

Guidelines for Rodent Survival Blood Collection

Reviewed and Approved by FAU IACUC

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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...) **In general, no more than 10% of the animal's blood volume should be removed at one sampling....**"

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:

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). In general, larger animals have a lower blood volume than smaller animals. If the total blood volume of an animal is unknown, a rough "rule of thumb" is that **6% of the body weight is blood volume**.
- Mouse blood volume is normally 72 ml/kg body weight - assuming the animal is mature, healthy, and on an adequate plane of nutrition. Thus, a **safe maximum blood sample for a 20 gram mouse would be 0.15 ml**.
- Rat blood volume is normally 64 ml/kg body weight, assuming the animal is mature, healthy, and on an adequate plane of nutrition. Thus, a **safe maximum blood sample for a 300 gram rat would be 1.15 ml**.
- Blood loss of 30% of blood volume, or greater, is life threatening.
- The **common 10 percent-10 percent rule** (this estimates a safe volume as 10% of the total blood volume, and that the total blood volume is approximately 10% of the body weight) **will result in an excessive blood loss**.

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