

Connection between childhood adversity and psychiatric disorders seen at cellular level

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In a new study published online in *Biological Psychiatry* on January 16, 2015, researchers from Butler Hospital identify an association between biological changes on the cellular level and both childhood adversity and psychiatric disorders. These changes in the form of telomere shortening and alterations of mitochondrial DNA (mtDNA), are important in the aging process, and this new research provides evidence that psychosocial factors—specifically childhood adversity and psychiatric disorders— may also influence these cellular changes and could lead to accelerated aging.

Mitochondria convert molecules from food into energy that can be used by cells and also play a key role in cellular growth, signaling, and death. Telomere shortening is also a measure of advanced cellular aging. Recent studies have examined the possible connection between mitochondria and psychiatric disorders, but the research is very limited, and no prior work has examined the relationship of mitochondrial DNA to psychosocial stress. "We are interested in these relationships because there is now clear evidence that stress exposure and psychiatric conditions are associated with inflammation and health conditions like diabetes and heart disease. Identifying the changes that occur at a [cellular level](#) due to these psychosocial factors allows us to understand the causes of these poor health conditions and possibly the overall [aging process](#)," said Audrey Tyrka, MD, PhD, Director of the Laboratory for Clinical and Translational Neuroscience at Butler Hospital and Associate Professor of Psychiatry and Human Behavior at Brown University.

Tyrka and fellow researchers recruited 299 healthy adults from the community for the study. Participants completed diagnostic interviews to assess psychiatric disorder diagnosis, and assess

childhood adversities, including parental loss, and childhood abuse and neglect. Participants were categorized into four groups based upon the presence or absence of [childhood adversity](#) and the presence or absence of lifetime depressive, anxiety, or substance use disorders. Using standard techniques, researchers extracted DNA from whole blood samples for each participant and quantified telomere length and mtDNA copy number, a measure of mitochondrial DNA content.

Results of the study show childhood adversity and lifetime psychopathology were each associated with shorter telomeres and higher mtDNA content. These effects were seen in individuals with major depression, depressive disorders, and anxiety disorders, as well as those with parental loss and childhood maltreatment. A history of substance disorders was also associated with significantly higher mtDNA copy numbers.

These findings indicate that childhood stress and some [psychiatric disorders](#) are linked to important [cellular changes](#) that may represent advanced cellular aging. "Understanding this biology is necessary to move toward better treatment and prevention options for stress-related psychiatric and medical conditions, and may shed light on the aging process itself," said Dr. Tyrka, also the director of Research for Butler Hospital.

Provided by Women & Infants Hospital

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