

Does the impact of psychological trauma cross generations?

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In groups with high rates of posttraumatic stress disorder (PTSD), such as the survivors of the Nazi Death Camps, the adjustment problems of their children, the so-called "Second Generation", have received attention by researchers. Studies suggested that some symptoms or personality traits associated with PTSD may be more common in the Second Generation than the general population. It has been assumed that these trans-generational effects reflected the impact of PTSD upon the parent-child relationship rather than a trait passed biologically from parent to child.

However, Dr. Isabelle Mansuy and colleagues provide new evidence in the current issue of [Biological Psychiatry](#) that some aspects of the impact of trauma cross generations and are associated with epigenetic changes, i.e., the regulation of the pattern of [gene expression](#), without changing the DNA sequence.

They found that early-life stress induced depressive-like behaviors and altered behavioral responses to aversive environments in mice. Importantly, these behavioral alterations were also found in the offspring of males subjected to early stress even though the offspring were raised normally without any stress. In parallel, the profile of [DNA methylation](#) was altered in several genes in the germline (sperm) of the fathers, and in the brain and germline of their offspring.

"It is fascinating that clinical observations in humans have suggested the possibility that specific traits acquired during life and influenced by

environmental factors may be transmitted across generations. It is even more challenging to think that when related to behavioral alterations, these traits could explain some psychiatric conditions in families," said Dr. Mansuy, lead author on this project. "Our findings in mice provide a first step in this direction and suggest the intervention of epigenetic processes in such phenomenon."

"The idea that traumatic stress responses may alter the regulation of genes in the germline cells in males means that these stress effects may be passed across generations. It is distressing to think that the negative consequences of exposure to horrible life events could cross generations," commented Dr. John Krystal, Editor of *Biological Psychiatry*. "However, one could imagine that these types of responses might prepare the offspring to cope with hostile environments. Further, if environmental events can produce negative effects, one wonders whether the opposite pattern of DNA methylation emerges when offspring are reared in supportive environments."

Further research will be necessary to answer those questions, but these findings open a new door in the emerging field of neuroepigenetics.

More information: The article is "Epigenetic Transmission of the Impact of Early Stress Across Generations" by Tamara B. Franklin, et al. The article appears in *Biological Psychiatry*, Volume 68, Issue 5 (September 1, 2010).

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