SW's increasing focus on EBP and development of new interventions.
- Facilitate SWs' common language and knowledge for interdisciplinary practice.

(Egan, Neely-Barnes, & Combs-Orme, 2011)

Food For Thought

- “You may not control all the events that happen to you, but you can decide not to be reduced by them.”

(Brené Brown)