

Optically induced enhancement of activity in biological neuronal networks monitored with wide field calcium imaging

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The information processing efficiency shown by biological neural networks is emergent behavior, a collective feature far beyond the capabilities of individual neuron. In order to study these properties we designed and realized an homemade optical setup aimed to study neural activity through Calcium imaging with single cell resolution and whole network field of view. Here we report a first important result: the possibility to tune network activity on a “wild type” neuronal culture, by exploiting light intensity. The results we are presenting here enables a complete remote control without the need for any genetic manipulation of the culture. The disappearing of this effect following selective blockage of thermosensitive transient receptor potential vanilloid channel (TRPV-4) identifies this channel as first responsible of the light-induced activity enhancement.