

## **MRI 磁共振影**

### **1. Purpose**

1.1 Magnetic resonance imaging (MRI) is a medical technique used to visualize internal structures of the body in detail. By using gradients in different directions, 2D images or 3D volumes can be obtained in any arbitrary orientation. MRI provides good contrast between the different soft tissues of the body, which makes it especially useful in imaging the brain, the body organs, and tumors.

### **2. Safety Requirements**

2.1 General laboratory procedures should be followed, which include: no eating, no chewing gum, no drinking, and no applying of cosmetics in the work area. Laboratory coats and gloves must be worn at all times in the work area, unless the protocol specifically describes the appropriate attire for the procedure.

### **3. Referenced Documents**

- 3.1 [In vivo Pharmascan 7 T horizontal MRI system](#) (at IBMS b1)
- 3.2 [In vivo Pharmascan 7 T horizontal MRI system](#) (at IBMS b2)
- 3.3 [In vivo Biospec 7 T horizontal MRI system](#) (at NBRP AIF)

### **4. Notes**

- 4.1 Please check yourself without any magnetic materials when you are close to magnet.
- 4.2 Anyone without training is not allowed to enter MRI lab warning area.
- 4.3 After finishing scanning, remember to turn off heater, water circulation, physiological monitor, gas generator and air tank, and then put everything back.
- 4.4 Sterilize and clean experimental areas after MRI scanning.

### **5. Quality Control**

- 5.1 Check the magnet center frequency.
- 5.2 Check the magnetic field homogeneity.
- 5.3 Check the power value of radio frequency.
- 5.4 Measure the signal to noise ratio (SNR).

### **6. Equipments**

- 6.1 In vivo Pharmascan 7 T horizontal MRI system (at IBMS b1)
- 6.2 [In vivo Pharmascan 7 T horizontal MRI system](#) (at IBMS b2)
- 6.3 In vivo Biospec 7 T horizontal MRI system (at NBRP AIF)

### **7. Supplies**

- 7.1 Gloves
- 7.2 Paper mask
- 7.3 Paper towel
- 7.4 Isoflurane
- 7.5 Pure oxygen and air tanks
- 7.6 Animal holder
- 7.7 Tape
- 7.8 Ethanol 70%

### **8. Procedures**

- 8.1 Measure the body weight of the animal.
- 8.2 Anesthetize animals by 2~3 % isoflurane with oxygen and with flow rate of 2 L/min.
- 8.3 Set up animals on the holder.
- 8.4 Start three axis scout view scanning and select position of scanning center.
- 8.5 Start automatic magnet shimming protocols for quality control.
- 8.6 Set up the parameters (ex. T1WI 、 T2WI 、 DWI or other protocols).
- 8.7 Monitor the respiration rate and body temperature of the animal.
- 8.8 After scanning, clean the apparatus with 70% EtOH.
- 8.9 Reconstruction of the raw data.
- 8.10 Load dataset in MRvision software.
  - 8.10-1 Select the region of interest (ROI) and analyze the SNR.
- 8.11 Load dataset in Avizo 6.1 software.
  - 8.11-1 Measure the image volume of ROI by label-field function.
  - 8.11-2 3D color-encoding by volume rendering function.

