

Guidelines for Rodent Survival Blood Collection

Reviewed and Approved by FAU IACUC

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I. Physiological data about rodent blood:

Mouse blood volume is normally **72 ml/kg** body weight (**0.072ml/g** body weight) - assuming the animal is mature, healthy, and on an adequate plane of nutrition. A drop of blood can be 15-20µl (small) or 25-30µl (large) but it is not possible to accurately quantify the amount.

Rat blood volume is normally **64 ml/kg** body weight (**0.064ml/g** body weight) - assuming the animal is mature, healthy, and on an adequate plane of nutrition.

The NIH's "**Guidelines for Survival Bleeding of Mice and Rats**" contain the following:

"Both the quantity and frequency of blood sampling are dependent on the circulating blood volume of the animal. The approximate blood volume of a mouse is 72 ml/kg, ± 8 ml ... (e.g., 1.5 ml for a 20-gram mouse...)"

Approximate Blood Sampling Volumes and Recovery Periods

Single Sampling		Multiple Sampling	
% Circulatory Blood Volume Removed	Approximate Recovery Period	% Circulatory Blood Volume Removed in 24 hours	Approximate Recovery Period
7.5%	1 Week	7.5%	1 Week
10%	2 Weeks	10-15%	2 Weeks
15%	4 Weeks	20%	4 Weeks

Per information extracted from McGuill, M.W. and Rowan, A.N., "**Biological Effects of Blood Loss: Implications for Sampling Volumes and Techniques**," *ILAR News*, Vol. 31(4), Fall 1989, pp 5-20:

II. Recommendations for a Single Blood Sample:

- Limit a single sampling to 15% of the total blood volume and allow a 30-day recovery period. Up to 20% of the blood volume may be feasible in an animal in prime health that is given replacement fluids (4 ml/kg IV isotonic saline).
- Mouse blood volume is normally 72 ml/kg body weight - assuming the animal is mature, healthy, and on an adequate plane of nutrition.
- Rat blood volume is normally 64 ml/kg body weight, assuming the animal is mature, healthy, and on an adequate plane of nutrition.
- Blood loss of 30% of blood volume, or greater, is life threatening.
- It is best practice to replace the blood volume collected with warmed sterile saline or other appropriate fluid (e.g., Lactated Ringers Solution), especially if a large volume has been collected and/or blood collection frequency is high. The replacement fluid can be administered SC, IP, or IV.

III. Recommendations for Multiple Blood Samples:

MOUSE Blood Sampling Volumes
Maximum Allowable Blood Sample Size (ml)

Body Weight In Grams	Total Blood Volume (ml) (TBV = 7% BW)	Weekly (7.5% TBV)	Every Two Weeks (10% TBV)	Every Four Weeks (15% TBV)
15	1.05	0.08	0.11	0.16
16	1.12	0.08	0.11	0.17
17	1.19	0.09	0.12	0.18
18	1.26	0.09	0.13	0.19
19	1.33	0.10	0.13	0.20
20	1.40	0.11	0.14	0.21
21	1.47	0.11	0.15	0.22
22	1.54	0.12	0.15	0.23
23	1.61	0.12	0.16	0.24
24	1.68	0.13	0.17	0.25
25	1.75	0.13	0.18	0.26
26	1.82	0.14	0.18	0.27
27	1.89	0.14	0.19	0.28
28	1.96	0.15	0.20	0.29
29	2.03	0.15	0.20	0.30
30	2.10	0.16	0.21	0.32

RAT Blood Sampling Volumes
Maximum Allowable Blood Sample Size (ml)

Body Weight In Grams	Total Blood Volume (ml) (TBV = 7% BW)	Weekly (7.5% TBV)	Every Two Weeks (10% TBV)	Every Four Weeks (15% TBV)
25	1.63	0.12	0.16	0.24
35	2.28	0.17	0.23	0.34
45	2.93	0.22	0.29	0.44
55	3.58	0.27	0.36	0.54
65	4.23	0.32	0.42	0.63
75	4.88	0.37	0.49	0.73
85	5.53	0.41	0.55	0.83
100	6.50	0.49	0.65	0.98
125	8.13	0.61	0.81	1.22
150	9.75	0.73	0.98	1.46
175	11.38	0.85	1.14	1.71
200	13.00	0.98	1.30	1.95
250	16.25	1.22	1.63	2.44
300	19.50	1.46	1.95	2.93
350	22.75	1.71	2.28	3.41
400	26.00	1.95	2.60	3.90
450	29.25	2.19	2.93	4.39
500	32.50	2.44	3.25	4.88