
Akt increases sox2 expression in adult hippocampal neural progenitor cells, but increased sox2 does not promote proliferation.

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Public Summary:

Multiple extracellular factors have been shown to modulate adult hippocampal neural progenitor cell (NPC) proliferation and self-renewal, and we have previously shown that Akt is an important mediator of the effects of these extracellular factors on NPC proliferation and differentiation. However, very little work has investigated how and whether Akt is involved in maintaining the multipotency of these cells. Here we demonstrate that Akt promotes expression of Sox2, a core transcription factor important for the self-renewal of NPCs. Retroviral-mediated overexpression of wild-type Akt increased Sox2 protein expression, particularly under conditions that promote cell differentiation, whereas Akt inhibition decreased Sox2. Similarly, quantitative reverse transcription (RT)-PCR in differentiating cultures indicated that Akt rescued Sox2 mRNA to levels present under conditions that promote cell proliferation. Additionally, pharmacological inhibition of Akt did not affect Sox2 protein levels in cells constitutively expressing Sox2 from a retroviral vector, indicating that Akt does not affect Sox2 protein stability. Further, in contrast to Akt overexpression, Sox2 overexpression does not increase NPC viable cell number or proliferation yet does inhibit differentiation. Collectively, these results indicate that Akt promotes cell proliferation and maintenance of a multipotent state via two downstream paths.

Scientific Abstract:

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