Video Article

In vivo visualization of synaptic vesicles within Drosophila larval segmental axons.

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Abstract

Elucidating the mechanisms of axonal transport has shown to be very important in determining how defects in long distance transport affect different neurological diseases. Defects in this essential process can have detrimental effects on neuronal functioning and development. We have developed a dissection protocol that is designed to expose the Drosophila larval segmental nerves to view axonal transport in real time. We have adapted this protocol for live imaging from the one published by Hurd and Saxton (1996) used for immunolocalizatin of larval segmental nerves. Careful dissection and proper buffer conditions are critical for maximizing the lifespan of the dissected larvae. When properly done, dissected larvae have shown robust vesicle transport for 2-3 hours under physiological conditions. We use the UAS-GAL4 method (Brand and Perrimon, 1993) to express GFP-tagged APP or synaptotagmin vesicles within a single axon or many axons in larval segmental nerves by using different neuronal GAL4 drivers. Other fluorescently tagged markers, for example mitochrondria (MitoTracker) or lysosomes (LysoTracker), can be also applied to the larvae before viewing. GFP-vesicle movement and particle movement can be viewed simultaneously using separate wavelengths.

Disclosures

No conflicts of interest declared.