ID4

ID4 is a protein-coding gene. In humans, it encodes for the protein known as DNA-binding protein inhibitor ID-4.

This protein is known to be involved in the regulation of many cellular processes during both prenatal development and tumorigenesis. This is inclusive of embryonic cellular growth, senescence, cellular differentiation, apoptosis, and as an oncogene in angiogenesis.

Zhang et al. found that Id4 is a downstream target of Notch2 signaling and maintains dentate gyrus (DG) Neural stem cells (NSCs) quiescence by blocking cell-cycle entry. Id4 expression is sufficient to promote DG NSC quiescence and Id4 knockdown rescues Notch2-induced inhibition of NSC proliferation. Id4 deletion activates NSC proliferation in the DG without evoking neuron generation, and overexpression increases NSC maintenance while promoting astrogliogenesis at the expense of neurogenesis. Together, these findings indicate that Id4 is a major effector of Notch2 signaling in NSCs and a Notch2-Id4 axis promotes NSC quiescence in the adult DG, uncoupling NSC activation from neuronal differentiation [1].

1)
Zhang R, Boareto M, Engler A, Louvi A, Giachino C, Iber D, Taylor V. Id4 Downstream of Notch2 Maintains Neural Stem Cell Quiescence in the Adult Hippocampus. Cell Rep. 2019 Aug 6;28(6):1485-1498.e6. doi: 10.1016/j.celrep.2019.07.014. PubMed PMID: 31390563.