Optogenetics to Interrogate Neuron-Glia Interactions in Pups and Adults

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Abstract
In just over 10 years, the use of optogenetic technologies in neuroscience has become widespread, having today a tremendous impact on our understanding of brain function. An extensive number of studies have implemented a variety of tools allowing for the manipulation of neurons with light, including light-activated ion channels or G protein-coupled receptors, among other innovations. In this context, the proper calibration of photostimulation in vivo remains crucial to dissect brain circuitry or investigate the effect of neuronal activity on specific subpopulations of neurons and glia. Depending on the scientific question, the design of specific stimulation protocols must consider from the choice of the animal model to the light stimulation pattern to be delivered. In this chapter, we describe a detailed framework to investigate neuron-glia interactions in both mouse pups and adults using an optogenetic approach.