Cornell University
Cornell Center for Animal Resources and Education

CARE403.01 Recommended Blood Collection Volume and Frequency

The intent of this standard operating procedure (SOP) is to describe the recommended blood collection volume and frequency from commonly used laboratory animal species. It is intended for anyone collecting blood samples. This procedure is approved by the Cornell Institutional Animal Care and Use Committee (IACUC) and the Cornell Center for Animal Resources and Education (CARE). Any exemption must be approved by the IACUC prior to its application.

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1. Introduction

This document provides information about the volume and frequency of blood collection in various species. The maximum limits are set up to maintain animal welfare and prevent potential complications such as hypovolemic shock and death.

2. Procedures

a. Do not collect blood from a site presenting inflammation or a hematoma.
b. Limit the number of venipunctures to four punctures per day with no more than two punctures per site.
c. The following table shows the maximum volume of blood which can be collected at once or over a 24-hour period, and the corresponding recovery time during which the animal should not be subjected to blood collection again (based on the percentage of total blood volume collected). Example: for a mouse, the sum of blood volumes collected over 24 hours cannot exceed 0.4 mL and the animal cannot be collected again before 4 weeks.

Maximum Volumes and Recovery Period			
Percent of blood volume collected at once (Single Sampling)	Recovery period in weeks	Percent blood volume collected over a 24 hour period	Recovery period in weeks
7.5%	1	7.5%	1
10%	2	10-15%	2
15%	4	20%	4

Species	Total Blood Volume (mL)	7.5% (mL)	10% (mL)	15% (mL)	20% (mL)
Mouse (26 g)	1.8	0.1	0.2	0.3	0.4
Rat (250 g)	16	1.2	1.6	2.4	3.2
Rabbit (4 kg)	224	17	22	34	45
Dog (10 kg)	850	64	85	127	170
Cat (3 kg)	168	12.8	17	25.5	34
Pig (30 kg)	1950	146	196	292	390
Ferret (1 kg)	70	5.3	7	10.5	14
Guinea Pig (200 g)	14.6	1.2	1.5	2.3	3.0
Hamster (100 g)	7.8	0.6	0.8	1.2	1.6

d. If >10% blood volume is required, replace collected blood volume by 3–4 times the volume of blood collected with isotonic fluids (i.e., fluids with same tonicity as blood, such as 0.9% saline, 5% dextrose or Lactate Ringer solution).
e. Reduce volume collected if the animal is weak, ill, geriatric, over weight or anemic. Hemoglobin concentration (HGB) should be over 9.0 g/dL.

3. Safety

a. Follow guidelines of **CARE SOP 715.02-Personal Protective Equipment** when working with animals.
b. Follow guidelines of **CARE SOP 711.01-Sharps Precautions** for handling and disposal of needles and syringes.
c. Follow guidelines of **CARE SOP 707.01-Animal Related Injury** for any personal injuries caused by an animal.
d. Refer to the CARE zoonosis web page for zoonotic information
e. Refer to OHS web page for allergy prevention information

4. Contingencies

Emergency veterinary care is available at all times, including after work hours and on weekends and holidays, through CARE (Pager 1-800-349-2456)

5. Reference

a. Diehl, K.-H. et al., “A Good Practice Guide to the Administration of Substances and Removal of Blood, Including Routes and Volumes”, *J. Appl. Toxicol.*, **21**, 15–23 (2001)
b. Wolfensohn, S., Lloyd, M. 2nd Edition, Blackwell Science Ltd. 1998.
c. Guidelines for survival bleeding of mice and rats; NIH: http://oacu.od.nih.gov/ARAC/Bleeding.pdf
d. CARE SOP 707 Animal Related Injury http://www.research.cornell.edu/care/documents/SOPs/CARE707.pdf
e. CARE SOP 715.02-Personal Protective Equipment:

http://www.research.cornell.edu/care/documents/SOPs/CARE715.pd

f. CARE SOP 711.01-Sharps Precautions:
http://www.research.cornell.edu/care/documents/SOPs/CARE711.pdf

g. CARE zoonosis web page
http://www.research.cornell.edu/care/zoonoses.html

h. Allergens Prevention web page:
http://www.research.cornell.edu/Care/documents/OHS/AllergyPreventionFactSheet.pdf

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