# QUIZ FOR NEW MRI USERS

MRI USER NAME: _____

DATE AND PLACE: _____

CIRCLE ALL THAT APPLY

1. Before you can use the MRI scanner for animal studies you have to:
   A. Have either been trained by MIC personal to use the scanner or have demonstrated competence in MRI
   B. Have completed animal handling course and are certified FELASA category C Researchers in Laboratory Animal Science
   C. Have no medical condition (such as metallic implants, pacemakers, etc) that would prohibit them from being in the high-field environment
   D. Have registered with and obtained a user account at MIC (Molecular Imaging Center at UiB)
2. To book the time on the MRI scanner you have to:
   A. Email MIC administrators and ask them nicely to book the time slots for you
   B. Ask your supervisor to book the time for you
   C. Go to the MIC booking page and book the timeslots by yourself
   D. Show up in the MRI room and start scanning if no one else is using the scanner
3. Who has access to the MRI facility?
   A. All registered users
   B. Cleaning personal from Vivarium
   C. Technicians who help with the experiments with supervision from registered users
   D. Haukeland employees
4. What are you NOT allowed to bring into the MRI room where the magnet is located?
   A. Food
   B. Sick animals
   C. Any metal object
   D. Electronics (cell phones and watches)
   E. Credit and access cards
5. Which of the following objects has magnetic properties (becomes magnetic when brought close to a high magnetic field)?
   A. Stainless steal scissors
   B. Plastic tweezers
   C. Mouse ear clippers
   D. A screwdriver
   E. Animal monitoring equipment

6. Which of the following IS NOT part of an MRI system?
    A. RF resonators (coils)
    B. Gradient coils
    C. Shim coils
    D. Animal monitoring equipment
    E. Computer controlling the scanner
7. Which equipment do you need to turn on EVERY time you want to scan animals?
    A. Main power switch in the electronics room
    B. Animal monitoring equipment
    C. The main magnetic field
    D. Water heater and circulation system
    E. Chiller in the electronics room
8. You arrive one day to the MRI room and all the equipment is dead and will not turn on. You have to:
    A. Call either Kai or Tina immediately
    B. Panic
    C. Press the red button in the MR control room AND the red button in the electronics room
    D. Press the green button in the MR control room AND the green button in the electronics room
9. What are the RF resonators used for?
    A. For keeping the animal constrained during a scan
    B. For creating a gradient field which encodes for the spatial coordinates
    C. For MR signal transmission and reception
    D. For magnetizing water protons
10. Which RF resonator would you use for imaging rat head tumors?
    A. 23 mm-ID resonator
    B. 38 mm-ID resonator
    C. 60 mm-ID resonator
    D. 100 mm-ID resonator
11. What is the animal bed used for?
    A. Providing anesthesia to the animals through the mask
    B. Securing and preparing the animal for scanning
    C. Keeping the animal warm during the scan
    D. Sliding the animal into the magnet center
12. What is the bed-tip used for?
    A. Providing anesthesia to the animals through the mask
    B. Attaching the animal to the tooth bar
    C. Nothing in particular, it is only an extension of the animal bed
    D. Attaching the RF coil (in majority of cases)
13. How do you monitor respiration of the animal during the scan?
    A. With a pressure-sensor pillow
    B. With a thermocouple
    C. With ECG electrodes
    D. With Paravision software
14. How do you keep the animal warm during the scan?
    A. By wrapping it up in lots of paper towels
    B. By using a blanket with hot recirculation water
    C. By using high-power RF pulses during the scan
    D. By blowing hot air onto the animal
    E. By circulating hot water in the base of the animal bed

15. How do you administer anesthesia to the animal during an MRI scan?
    A. By injecting phentobarbital subcutaneously
    B. By applying sevoflurane gas mixed with oxygen and $N_2O$ through a nose mask
    C. By applying isoflurane gas mixed with oxygen and $N_2O$ through a nose mask
    D. Anesthesia is not necessary during an MRI scan
16. Before you can get an account on the MRI system, you have to:
    A. Be a registered MIC user
    B. Have either completed the MRI course or demonstrated competence in MRI
    C. Have completed animal handling course and are certified FELASA category C Researchers in Laboratory Animal Science
    D. Contact Kai or Tina
17. What is the name of the program that controls the scanner?
    A. Topspin 2.0
    B. Paravision 3.0
    C. Propervision 5.1
    D. Paravision 5.1
18. What is a TriPilot?
    A. A pilot study which has been performed three times
    B. A fast scan that collects three equivalent images, one after another
    C. A pulse sequence which performs initial calibration of the scanner
    D. A fast scan that collects three slices in the iso-center of the magnet to facilitate slice positioning using geometry editor
19. What adjustments/calibrations are being performed before the first scan of the study?
    A. Resonant frequency adjustment
    B. Preemphasis adjustment
    C. Shimming
    D. Transmitter gain adjustment
    E. Receiver gain adjustment
20. How do you force the adjustments to execute after the first scan of the study?
    A. Press TRAFFIC LIGHT
    B. Press SHIFT + TRAFFIC LIGHT
    C. Press GOP
    D. Press GPS
21. When do you need to force these adjustments/calibrations?
    A. After you create a scan
    B. After you create a new study
    C. After you create a new patient
    D. Whenever you reposition the animal
22. How is the transmitter gain adjustment performed?
    A. By computing the gain needed for achieving a $90^0$ pulse
    B. By computing the gain needed for achieving a $180^0$ pulse
    C. By computing the gain needed for achieving a $90^0$ and a $180^0$ pulse
    D. By computing the gain needed for maximum flip angle
    E. By computing the gain needed for minimum flip angle
23. What if I get no signal/image after running the Tri-Pilot?
    A. Check that the animal is in the right position within the magnet
    B. Check that you have connected the coil to the preamplifier at the back of the scanner
    C. Turn off and then back on the power switch on the spectrometer
    D. Restart the computer
    E. Call Tina, Kai or Frits for help

24. Which PV window do I use for viewing finished scans?
    A. Macro manager
    B. Data manager
    C. Image display and processing tool
    D. Scan control tool
    E. Acq/Rec Display
25. I see an image on the screen but not of the part of the body I am interested in. What should I do?
    A. Using the RULER tool in the Image Display and Processing window, measure the distance by which you have to move the animal into/out of the scanner, and then move it the corresponding amount
    B. Move animal in/out of the scanner by 1 cm, perform a Tri-Pilot, check the position and repeat until you have the region of interest in the middle of the Field-of-View
    C. Move the Field-of-View in the geometry editor so that the region of interest is in the middle of the Filed-of-View
    D. Switch to a different RF coil
26. What are scan protocols?
    A. A set of rules written by MIC which you need to follow when scanning
    B. A set of rules written by Bruker which you need to follow when scanning
    C. A collection of pulse sequences
    D. A combination of a measuring method combined with a set of suitable parameter values to achieve special experimental purposes
27. If you want to create a new scan with exactly the same acquisition parameter as the previous scan, you need to:
    A. Save the collected scan in a protocol folder and then load it when creating a new scan
    B. Clone scan
    C. Clone reco
    D. This cannot be done
28. You collected an image, but see that you should have had better image resolution. Which of the following is the best solution to this problem?
    A. Undo scan, change resolution settings through geometry editor, run scan again
    B. Clone scan, change resolution settings through geometry editor, run the new scan
    C. Delete scan, load the scan again from a protocol folder, change resolution settings through geometry editor, run the new scan
    D. Clone reco, change resolution settings through geometry editor, run reco again
29. The reconstruction algorithm failed to produce the desired result. What do you do?
    A. This cannot be done in Paravison, so you need to export data to another post-processing software
    B. Delete scan, collect data again
    C. Clone reco, run reco again
    D. Delete reco, run reco again
30. You would like to adjust the position of the imaging slice. What do you do?
    A. Open Edit Scan tool and change geometry parameters using slice adjustment tool
    B. Open Edit Scan tool and change contrast parameters
    C. Open Geometry Editor tool and change geometry parameters using slice adjustment tool
    D. Open Geometry Editor tool and change contrast parameters

31. You would like to change the contrast in the image. What do you do?
    A. Open Edit Scan tool and change geometry parameters
    B. Open Edit Scan tool and change contrast parameters
    C. Open Geometry Editor tool and change geometry parameters
    D. Open Geometry Editor tool and change contrast parameters
32. You would like to increase the SNR in your image. What do you do?
    A. Decrease resolution in the image by increasing FOV (field-of-view)
    B. Increase resolution in the image by decreasing FOV (field-of-view)
    C. Increase slice thickness
    D. Increase the number of signal averages
33. Which manual are you required to read before starting to use the MRI scanner?
    A. System Manual
    B. Operation Manual
    C. Application Manual
    D. Advanced User Manual
    E. Extra Manual
34. I would like to analyze SNR (Signal-to-Noise) after contrast injection in a brain tumor. What kind of analysis tool can I use in PV 5.0?
    A. Region of interest (ROI)
    B. Image sequence analysis tool (ISA)
    C. Diffusion tensor imaging (DTI) tool
    D. Image J
35. I would like to fit an exponential decay to a set of images to obtain $T_2$ relaxation time. What kind of analysis tool can I use in PV 5.0?
    A. Region of interest (ROI)
    B. Image sequence analysis tool (ISA)
    C. Diffusion tensor imaging (DTI) tool
    D. Image J
36. What is the best way to transfer data to my computer?
    A. By asking Kai to make a copy of data for me
    B. Using ssh file transfer protocol (sftp)
    C. Using and external memory device such as a USB stick or external hard drive
    D. By burning the data on a CD/DVD storage media
37. Which equipment do I need to turn off/disconnect when I am done scanning?
    A. Water circulation system in the electronics room
    B. High power cabinet in the electronics room
    C. Isoflurane on the anesthesia vaporizer
    D. Anesthesia gas cables (blue and white) in both rooms (MR room and animal preparation room)
    E. Disconnect the battery from the temperature module and connect it to the charging port on the respiration module
38. What do you need to record in the MR log book?
    A. Date and time of scanning
    B. Project title
    C. Level of liquid He and liquid $N_2$ at the end of scanning
    D. Your name
    E. Your supervisor's name