INPhINIT

"la Caixa" Fellowship Programme

IBEC

Institute for Bioengineering of Catalonia

EXCELENCIA SEVERO OCHOA

Many people form part of history.
Only a few manage to change it.

IBEC participates in "la Caixa" Fellowship Programme with a set of stimulating PhD projects and excellent research groups to host the fellows

Molecular and cellular neurobiotechnology group

Group leader: José Antonio del Río

Optogenetic control of axonal regeneration

The experimental line in which the project will be developed is based on the study of the modulation of the neuronal activity, by optogenetic means, and its role in axonal growth and synaptogenesis during development or after spinal cord injury.

After a spinal cord injury, injured axons fail to regenerate and reestablish synapses, causing a loss of function. However, after a partial injury, non-injured axons are able to sprout and create new synapses onto targets originally innervated by severed axons. This process is associated to the preservation on these neurons of neuronal activity. Thus, the aim of this project is to promote axonal sprouting and regeneration as well as new synapse formation induced by neuronal activity by using optogenetic stimulation. Moreover, this project will also characterize the molecular mechanisms of the genetic and epigenetic reprogramming of cortical, sensory and motor neurons.

Job position description

This project will be developed by the use of different state of the art techniques such as: Primary neuronal cell culture (cortical, sensory and motor neurons), Optogenetic stimulation tolos (celular transfection, infection and electroporation, pulse train light stimulation), neuronal activity with fluorescent probes (calcium, voltage, vesicle release), microfluidic devices to create in-vitro models of development and/or injury (lab-on-a-chip), immunoassays (IHC, ELISA, Slot Blot, Western blot, Immunoprecipitation, chromatin immunoprecipitation), Molecular biology (cloning, PCR, qPCR), Deep sequencing (MeDIPseq, mRNAseq)

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