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Neuroprotective Effect of Resveratrol in Cerebral Ischemia

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20.1 Introduction

Stroke is a condition of acute neurologic dysfunction that results from ischemic brain injury. It has variable clinical manifestations, which correspond to the focal areas of the brain involved [1]. The two main types of stroke are ischemic and hemorrhagic, accounting for approximately 85% and 15% of cases, respectively [2]. Ischemia is a reduction in blood flow sufficient to alter normal cellular function, and embolism is the most frequent cause of cerebral ischemia. With the onset of cerebral ischemia, the blood supply to the brain is interrupted, and brain cells are deprived of glucose and oxygen. Neurons are very sensitive to ischemia, and brief periods of ischemia may initiate a complex sequence of events leading to neuronal loss, with the CA1 pyramidal neurons of hippocampus being among the most susceptible [3]. Early reperfusion of the ischemic brain is the preferred method of limiting brain injury following stroke or thrombolytic therapy in patients with acute ischemic stroke and has decreased mortality [4]. But the reperfusion process has its own hazards, as reperfusion induces an inflammatory response that causes additional injury to the cerebral microcirculation and adjacent brain tissue. Reperfusion often leads to generation of intracellular reactive oxygen species (ROS), calcium overload, excitotoxic cell injury, and inflammation, and ultimately to irreversible brain injury [5]. This chapter discusses the possible mechanisms underlying the beneficial effects of resveratrol in cerebral ischemic injury.

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