

## Fluorescence Microscopy Journal Club

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# CaV1 and CaV2 calcium channels mediate the release of distinct pools of synaptic vesicles

by Brian D. Mueller et al.

*eLife* 12:e81407

This article is open access: <https://doi.org/10.7554/eLife.81407>

Hello researcher,

Today, I am happy to share with you another [article](#) in our [Fluorescence Microscopy Journal Club](#) series featuring super-resolution microscopy.

The activation of voltage-gated calcium channels at presynaptic terminals is known to play a role in the fusion of synaptic vesicles containing neurotransmitters by increasing intracellular calcium levels. Presynaptic output is influenced by a number of factors, including density of calcium channels, properties of the channels, and distance of channels from vesicles.

In this study, the authors examine the function of the calcium channels CaV1 and CaV2 in the neuromuscular junction of *C. elegans* using a behavioral assay of locomotion, electrophysiology, and flash-and-freeze electron microscopy. Using single-molecule localization microscopy (SMLM), they demonstrate that CaV1 and CaV2 mediate the fusion of distinct pools of synaptic vesicles in the neuromuscular junction of *C. elegans*. Furthermore, CaV2 is closely associated with vesicles proximal to the active zone and associated with the priming protein UNC-13L. CaV1 is lateral to the active zone, associated with vesicles containing UNC-13S. They show CaV1 is also closely related nano-anatomically with Ryanodine receptors, and show additional functional evidence that CaV1 channels' activity is linked to calcium release from internal stores. The authors hypothesize the two channels play complementary roles in tuning and governing the fusion of synaptic vesicles and neurotransmitter release.

The extensive use of SMLM data collected with Bruker's [Vutara 352](#) highlights the utility of this technique in understanding the nano-machinery that controls synaptic function.

I hope you find this article interesting. Please [contact me](#) if you'd like any assistance in super-resolution microscopy applications.

**Jeff Stuckey**

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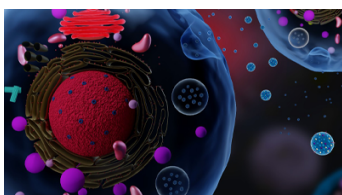
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