

The view inside your brain

Dana H. Simmons

Department of Neurobiology, The University of Chicago, Chicago, IL, USA

Correspondence to: Dana H. Simmons. Department of Neurobiology, The University of Chicago, Chicago, IL, USA. Email: dhsimmons@uchicago.edu.

Submitted Sep 16, 2017. Accepted for publication Oct 13, 2017.

doi: 10.21037/cdt.2017.10.06

View this article at: <http://dx.doi.org/10.21037/cdt.2017.10.06>

Dana H. Simmons is a graduate student at The University of Chicago, where she studies cerebellar physiology. The principle type of neuron in the cerebellum, the Purkinje neuron, is perhaps the most branched type of neuron in the nervous system. While performing confocal calcium imaging experiments, Dana was struck by the beauty of the Purkinje neurons' complex dendritic branching. Inspired by the repeated appearance of this "Purkinje Pattern," or branched structure, throughout microscopic and macroscopic nature (e.g., trees, rivers, coral, antlers, blood vessel networks, decision diagrams), Dana began to utilize

the confocal microscope and lasers to highlight the Purkinje cell's dendrites, and the textured tissue in which it lies. Dana has created a collection of Purkinje neuron images that highlight the beauty of entire Purkinje neurons with a single laser (*Figure 1*) and with added white light (*Figure 2*). Additionally, she has created a series of images that focus specifically on the dendritic branches (*Figure 3*). In several images, it is possible to view the glass micropipettes used to fill the Purkinje neuron with dye via whole cell patch clamp electrophysiology (*Figure 4*). Dana's goal with her science-based art is to inspire curiosity and encourage discussion

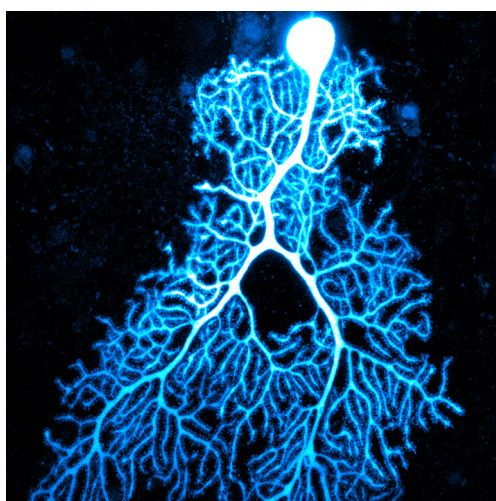


Figure 1 "Diagonal". Purkinje neuron filled with Alexa 633 fluorescent dye via patch clamp electrophysiology. The dendritic arbor highly resembles tree branches.

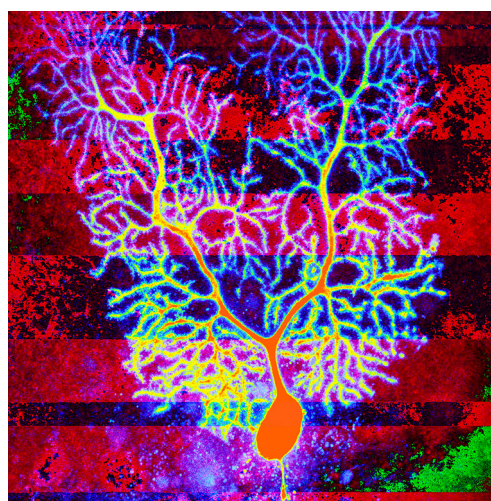


Figure 2 "Coral". Purkinje neuron filled with fluorescent dye. This image was obtained as a z-stack using both lasers and white light of variable intensity. The z-stack was collapsed into a single image, and additional false coloring was added.

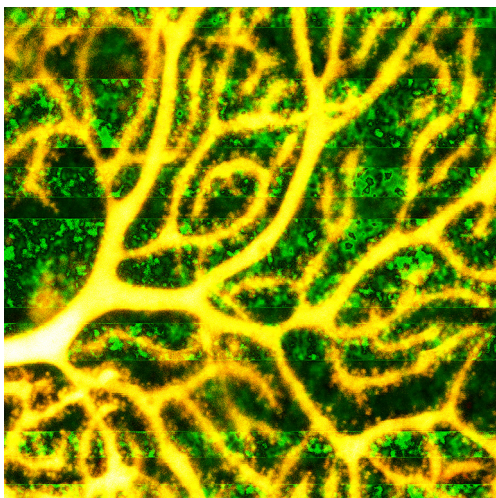


Figure 3 “Stevenson”. Close-up view of the complex dendritic arbor on a Purkinje neuron. At this magnification, it is easy to see dendritic spines, which are rounded structures protruding from the thin dendrites.

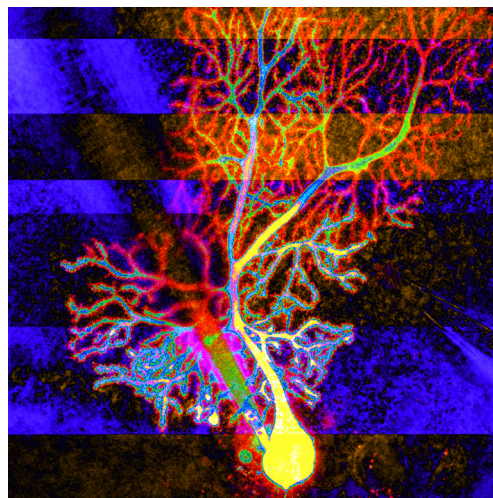


Figure 4 “Propter”. Two glass micropipettes are visible in this image. The pipette connecting to the soma fills the Purkinje neuron with dye. The pipette whose taper extends into the dendritic arbor provides presynaptic electrical stimulation, which can be measured in the postsynaptic Purkinje neuron.

about neuroscience.

Acknowledgements

Thanks to the members of the Hansel Lab.

Footnote

Conflict of Interest: The author has no conflicts of interest to declare.

Cite this article as: Simmons DH. The view inside your brain. *Cardiovasc Diagn Ther* 2018;8(3):403-404. doi: 10.21037/cdt.2017.10.06