

CHILD MALTREATMENT AND EPIGENETICS

Maltreatment can have enduring effects on development by changing the ways genes are expressed and function.³

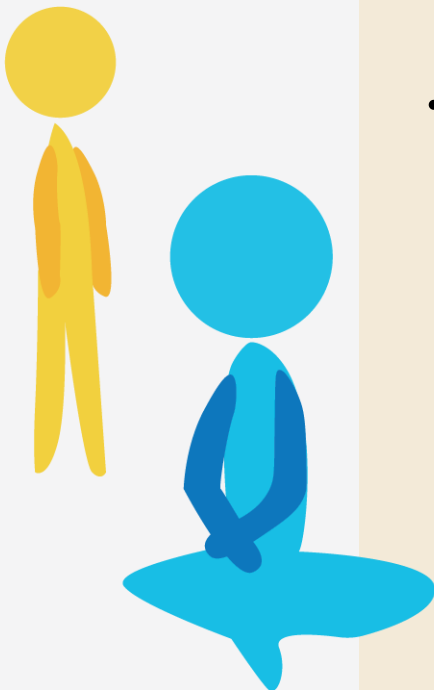
What is epigenetics?

- Epigenetics broadly refers to the way the environment impacts gene expression (in other words, the way our body's cells read and interpret genetic code). Epigenetic modifications (e.g., methylation and histone modification) change the way genes are expressed. Like a light switch, epigenetic modifications can turn genes "on"/ "off" or act as a dimmer switch to increase/decrease the way the gene is expressed.⁶
- Chronic stressors, like child maltreatment, can initiate epigenetic changes, representing one potential mechanism for how chronic stress like child maltreatment can lead to adverse health outcomes. In other words, experiencing child maltreatment can cause changes to how genes are expressed, which in turn can cause poor health and mental health outcomes.⁴



What do we know about child maltreatment and epigenetic changes?

- Studies have begun to uncover the ways that child maltreatment influences future psychological and health outcomes via epigenetic mechanisms.⁵
- Researchers at the Universities of Minnesota and Rochester studied a group of 548 school-aged children, about half of whom had child maltreatment histories.¹
 - Researchers measured maltreatment using the Maltreatment Classification System, where trained researchers code for categories of maltreatment using official Child Protective Services records.
 - Results revealed significant differences in methylation, a marker of epigenetic change, between maltreated and non-maltreated youth.
 - Researchers examined epigenetic changes in genes that influence how we feel pleasure, respond to stress, and process alcohol. Children who experienced maltreatment starting early in life had significantly more methylation on a gene site related to how we feel pleasure (i.e., dopamine).
 - Maltreated boys, specifically, who experienced maltreatment starting early in life, had significantly more methylation on the gene related to risk for alcohol use disorders.



What we know continued...

- In another study using a sample of 534 children, researchers investigated the role of maltreatment in predicting methylation on a gene involved in the stress response (i.e., the glucocorticoid receptor NR3C1 gene).²
 - They found that the more severe and frequent children's maltreatment experiences were, the more likely they were to have excessive methylation on the glucocorticoid receptor gene. The glucocorticoid receptor gene is related to the body's stress response system and how we respond to stressful situations. In turn, this methylation was associated with mental health problems including depression and externalizing behavior problems.

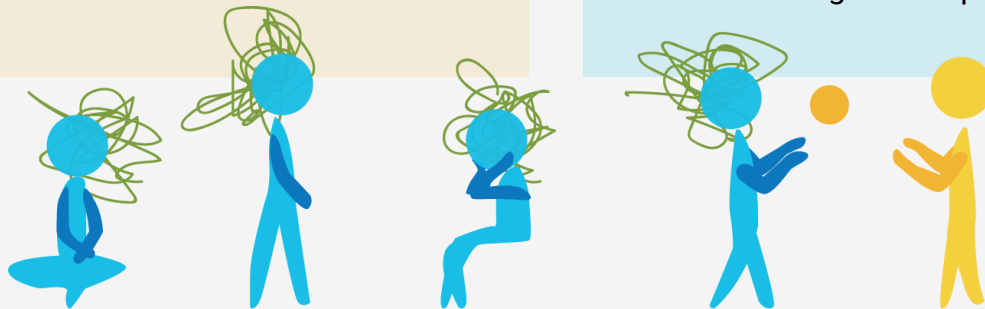
Key Terms

Gene: A functional unit of our DNA. Genes are sometimes referred to as the "fundamental unit of heredity"⁶

Gene expression: The way our DNA are converted into a functional product.

Epigenetic modification: A change to our genetic code that is triggered by things we experience in life (i.e., the environment).

Methylation: A commonly studied type of epigenetic modification. Methylation involved the addition of certain molecules (*methyl groups*) to our DNA. This causes the gene to be "dimmed" or "switched off" – in other words it decreases the gene's expression.



References

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