



Apr 26, 2024

Version 1

A protocol for computerized quantitative analysis of nerve fibers, mast cells, enteric glial cells and the proximity of mast cells to the nerve fibers in 3D Images of human sigmoid mucosal biopsies V.1

DOI

<https://dx.doi.org/10.17504/protocols.io.rm7vzj3qrlx1/v1>Tao Li¹, Pu-Qing Yuan¹, Yvette Taché¹¹University of California at Los Angeles (UCLA)

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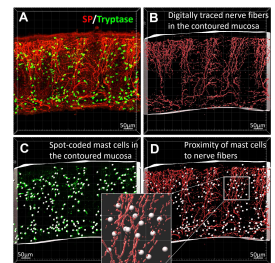
SPARC

A single cell RNA seque...



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Protocol Citation: Tao Li, Pu-Qing Yuan, Yvette Taché 2024. A protocol for computerized quantitative analysis of nerve fibers, mast cells, enteric glial cells and the proximity of mast cells to the nerve fibers in 3D Images of human sigmoid mucosal biopsies. **protocols.io** <https://dx.doi.org/10.17504/protocols.io.rm7vzj3qrlx1/v1>

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Protocol status: Working

We use this protocol and it's working

Created: April 26, 2024

Last Modified: April 26, 2024

Protocol Integer ID: 98874

Keywords: 3D images, quantitative analysis, nerve fibers, mast cells, human sigmoid biopsy, Imaris, nerve fibers in 3d image, immune cells in 3d image, quantitative analysis of nerve fiber, proximity of mast cell, human sigmoid mucosal biopsies this protocol, human sigmoid mucosal biopsy, masked nerve fiber, spotted mast cell, 3d image, nerve fiber, mast cell, 2d image, limitations of 2d image, enteric glial cell, individual spot to the surface, surfaces rendering technology, underlying peripheral mechanism, cell, surface, computerized quantitative analysis, peripheral mechanisms of visceral pain, protocol for computerized quantitative analysis, segmentation

Funders Acknowledgements:

NIH/SPARC

Grant ID: 1OT2OD024899-01

Abstract

This protocol describes a step-by-step computational workflow that we developed by adapting Imaris 9.7-9.9 Surfaces Rendering Technology (<https://imaris.oxinst.com/products/imaris-for-neuroscientists>) to perform the quantitative analysis of nerve fibers, enteric glial and immune cells in 3D images of human sigmoid mucosal biopsies, as well as to assess the proximity of mast cells to the nerve fibers which cannot be easily portrayed and precisely measured with 2D images. The volumes of surface-masked nerve fibers and enteric glial cells, the numbers of spotted mast cells and the shortest distances of the centers of each individual spot to the surfaces of nerve fibers in 3D images were automatically computed and plotted correspondently with Imaris 9.7-9.9. This computerized protocol not only reduces the biases due to observer/examiner judgment and overcomes limitations of 2D images, but also much faster than measuring manually and allows us to quantitate a larger number of samples, increasing statistical accuracy. The created parameters also provide efficient reference for us to apply the New AI Machine Learning Segmentation implemented into Imaris 10.1 recently for our quantitative analysis of large datasets. This protocol has been using in our study relevant to the underlying peripheral mechanisms of visceral pain in irritable bowel syndrome.

Attachments



A protocol for quant...

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