NU–IACUC POLICY

Northeastern University Institutional Animal Care and Use Committee

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| Blood Collection from Common Laboratory Animals |

*Re-Approved: 10/08/2024*

Technique:

Blood collection guidelines have been established to assist investigators with their choice of survival blood collection techniques and to determine the maximum blood that can be collected from each research subject. Blood collection from laboratory animals is a valuable tool in the research process. It is essential that proper technique be followed and personnel collecting blood are properly trained and are skilled at the techniques. The proficiency of the investigator staff and the volume and collection frequency must be taken into consideration when choosing a method at protocol/amendment submission. Deviations from these guidelines must be scientifically justified in the animal care and use protocol/amendment and approved by the IACUC.

There are crucial factors to consider when choosing your blood collection technique that are applicable to the research and the well-being of the animals. They include, but are not limited to:

* Species (each species has a different total blood volume or TBV based on body weight)
* Weight and size of the animals
* Type of sample required (i.e. serum, plasma, whole blood)
* The volume of blood required
* Frequency of sampling, i.e. for PK study.
* The experience of the personnel collecting the blood.
* The effect of the collection technique on the animal

Blood Collection Guidelines (Based on Individual species mean blood volumes):

Serial Blood Collection (multiple samples):

Over 2 Weeks: 10% TBV

Over 4 Weeks: 15% TBV

* If 15% of TBV is collected, the equivalent volume of saline must be administered IP or SC.

Single Blood Collection Sample:

Once Every 2 Weeks: 10% TBV

* If 10% of TBV is collected at one time, the equivalent volume of saline must be administered IP or SC.

More than 10% TBV:

This amount can be collected once every 4 weeks. If More than 10% of the TBV is required to be collected at one time, it must be scientifically justified in the protocol and approved by the IACUC. If this volume is collected, the equivalent volume of saline must be administered IP or SC.

Every species has a different total blood volume. The following is a list of species used at Northeastern University and their total blood volume based on body weight:

Circulating Blood Volume in Laboratory Animals1

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|  | Blood Volume (ml/kg) | |
| Species | Recommended Mean | Range of Means |
| Mouse | 72 | 63-80 |
| Rat | 64 | 58-70 |
| Rabbit | 56 | 44-70 |
| Hamster | 72 | 65-80 |

Maximum Survival Blood Collection Volumes for Mice

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| --- | --- | --- | --- |
| Body Weight (g) | Circulating Blood Volume (CBV) (ml) | 10% CBV (ml)  every 2 weeks∇ | 15% CBV (ml) over  4-week period∇ |
| 20 | 1.26 – 1.44 | 0.13 – 0.14 | 0.19 – 0.22 |
| 25 | 1.58 – 1.80 | 0.16 – 0.18 | 0.24 – 0.27 |
| 30 | 1.89 – 2.16 | 0.19 – 0.22 | 0.28 – 0.32 |
| 35 | 2.21 – 2.52 | 0.22 – 0.25 | 0.33 – 0.38 |
| 40 | 2.52 – 2.88 | 0.25 – 0.29 | 0.38 – 0.43 |

∇ Maximum total sample volume for that time period. (based on 63-72 ml/kg TBV)

Maximum Survival Blood Collection Volumes for Rats

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| Body Weight (g) | Circulating Blood Volume (CBV) (ml) | 10% CBV (ml)  every 2 weeks∇ | 15% CBV (ml) over  4-week period∇ |
| 125 | 7.25 – 8.00 | 0.73 – 0.80 | 1.09 – 1.20 |
| 150 | 8.70 – 9.60 | 0.87 – 9.60 | 1.31 – 1.44 |
| 200 | 11.60 – 18.80 | 1.16 – 1.28 | 1.74 – 1.92 |
| 250 | 14.50 – 16.00 | 1.45 – 1.60 | 2.18 – 2.40 |
| 300 | 17.40 – 19.20 | 1.74 – 1.92 | 2.61 – 2.88 |
| 350 | 20.30 – 22.40 | 2.03 – 2.24 | 3.05 – 3.36 |
| 400 | 23.20 – 25.60 | 2.32 – 2.56 | 3.48 – 3.84 |

∇ Maximum total sample volume for that time period. (based on 58-64 ml/kg TBV)

Collection Sites:

The following is a list of recommended collection sites according to species:

Rat, Mouse: submandibular, tail (lancing of vein or via needle/syringe), saphenous vein, retro-orbital\*, cardiac puncture\*\*

Rabbit: Central ear artery, lateral ear vein, cardiac puncture\*\*

Hamster/vole: retro-orbital\*, cardiac puncture\*\*, saphenous vein.

\* Only permitted with the use of anesthesia unless a strong scientific justification to perform without anesthesia is provided in the protocol and approved by the IACUC. Additionally, this technique should be used once per eye every two weeks to allow the plexus to heal.

\*\* Only permitted under anesthesia, as a terminal procedure.