



The Impact of Trauma on a Child's Brain and Body

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Objectives

- Define stress and toxic stress
- Define trauma and resiliency
- Understand the effects of trauma on a child's brain
- Understand the effects of trauma on epigenetics, HPA axis, and the immune system
- Review trauma triggers and resultant behaviors



Brief increases in heart rate,
mild elevations in stress hormone levels.



Serious, temporary stress responses,
buffered by supportive relationships.



Prolonged activation of stress
response systems in the absence
of protective relationships.

Stress

- Stress is defined as anything that produces a disruption in the physiologic or emotional balance of a person
- Stresses can be positive or negative, large or small
- Every day is filled with stress: acute illness, argument with a parent, spelling test, birthday party, argument on the playground, field trip, report card, early release
- A child's reaction to stress will depend on their internal regulation, and the response of the adult to the stress



Toxic Stress

- Toxic stress occurs when there is a threat, and the body responds in a “fight, flight or freeze” mode, and then it continues to happen multiple times every day
- Emergency stress hormones such as cortisol and adrenalin are released
- Bypass the thinking brain--prefrontal cortex--and activate the survival brain--amygdala and hippocampus
- Tolerable stress is meant to be a short process, with elevated hormones for 4 minutes, back to baseline in 20 minutes
- Repeated and chronic activation with these elevated hormones causes the activated neural pathways to become efficient and predominant
- Underdevelopment of neural pathways involved in complex thought, learning, cause and effect, safety, self-soothing, and executive functioning

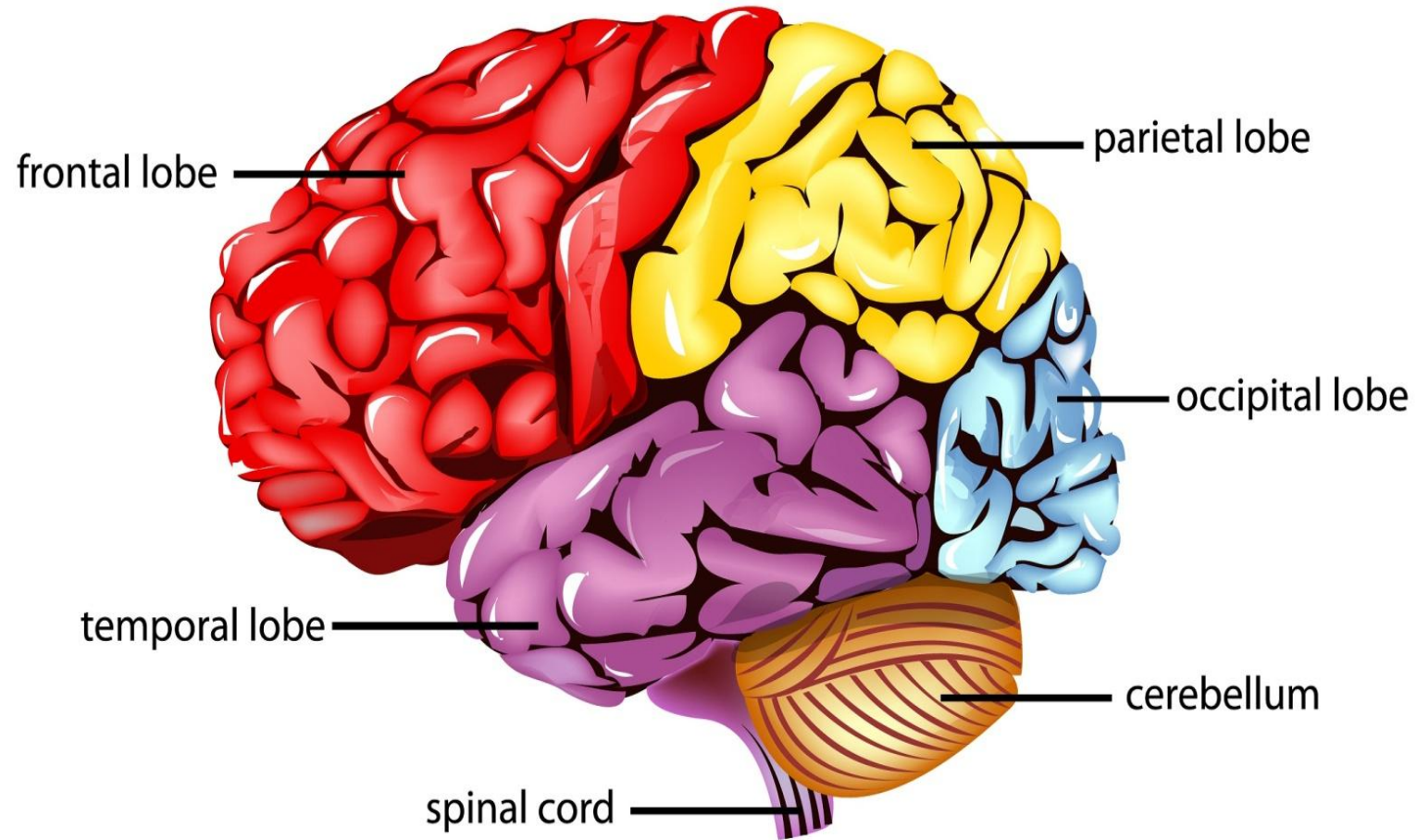
Trauma

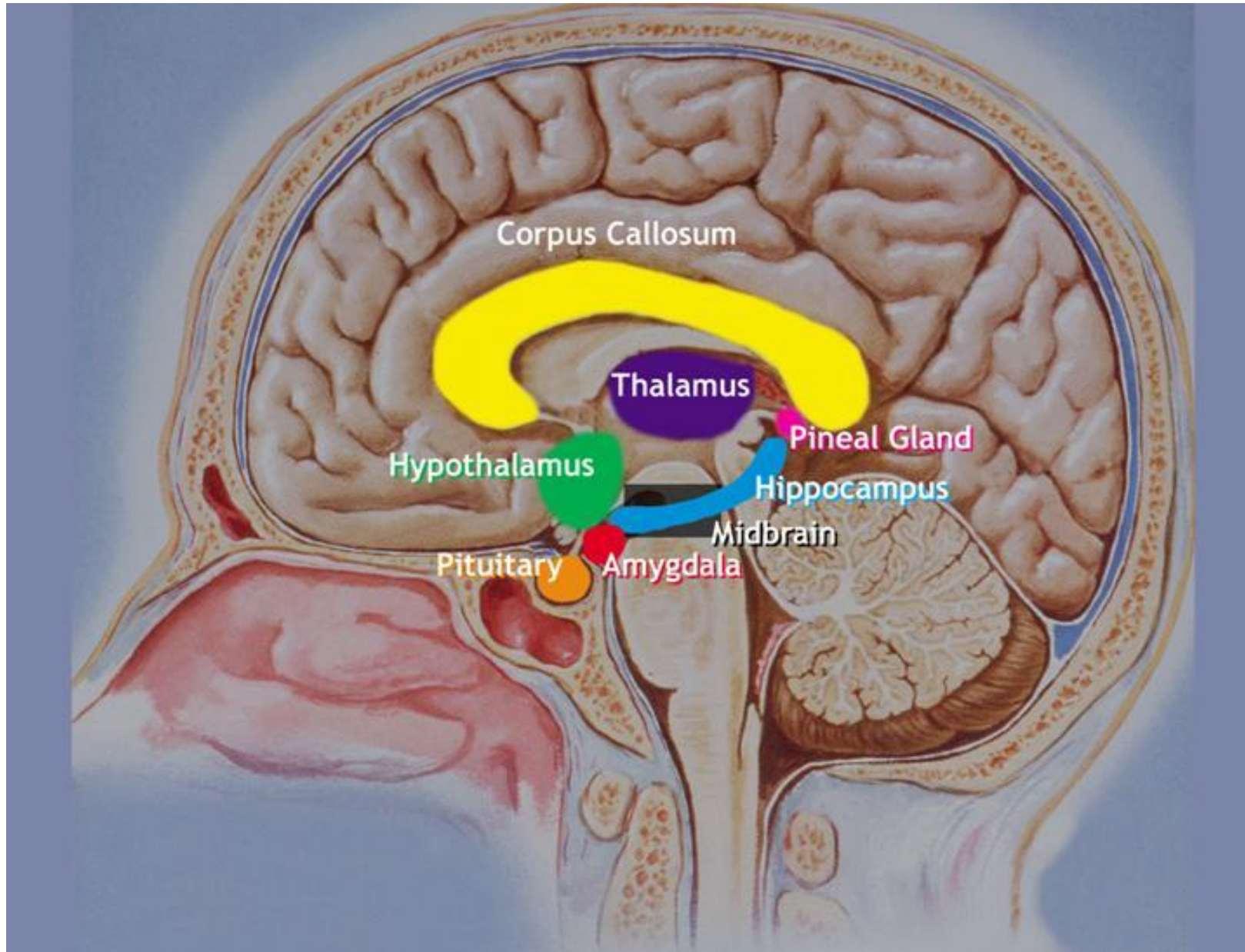
- The difference between stress, toxic stress and trauma can be semantics. Prolonged toxic stress causes trauma.
- Trauma can also be larger events than stress:
 - Car accident
 - Death of a parent
 - Physical abuse
 - Sexual abuse
 - War
 - Natural disasters (hurricane, tornado, fire, flood)
 - Violence
 - Medical procedures

Trauma

- Same physiologic response as stress with elevation of cortisol and adrenalin, and activation of the stress pathways
- Trauma reactions may take longer to return to baseline
- Trauma response can also be prolonged
- One episode of trauma, or multiple traumas are processed based on the child's resiliency
- Trauma can result in long term issues (PTSD or complex trauma)
- Toxic stress and trauma can cause permanent changes in many aspects of the child's physiologic and psychologic make up

Parts of the Human Brain





Resilience

Children process stress and trauma based on many factors:

Past episodes of toxic stress/trauma

Relationships with adults who keep them safe, nurtured, and respond to their needs

Innate coping mechanisms

Ongoing toxic stress and trauma

The adult relationship can be a parent, grandparent, teacher, coach, etc.

Resilience



Ann Masten, PHD called this Resilience

Ordinary Magic

For kids, the pathways to resilience are rooted in the give and take of safe, stable and nurturing relationships that are continuous over time (attachment)

and in the growth that occurs through play, exploration and exposure to a variety of normal activities and resources

Why Do We Care?

25 years ago Dr. Vince Felitti and Dr. Robert Anda published the ACE study.

Adverse Childhood Experiences were shown to correlate with many adult chronic diseases:

hypertension stroke heart disease cancer
diabetes substance abuse shortened life suicide

In the past 20 years science has proven a cause-and-effect association.

Trauma causes:

Epigenetic changes Immune system changes
Neurologic changes Hormone changes

Some changes become permanent; most changes can be reversed if the trauma is interrupted, and the child is then nurtured in a safe nurturing environment.

We all have the power and the skills to make these changes happen.

ABUSE



Physical



Emotional



Sexual

NEGLECT



Physical



Emotional

HOUSEHOLD DYSFUNCTION



Mental Illness



Incarcerated Relative



Mother treated violently



Substance Abuse



Divorce

BEHAVIOR



Lack of physical activity



Smoking



Alcoholism



Drug use



Missed work

PHYSICAL & MENTAL HEALTH



Severe obesity



Diabetes



Depression



Suicide attempts



STDs



Heart disease



Cancer



Stroke



COPD



Broken bones

Biochemistry of Stress

Toxic stress causes unregulated stress hormones such as cortisol, which increases blood pressure and heart rate, affects the immune system, and causes methylation of genes and changes in histone

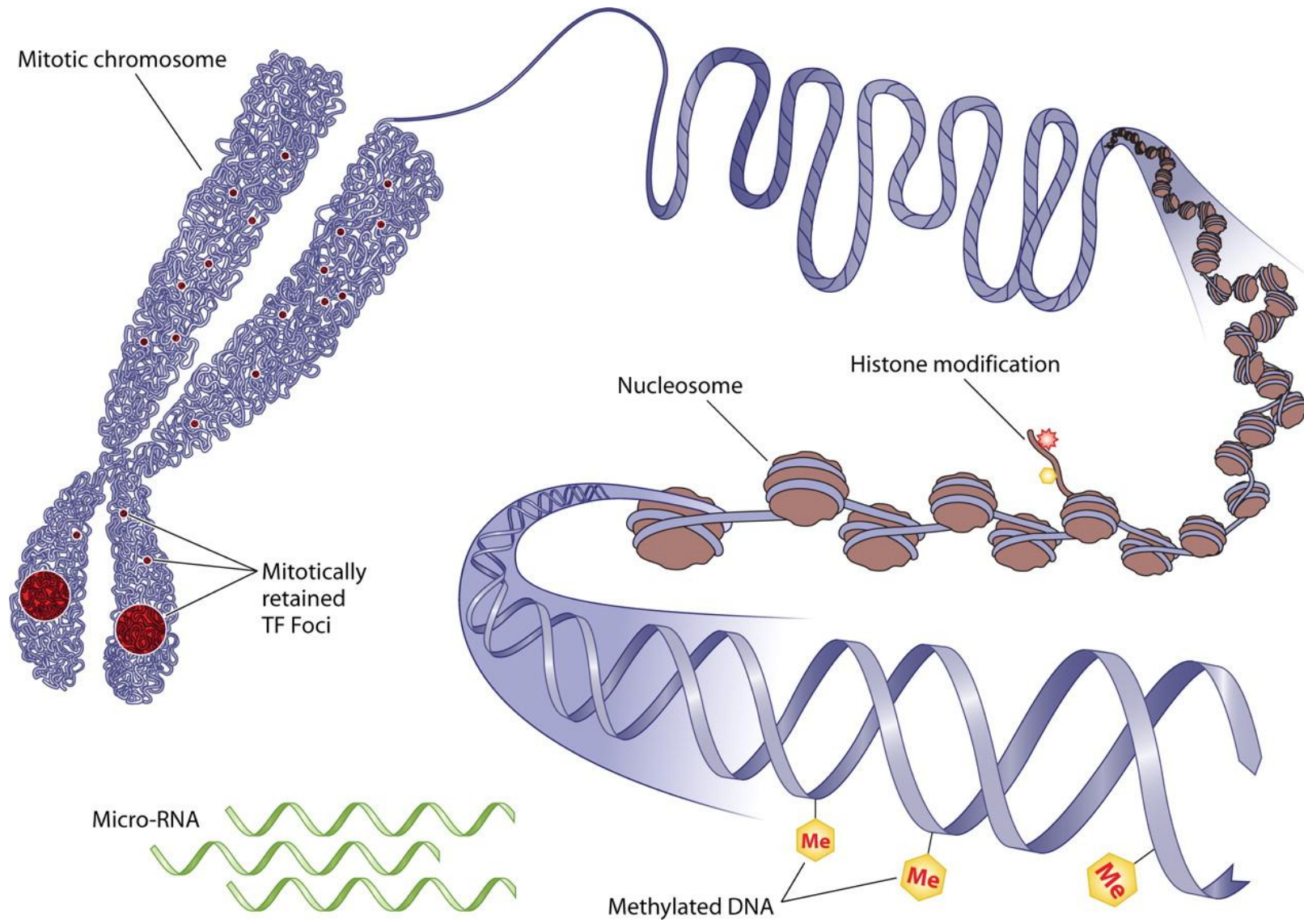
Epigenetics: the study of modifiable changes in gene expression that do not involve changing the underlying DNA

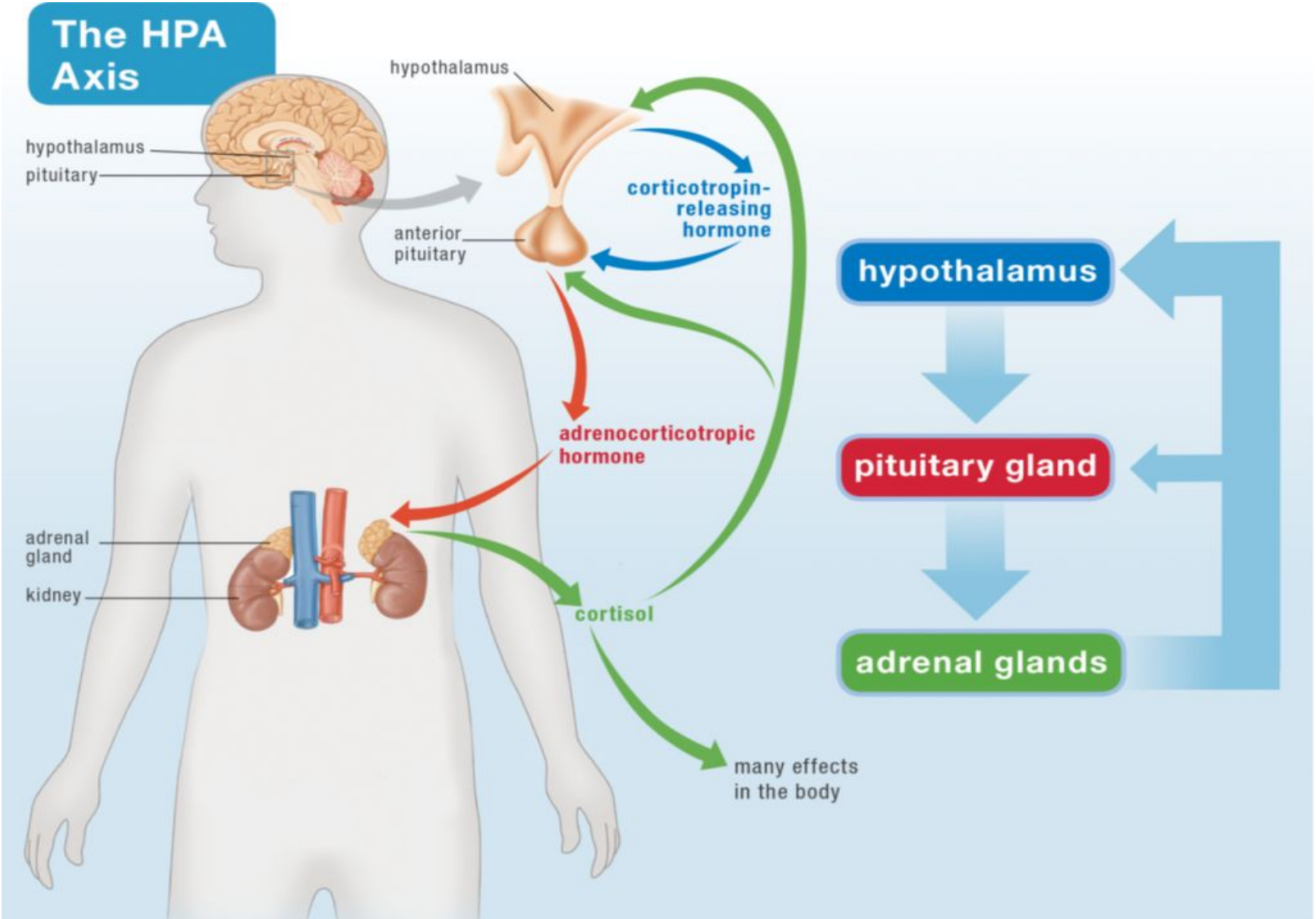
Methylation—adding a CH₃ group

- This will affect the expression or transcription of the gene
- Turn on or turn off

Histone—the protein packaging that builds the DNA into chromatin, which then becomes the chromosome

Hypothalamic-pituitary-adrenal (HPA) axis is the main stress regulatory system





Trauma Informed Care

Trauma informed care means:

All who interact with children who have experienced toxic stress or trauma, understand their reactions.

Children have developed survival mechanisms

Their behavior is not purposefully manipulative, defiant, or avoidant

Hyper-vigilance and fear, shame and guilt are usual reactions to trauma

Teachers, parents, foster parents, coaches, pastors, day care providers all need trauma training

Trauma

Survival mechanisms can include avoidance, dissociation, aggression

Trauma and toxic stress activate the pathways:

FIGHT	aggression	behavior issues
FLIGHT	runaway	avoidance
FREEZE	dissociate	

These pathways are reactivated every time the child is triggered:

- sight, smell, noise, touch, environment

Triggers can re-occur for years or the entire lifetime

Trauma

Teenagers become embarrassed by their trauma symptoms, so they try to overcompensate:

- Memory issues—all learning is worthless, don't try—better than failing
- Emotional dysregulation—better to always be mad, than show “weakness”
- Trust—no one understands, no need to share with anyone—increases vulnerability
- Loyalty—if they discuss the trauma, a family member will be exposed
- Mental Health—increased incidence of mental health diagnoses
- Suicide rate—80% of teen suicide attempts are related to past trauma

Put on Your Trauma Lens



The Dogs of Monarch

Come back for Part 2

