

Aim: Study of Different Routes of Drug Administration in Mice and Rats.

References:

- CPCSEA Guidelines for Laboratory Animal Facility, Ministry of Environment, Forest and Climate Change, Government of India.
- Institutional Animal Ethics Committee (IAEC) Standard Operating Procedures.
- AVMA Guidelines for the Euthanasia of Animals.

Objective:

To provide detailed procedures for administering drugs via various routes in mice and rats, ensuring proper technique, dosage accuracy, and minimal stress to the animals.

Materials and Equipment:

- Sterile syringes and needles (various sizes)
- Oral gavage needles
- Intravenous catheters (if needed)
- Drug solutions
- Anesthetics (if necessary)
- Personal protective equipment (PPE)
- Restraining devices (e.g., restraining tubes)
- Disinfectants
- Record-keeping materials

Procedure:

1. Oral (Per os, PO) Administration:

1. Preparation

- Prepare the drug solution and fill the syringe.
- Attach the appropriate size oral gavage needle.

2. Restraint and Technique

- Restrain the animal using a restraining tube or by holding it gently.
- Measure the distance from the mouth to the last rib and mark the gavage needle to prevent injury.
- Insert the gavage needle gently into the mouth, guiding it along the esophagus.
- Administer the drug slowly to avoid aspiration.

3. Post-Procedure Care

- Monitor the animal for signs of distress or discomfort.
- Record the administered dose and any observations.

2. Intravenous (IV) Administration:

1. Preparation

- Use a 25-27 gauge needle for mice and a 23-25 gauge needle for rats.
- Prepare the drug solution and fill the syringe.

2. Restraint and Technique

- Warm the tail to dilate veins if administering via the tail vein.
- Restrain the animal in a restraining device.
- Insert the needle into the lateral tail vein at a shallow angle.
- Administer the drug slowly to ensure it enters the bloodstream.

3. Post-Procedure Care

- Apply gentle pressure to the injection site to prevent hematoma.
- Monitor the animal for any adverse reactions.
- Record the dose and observations.

3. Intraperitoneal (IP) Administration:

1. Preparation

- Use a 25-27 gauge needle for mice and a 23-25 gauge needle for rats.
- Prepare the drug solution and fill the syringe.

2. Restraint and Technique

- Restrain the animal with the head tilted down to expose the lower abdomen.
- Insert the needle into the lower right quadrant of the abdomen at a 30-40° angle.
- Aspirate to ensure the needle is not in the bladder or a blood vessel, then administer the drug.

3. Post-Procedure Care

- Monitor the animal for signs of discomfort or adverse reactions.
- Record the administered dose and any observations.

4. Subcutaneous (SC) Administration:

1. Preparation

- Use a 25-27 gauge needle for mice and a 23-25 gauge needle for rats.
- Prepare the drug solution and fill the syringe.

2. Restraint and Technique

- Restrain the animal and lift the skin between the shoulders to form a tent.
- Insert the needle into the tented area and administer the drug slowly.

3. Post-Procedure Care

- Monitor the animal for any adverse reactions.
- Record the dose and observations.

5. Intramuscular (IM) Administration:

1. Preparation

- Use a 27-30 gauge needle for both mice and rats.
- Prepare the drug solution and fill the syringe.

2. Restraint and Technique

- Restrain the animal and identify the muscle mass (e.g., quadriceps).
- Insert the needle into the muscle at a 90° angle and administer the drug slowly.

3. Post-Procedure Care

- Apply gentle pressure to the injection site.
- Monitor the animal for signs of pain or discomfort.
- Record the dose and observations.

6. Intranasal (IN) Administration:

1. Preparation

- Use a fine-tipped pipette or small syringe.
- Prepare the drug solution and fill the delivery device.

2. Restraint and Technique

- Restrain the animal in a supine position.
- Place a small drop of the drug solution at the nostril.
- Allow the animal to inhale the solution naturally.

3. Post-Procedure Care

- Monitor the animal for any respiratory distress.
- Record the administered dose and any observations.

Safety Precautions

- Always wear appropriate PPE.
- Ensure all drug solutions are sterile and prepared under aseptic conditions.
- Handle all animals gently and with respect to minimize stress.
- Adhere to the correct dosage calculations based on the animal's weight.

Ethical Considerations

- Obtain necessary approvals from the Institutional Animal Ethics Committee (IAEC).
- Adhere to the principles of the 3Rs (Replacement, Reduction, Refinement).
- Ensure all procedures are justified and minimize animal suffering.

Notes

- Regular training and competency assessments should be conducted for all personnel involved in animal handling and procedures.
- Any deviations from standard procedures should be documented and justified, with measures taken to minimize any negative impact on animal welfare.

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