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Tyrosine improves behavioral and neurochemical deficits caused by cold exposure

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Abstract

The effects of acute cold stress were assessed behaviorally and neurochemically. The norepinephrine (NE) precursor, tyrosine (TYR), the catecholamine-releasing compound, amphetamine (AMPH), and the adrenoceptor agonist, phenylpropanolamine (PPA), were administered systemically either alone or in conjunction with TYR 30 min prior to cold exposure. All three sympathomimetic treatments dose-dependently improved performance in a forced swim test following hypothermia (T(c)=30 degrees C). AMPH/TYR or PPA/TYR combinations further improved performance vs. either agent given alone. Microdialysis showed elevated hippocampal NE concentrations in response to hypothermia. TYR further elevated NE concentration in cold/restrained rats vs. saline (SAL)-treated controls. These results suggest that sympathomimetic agents, including the nutrient TYR, which enhance noradrenergic function, improve performance in animals acutely stressed by hypothermia.