Mar 13, 2020   Version 2

🌐 3D Reconstruction of Neurons in Vaa3D V.2

DOI

dx.doi.org/10.17504/protocols.io.bdppi5mn

Allen Institute for Brain Science[1]

[1]Allen Institute

BICCN / BICAN   Allen Institute for Brain S...

👤 **Allen Institute**
     Allen Institute

Protocol status: Working
We use this protocol and it's working

Created: March 13, 2020

Last Modified: March 17, 2021

Protocol Integer ID: 34255

Keywords: reconstruction, Vaa3D, neuron, DA0022, 3d reconstruction of neuron, accurate digital representations of neuron morphology, 3d reconstruction, neuron morphology, serial 2d image, 3d space, nodes in 3d space, vaa3d, brain tissue, neuron, 2d image, variety of brain region, vaa3d this protocol, image stack, brain region, cell, accurate digital representation, full extent of the cell, axon, processing, tissue,

Abstract

This protocol is used to generate accurate digital representations of neuron morphologies from a variety of brain regions and species. Each reconstruction captures the positions and thicknesses of the soma, dendrites and axon of a biocytin-filled cell within a slice of brain tissue. To generate the reconstruction we use an image stack containing ~200-700 serial 2D images that captures the full extent of the cell within the slice. We use the Vaa3D (Terafly) program with a Kazom's Mozak user interface (Mozak for short) to visualize the 2D images in 3D. Once the stack is loaded in Mozak, our reconstruction is generated by placing nodes in 3D space. The placement of these nodes is dependent on the signal in the images. Our final output, an SWC text file (.swc format), contains many thousand rows. Each row contains a node ID, an x, y, z coordinate, radius value, neurite type, and parent node ID. After tracing is complete, we preform post processing to provide radius values, check for errors and consistency then the SWCs are uploaded into our Laboratory Information Management System.

Attachments

[DA0022_3D_Reconstruc](#)

[...](#)
1.1MB

Troubleshooting

Part of **SPRINGER NATURE**