Laboratory Animal Resources Center Research, Surgical & Training Programs			
Title: Guidelines for Blood Collection from Mice, Rats & Rabbits			
Guideline #: 002	**Date in Effect**: 3/13/2008		
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In Effect ☒ **Rescinded** ☐	**Date Rescinded**: N/A		
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Caveat

1. All procedures performed on animals at UTSA must receive prior IACUC approval, including those described in this guideline.

2. Too much blood collected at any one time may cause hypovolemic shock, physiological stress and even death. If smaller volumes are collected too frequently, anemia may result.

3. As a general rule, 10% of the total blood volume can be collected at one time every 2-4 weeks, or 1% at more frequent intervals of 24 hours or more. The total blood volume can be calculated as approximately 6% of body weight. The estimated volume at exsanguination is approximately half of the total blood volume.

4. Blood collection in excess of the established guidelines below must be compensated by fluid replacement and requires IACUC approval.

5. The choice of anesthetics is an important consideration when collecting blood from rodents due to physiologic effects of the anesthetic. If you are not experienced in blood collection techniques, training is required. If you have questions or comments about any of the listed techniques or if you need training, please, contact anyone in the LARC veterinary group.

MICE

To improve vasodilation, it may be helpful to warm the entire patient or the area of collection. This can be accomplished in 10-15 min at 37-38^{o}C with a special commercially available warming chamber. Care should be taken to prevent overheating. Various tourniquets may also be used.

Total blood volume = 6% of lean body weight.
Maximum blood collection = 10% of total blood volume every two 2-4 weeks.

Example – 30 gm (0.03 kg) mouse:

- 0.03 kg x 0.06 (i.e. 6%) = 0.0018 L = 1.8 ml
- 1.8 ml x 0.10 (i.e. 10%) = **0.18 ml** = **180 µl**
- **180 µl is the maximum blood volume to be collected every 2-4 weeks.**

Collection Site	Advantages	Disadvantages
Lateral tail vein	• Anesthesia not required • Vein is easily accessed	• Must be securely restrained • Yields only small quantities • Some specialized equipment needed
Orbital Sinus or Plexus	• Large volumes of blood can be collected	• Anesthesia is required and protocol justification required.
Goldenrod Lancet Using the mandibular Site (http://www.medipoint.com/html/animal_lancets.html)	• Safe • Anesthesia not required • Excellent technique for serial blood sampling • Easy to perform • Rapid collection • Yields large quantities	• Potential of collecting more blood than recommended under these guidelines.
Lateral Saphenous Vein	• Anesthesia not required • Excellent technique for serial blood sampling • Moderate volume of blood can be collected	• Requires some specialized training • Some specialized equipment required.
Please see the following site for a demonstration in lateral saphenous blood collection from mice: http://www.uib.no/vivariet/mou_blood/Blood_coll_mice_.html		
Cardiac Puncture	• Maximum volume of blood can be collected	• Requires deep anesthesia. • Non-survival procedure only

RATS

To improve vasodilation, it may be helpful to warm the entire patient or the area of collection. This can be accomplished in 10-15 min at 37-38^{o} C with a special commercially available warming chamber. Care should be taken to prevent overheating. Various tourniquets may also be used.

Total blood volume = 6% of lean body weight.
Maximum blood collection = 10% of total blood volume every two 2-4 weeks.

Example – 100 gm (0.1 kg) animal:

- 0.1 kg x 0.06 (i.e. 6%) = 0.006 L = 6 ml
- 6 ml x 0.10 (i.e. 10%) = **0.6 ml** = **600 µl**
- **600 µl is the maximum blood volume to be collected every 2-4 weeks.**

Collection Site	Advantages	Disadvantages
Lateral Tail Vein	• Vein is easily accessed • Anesthesia not required • Yields moderate quantities	• Specialized equipment is needed • Animal must be securely restrained
Ventral Tail Artery	• Large quantities of blood can be collected	• Anesthesia is required • Requires training
Orbital Sinus or Plexus	• Large volume of blood can be collected	• Anesthesia is required and protocol justification • Requires training
Lateral Saphenous Vein	• Large quantities of blood can be collected • Anesthesia not required • Excellent technique for serial sampling	• Requires training
Anterior Vena Cava	• Large quantities can be collected	• Requires anesthesia • Requires specialized training
Cardiac Puncture	• Maximum volume of blood can be collected	• Requires deep anesthesia • Non survival procedure

RABBITS

To improve vasodilation, Oil of wintergreen can be applied to the skin over the marginal ear vein or central auricular artery to assist with vasodilation. Alternatively, acepromazine, 0.5-1.0 mg/kg SC given 15-30 minutes before blood collection will aid in dialating the vessels.

Total blood volume = 6% of lean body weight.
Maximum blood collection = 10% of total blood volume every two 2-4 weeks.

Examples:

4 lb rabbit	=	1.80 kg x 0.06	=	108 ml x 0.10	=	**10.8 ml**
6 lb rabbit	=	2.72 kg x 0.06	=	163 ml x 0.10	=	**16.3 ml**
8 lb rabbit	=	3.60 kg x 0.06	=	216 ml x 0.10	=	**21.6 ml**
10 lb rabbit	=	4.50 kg x 0.06	=	270 ml x 0.10	=	**27.0 ml**

Rabbits may follow the above bleeding schedule as long as packed cell volume (PCV) and total plasma proteins (TPP) are monitored. The occurrence of anemia, hypoproteinemia, or unthriftiness require appropriate supplementation and a rest from further bleeds. The duration of this rest will be determined by the University Veterinarian. Animals should be weighed weekly if on the above bleeding schedule and their weights recorded appropriately.

Collection Site	Advantages	Disadvantages
Marginal Ear Vein	• Anesthesia not required • Vein is easily accessed • Yields small - moderate quantities of blood	• Must be securely restrained • Some specialized equipment is needed • Topical anesthetic is recommended
Central Ear Artery	• Large quantities of blood can be collected	• Topical anesthesia is strongly recommended (due to the possibility of arterial spasm) • Training recommended
Lateral Saphenous Vein	• Anesthesia not required • Collection of small quantities of blood	• Training recommended • Some specialized equipment needed
Cephalic Vein	• Anesthesia not required • Collection of small quantities of blood	• Training recommended • Some specialized equipment needed
Jugular Vein	• Large quantities of blood can be collected	• Anesthesia is recommended • Requires specialized

		training
Anterior Vena Cava	• Maximum quantity of blood can be collected	• Requires anesthesia • Requires skill • Risk of cardiac tamponade
Cardiac Puncture	• Maximum quantity of blood can be collected	• Requires deep anesthesia • Non survival procedure