

CRBM external seminar
December 13th 2023 11:00 am Salle Marcel Dorée

Zebrafish olfactory organ morphogenesis modélisation

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Julie is a developmental biologist, researcher at the CBI, Toulouse. After a PhD in 2004 under the supervision of Marc Moreau in Toulouse, she moved to the UK for a post-doc in the lab of Caroline Hill. She was recruited at the CNRS in 2008. Using genetics, mathematical modeling and live imaging, she explores the development of sensory organs in the zebrafish.

Abstract

The morphogenesis of the olfactory sensory organ of the zebrafish is a unique model for studying cellular motility involved in the maturation of the olfactory epithelium (OE) into a rosette-shaped cluster derived from a row of aligned cell delimitating an arc around the forebrain, the telencephalon. This olfactory morphogenesis has been shown to require the *Cxcl12a/Cxcr4b* axis, a well-known chemotaxis chemokine involved in many aspects of cellular differentiation and organogenesis. However, the expression pattern of *cxcl12a* in the telencephalon and the activation of the elicited pathway in olfactory cells are still not characterized. To understand these processes, we developed a mathematical model mimicking OE morphogenesis. We then used the infra-red laser evoked gene operator (IR-LEGO) technique to control gene expression in time and space during live imaging to test the outcome of the generated model. In conclusion, our results, combined with a virtual representation of the activation of the *Cxcl12a* pathway, allow us to propose that a model of mosaic and heterochronic activation of this pathway allows collective migration to form the olfactory epithelium.

Selected publications

Batut, J., Kvaskoff, M. and Morris, M. C. (2021). When mentoring matters: a French mentoring program for women in science. *Nat Biotechnol* **39**, 776–779.

Aguillon, R., Madelaine, R., Aguirrebengoa, M., Guturu, H., Link, S., Dufourcq, P., Lecaudey, V., Bejerano, G., Blader, P. and Batut, J. (2020). Morphogenesis is transcriptionally coupled to neurogenesis during peripheral olfactory organ development. *Development* **147**, dev192971.