New methods to explore astrocyte effects on brain function

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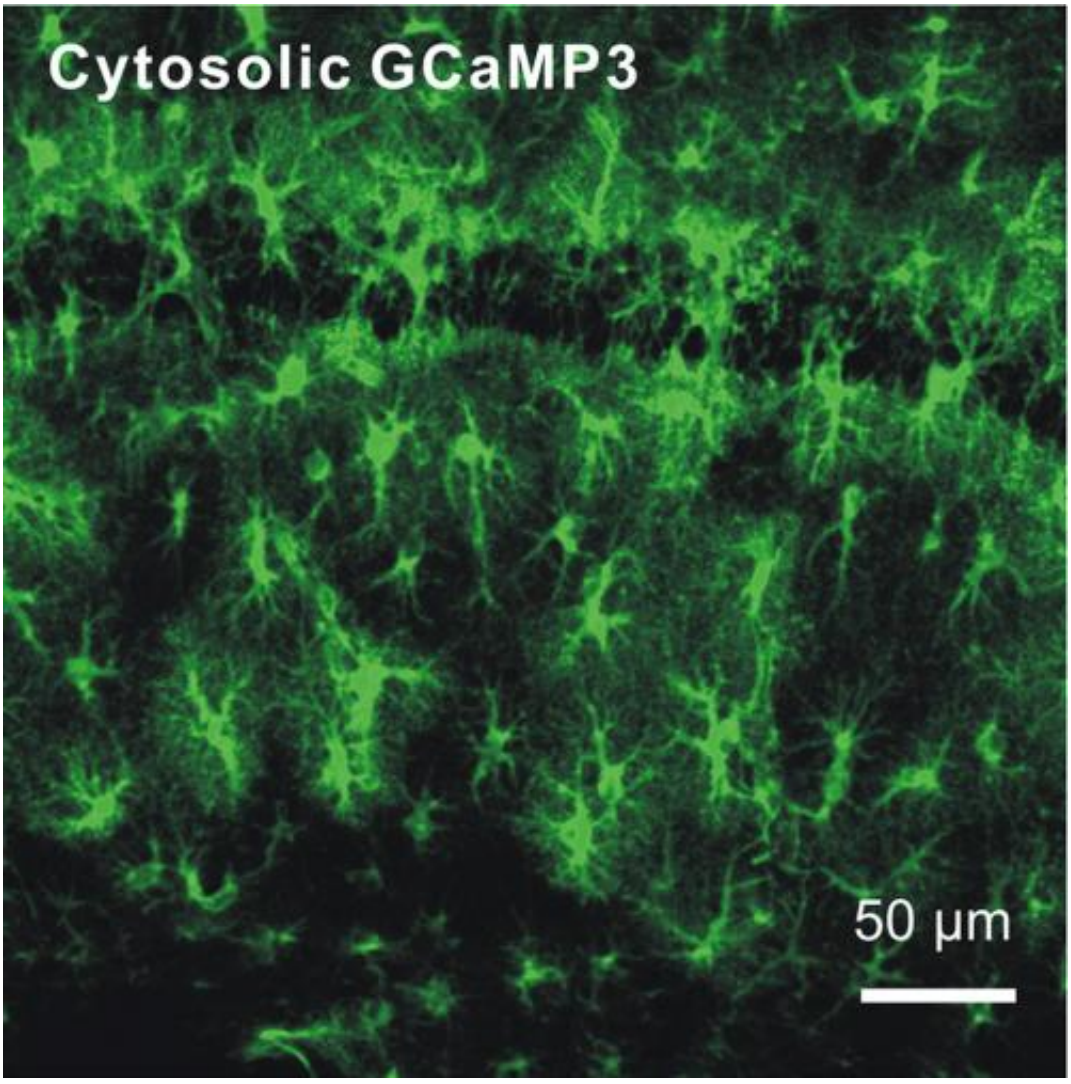

This image shows cytosolic GCaMP3 expressed in astrocytes in the hippocampus of adult mice. A *JGP* study presents new methods to evaluate how astrocytes contribute to brain function and paves the way for future exploration of these important brain cells. Credit: Shigetomi, E., et al. 2013. *J. Gen. Physiol.*

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A study in *The Journal of General Physiology* presents new methods to evaluate how astrocytes contribute to brain function, paving the way for future exploration of these important brain cells at unprecedented levels of detail.

Astrocytes—the most abundant cell type in the human brain—play crucial roles in brain physiology, which may include modulating synaptic activity and regulating local blood flow. Existing research tools can be used to monitor calcium signals associated with interactions between astrocytes and neurons or blood vessels. Until now, however, astrocytic calcium signals have been investigated mainly in their somata (cell bodies) and large processes, rather than in distal fine processes close to neuronal synapses or the endfeet that surround blood vessels. Previous studies have also mainly investigated immature specimens rather than mature brain cells.

Now, a team of California researchers provides detailed methods to visualize calcium signals throughout entire astrocytes in hippocampal slices from adult mice. The team observed numerous spontaneous localized calcium signals throughout the entire astrocyte, including the branchlets and endfeet. Their results indicated that calcium signals in endfeet were independent of those in somata and occurred more frequently. In addition to the specific findings, their methods can be used in future studies to advance our understanding of the physiology of astrocytes and their interactions with neurons and the microvasculature of the brain.

More information: Shigetomi, E., et al. 2013. J. Gen. Physiol. doi:10.1085/jgp.201210949. Adler, E. 2013. J. Gen. Physiol.

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