Compulsory preparation material

Scientific papers

1. Bjerke I, Øvsthus M, Andersson K, Blixhavn C, Kleven H, Yates S, et al. Navigating the murine brain: Toward best practices for determining and documenting neuroanatomical locations in experimental studies. Front Neuroanat. 2018;12: 1–15. doi:10.3389/FNANA.2018.00082

2. Kleven H, Reiten I, Blixhavn CH, Schlegel U, Øvsthus M, Papp EA, Puchades MA, Bjaalie JG, Leergaard TB and Bjerke IE. A neuroscientist's guide to using murine brain atlases for efficient analysis and transparent reporting. Front Neuroinf. 2023, 17. doi:10.3389/fninf.2023.1154080.

3. Puchades MA, Csucs G, Lederberger D, Leergaard TB and Bjaalie JG. Spatial registration of serial microscopic brain images to three-dimensional reference atlases with the QuickNII tool. PLosONE. 2019, 14(5): e0216796. https://doi.org/10.1371/journal.pone.0216796

4. Yates S, Groeneboom N, Coello C, Lichtenthaler S, Kuhn P-H, Demuth H-U, et al. QUINT: Workflow for Quantification and Spatial Analysis of Features in Histological Images From Rodent Brain. Front Neuroinform. 2019;13: 1–14. doi:10.3389/fninf.2019.00075

5. Wilkinson M, Dumontier M, Aalbersberg I, Appleton G, Axton M, Baak A, et al. The FAIR Guiding Principles for scientific data management and stewardship. Sci Data. 2016;3: 1–9. doi:10.1038/sdata.2016.18

6. Bjerke I, Yates S, Laja A, Witter M, Puchades M, Bjaalie J, et al. Densities and numbers of calbindin and parvalbumin positive neurons across the rat and mouse brain. iScience. 2021;24: 101906. doi:10.1016/j.isci.2020.101906

7. Amunts, K., Knoll, A. C., Lippert, T., Pennartz, C. M., Ryvlin, P., Destexhe, A., ... & Bjaalie, J. G. (2019). The Human Brain Project—Synergy between neuroscience, computing, informatics, and brain-inspired technologies. PLoS biology, 17(7), e3000344. doi: 10.1371/journal.pbio.3000344

Software and procedure descriptions

QuickNII - Serial section aligner to volumetric atlases (download software at https://www.nitrc.org/projects/quicknii/). Under "Download" select the package called QuickNII-ABAv3-2017.zip. Online documentation: https://quicknii.readthedocs.io

VisuAlign - Non linear 2D to 3D image registration (download software at https://www.nitrc.org/projects/visualign). Under "Download" select the package called VisuAlign-v0_9.zip. Online documentation: https://visualign.readthedocs.io

ilastik - Interactive image classification, segmentation and analysis (download software and documentation at https://www.ilastik.org/)

Nutil - Neuroimaging utilities (download software v.0.8 at https://www.nitrc.org/projects/nutil/)

NOTE! Windows only! Online documentation: https://nutil.readthedocs.io/en/latest/

MeshView - web application for real-time 3D display of atlas meshes and point clouds

Link : https://meshview-for-brain-atlases.readthedocs.io

Choose the link: [Allen Mouse Brain Atlas CCFv3 2017]

(https://meshview.apps.hbp.eu/?atlas=ABA_Mouse_CCFv3_2017_25um) - hierarchical, 670 visible structures, with "root" (transparent at start)

User manual: https://meshview-for-brain-atlases.readthedocs.io

Recommended preparation material

1. Groeneboom NE, Yates SC, Puchades MA and Bjaalie JG. Nutil: A Pre- and Post-processing Toolbox for Histological Rodent Brain Section Images. Front. Neuroinform. 2020, 14:37. doi: 10.3389/fninf.2020.00037

2. Carey H, Pegios M, Martin L, Saleeba C, Turner A, Everett N, Puchades M, Bjaalie J and McMullan S. DeepSlice: rapid fully automatic registration of mouse brain imaging to a volumetric atlas. Nat Comm. 2023, 14. https://doi.org/10.1101/2022.04.28.489953

3. Kjonigsen L, Lillehaug S, Bjaalie J, Witter M and Leergaard T. Waxholm Space atlas of the rat brain hippocampal region: Three-dimensional delineations based on magnetic resonance and diffusion tensor imaging. Neuroimage. 2015, 108: 441–449. doi:10.1016/j.neuroimage.2014.12.080

4. Osen K, Imad J, Wennberg A, Papp E and Leergaard T. Waxholm Space atlas of the rat brain auditory system: Three-dimensional delineations based on structural and diffusion tensor magnetic resonance imaging. Neuroimage. 2019, 199: 38–56. doi:10.1016/J.NEUROIMAGE.2019.05.016

5. Papp E, Leergaard T, Calabrese E, Johnson G and Bjaalie J. Waxholm Space atlas of the Sprague Dawley rat brain. Neuroimage. 2014, 97: 374–386. doi:10.1016/j.neuroimage.2014.04.001

6. Papp E, Leergaard T, Csucs G and Bjaalie J. Brain-Wide Mapping of Axonal Connections: Workflow for Automated Detection and Spatial Analysis of Labeling in Microscopic Sections. Front Neuroinform. 2016, 10: 1–11. doi:10.3389/fninf.2016.00011

7. Bjerke IE, Yates SC, Carey H, Bjaalie JG and Leergaard TB. Scaling up cell-counting efforts in neuroscience through semi-automated methods. iScience. 2023, 26(9). https://doi.org/10.1016/j.isci.2023.107562

8. Kleven H, Bjerke IE, Clascá F, Groenewegen HJ, Bjaalie JG and Leergaard TB. Waxholm Space atlas of the rat brain: A 3D atlas supporting data analysis and integration. Nat Methods. 2023, 20(11). https://doi.org/10.1038/s41592-023-02034-3

Other:

Next generation rodent brain atlases [Youtube video] Available from https://youtu.be/d-FwWfdDR_8

QUINT workflow [Youtube video] Available from https://www.youtube.com/watch?v=n-gQigcGMJ0

Multiscale Integration of Brain Data [Youtube video] Available from https://youtu.be/atCdA2H45iU

Interactive exploration of multilevel human brain atlases [Youtube video] Available from https://youtu.be/HL4ki5_PzXo

FAIR data in neuroscience and life sciences: EBRAINS solutions for data publishing [Youtube video] Available from https://www.youtube.com/watch?v=_p_xmAyaIkQ

Kleven, H. & Bjerke, IE (2021) **The critical window for becoming a FAIR researcher** [Blog post] Available from https://www.incf.org/blog/critical-window-becoming-fair-researcher