



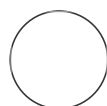
NOV 14, 2023

Regional Mouse Brain Analysis (Modified QUINT)

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DISCLAIMER

This collection of protocols was written in the Henderson lab, but all software and original protocols were developed and are available through the NeuroImaging Tools and Resources Collaboratory (NITRC).

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

Created: Aug 18, 2023

ABSTRACT

This is series of protocols that has been adapted from published and unpublished protocols broadly referred to as the QUINT workflow. Note that the original QUINT workflow was generated by Yates and colleagues, and all credit for development of these programs goes to that team. References for each software is listed below.

Yates, S. C. et al. QUINT: Workflow for Quantification and Spatial Analysis of Features in Histological Images From Rodent Brain. *Frontiers in neuroinformatics* 13, 75, doi:10.3389/fninf.2019.00075 (2019).

Puchades, M. A., Csucs, G., Ledergerber, D., Leergaard, T. B. & Bjaalie, J. G. Spatial registration of serial microscopic brain images to three-dimensional reference atlases with the QuickNII tool. *PloS one* 14, e0216796, doi:10.1371/journal.pone.0216796 (2019).

VisuAlign, RRID:SCR_017978

1. QuPath: <https://qupath.github.io/>
2. QuickNII: <https://www.nitrc.org/projects/quicknii> (SELECT ABA Mouse Edition)
3. Visualign: <https://www.nitrc.org/projects/visualign/>
4. Qmask: \\pn.vai.org\projects_secondary\henderson\NOAH\QMask-Standalone
5. Nutil: <https://www.nitrc.org/projects/nutil/>

ATTACHMENTS

[812-2118.pdf](#)

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Keywords: QUINT, Segmentation, Registration, non-linear warp transformation

Funders

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GUIDELINES

Purpose

The purpose of this workflow is to enable mouse brain segmentation, registration and quantification of regional signal. The simplest segmentation is done in QuPath because this program handles whole slide images and has good segmentation algorithms. Registration is done using 3 programs: QuickNII (aligns to a 3D atlas, typically the 2017 CCFv3 Allen Brain Atlas), Visualign (allows for non-linear warp transformation of the atlas to match sections), QMask (masks each side of the brain to allow for bilateral assessment of brain regions). Segmentations and registrations are then brought together in Nutil, enabling the generation of quantitative measures for every region of the brain.

Necessary Programs and Locations

1. QuPath: <https://qupath.github.io/>
2. QuickNII: <https://www.nitrc.org/projects/quicknii> (SELECT ABA Mouse Edition)
3. Visualign: <https://www.nitrc.org/projects/visualign/>
4. Qmask: \\pn.vai.org\projects_secondary\henderson\NOAH\QMask-Standalone
5. Nutil: <https://www.nitrc.org/projects/nutil/>

Folder Organization

The programs for registration and quantification rely on having exact file paths from which to call the data. Therefore, it is easiest to set these folders up from the beginning. We have the following typical layout for folders:

1. Project (e.g. Tau-MLi-2)
 - a. Figure (e.g. Figure 23)
 - i. Repeat (e.g. 1 or 2)
 1. Cohort/Block (e.g. TM1)
 - a. QuPath (place for qupath project and exported
 - b. QVN (for QuickNII, Visualign, Nutil)
 - i. Atlas
 - ii. Input
 - iii. Mask
 - iv. Output_Left
 - v. Output_Right
 - b. Figure (next one, same internal folder organization)...

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ATTACHMENTS

812-2118.pdf

FILES

Protocol



NAME

QuPath Visualization/Segmentation

VERSION 1

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Protocol



NAME

QuickNII Brain Atlas Registration

VERSION 1

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Maria MatosYale University

OPEN →

Protocol



NAME

**QMask Hemispheric
Separation**

VERSION 1

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OPEN →

Protocol



NAME

Visualign

Transformation

VERSION 1

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[OPEN](#) →

Protocol

NAME

Nutil Data
Integration

VERSION 1

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[OPEN](#) →

Protocol

NAME

QUINT Workflow
Appendix

VERSION 1

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Protocol

NAME

QUINT Workflow for
Fluorescence

VERSION 1

CREATED BY

Maria MatosYale University

[OPEN](#) →