The Neurobiology of Resilience

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Why Understand the Neurobiology of Resilience

‣ Helps to understand psychosocial protective factors
‣ Helps to understand how to cope with stress
‣ A better understanding of treatments and interventions for trauma/toxic stress
‣ Can lead to a better understanding of the importance of alternative treatment and healthy lifestyles
Definition

- **Resilience.** A dynamic **process reflecting positive adjustment** despite significant **risk or adversity** (Luthar & Zigler, 1991; Garmezy, 1971; Rutter, 1987)
  - Allostasis – a **dynamic** regulatory process wherein homeostatic control is maintained by an active process of **adaptation** during exposure to physical and behavioral **stressors** (McEwen and Gianoros, 2010)
Resilience
THE OTHER SIDE OF THE COIN FROM TRAUMA
Amygdala
Neurobiology of Resilience

Genetics
Epigenetics
Neurochemicals
Neurocircuitry
Genetics

Methylation of DNA and histones causes nucleosomes to pack tightly together. Transcription factors cannot bind the DNA, and genes are not expressed.

Histone acetylation results in loose packing of nucleosomes. Transcription factors can bind the DNA and genes are expressed.
Epigenetics

- Biological mechanisms that will switch genes on and off (What happens around the gene):
  - Epigenetics control genes
  - Epigenetics is everywhere
  - Epigenetics makes us unique
  - Epigenetics is reversible or plastic
Epigenetic Factors

- Exposure to stress
- Environmental toxins
- Prenatal environment
- Diet
- Exercise
- Developmental (critical) periods
- Aging
- Virus/infection
Epigenetics and Stress

[Bar chart showing the relationship between ACE Score and some data]
Neurochemicals

HPA Axis
- CRH
- Cortisol
- DHEA

Sympathetic NS
- Norepinephrine
- Neuropeptide Y
- Galanin

Others
- Dopamine
- Serotonin
- BDNF
- ALLO
- Oxytocin
Brain Circuitry

Dynamic Brain Changes During Stress

Resilient Coping

Risky Coping

VmPFC

Sinha et al., 2016
Thank You

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- Please email me or the CTAC for:
  - More information
  - References
  - To request more offerings on this topic