

## **INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE**

### **POLICY ON BLOOD COLLECTION**

#### **GENERAL POLICY**

The volume of blood removed, and the time course over which that blood is removed, are critical factors in determining acceptable blood collection regimens that minimize the effect of blood loss on the animal.

The volume of blood that can be collected without serious side effects is determined by the animal's total blood volume. Most healthy animals can tolerate losing up to 15% of their total blood volume over a two-week period. Collection of volumes within this range along with good hemostasis will minimize hypovolemia and allow the animal to regenerate adequate numbers of erythrocytes before the next collection.

If the amount taken exceeds 15% of the animal's total blood volume, additional justification is required. This may include a review of the literature documenting that adverse effects were not found when greater volumes were collected in this specific species and strain, under the same experimental conditions. Alternatively, a scientific justification may require higher volumes but include the provision of additional veterinary care, including close monitoring for signs of pain/distress, hematocrit (packed cell volume) measurements, and specific supportive care (e.g. provision of fluid replacement and/or nutritional support). A CCM veterinarian should be consulted for specific recommendations.

Additional factors to consider in minimizing effects of blood loss include age, health status, genetic traits, and nutritional restrictions (e.g., low iron diet) or other components of the protocol (e.g., irradiation or pharmacological treatment) that may retard hematopoiesis. Such factors may require that less blood is taken at longer intervals than stated above or that parenteral fluids may be indicated immediately following blood collection to minimize the consequences of blood collection on the animal's welfare.

## Blood Collection Volume Calculation

The easiest way to determine the total blood volume for an animal is to follow the general principle that total blood volume is equivalent to 6% of the animal's body weight.

$$\text{TOTAL BLOOD VOLUME (mls)} = \text{BODY WEIGHT (grams)} \times 0.06$$

For example, if 10 blood collection timepoints in a 300-gram rat were needed over a 24-hour period with 250  $\mu\text{L}$  of blood to be taken per timepoint, the equation would be:

$$10 \times 250 \mu\text{L} = 2500 \mu\text{L} \text{ or } 2.5 \text{ ml blood needed}$$

$$300 \text{ gms} \times 0.06 = 18 \text{ mL total blood volume}$$

$$2.5/18 \times 100 = 13.9\% \text{ of total blood volume (acceptable amount)}$$

For larger species, the same formula can be provided as:

$$\text{TOTAL BLOOD VOLUME (liters)} = \text{BODY WEIGHT (kilograms)} \times 0.06$$

## Blood Collection Sites

Recommendations for species specific blood collection sites are located on the IACUC website (<https://mghresearch.partners.org/iacuc-policies/>).

Depending on the frequency of blood collection, species, volume and duration, additional methods such as surgical cannulation may be an option for blood sampling. Investigators should consult with a CCM veterinarian for additional guidance and training.

v1.1, December 2004

v1.2, December 2005

v1.3, 17 September 2014

v1.4, 19 April 2017

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