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Lecture Abstract or Synopsis for publication

LIPILOU-NSC Study: Neurotrophic Effect of Atorvastatin in NSCs Agency Ischemic Injury

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Abstract

With the growth of the aged population, cerebral infarction has become one of the most critical health issues Oxygen and glucose deprivation (OGD) is well-known to play vital roles in cerebral. OGD also injures neural stem cells (NSCs), which could contribute to brain recovery after cerebral infarction. Proper protection of NSCs after stroke might enhance recovery. Because atorvastatin has been known to have neuroprotective effects, we performed the present study to check whether it could rejuvenate NSCs injured by OGD. Primary cultured NSCs were exposed to OGD for 8 h, and the main characteristics of stem cells, such as survival, proliferation, migration, and differentiation, were evaluated to confirm the effect of OGD on NSCs. Next, cells were treated with various concentrations of atorvastatin with exposure to OGD for 8 h to confirm whether it could rejuvenate NSCs. OGD significantly affected the survival, proliferation, migration, and differentiation of NSCs. However, treatment with atorvastatin meaningfully restored survival, proliferation, migration, and differentiation of NSCs. These beneficial effects of atorvastatin were blocked by treatment with either a PI3K inhibitor or an ERK inhibitor. In conclusion, OGD damages NSCs and causes them to lose the main characteristics of stem cells so that they cannot contribute to brain recovery after cerebral infarction. However, treatment with atorvastatin after cerebral infarction can effectively rejuvenate NSCs through activating the PI3K and ERK pathways to aid in brain regeneration.

Keywords

Atorvastatin; Extracellular signal-regulated kinase; Neural stem cells; Oxygen–glucose deprivation; Phosphatidylinositol 3-kinase; Stroke