Minireview: neuroprotective effects of estrogen-new insights into mechanisms of action.

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Abstract
An accumulating body of evidence clearly establishes that estradiol is a potent neuroprotective and neurotrophic factor in the adult: it influences memory and cognition, decreases the risk and delays the onset of neurological diseases such as Alzheimer’s disease, and attenuates the extent of cell death that results from brain injuries such as cerebrovascular stroke and neurotrauma. Thus, estradiol appears to act at two levels: 1) it decreases the risk of disease or injury; and/or 2) it decreases the extent of injury incurred by suppressing the neurotoxic stimulus itself or increasing the resilience of the brain to a given injury. During the past century, the average life span of women has increased dramatically, whereas the time of the menopause has remained essentially constant. Thus, more women will live a larger fraction of their lives in a postmenopausal, hypoestrogenic state than ever before. Clearly, it is critical for us understand the circumstances under which estradiol exerts protective actions and the cellular and molecular mechanisms that underlie these novel, nonreproductive actions.

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