

## The role of adult neurogenesis in olfaction

[https://www.youtube.com/watch?v=fdyRamKl1wE&ab\\_channel=TUDresden](https://www.youtube.com/watch?v=fdyRamKl1wE&ab_channel=TUDresden)

*Preferred course of study/expertise of candidate:* Neuroscience, Cellular and Molecular biology

Olfaction underlies our ability to detect chemicals in the environment allowing us to prime specific memories and emotions, shape perceptions of stress and mood and, hence, directly influence our behaviour. Notably, the olfactory system is exceptional in that it includes Neural Stem Cells (NSC) undergoing adult neurogenesis both at the level of the Olfactory Epithelium (OE) and Olfactory Bulb (OB) within the peripheral and central nervous system, respectively (1,2).

Our group has found that shortening the G1 phase of the cell cycle promotes the expansion of NSC and ultimately increases the number of neurons generated in the mammalian brain (3). More recently, we used this approach to increase neurogenesis in the OB and found not only those supernumerary neurons matured and integrated normally in the olfactory system but also that mice performed better at discriminating between very similar odorants (4).

Moving from the central to the peripheral nervous system, little is known about the role of adult neurogenesis within the OE and how this process influences olfaction. Following our previous approach, the PhD candidate will develop and test the efficacy of increasing NSC expansion and adult neurogenesis in the rodent OE toward improving olfactory function in physiological conditions or rescuing its loss upon disease.

1. Schwob, J.E., et al., *Stem and progenitor cells of the mammalian olfactory epithelium: Taking poietic license*. J Comp Neurol, 2017. **525**(4): p. 1034-1054.
2. Lazarini, F. and P.M. Lledo, *Is adult neurogenesis essential for olfaction?* Trends Neurosci, 2011. **34**(1): p. 20-30.
3. Lange, C., W.B. Huttner, and F. Calegari, *Cdk4/cyclinD1 overexpression in neural stem cells shortens G1, delays neurogenesis, and promotes the generation and expansion of basal progenitors*. Cell Stem Cell, 2009. **5**(3): p. 320-31.
4. Bragado Alonso, S., et al., *An increase in neural stem cells and olfactory bulb adult neurogenesis improves discrimination of highly similar odorants*. EMBO J, 2019. **38**: p. e98791