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Adverse childhood experiences, allostasis, allostatic load, and age-related disease.

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Abstract

How do adverse childhood experiences get 'under the skin' and influence health outcomes through the life-course? Research reviewed here suggests that adverse childhood experiences are associated with changes in biological systems responsible for maintaining physiological stability through environmental changes, or allostasis. Children exposed to maltreatment showed smaller volume of the prefrontal cortex, greater activation of the HPA axis, and elevation in inflammation levels compared to non-maltreated children. Adults with a history of childhood maltreatment showed smaller volume of the prefrontal cortex and hippocampus, greater activation of the HPA axis, and elevation in inflammation levels compared to non-maltreated individuals. Despite the clear limitations in making longitudinal claims from cross-sectional studies, work so far suggests that adverse childhood experiences are associated with enduring changes in the nervous, endocrine, and immune systems. These changes are already observable in childhood years and remain apparent in adult life. Adverse childhood experiences induce significant biological changes in children (biological embedding), modifying the maturation and the operating balance of allostatic systems. Their chronic activation can lead to progressive wear and tear, or allostatic load and overload, and, thus, can exert long-term effects on biological aging and health.