Resampled Allen Atlas

The Allen Brain Atlas (ABA) is a stacked set of Nissl stained histology slices of unfixed, fresh frozen C57Bl/6J male mouse brains at 8 weeks of age created by Hong Wei Dong, M.D., Ph.D. . The Nissl slices were imaged at high resolution using a Leica DC500 CCD camera mounted onto a Leica DM600 microscope. Adobe photoshop was used to draw labelled maps of the slices. The ABA is available in coronal orientation containing 132 sections spaced at 100 m and sagittal orientation containing 21 sections spaced at 200 m; both are aligned linearly to minimize movement between slices. The ABA was first released in 2005 and two revised versions have been released, versions 1 and 2, in 2008 and 2011. The version we are using is the coronal orientation of version 2. This is version contains 738 outlined brain structures, increased from version 1 which contained 208.

The main problems for us in using the ABA is that the orientation is different from our MRI atlases and the ABA was created using 8 week old mice and the mice we are imaging are 16 weeks old. To solve these problems the ABA was registered to a resampled version of the Crawley atlas.

The Crawley Atlas was generated by a series of MR images of 36 B6 mice at 11 weeks of age collected and segmented into 62 sections (J. Ellegood et al., 2013). The resampled version used was transformed to map to a non-linear average from MR images of 60 C57Bl6 fixed mouse brains at 16 weeks of age, consisting of groups of 30 exercise and 30 control mice.

The Allen Mouse Brain Atlas was registered to the resampled version of the Crawley Atlas . Transforms were performed using the program Register, with a transform type of 3 rotations & 3 translations & 3 scales and an average of 500 tags per transform. The atlas was resampled four times.

Here is a series of images of the resampled ABA registered to the non-linear average image:

ABA image 1

ABA image 2

ABA image 3

ABA image 4

ABA image 5

ABA image 6

ABA image 7

ABA image 8

The resampled Allen Atlas can be found at:

/micehome/cjones/Documents/Registration/aba2011_resampled.mnc

The resampled version of the Crawley Atlas can be found at:

/micehome/cjones/Documents/Registration/new_atlases_24dec12/resampled_atlas_Crawley_CC.mnc ?

The original Allen Atlas (that has been rotated to fit into roughly the same space as our fixed images) can be found at:

/micehome/cjones/Documents/Registration/aba2011_32bit_rotate.mnc

References

Allen Institute for Brain Science, 2011. Allen Reference Atlas – Version 1(2008). alleninstitute.org.

Allen Institute for Brain Science, 2011. Allen Reference Atlas – Version 2(2011). alleninstitute.org.

Ellegood, J., Babineau, B.A., Henkelman R.M., Lerch, J.P., Crawley, J.N., 2013. Neuroanatomical analysis of BTBR mouse model of autism using magnetic imaging and diffusion tensor imaging. Neuroimage 70, 288-300.