

QTIP: Quantifier for Topographic Index of Presynaptic-terminal

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Installation:

Extract "QTIP.rar" and put under the plugins folder of ImageJ (1.46 and later). It contains 5 class files. Restart ImageJ. A new plugin will show at the Plugins menu.

Run:

Load an image ready for TI quantification into ImageJ. It is a 3D image containing axon terminal clone and the neuropil channels. Click "Plugins>QTIP".

Parameters:

- Noise thresholds for axon and neuropil. This is the initial threshold for robust adaptive threshold selection. Suggested range: 5-8.
- Select the correct color channel for clone and neuropil.
- Filename for saving the TI result. If it is left blank, the result won't be saved.

Visualization Output:

If the checkbox for "showing the segmentation mask images" is checked, the program will show the slice by slice binary masks as image stacks, which are the segmentation results for clone and neuropil channels. The original image will also be changed to show the combined signal of two channels in the neuropil channel. (Note that this won't change the original image file unless you save and overwrite it.)

Plugin Output:

- Topographic Index (TI): It indicates the relative topographic position of the clone in the neuropil. The smaller the value, the closer it is to the dorsal side.
- Volume Ratio: It is the ratio between the volumes of the clone and the neuropil.
- Two boundary metrics: one indicates how close the axon's dorsal boundary to the neuropil's dorsal boundary, another indicates how axon's ventral boundary to the neuropil's dorsal boundary.

All are shown in the Log window, as well as being saved in the output file (in csv format). A headline is added to the output file to indicate the meanings of each column. The file is located in ImageJ's plugins folder.

Batch Process:

1. Choose Process>>Batch>>Macro There will be a dialog.
2. "Input.." is where you specify the directory of images. Leave the "Output.." blank, because you are not saving any images.
3. Click "Open.." to include the macro file for running the plugin (extension ijm). It has only one line that runs the plugin with parameters. You can edit it, e.g. for changing parameters.
4. Click "Process". It will start the batch process.