Sonic hedgehog (Shh)-Gli signaling controls neural progenitor cell division in the developing tectum in zebrafish

Feijóo, Carmen G.

Oñate, Maritza G.

Milla, Luis A.

Palma, Verónica A.

Despite considerable progress, the mechanisms that control neural progenitor differentiation and behavior, as well as their functional integration into adult neural circuitry, are far from being understood. Given the complexity of the mammalian brain, non-mammalian models provide an excellent model to study neurogenesis, including both the cellular composition of the neurogenic microenvironment, and the factors required for precursor growth and maintenance. In particular, we chose to address the question of the control of progenitor proliferation by Sonic hedgehog (Shh) using the zebrafish dorsal mesencephalon, known as the optic tectum (OT), as a model system. Here we show that either inhibiting pharmacologically or eliminating hedgehog (Hh) signaling by using mutants that lack essential components of the Hh pathway reduces neural progenitor cell proliferation affecting neurogenesis in the OT. On the contrary, pharmacological gain-of-function experiments result in significant increase