

Bone Imaging Laboratory

Standard Operating Procedure



In Vivo Scan (vivaCT 40)

Prepared by: Helen Buie

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Before the scan day:

1. Check supplies (the two f/air filter, oxygen tank and isoflurane levels, ophthalmic ointment) and restock if necessary and dispose of used items . Also check that the in vivo scanning fixture that will be used is in good working condition.	☐
2. Register samples for scanning. • see the sample naming convention • register samples using the μCT-Samples program • record sample names and numbers on your log sheet	☐
3. Setup a control file. Use the planning document to estimate your scan dose. • mice: $CTDI_{water} = 145 - 235$ mGy/wk is okay; 480 mGy/wk may cause bone loss!	☐

On the scan day:

4. If necessary, Turn on the scanner and open the scanning program to start the 20 min warm up.	☐
5. Check the two f/air filters. There is one filter on the wall, which attaches to the anesthetic chamber, the other filter is by the vivaCT and connects to the auxiliary anesthetic line. If the filters have absorbed 50 g of anesthetic, replace it with a new filter and dispose of the old filter .	☐
6. Attach the in vivo scanning fixture to the track , connecting the anesthetic lines and/or rodent masks. Be sure to connect the anesthetic and exhaust lines correctly.	☐
7. Prepare the anesthetic system. • line the chamber with a piece of paper towel and close the lid • connect the chamber anesthetic line and exhaust • switch on the toggle for the chamber (toggle for the auxiliary line is off) • fully open the valve for the oxygen tank • turn the oxygen tank gauge to 15 (maximum) • adjust the oxygen flow rate to 1 L/min (usually it is always set to this level) • set the isoflurane level (1.0-1.5 v/v% for mice; 1.5-2.0 v/v% for rats)	☐
8. Anesthetize the animal. • place the rodent into the chamber and wait 30-60 s for it to fall asleep ○ increase isoflurane by 0.25 v/v% if animal is resistant ○ decrease isoflurane level if the animal's breathing is rough • when the animal is asleep, switch on the toggle for the auxiliary line	☐

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- if using the whole body fixture, apply the ophthalmic ointment to the eyes - wait 1-2 min to minimize the risk of the animal waking up	
9. Transfer the animal to the scan fixture. - remove the animal from the chamber - switch off the toggle to the chamber - place the animal into the scan fixture and, if applicable, affix the anesthetic mask - apply the ophthalmic ointment to the eyes to prevent dryness - prepare the animal for scanning in the in vivo fixture to minimize motion	☐
10. Scan. - if it is the first scan login to the workstation with the <i>invivo</i> user account - put in your operator number or name start the scanning program - select the control file - select the sample number for the animal - perform a scout view - place reference line and start the scan - record the measurement number on log sheet	☐
11. Check the scan quality and scan again if necessary. - after the scan, check the quality of the reconstructed preview - if there are motion artifacts, scan again	☐
12. Repeat steps 10-11 for additional scans of the animal.	☐
13. Post-scanning procedures. - switch off the toggle for the auxiliary tube - switch on the toggle for the chamber - remove the animal from the scan fixture - ear notch the animal with an ID number if necessary - weigh the animal - allow the animal to wake up (typically within 2-3 min) away from other animals, e.g., in a beaker or separate cage	☐
14. Repeat steps 8-13 for additional animals.	☐
15. Clean-up. - turn off isoflurane - turn off oxygen gauge and valve - remove anesthetic chamber and in vivo fixture and clean with dish soap - close the scanning program - log out of the workstation	☐