

MRI Protocol - December 2018

Quality

An MRI with high resolution and contrast will result in the most accurate design.

Laterality

The laterality of the scan can sometimes be ambiguous. Placing a fiducial marker (e.g. Vitamin-E capsule) on one side of the head solves this problem.

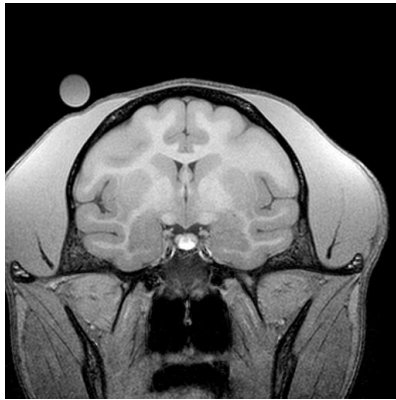


Figure 1. A vitamin E capsule is placed near the right ear in this high quality MRI to define the laterality of this scan.

File Format

We use the opensource program, 3D Slicer, www.slicer.org, to view and manipulate the MR data. We have a set of short 3D Slicer tutorials on our [YouTube channel](#). The MRI data can be sent or bundled via a 3D Slicer file (.mrb).

Alignment

We label the inferior orbital ridges and the ear canals with fiducial points in 3D Slicer and then rotate and translate the MRI so the Slicer coordinate system matches the Stereotaxic coordinate system. These anatomic structures must be clearly visible on the MRI so they can be labeled.

An MRI compatible stereotaxic frame can be used to hold the head stationary during the scan. Many times the ear bars are not positioned correctly and then accurately defining the ear canals can be problematic. This [paper](#) describes a useful tooth marking technique to reduce the variability each time the animal is placed in the stereotaxic frame.

Unless the tooth marking technique is followed, we prefer the animals to be scanned without a stereotaxic frame. In this case, the animal's head can be firmly padded with pillows to insure stability.

Segmentations

Ideally the skull and all of the necessary brain regions will be segmented from the MRI. Sometimes a CT scan is performed and this can be registered to the MRI. In this case, the skull can be segmented from the CT and the brain regions can be segmented from the MRI. Segmentations are done most efficiently with the 3D Slicer software and are covered in our tutorial videos. A [black bone MRI scan](#) has proven to be accurate and easy to segment as well.