

**Keywords:** Alzheimer's disease; Amyloid beta; PI3K; Neurons; Neural stem cells

**Abbreviations:** PI3K: Phosphatidylinositol 3-kinase; GSK-3 : Glycogen synthase kinas-3 ; VEGF: Vascular endothelial growth factor; GS: Glycogen synthase; CoQ10: Coenzyme Q10;

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cells (ESCs) and activation of this pathway is significant for maintaining pluripotency in ESCs [15]. Several studies showed that the phosphatase and tensin homolog deleted on chromosome 10 (PTEN), an antagonist of PI3K, negatively regulates NSCs proliferation, survival, and self-renewal both in vivo and in vitro. Contrary to PTEN, components of the PI3K pathway were reported to be involved in the self-renewal of NSCs [16,17] (Figure 1).

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