Department Zebrafish Neurogenetics at the Institute of Developmental Genetics

The goal of the **Zebrafish Neurogenetics Department** at the **Institute of Developmental Genetics** is to unravel the mechanisms and factors coordinating neurogenesis and neuronal specification and function in the vertebrate brain. The model system is the zebrafish midbrain-hindbrain, which harbors crucial neuronal populations involved in social behavior control. In this model, genetic approaches (mutagenesis, transgenesis) are combined with manipulations of the embryonic and adult brain to approach the spatio-temporal control of neurogenesis and neural stem cell maintenance and its influence on neuronal specification and function.

Specifically we study the function of new proneural or neurogenic genes expressed within the embryonic and adult midbrain-hindbrain, and we investigate the development and function of raphe serotonergic neurons, which develop from midbrain-hindbrain progenitors and are involved in mood behavior. We further approach the outcome of neurogenesis control by focusing on one aspect of mood, the response to drugs of addiction.

The Department participates in the Helmholtz Research Programme **Comparative Genome Research**, in which it contributes to the specific topics **Functional Genome Dissection** and **Stem Cells**.

The Zebrafish Neurogenetics Department is part of the Integrated Project ZF-Models within the European Union 6th Framework Programme, and is further supported by a Life Science Project Grant as well as a special grant from the ICM (Institute for Brain and Spinal Cord Research, France).

The Department emanated from the Zebrafish Neurogenetics Group within the Institute of Developmental Genetics as a department in 2006. The Department has 14 members of staff, including 9 scientists, of whom 4 are postgraduate students. 5 scientists are supported by grants.

Research Spotlight

The zebrafish as a model for assessing the rewarding effects of drugs of addiction

Mood disorders, of which drug addiction is an example, affect millions of people worldwide. The genetic components underlying these behaviors remain poorly understood. To gain an insight into these processes, we developed behavior paradigms assessing reward in adult zebrafish. We showed that adult zebrafish robustly respond to the psychostimulant drug D-amphetamine, a major component of Ecstasy. Using mutants of the cholinergic system, we further showed that, like in mammals, cholinergic neurotransmission is involved in modulating reward in fish. Based on these results, we screened for ENU-induced zebrafish mutants resistant to D-amphetamine. We recovered several lines which we are currently characterizing. Our results validate the zebrafish for studies on addiction, and are likely to result in the identification of new genetic components of the addiction process.

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