

# The Trauma Deep Within the Genes:

The Epigenetics of PTSD

Nadia Smati

Genomics and Medicine 2012

# Clinical Understanding of PTSD

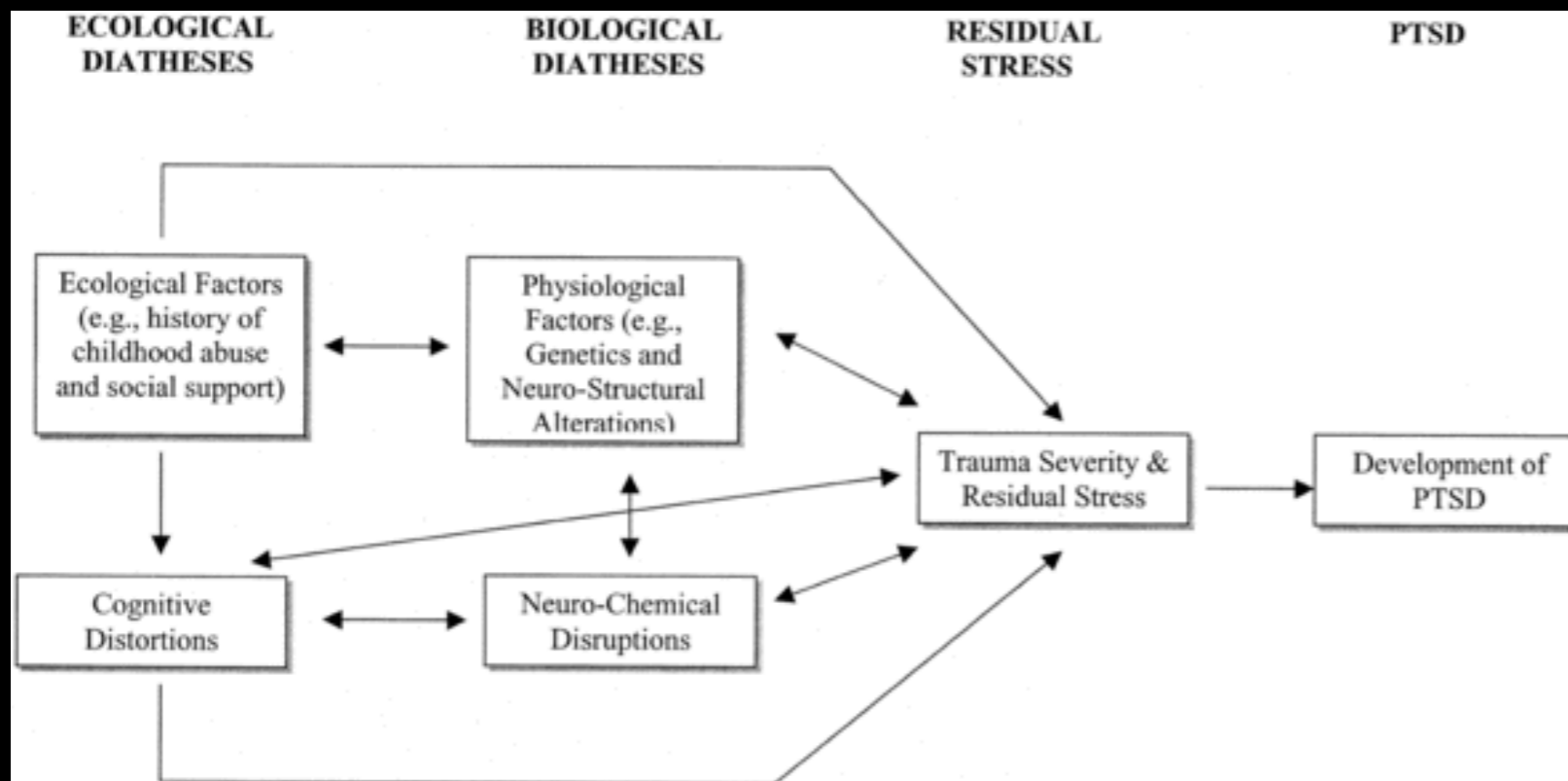
-Mental Health Disorder TRIGGERED  
by Traumatic Event

-Adaptive Response

## DSM-IV Diagnostic Criteria for PTSD

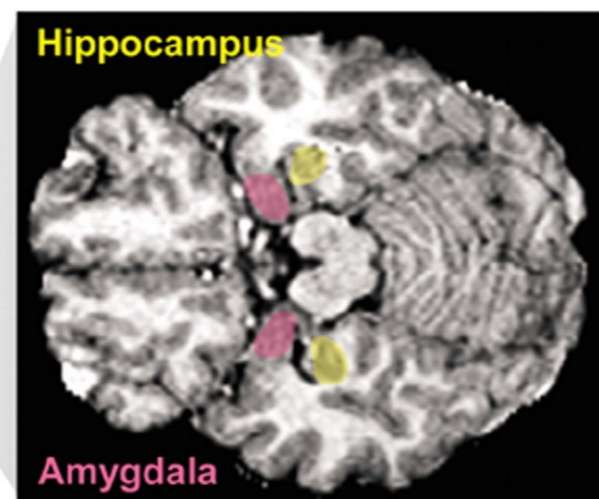
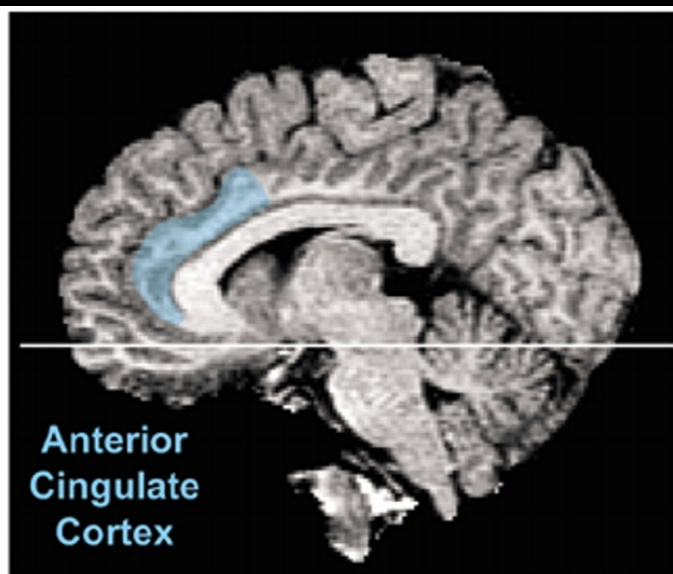
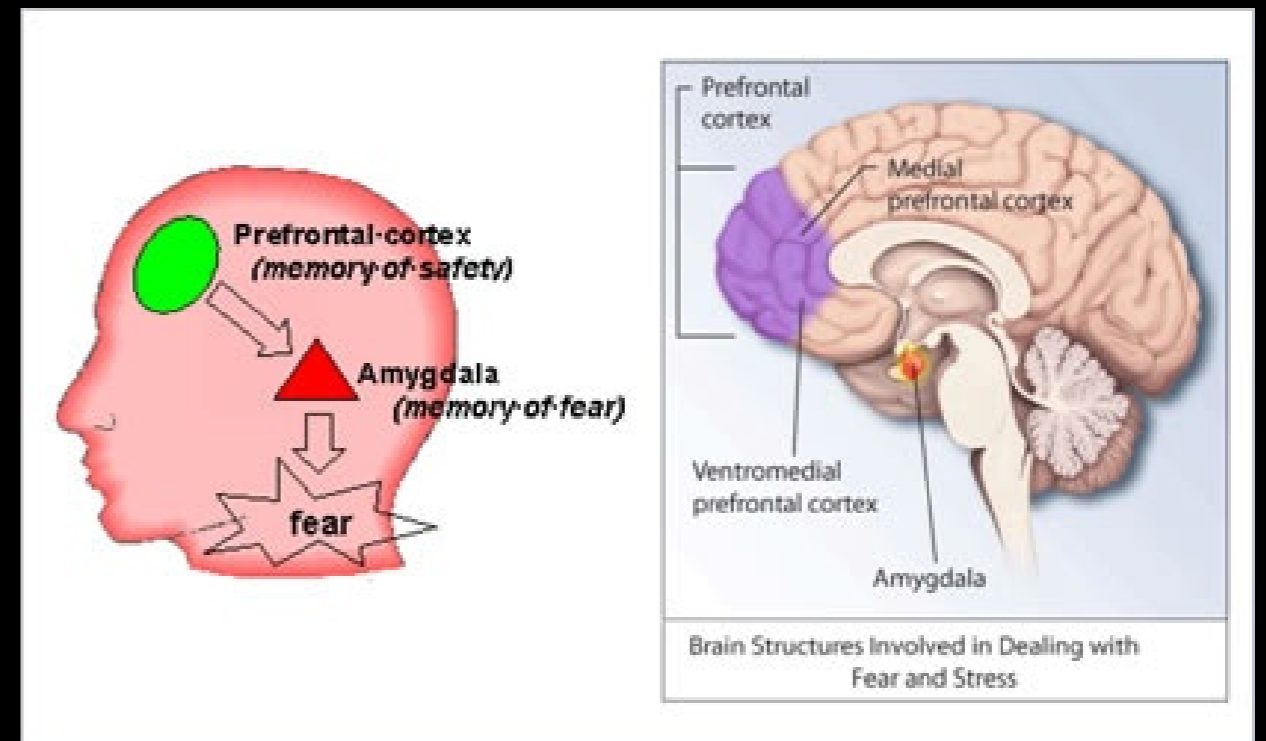
- Exposure to a traumatic event and subjective emotional response of fear, helplessness, or horror
- Persistent re-experiencing of the traumatic event
- Persistent avoidance and numbing
- Persistent symptoms of increased arousal
- *Significant distress or impairment*
- *Duration of at least 1 month*

DSM-IV™, 1994.



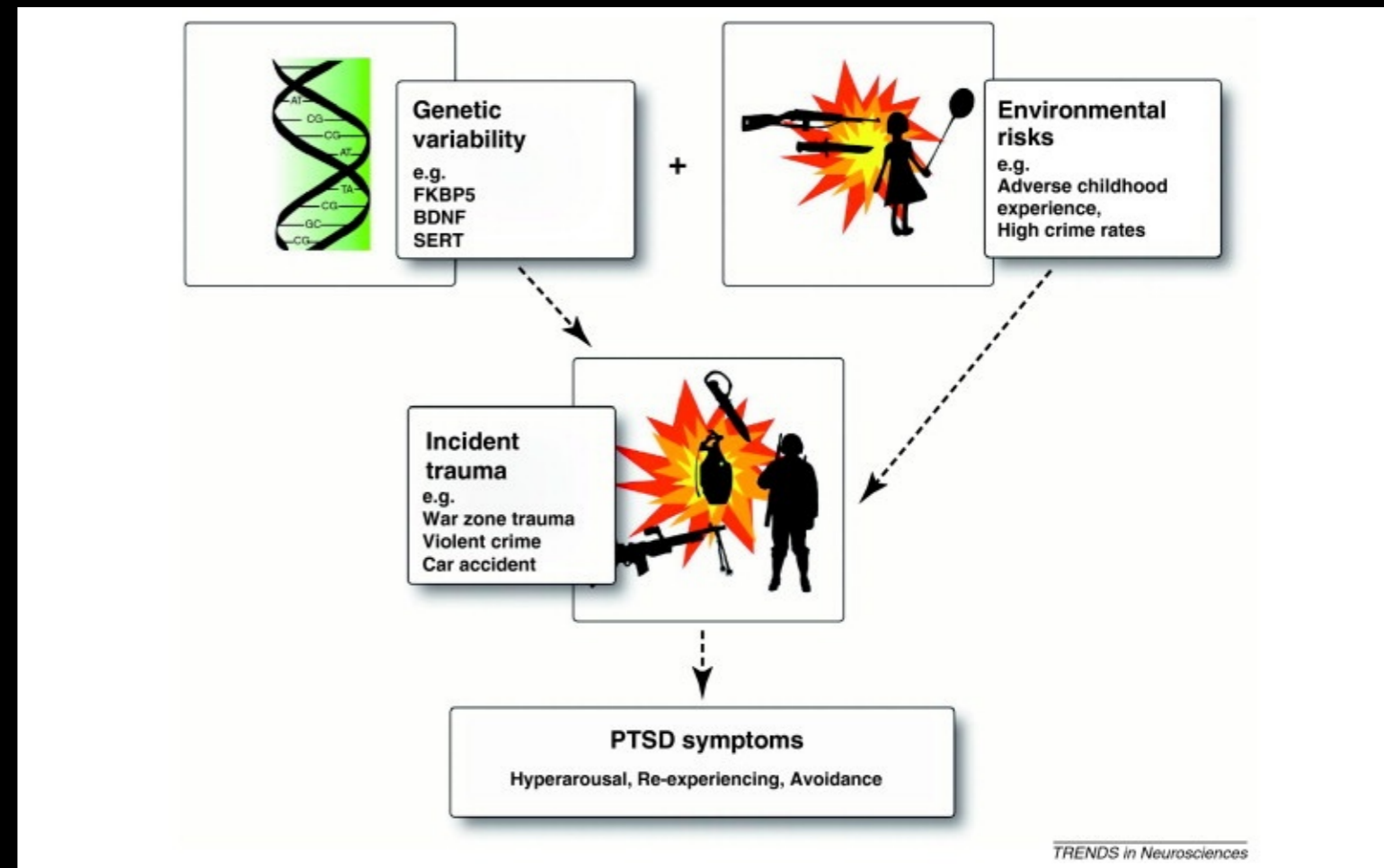
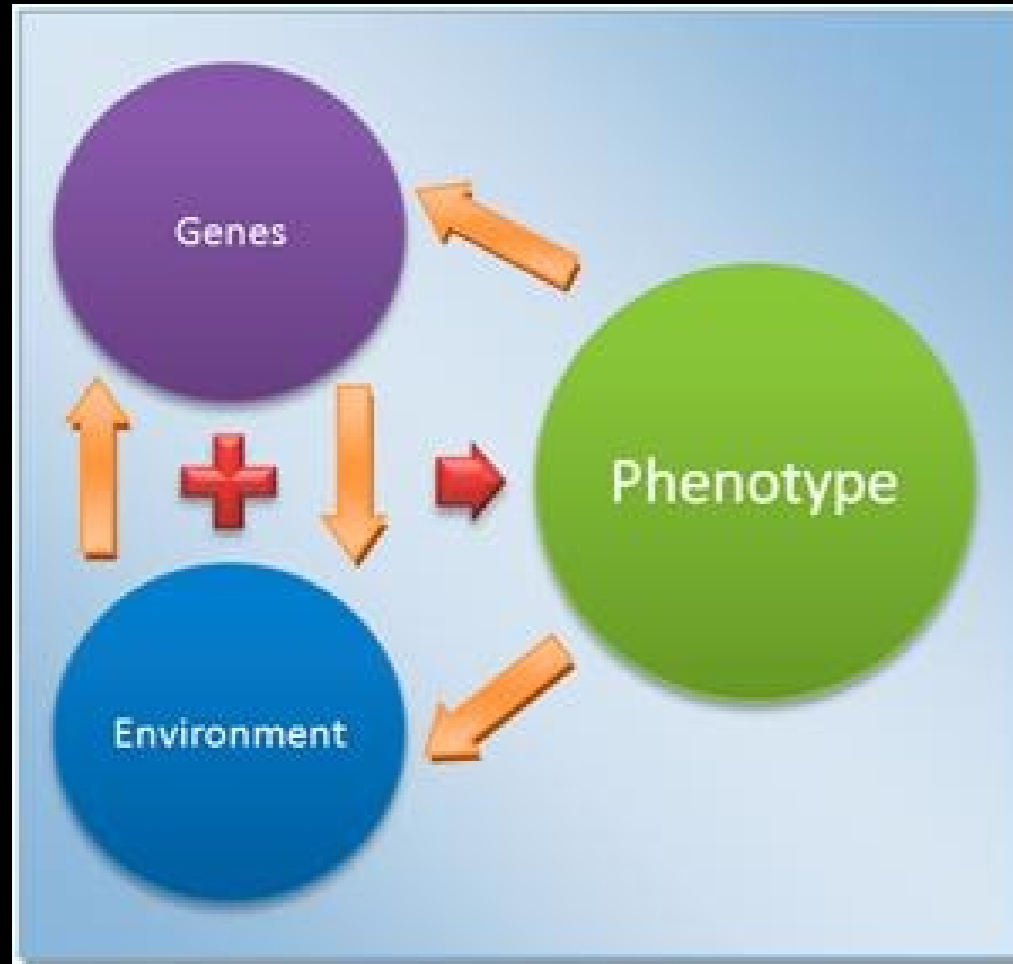
# Scientific Understanding of PTSD: The Brain

Key Players:  
Hippocampus  
Prefrontal Cortex  
Amygdala

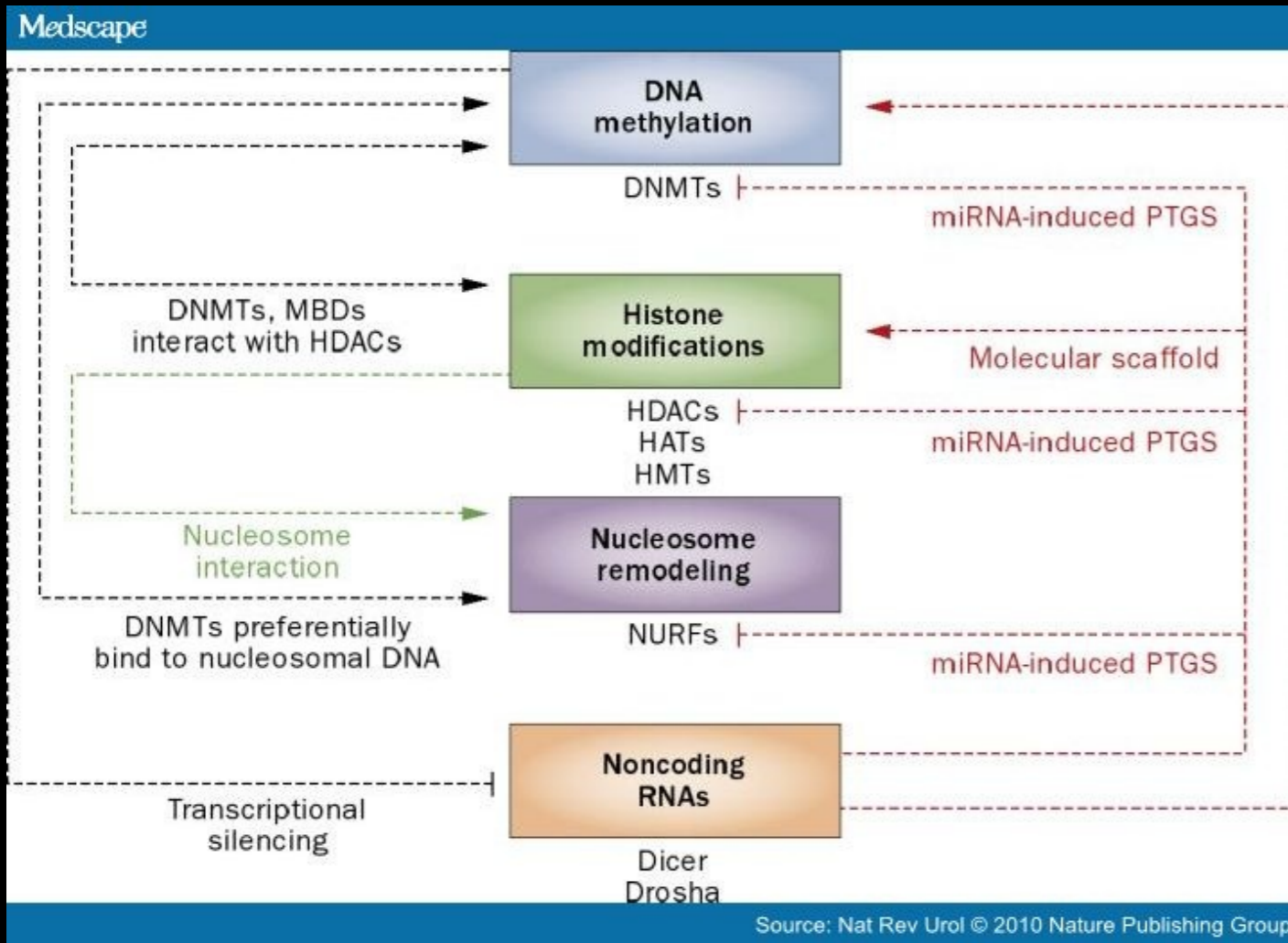


Comparison Studies-  
Combat Exposure, Trauma,  
PTSD

# Gene x Environment



# Epigenetic Modifications



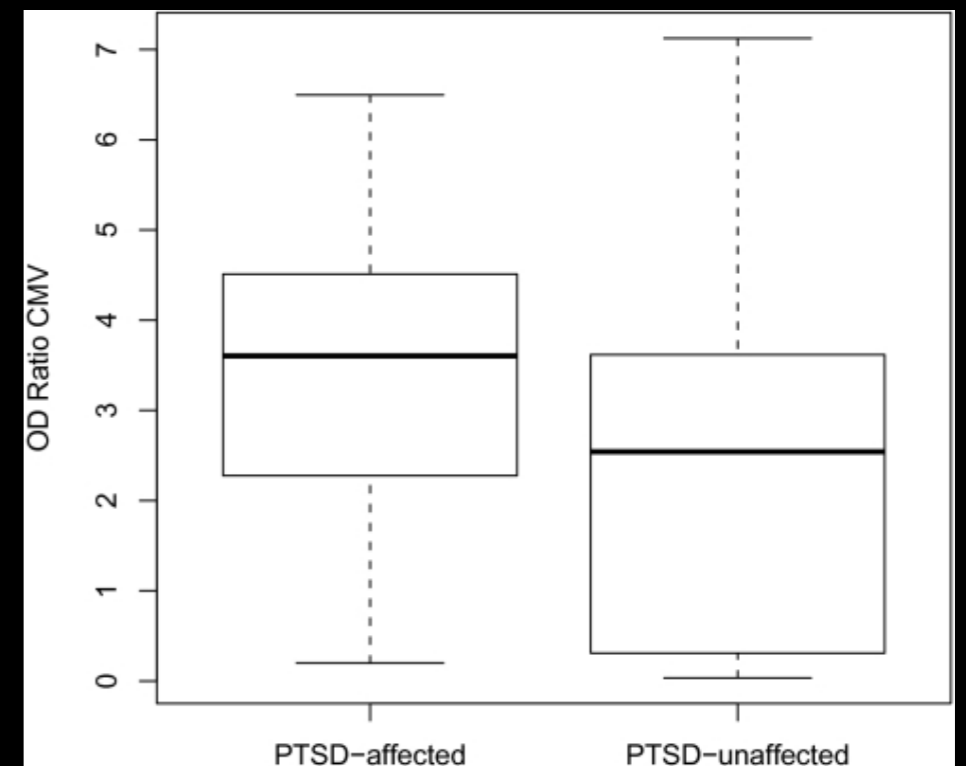


# Inside the Epigenome- Animal Studies

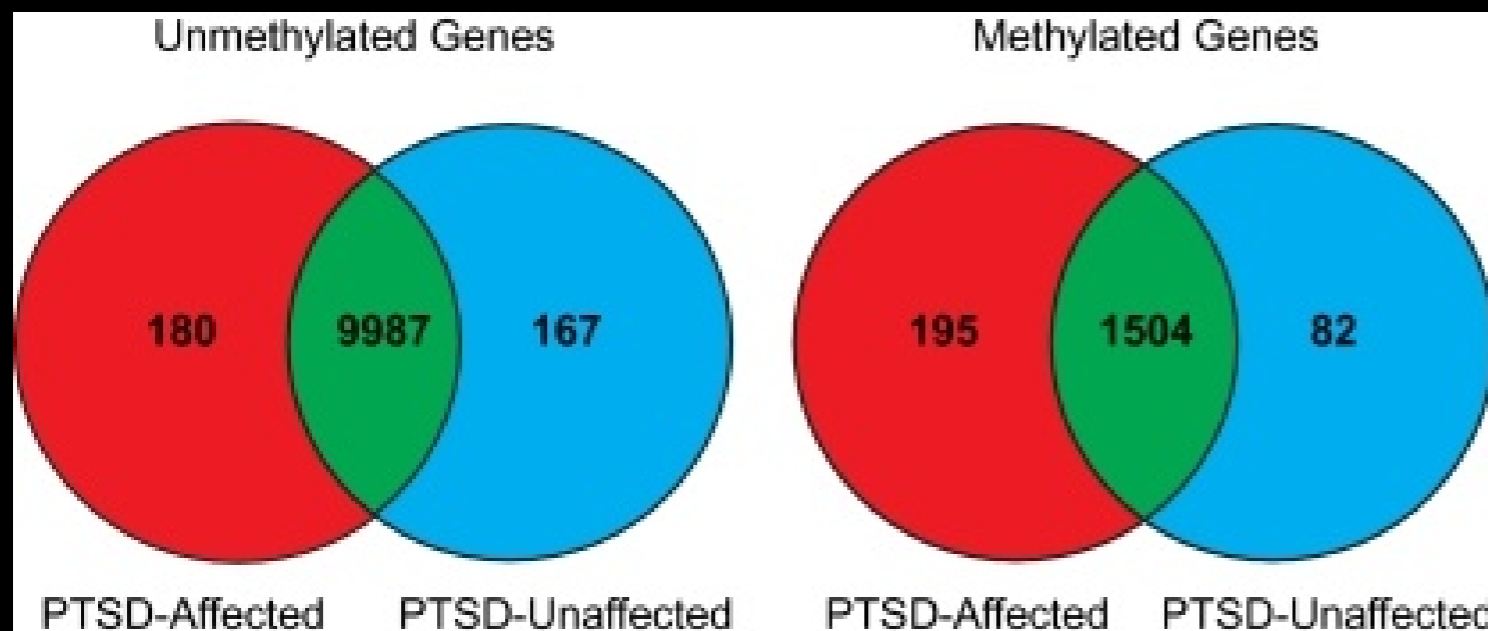
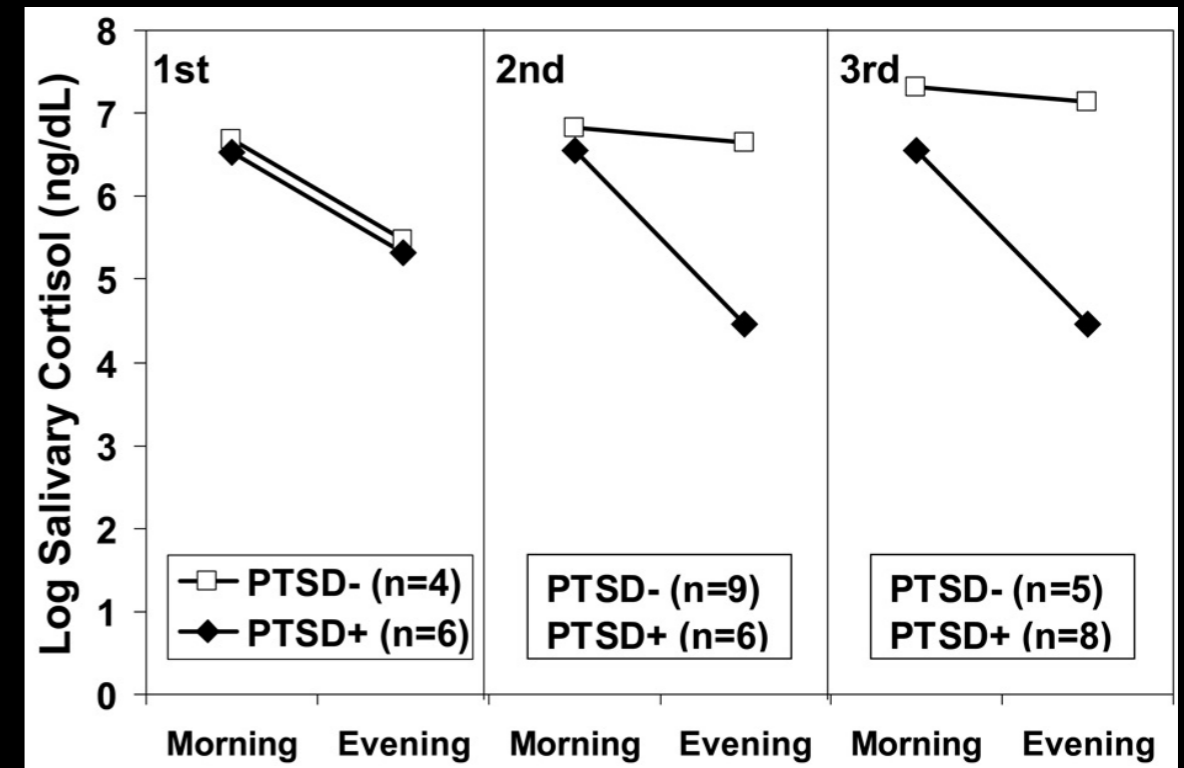
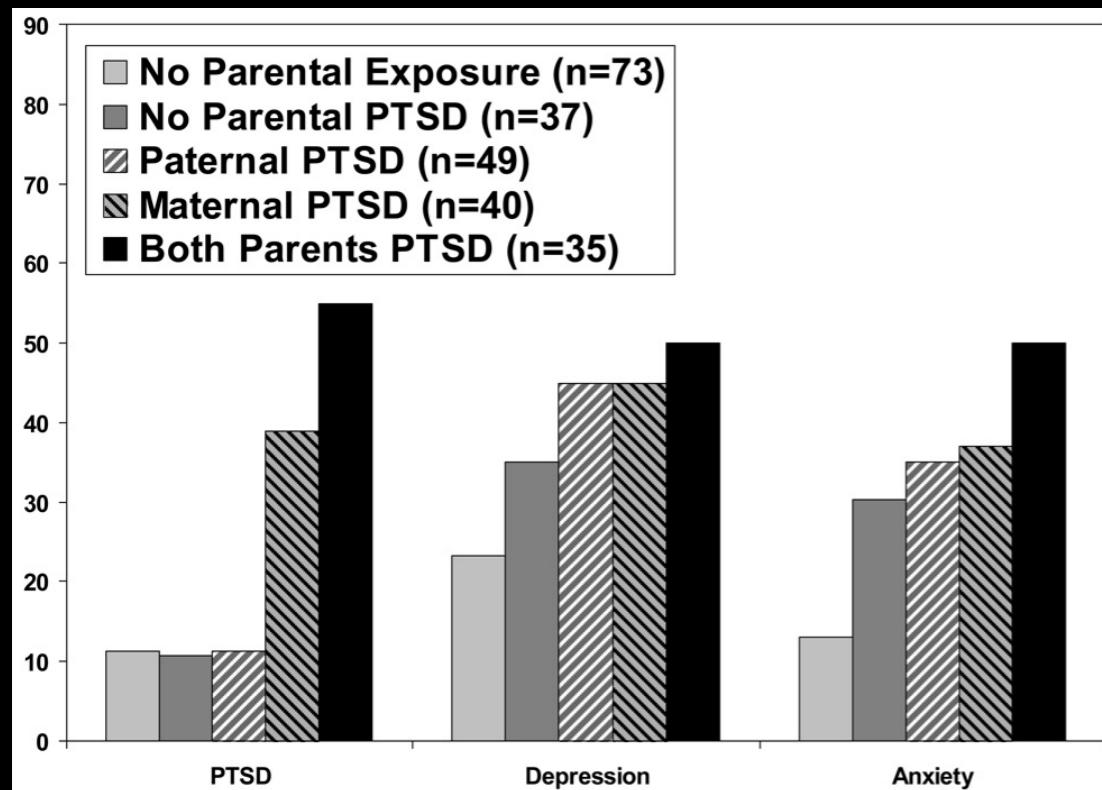
-DNA methylation as a result of Maternal Programming of Stress Responses in Rats

-Rat and Animal Model of PTSD (Cat Exposure)- Bdnf DNA methylation in the dorsal hippocampus

-Altered Immune Systems

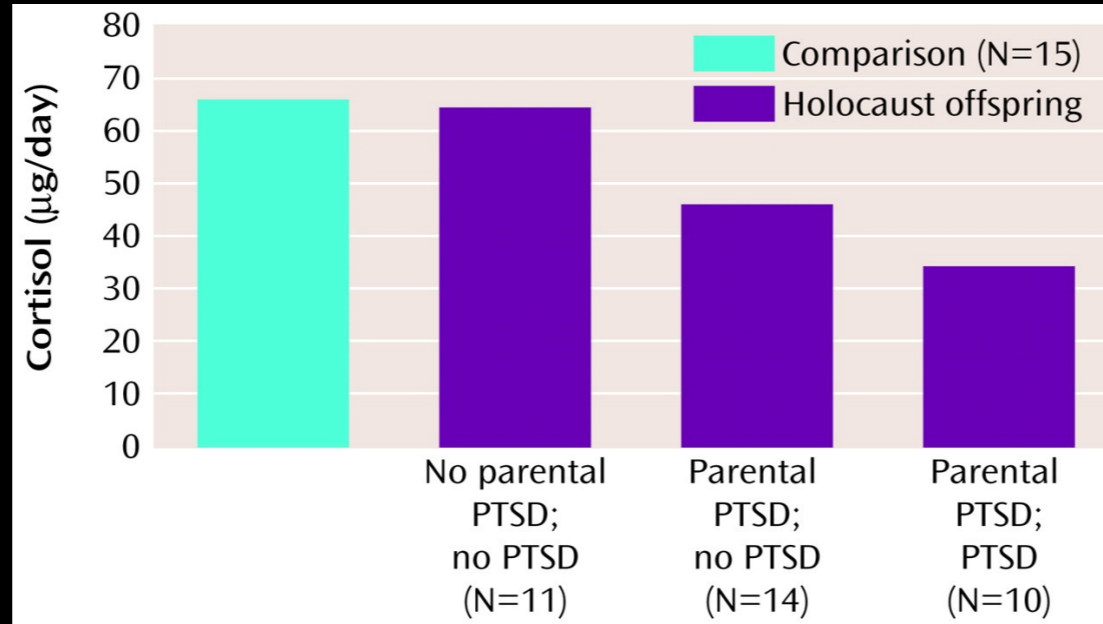


# Inside the Epigenome- Human Studies



-Methylation status of the human NR3C1 gene in newborns to Depressed Mothers

# Longitudinal Case Studies: Stress Across Generations Stress Across Generations





Epigenetics Changing Our Understanding of the Human Experience: Past and Present









# Implications

Understanding PTSD-Treatment and Diagnosis

New Methods of Treatment

Screening due to Heritability

New Understanding of Effects on Stress and Trauma

PTSD-Manifestation of GXE

# Works Cited

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2891396/>

<http://www.nature.com/mp/journal/v6/n4/full/4000867a.html>  
<http://www.ncbi.nlm.nih.gov/pubmed/7492257>

<http://www.ncbi.nlm.nih.gov/pubmed/19018230>  
<http://www.ncbi.nlm.nih.gov/pubmed/21306736>

<http://ajp.psychiatryonline.org/article.aspx?Volume=164&page=1250&journalID=13>

<http://www.guardian.co.uk/science/neurophilosophy/2011/sep/09/pregnant-911-survivors-transmitted-trauma>

<http://www.ncbi.nlm.nih.gov/pubmed/21508512>

<http://www.ncbi.nlm.nih.gov/pubmed/19813242>

<http://www.ncbi.nlm.nih.gov/pubmed/8357033?dopt=Abstract&holding=npg>