

# DREXEL UNIVERSITY ANIMAL CARE AND USE COMMITTEE

## POLICY FOR ANIMAL BLOOD COLLECTION SITES

**OBJECTIVE:** The Drexel University Animal Care and Use Committee has established this policy to specify the common blood collection routes consistent with The Guide for the Care and Use of Laboratory Animals and AVMA Guidelines on Euthanasia animals.

**RESPONSIBILITY:** The Investigator is responsible for ensuring that each individual obtaining blood from animals follows this policy. ULAR is responsible for providing training on the appropriate methods for obtaining blood samples from various species of animals

The following lists are meant to be used as guidelines for common methods and procedures by species. All methods of Blood Collection must be approved through IACUC prior to use. Please also see the Drexel IACUC Policy for Blood Volume Sampling and Policy for Tail Sampling.

### Mouse

Species	Common Blood Collection Route	Anesthesia Required	Number of Samples	Adverse Effects	Comments
Mouse	Saphenous vein	Yes	No more than 4 within any 24 hour period	<ul style="list-style-type: none"> <li>Bruising</li> <li>Hemorrhage</li> <li>Infection</li> <li>Temporary favoring of the limb</li> </ul>	<ul style="list-style-type: none"> <li>Variable sample quality.</li> <li>The procedure is customarily done on an awake animal but effective restraint is required</li> <li>Requires more hands-on training than tail sampling to reliably withdraw more than a minimal amount of blood.</li> <li>Temporary favoring of limb may be noted following the procedure.</li> <li>The clot/scab can be gently removed for repeated small samples if serial collection is required.</li> </ul>

<b>Mouse</b>	Tail vein	No	One or two blood samples can be taken per session and in any 24-hour period, depending on sample volume. This limit also applies to microsampling	<ul style="list-style-type: none"> <li>▪ Infection &lt;1%</li> <li>▪ Hemorrhage &lt;1%</li> </ul>	<ul style="list-style-type: none"> <li>• Sample collection by nicking the vessel is easily performed, but produces a sample of variable quality that may be contaminated with tissue products. Sample quality decreases with prolonged bleeding times and “milking” of the tail.</li> <li>• Sample collection using a needle (cannulation) minimizes contamination of the sample, but is more difficult to perform in the mouse.</li> <li>• Repeated collections possible. With tail nicking, the clot/scab can be gently removed for repeated small samples if serial testing is required (e.g., glucose measures, etc.)</li> <li>• • Cannulation and tail nicking are routinely done without anesthesia, although effective restraint is required</li> </ul>
	Facial vein/ Submandibular	No		Hematoma Infection <1%	<ul style="list-style-type: none"> <li>• Repeated sampling is possible by alternating sides of the face.</li> <li>• Sample may be a mixture of venous and arterial blood.</li> <li>• Manual restraint of awake animals results in proper site alignment and venous compression for good blood flow.</li> <li>• Can be performed rapidly and with a minimal amount of equipment, allowing for rapid completion.</li> </ul>
	Tail clip (biopsy)	Yes	No more than 4 blood samples within a 24 hour period	<ul style="list-style-type: none"> <li>▪ Infection &lt;1%</li> <li>▪ Hemorrhage</li> <li>▪ Post procedural pain; not recommended.</li> </ul>	<ul style="list-style-type: none"> <li>• Can be used by clipping (e.g. amputating) no more than 5 mm</li> <li>• Produces a sample of variable quality that may be contaminated with tissue products</li> <li>• Sample quality decreases with prolonged bleeding times and “milking” of the tail.</li> <li>• Repeated collections possible. The clot/scab can be gently removed for repeated small samples if serial testing is required (e.g., glucose measures, etc.).</li> <li>• Hemostasis must be ensured after sampling</li> <li>• Animals 21 days old and older require anesthesia for tail clipping</li> </ul>
	Retro-orbital sinus ( <b>terminal</b> )	Yes	only one sample be taken	<ul style="list-style-type: none"> <li>• Terminal</li> </ul>	<ul style="list-style-type: none"> <li>• Non-Survival only; Animal must be deeply anesthetized and not recover from anesthesia</li> </ul>
	Cardiac ( <b>terminal only</b> )	Yes	Once	Terminal	Non-Survival only; Animal must be deeply anesthetized and not recover from anesthesia

## Rat

Species	Common Blood Collection Route	Anesthesia Required	Number of Samples	Adverse Effects	• Comments
Rat	Saphenous vein	No	No more than 4 blood samples should be taken within any 24 hour period	<ul style="list-style-type: none"> <li>• Bruising</li> <li>• Hemorrhage</li> <li>• Infection</li> <li>• Temporary favoring of the limb</li> </ul>	<ul style="list-style-type: none"> <li>• Variable sample quality.</li> <li>• The procedure is customarily done on an awake animal but effective restraint is required</li> <li>• Requires more hands-on training than tail or retro-orbital sampling to reliably withdraw more than a minimal amount of blood.</li> <li>• Temporary favoring of limb may be noted following the procedure.</li> <li>• The clot/scab can be gently removed for repeated small samples if serial collection is required.</li> </ul>
Rat	Tail vein	No	No more than 8 should be taken per session and in any 24 hour period	<ul style="list-style-type: none"> <li>• Infection &lt;1%</li> <li>• Hemorrhage &lt;1%</li> </ul>	<ul style="list-style-type: none"> <li>• Sample collection by nicking the vessel is easily performed, but produces a sample of variable quality that may be contaminated with tissue products. Sample quality decreases with prolonged bleeding times and “milking” of the tail.</li> <li>• Sample collection using a needle (cannulation) minimizes contamination of the sample, but is more difficult to perform in the mouse.</li> <li>• Repeated collections possible. With tail nicking, the clot/scab can be gently removed for repeated small samples if serial testing is required (e.g., glucose measures, etc.)</li> <li>• Cannulation and tail nicking are routinely done without anesthesia, although effective restraint is required</li> </ul>
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	Tail Clip (biopsy)	Yes			

				<ul style="list-style-type: none"> <li>• Post procedural pain; not recommended.</li> </ul>	<ul style="list-style-type: none"> <li>• Produces a sample of variable quality that may be contaminated with tissue products</li> <li>• Sample quality decreases with prolonged bleeding times and “milking” of the tail.</li> <li>• Repeated collections possible. The clot/scab can be gently removed for repeated small samples if serial testing is required (e.g., glucose measures, etc.).</li> <li>• animals 21 days and older require anesthesia for tail clipping</li> <li>• Hemostasis must be ensured after sampling</li> </ul>
Jugular vein	Yes	No more than eight blood samples should be taken in a 24-hour period.	<ul style="list-style-type: none"> <li>• Bruising</li> <li>• Infection &lt;1%</li> <li>• Haemorrhage &lt;1%</li> </ul>	<ul style="list-style-type: none"> <li>• Results in high quality sample</li> <li>• Does not easily lend itself to repeated serial sampling</li> <li>• Significant competence may replace the need for anesthesia</li> </ul>	
Subclavian vein or Anterior Vena Cava	Yes		<ul style="list-style-type: none"> <li>• Hemorrhage &lt;1%</li> </ul>	<ul style="list-style-type: none"> <li>• Results in high quality sample</li> <li>• Repeated collections possible</li> </ul>	
Retro-orbital sinus ( <b>terminal</b> )	Yes	only one sample be taken	<ul style="list-style-type: none"> <li>• Terminal</li> </ul>	Non-Survival only; Animal must be deeply anesthetized and not recover from anesthesia	
Cardiac ( <b>terminal only</b> )	Yes	One	Terminal	Non-Survival only; Animal must be deeply anesthetized and not recover from anesthesia	

## Rabbit

Species	Common Blood Collection Route	Anesthesia Required	Number of Samples	Adverse Effects	Comments
Rabbit	Marginal ear vein/artery	No	Up to 8 samples may be taken in any 24 hour period, depending on sample volume	<ul style="list-style-type: none"> <li>Bruising &lt;1%</li> <li>Infection &lt;1%</li> </ul>	<ul style="list-style-type: none"> <li>Local anesthetic cream can be applied to the site 30 minutes prior to blood sampling.</li> <li>Unless animal is used to handling and restraint, use of anesthesia is best</li> <li>Serial blood samples can be taken by moving towards the base of the ear on the same vein and by altering ears</li> <li>The ear should be warmed in order to dilate the vessel</li> <li>No more than 3 needles sticks should be given in any one attempt</li> <li>Hemostasis must be ensured after sampling</li> </ul>
	Cardiac puncture (terminal only)	Yes	Once	Terminal	Non-Survival only; Animal must be deeply anesthetized and not recover from anesthesia

## Cat

Species	Common Blood Collection Route	Anesthesia Required	Number of Samples	Adverse Effects	Comments
Cat	Femoral vein e	Yes	Hemaoma, hemorrhage, infection		<i>Good for repeated small bleeds or one large bleed. Low potential for tissue damage</i>
	Cephalic Vein	Yes		Hematoma, infection at site of cath placement	<i>Good for catheter placement</i>

## Swine

Species	Common Blood Collection Route	Anesthesia Required	Number of Samples	Adverse Effects	Comments
Pig	Ear Vein	No	Up to 8 in any 24 hour period	<ul style="list-style-type: none"> <li>• Bruising</li> <li>• Hemorrhage</li> <li>• Infection</li> </ul>	<ul style="list-style-type: none"> <li>• Suitable for single and repeated sampling of small volumes; vein easily blown</li> <li>• Restrained needs to be used, sedation should be considered where appropriate</li> <li>• No more than 3 attempts should be made per sampling</li> <li>• Local anesthetic cream can be applied to the site 30 minutes prior to blood sampling</li> <li>• The ear should be warmed in order to dilate the vessel.</li> <li>• Pigs should be trained to cooperate with blood sampling in order to minimize stress.</li> </ul>
	Cardiac puncture ( <b>terminal only</b> )	Yes	Once	Terminal	Non-Survival only; Animal must be deeply anesthetized and not recover from anesthesia

[https://www.depts.ttu.edu/iacuc/acrc/docs/Policy\\_07\\_Blood\\_Collection\\_Policy.pdf](https://www.depts.ttu.edu/iacuc/acrc/docs/Policy_07_Blood_Collection_Policy.pdf)

<https://animal.research.uiowa.edu/iacuc-guidelines-blood-collection>

[https://oacu.oir.nih.gov/sites/default/files/uploads/arac-guidelines/rodent\\_bleeding.pdf](https://oacu.oir.nih.gov/sites/default/files/uploads/arac-guidelines/rodent_bleeding.pdf)

<https://www.nc3rs.org.uk/rabbit-marginal-ear-veinartery-non-surgical>

<http://nexusacademicpublishers.com/uploads/books/20140116135637.pdf>

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