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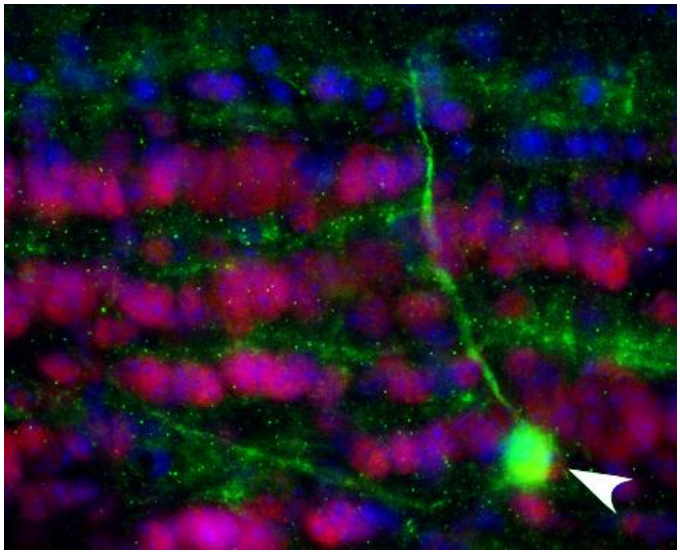
Characterization of Fgf10-expressing cells and the cellular and molecular regulation of a novel migratory stream in the adult mouse brain

Accumulating evidence suggests that new neurons and glials cells are generated in diverse areas of the adult mammalian brain. In this project we investigate the potential and fate of a discrete population of cells that express Fibroblast Growth Factor 10 (Fgf10), a gene that has been associated with stem cell function in non-neural tissues. We have focused on two specific areas of the adult brain; the olfactory bulbs and the hypothalamus. Using tissue derived from a line of Fgf10-lacZ reporter mice and a combination of immunohistochemistry and 3D-reconstruction analyses, we have discovered that in both of these areas, descendents of FGF10-expressing ($Fgf10^+$) cells can differentiate into both neurons and glial cells. This suggests that $Fgf10^+$ cells are multipotential and that the local niches determine the fate of their progeny. For example, in the olfactory bulbs, the descendents of $Fgf10^+$ cells populate the mitral, glomerular and external plexiform layers and predominantly generate GABA-ergic neurons.
We have also studied the origins of such cells and found that the $Fgf10^+$ cells in Amygdala appear to contribute to the neurons and glial cells found in the olfactory bulbs, with cells following a ventral trajectory to reach the olfactory bulbs. By contrast, in the adult hypothalamus, new neurons and glials cells appear to originate from $Fgf10^+$ tanycytes residing in the median eminence.
we are conducting loss and gain-of-function studies to determine the molecular role of Fgf10 and the significance and contribution of these sets of neurons and glial cells to adult brain function.



Vibratome section of olfactory bulbs derived from adult Fgf10-lacZ reporter mice, immuno-labelled with NeuN (red) and anti-β-galactosidase (green) antibodies and counterstained with Hoechst, reveals the presence a Fgf10-expressing neuron in this tissue.