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The Molecular Neurogenetics Unit investigates the molecular underpinnings of development and functioning of the nervous system and its building blocks, the neurons and other cell types.

Neurogenetics has acquired a prominent position within the molecular neuroscience field, thanks to the elucidation of the human genome sequence and the application of robust tools for genomics research.

StrategyOur research has identified a large number of genes that carry causative mutations in a variety of cognitive disorders that have an important medical and socio-economical impact to our society; in particular intellectual disability, autism and neural migration disorders.

The identified “disease” genes have crucial functions in development and maintenance of the brain and in basic molecular pathways in learning and memory. Therefore, we use such genes as a starting point to resolve the role of the corresponding proteins in the normal and diseased brain.

Multi-level strategyTo that end, we follow a multi-level strategy that besides neurogenetics includes functional genomics which encompasses the generation and characterization of model organisms (mouse, rat and Drosophila) and molecular & cellular neurobiology to dissect molecular and cellular mechanisms that are key to learning and memory.

Our strategy aims to reveal novel neurobiological concepts by resolving the genetic and epigenetic networks that are disrupted in cognitive disorders. At the same time, we generate new opportunities for diagnostics and ultimately treatment of patients with a cognitive dysfunction.

In other words, we adhere to a true translational research approach starting from patients to clinical and molecular genetics to genes to molecular and cellular networks to model organisms and back again to humans.

Lines of investigationResearch within the Molecular Neurogenetics Unit comprises three major lines of investigation:

Human Molecular Genetics
Functional Neurogenomics
Molecular & Cellular Neurobiology