

Manipulating a living cell with light

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Abstract

In this contribution, optical manipulation of living cell functionality with laser light will be shown. In particular, it will be described how it is possible to obtain information on cell division mechanism by optical microtrapping and nano-surgery operation on subcellular part. Furthermore, it will be shown the possibility to control ERG channel current via light, up to the complete inhibition of pump channel current. Finally, a nanosurgery experiment will be shown on a living mice, demonstrating the Central Nervous System reaction to a local damage in an intact neural network.

From the methodological point of view, it will be shown the principle of operation of optical microtrapping, optical nanosurgery and optical knock-out. Some methodological studies and results will be described regarding the nanosurgery features of label subcellular samples, and the optical knock-out of proteins, comparing photodamage with photobleaching