



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?
 - 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 steel 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
 - D. Press the green button in the MR control 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 resonator
 - B. 38 mm resonator
 - C. 60 mm resonator
 - D. 100 mm resonator
11. What is the animal bed used for?
 - A. Attaching the animal onto the anesthesia 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. 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
13. 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
14. 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 N₂O through a nose mask
 - C. By applying isoflurane gas mixed with oxygen and N₂O through a nose mask
 - D. Anesthesia is not necessary during MRI scan

15. 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
16. What is the name of the program that controls the scanner?
 - A. Topspin 2.0
 - B. Paravision 3.0
 - C. Propervision 5.0
 - D. Paravision 5.0
17. 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
18. 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
19. How do you force the adjustments to perform when you want to?
 - A. Press TRAFFIC LIGHT
 - B. Press SHIFT + TRAFFIC LIGHT
 - C. Press GOP
 - D. Press GPS
20. 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
21. How is the transmitter gain adjustment performed?
 - A. By computing the gain needed for achieving a 90° pulse
 - B. By computing the gain needed for achieving a 180° pulse
 - C. By computing the gain needed for achieving a 90° and 180° pulses
 - D. By computing the gain needed for maximum flip angle
 - E. By computing the gain needed for minimum flip angle
22. 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 main power on the spectrometer
 - D. Restart the computer
 - E. Call Tina, Kai or Frits for help
23. 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

24. 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
25. 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
26. 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
27. 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
28. The reconstruction algorithm failed to produce the desired result. What do you do?
- A. This cannot be done in Paravision, 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
29. 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
30. 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

31. 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
32. 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
33. 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
34. 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
35. 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 an external memory device such as a USB stick or external hard drive
 - D. By burning the data on a CD/DVD storage media
36. 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
37. 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