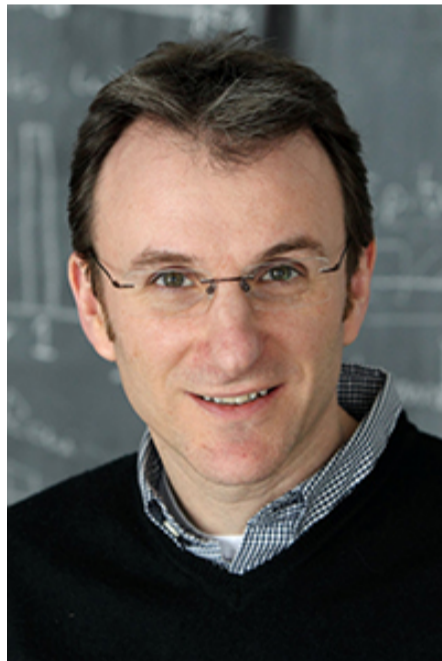


Harm to Brain Cell Structure Remains Long After Child Abuse, Study Finds

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McGill University

- > *2016 Distinguished Investigator Grant*
- > *2008 Independent Investigator Grant*
- > *2000 Young Investigator Grant*

♥ Story highlights

Researchers have a detailed new look at the long-lasting changes to the brain that may leave child abuse victims vulnerable to depression and suicide.

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Child abuse leaves connections between developing neurons less insulated, leading to lasting abnormalities in brain structure.

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Child abuse can leave lasting marks on the brain at the cellular level, according to new research reported December 1st in the *American Journal of Psychiatry* (<https://ajp.psychiatryonline.org/doi/abs/10.1176/appi.ajp.2017.16111286>). In an analysis of brain samples from adults who died by suicide and had a history of child abuse, researchers have uncovered cellular abnormalities in a key emotion-processing region of the brain that likely impair neurons' ability to communicate with distant brain regions.

The impact of these changes on brain connectivity could explain why people who suffered abuse as children remain vulnerable to depression (/depression) and other stress-related psychiatric conditions later in life. The findings underline the importance of identifying and addressing abuse early in a victim's life, whenever possible.

Earlier studies using MRI scans have found evidence of structural differences in the brains of people with a history of child abuse or other forms of early-life trauma. In the new study, researchers led by Gustavo Turecki, M.D., Ph.D. (<http://www.douglas.qc.ca/researcher/gustavo-turecki?locale=en>), at McGill University -- a 2016 Distinguished Investigator, 2008 Independent Investigator and 2000 Young Investigator -- took a closer look at these differences by examining tissue samples from the Douglas-Bell Canada Brain Bank.

The 27 child abuse victims included in the study had all suffered severe physical or sexual abuse before the age of 15. All died by suicide. As controls, the team also examined postmortem brain tissue from 25 people who suffered from major depression and died by suicide but had no history of child abuse, as well as 26 psychiatrically healthy individuals with no history of child abuse.

The team's analysis focused on the anterior cingulate cortex, a brain region involved in regulating mood and emotions. Using a combination of molecular and sophisticated microscopy techniques, the team determined that cells from people who had suffered abuse as children were less insulated by the protective outer coating that surrounds the branching connections between neurons. This structure, known as a myelin sheath, develops during childhood and is important for preserving electrical signals that must travel long distances across the brain. Myelin is what gives the brain's white matter its color.

Dr. Turecki and his colleagues also conducted molecular analyses of cells from the anterior cingulate cortex and found evidence of epigenetic reprogramming—changes to the chemical marks that influence the activity of specific genes—among the samples from people who suffered abuse as children. The changes they identified included many that would impact myelin development.