

Recommendations for orbital blood sampling in rodents

Orbital blood sampling (or retroorbital sinus blood sampling) is a technique for collecting large blood samples from rodents (mice, rats) (the sampling frequency should not be too high). Due to the high skill requirement and significant risks involved, it is considered a highly invasive method and is now generally discouraged.

If you must use this method due to the experimental design, please comply with and pay attention to the following:

1. Regulations

In accordance with the guidelines for the care and use of laboratory animals, orbital blood sampling must be included in the animal experimental plan and approved by the International Association for the Care and Use of Laboratory Animals (IACUC) before it can be performed. The scientific basis for this method must be explained in the plan.

2. Anesthesia Requirements

For animal welfare reasons, general anesthesia is necessary before performing orbital blood sampling to reduce pain and stress. It is recommended to also use local ocular anesthetic eye drops (e.g., tetracaine). (Necessity of Anesthesia: Due to the rich nerve supply in the orbital region, the procedure can cause significant pain (classified as moderate pain) and potential trauma.)

3. Professional Technical Procedures and Limitations

This procedure should be performed by professionally trained personnel (with training records) to minimize blood collection time and tissue damage. Typically, each blood collection should yield 10% of the total blood volume (approximately 150-175 μL for a 25g mouse). There should be at least a 14-day interval between two blood collections from the same eye to allow for animal recovery. Post-operatively, appropriate pressure must be applied to the eye with gauze for at least one minute to achieve hemostasis. Recovery should be monitored for 30 minutes to 2 hours after blood collection.

4. Risks and Potential Complications

Damage: Improper operation may damage the eyeball, orbital tissues, or inferior nerves.

Pressure: This procedure is more stressful than other sampling techniques and requires strict adherence to anesthesia.

Hematoma: Postoperative swelling may occur. This procedure may result in conjunctival hemorrhage, orbital infection, eyeball damage, retinal damage, or blindness.

5. Humane endpoint

If the animal exhibits severe behavioral abnormalities (extreme pain, loss of appetite, rapid weight loss) or severe eye infection after surgery, humane endpoint (euthanasia) should be initiated.

6. Alternative methods

If continuous sampling is required, it is recommended to choose more refined operating techniques, such as submandibular blood collection or tail vein blood collection (for rats).

Animal experimentation and instrument operation consultation advice

Researchers who have become rusty with certain techniques or instrument operations due to a period of inactivity, such as euthanasia equipment operation, should make good use of the Laboratory Animal Center's resources to refresh their knowledge.

1. Laboratory Animal Center Online Teaching Platform Courses
(https://lac.tcu.edu.tw/?page_id=152)
2. Center Website Introduction - Education and Training
(https://lac.tcu.edu.tw/?page_id=152#)
3. Ask Laboratory Animal Center Colleagues in person