**Guidelines for Rodent Survival Blood Collection**

Reviewed and Approved by FAU IACUC

Effective Date: 04 December 2015 Last Reviewed/Revised: N/A

**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 |