Supplementary Material

# Supplementary Tables

**Table 1:** Comparison of rodent MRI processing pipelines

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Pipeline | Software | Registration tool | T2w/  T2 map | dMRI | fMRI | Atlas |
| AIDAmri  <https://github.com/maswendt/AIDAmri> | [Python](https://www.python.org/)  (open source, cross-platform) | NiftyReg | ✓/✓ | ✓ | ✓ | ARA v3 |
| ANTX  (Koch et al., 2017)  <https://github.com/philippboehmsturm/antx> | [Matlab](https://de.mathworks.com/products/matlab.html)  (commercial, cross-platform) | SPM8  (SPMMouse) and  Elastix | ✓/ |  |  | ARA v3 |
| MouseMorph  Powell et al. (unpublished)  <https://github.com/nmpowell/mousemorph> | [Python](https://www.python.org/)  (open source, cross-platform) | NiftyReg | ✓/ | ✓ |  | 3D MRM atlas |
| (Budin et al., 2013)  No available for downlaod | [Midas server](http://www.midasplatform.org/)  (open source, cross-platform) | 3DSlicer | ✓/ | ✓ |  | 3D MRM atlas |

**Table 2**: Summary of in vivo and ex vivo mouse brain atlases based on MRI or microscopy

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name | Distributor | Type | Animals | Image resolution | Labels | References |
| ARA  (CCF v3) | [The Allen Institute](http://mouse.brain-map.org/), Seattle, USA | Serial two-photon (STP) tomography merged for 3D | 1675 mice, 56-day old C57BL/6J | 10 um3 isotropic  800 slices | 1305 (neural structures, fiber tracts and gross anatomical features) | (Ding et al., 2016; Dong, 2008; Lein et al., 2006; Oh et al., 2014) |
| tlas3D\* | [Neural Systems and Graphics Computing Laboratory, University of Oslo, Norway](http://rbwb.org/) | Photographs of Nissl and AChE stained cryosections | 26 mice, 3 months old C57BL/6J | 4.5 um/pixel - 132 (coronal), 21 (sagittal) and 30 (horizontal) | 730 (neural structures, fiber tracts and gross anatomical features) | (Hjornevik et al., 2007; Paxinos, 2013) |
| Mouse Brain Library | [The Mouse Brain Library](http://www.mbl.org/atlas232/atlas232_frame.html) | Nissl staining, celloidin-embedded brains | 1 mouse, 294-day old C57BL/6J | 4.5 um/pixel, 30 um thick, 17 sections | none | - |
| BrainMaps | [BrainMaps](http://brainmaps.org/index.php?p=speciesdata&species=mus-musculus), Usrey Lab UC Davis, USA | 2D images of histological stains (e.g. Giemsa, Nissl, AChE and others) | 1 mouse per stain | 0.46x0.46x25 um  8-234 slides (depending on stain) | none | (Mikula et al., 2007) |
| AMBMC | [Australian Mouse Brain Mapping Consortium](http://imaging.org.au/AMBMC/Model) | Ex vivo T1/T2\*-w 16.4T MRI | 18 mice, C57BL/6J | 15 um3 isotropic  499 slices | 62 (main anatomical structures) | (Janke and Ullmann, 2015) |
| MAP 2003 Atlas | [Laboratory of Neuro Imaging, University of Southern California, Los Angeles, USA](http://www.loni.usc.edu/atlases/Atlas_Detail.php?atlas_id=19) | In vivo T2-w 11.7T MRI and Nissl/myelin stain blockface imaging | 165 C57BL/6J, 100-day old | 60 um3 isotropic  256 slices (MRI) and 6.7 um/pixel (histology) | 774 (neural structures, fiber tracts and gross anatomical features) | (MacKenzie‐Graham et al., 2007) |
| MR histology | [Duke University, USA and Biomedical Informatics Research Network (MBIRN)](http://www.civm.duhs.duke.edu/pubs/supplemental/NeuroImage200702/index.html) | Ex vivo T1/T2/-weighted 9.4T Oxford magnet | >100 C57BL/6, 9-12 weeks old | 21.5/43.0 | 39 (gross anatomical features) | (Hawrylycz et al., 2011; Johnson et al., 2010) |
| 3D MRM atlas | [Brookhaven National Laboratory, Upton, USA](https://www.bnl.gov/world/) | In vivo T2-weighted MRI, 9T | C57BL/6 mice, 12-14 week old | 100 um3 isotropic | 20 (gross anatomical features) | (Ma et al., 2008) |
| Ex vivo T2\*-weighted 17.6T MRI | 12 weeks, male, C57BL/6J | 47 um3 isotropic  256 slices | 20  (gross anatomical features) | (Ma et al., 2005) |

# Supplementary Figures

# Figure 1. Sagittal views of common mouse brain atlases (upper row) and corresponding level of detail of segmented brain regions.

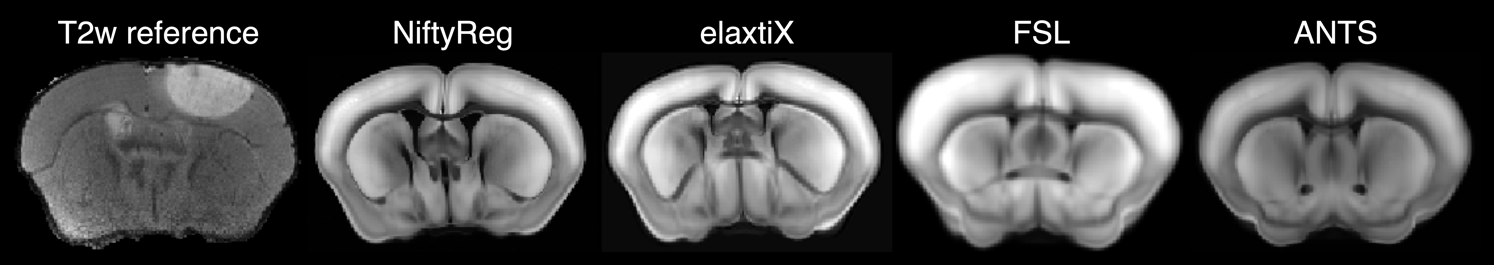


Figure 2. The in-house developed template was registered to a T2w reference test dataset (<https://web.gin.g-node.org/pallastn/AIDA_dataset>) using four different transformation tools with modified parameters: NiftyReg, elastiX, FSL, ANTS. In each case we conducted an affine and non-linear b-spline registration and applied the transformation to the ARA template. In comparison, the ARA template transformed with NiftyReg meets the requirements best.

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