



proliferation / self-renewal pathway in stem cells

### Figure 9. Sonic Hedgehog Signaling Maintains Proliferation/Self-renewal of Cerebellar Progenitor Cells

The Shh signaling cascade regulates both the Rb pathway and the p53 pathway via Bmi1 control of the p16/p19 proliferation checkpoint. Inhibition of Smoothed (Smoh) by the Shh receptor Patched (Ptch) results in downstream signaling in the nucleus. One part of the signal induces N-Myc, Cyclin D1, and D2, whereas the other part activates Bmi1 via the Gli effectors. (Adapted from Valk-Lingbeek et al. 2004.)