Arizona State University
Institutional Animal Care and Use Committee
STANDARD INSTITUTIONAL GUIDELINE

WHOLE ANIMAL PERFUSION

Perfusion removes blood from organs of interest while rapidly and uniformly preserving tissues for further assessment. While this method can be used for most species including mice, rats, cats, and non-human primates, it is important to note that the specific techniques are dependent on the species, the tissue to be fixed, and how the tissue will be processed following fixation.

Description of the procedure:

1) If using a perfusion system, make sure there are no bubbles in the line before starting. If using syringes, make sure to have plenty of syringes prefilled with the appropriate solution. The perfusion is started with normal or phosphatebuffered saline and may be followed by a fixative, such as formalin, as indicated by the research need.

2) The animal is deeply anesthetized as described in the IACUC protocol. Adequate anesthetic depth is confirmed using a firm toe pinch. If the animal reacts, additional time or anesthetic is given.

3) The following steps need to be performed quickly to ensure the heart is still beating during perfusion.

4) Once the animal has reached a surgical plane of anesthesia, grasp the xiphoid process to retract it away from the liver. Using blunt scissors, make an incision caudal to the xiphoid process. Extend the incision laterally along the rib cage.

5) Separate the liver from the diaphragm, being careful not to damage it.

6) Using blunt scissors, make an incision in the diaphragm along the entire length of the rib cage to expose the pleural cavity.

7) Cut the ribs on both sides of the animal to the level of the collar bone.

8) Clamp the tip of the sternum with a hemostat, and place the hemostat over the head to retract the rib cage. Cut any tissue connecting the rib cage to the heart. When done properly, the thymus lifts away from the heart along with the sternum, providing a clear view of the major vessels.

9) An appropriate gauge needle (size dependent on species) is passed through the left ventricle into the ascending aorta, but not up to the aortic arch where the brachial and carotid arteries diverge.

10) Make a small incision in the right atrium using sharp scissors.

Updated 10/22/2020
Updated 11/16/2017
Updated 11/20/2014

11) Start infusing the solution through the syringe or perfusion pump. Care should be taken to perfuse slowly to avoid unnecessary rupture of capillaries. The speed will be determined by the size of the animal or specific research parameters.

12) If the fluid does not flow adequately, the needle may be abutted against the heart wall. In such cases, adjust the angle of the needle to achieve an appropriate flow.

13) Continue the perfusion until the liver is uniformly pale.

Detailed reference for rodent perfusion including an informative video:

http://www.jove.com/video/3564/whole-animal-perfusion-fixation-for-rodents

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