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Our ancestors' ghosts: How transgenerational stress may influence the risk of neurological diseases

For most neurological diseases, including neurodegenerative diseases and stroke, the causes remain largely unknown. Recent research emphasized that many neurodegenerative diseases and stroke are associated with a pro-inflammatory state. Variables that alter the inflammatory state may therefore affect disease risk, progression, and recovery. Stress represents one of the most potent modulators in immune function and inflammatory processes. Work in our laboratory has shown that stress across generations has downstream effects on endocrine, metabolic and behavioral manifestations of neurodegenerative diseases and stroke via epigenetic regulation of inflammatory processes. Through potentially heritable epigenetic marks, ancestral stress and trauma may influence disease risk and outcomes in the unexposed offspring. The compounding effects of gestational stress propagate across multiple generations to influence disease risk and outcomes via miRNA regulation. In turn, the adverse transgenerational programming by stress can be reversed by environmental enrichment therapy. Our findings indicate that epigenetic and metabolic biomarkers of stress represent potentially predictive and diagnostic biomarkers of neurodegenerative diseases and stroke. Thus, ancestral programming by stress may be a significant risk factor in many common neurological diseases through altered epigenetic regulation.

Biography

Gerlinde A S Metz completed her PhD at ETH Zurich and habilitated in Medicine at University of Jena. She is a Professor and Tier 1 Board of Governors Research Chair at Canadian Centre for Behavioral Neuroscience, University of Lethbridge, Alberta, Canada. Her research program focuses on "The influence of experience and environment on behavior and brain plasticity, as well as transgenerational programming of health and disease". She has published over 130 peer-reviewed papers in reputed journals and has been serving as an Editorial Board Member of *Environmental Epigenetics*.

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