# Chapter 15 Epigenetics, Stress, and Their Potential Impact on Brain Network Function

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# Abstract

What “causal” relationships might link epigenetics, stress, and human brain function? Understanding these interrelationships can significantly enhance how we view the role of life events in shaping how the brain “works.” Behavior reflects the brain in “action,” and a mechanistic understanding of these relationships may also illuminate why so many neuropsychiatric illnesses are characterized by disordered stress-responses and behavior. This chapter explores these questions. We briefly review the origins of the epigenetics revolution in biology. We then discuss findings linking hypothalamic-pituitary-adrenal axis function and cortical metrics drawn from neuroimaging. We then briefly summarize known epigenetic mediation of molecular brain function at the level of the synapse. Finally we provide an overview of current and forward-looking approaches toward understanding macroscopic brain *network* function. This preliminary synthesis is intended to motivate integrative future approaches grounded in previous experimental and theoretical work in neurobiology, psychosocial studies, and neuroimaging.