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Protective Effects of Ginseng Components in a Rodent Model of Neurodegeneration

Abstract

To test the proposed neuroprotective activity of whole ginseng extract and its components, we used 3-nitropropionic acid (3-NP), an inhibitor of succinate dehydrogenase, to produce neurodegeneration. Treatment with 3-nitropropionic acid (90mg/kg) over a 5-day period resulted in severe impairment of movement and loss of neurons in the striatum. Pretreatment with a preparation from the whole root of American ginseng had no protective effects. Pretreatment with a preparation of ground leaves and stems, which contains greater levels of ginsenosides than ground root, improved the behavioral score and reduced the volume of the striatal lesion. A partial purification of American ginseng was performed to concentrate the putative protective components: Rb₁, Rb₃, and Rd (termed Rb extract). Pretreatment with the Rb extract significantly reduced the 3-nitropropionic acid–induced motor impairment and cell loss in the striatum, and it completely prevented any mortality. Significant effects on motor function, mortality, and the striatal lesion volume also were measured in animals pretreated with the individual ginsenosides, Rb₁, Rb₃, or Rd. The results demonstrate that some of the ginsenosides have neuroprotective activity, and that a partial purification of whole ginseng to concentrate the neuroprotective components may have utility as a neuroprotective agent. *Ann Neurol* 2005;57:642–648