Cihan University/ Sulaymaniya

College of Health Science

Medical Laboratory Analysis

4th Stage- 1st Semester

Pr. Clinical Immunology

Lab- 3: Laboratory Animals in Immunology Research

2024- 2025

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Laboratory animals

- Laboratory animals are distinguished from other animals by their intended use in research, teaching, or testing.
- They possess specialized anatomic, genetic, or metabolic conditions that differ from other members of the same species.

Common Laboratory Animals

- Various laboratory animals are used in biomedical researches.
- They serve as models of human and animal diseases.
- They are also used for raising hyper immune sera against different type of antigens.
- Most frequently used laboratory animal species are rabbits, guinea pigs, hamsters, rats and mice.

Feeding, Care and Maintenance of Laboratory Animals

- Lab animals need to be taken care of and maintained in the most convenient environment. This will require:

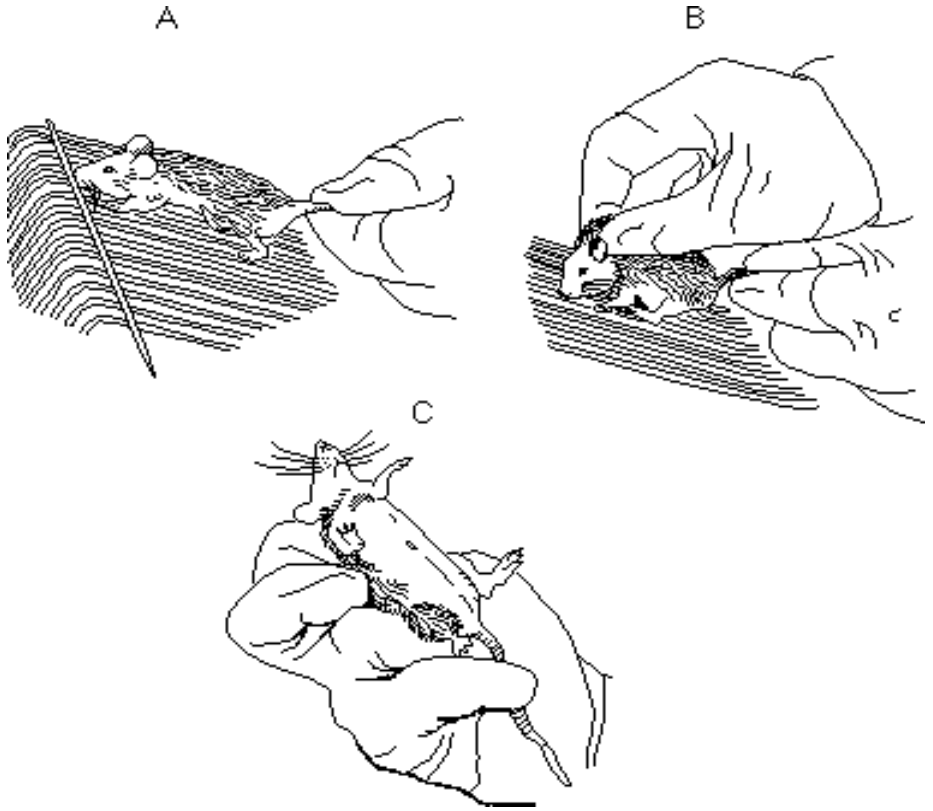
1. Proper space,
2. Balanced diet,
3. Timely feeding and proper in-house temperature,
4. Ventilation,
5. Regular cleaning and disinfection of the space and check for infections and other diseases.

IVC (Individual Ventilated Cages)

Handling of Laboratory Animals

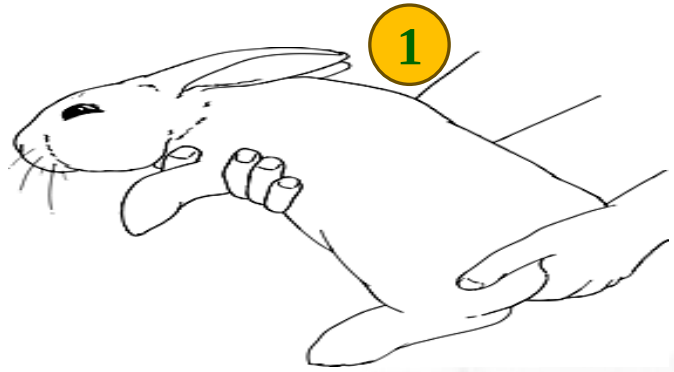
1. Mice and Rat:

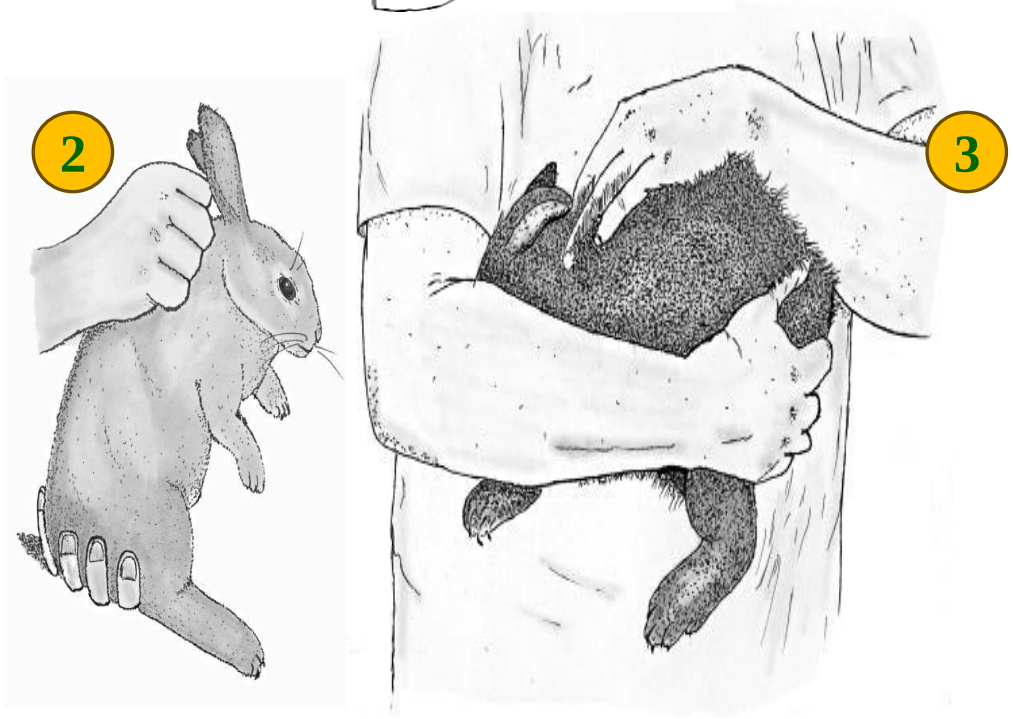
- When picking up adult mice, grasp them gently but firmly at the base or center of their tail.
- Do not pick them up by the tip of the tail.
- Place the animal on a surface such as the wire cage top or lid.
- While still holding the tail near the base, with your other hand firmly grasp the loose skin on the back starting near the ears using your thumb and first two fingers.
- The tail can then be held by the last two fingers.



2. Rabbit

- Two hands should be used while lifting the rabbit, one supporting the chest and one supporting the bottom.
- Hold the rabbit at the loose skin of the back with its head slightly higher than its bottom.
- This will help prevent the rabbit kicking out backwards or trying to do a forward movement.
- Never lift the rabbit with ears this will make them nervous and irritated.



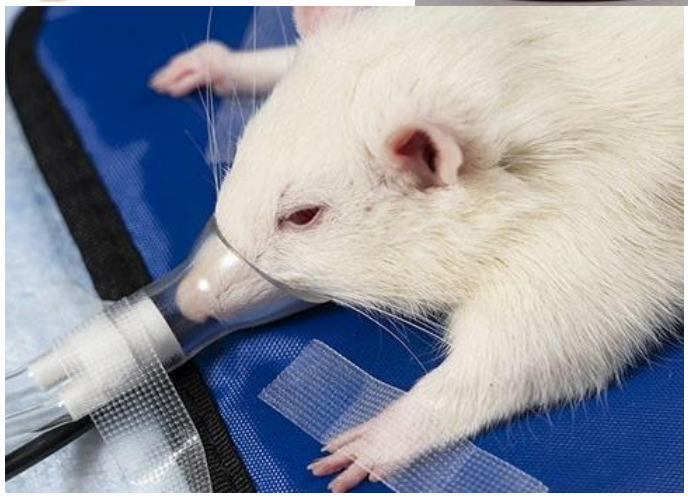


Restraining

- Mice and rat can be easily restrained in a 50ml plastic syringe barrel in which a longitudinal slit has been made by cutting the plastic.
- Rabbit/ guinea pig can be restrained in wooden box of with a hole made into it for taking out the head and ears in case of injection or blood collection.

Anesthesia of Lab. Animal

- If the procedure involves surgical operation or other painful handling, the animal must be anesthetized before following any such procedure.
- Type of anesthesia use for GA
  - Halothane,
  - Xylazine + Ketamine,
  - Isoflurane,
  - Nitrous oxide,

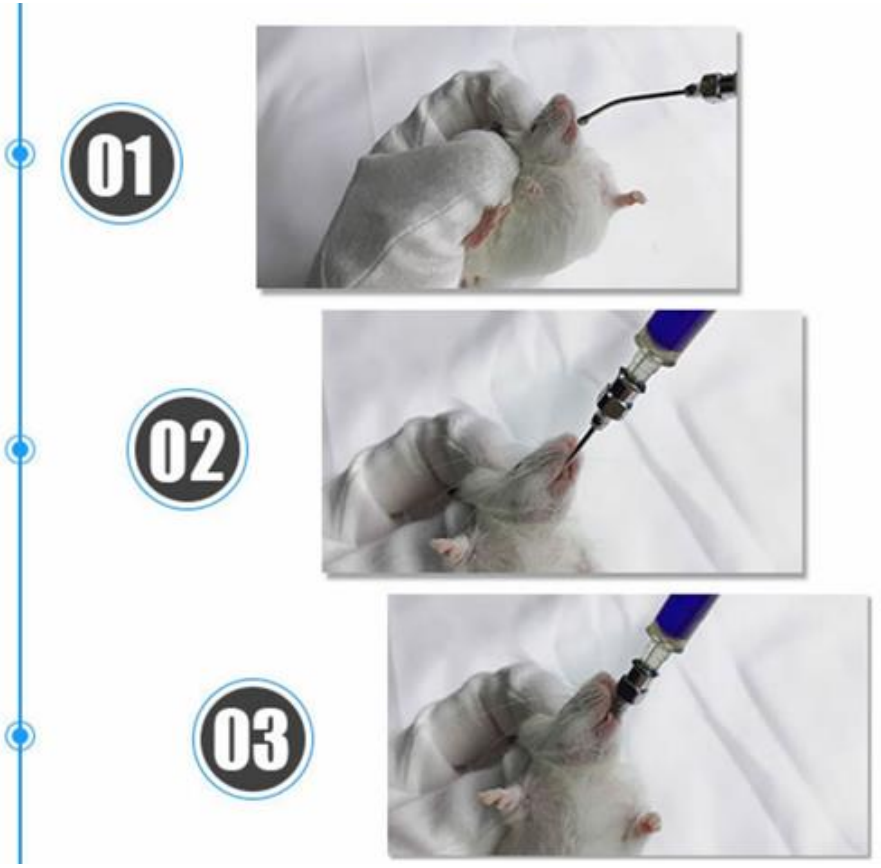


Scientists and Researchers Rely on Mice and Rats for Several Reasons

1. Rodents are small, easily housed and maintained, and adapt well to new surroundings.
2. They reproduce quickly so several generations of mice can be observed in a relatively short period of time.
3. Mice and rats are relatively inexpensive and can be bought in large quantities.
4. The rodents are generally mild-tempered and docile, making them easy for researchers to handle.
5. Another reason rodents are used as models in medical testing is that their genetic, biological and behaviour characteristics closely resemble those of humans.

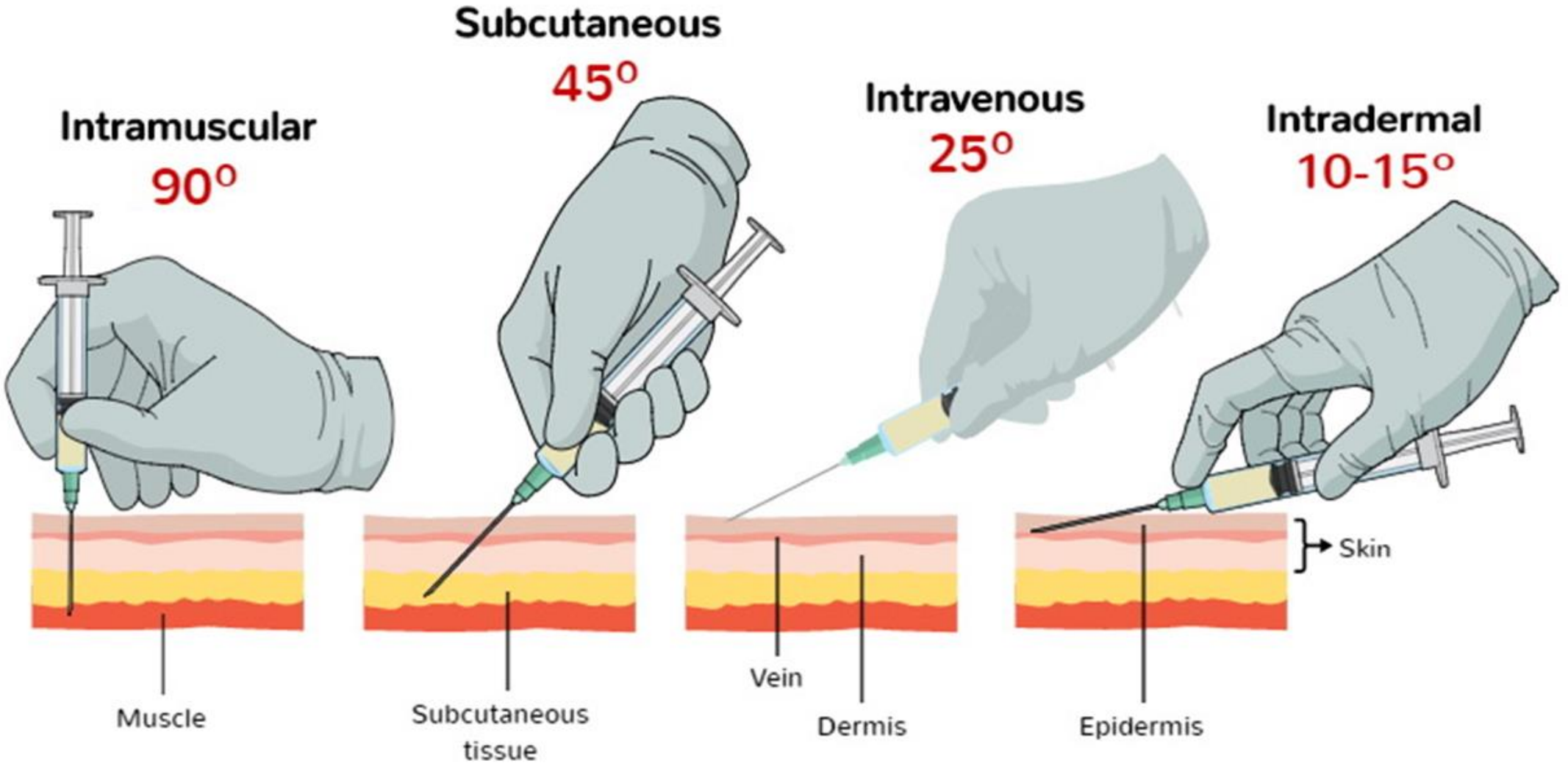
Administration of Drugs and Experimental Compounds in (Mice and Rats)

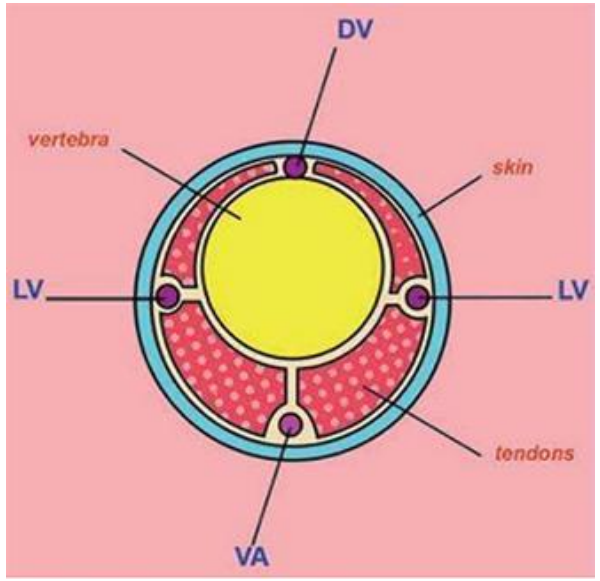
1. Oral feeding
2. Intravenous IV: is done in the tail vein.
3. Intraperitoneal IP: by using of peritoneal cavity and is widely used.
4. Intradermal ID: skin of foot pad or back.
5. Intramuscular IM: thigh muscle limited in use.
6. Subcutaneous SC: skin of the flank region or the back.

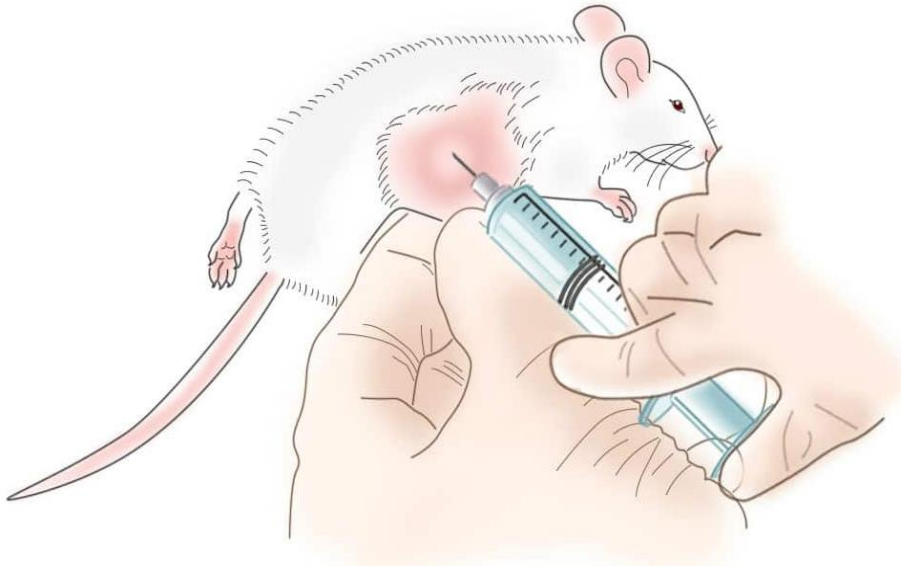


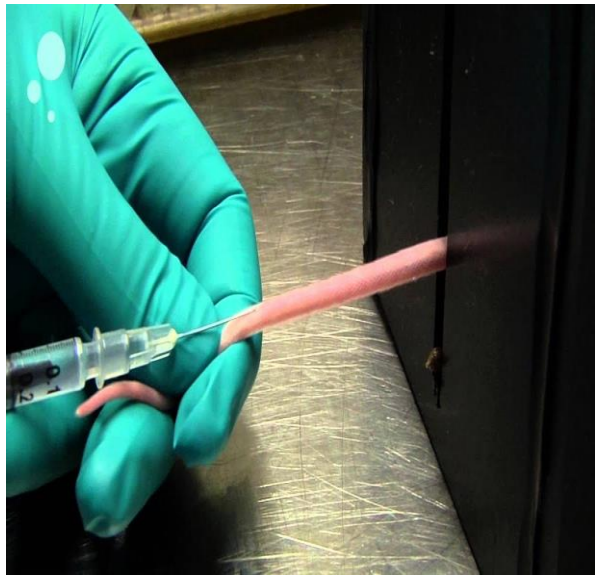
1- Oral Feeding

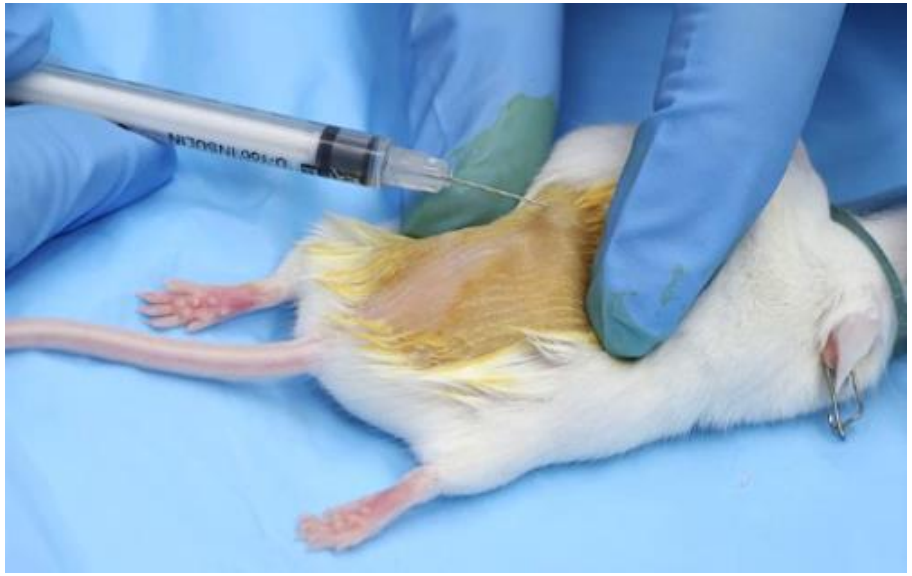
Injection Techniques











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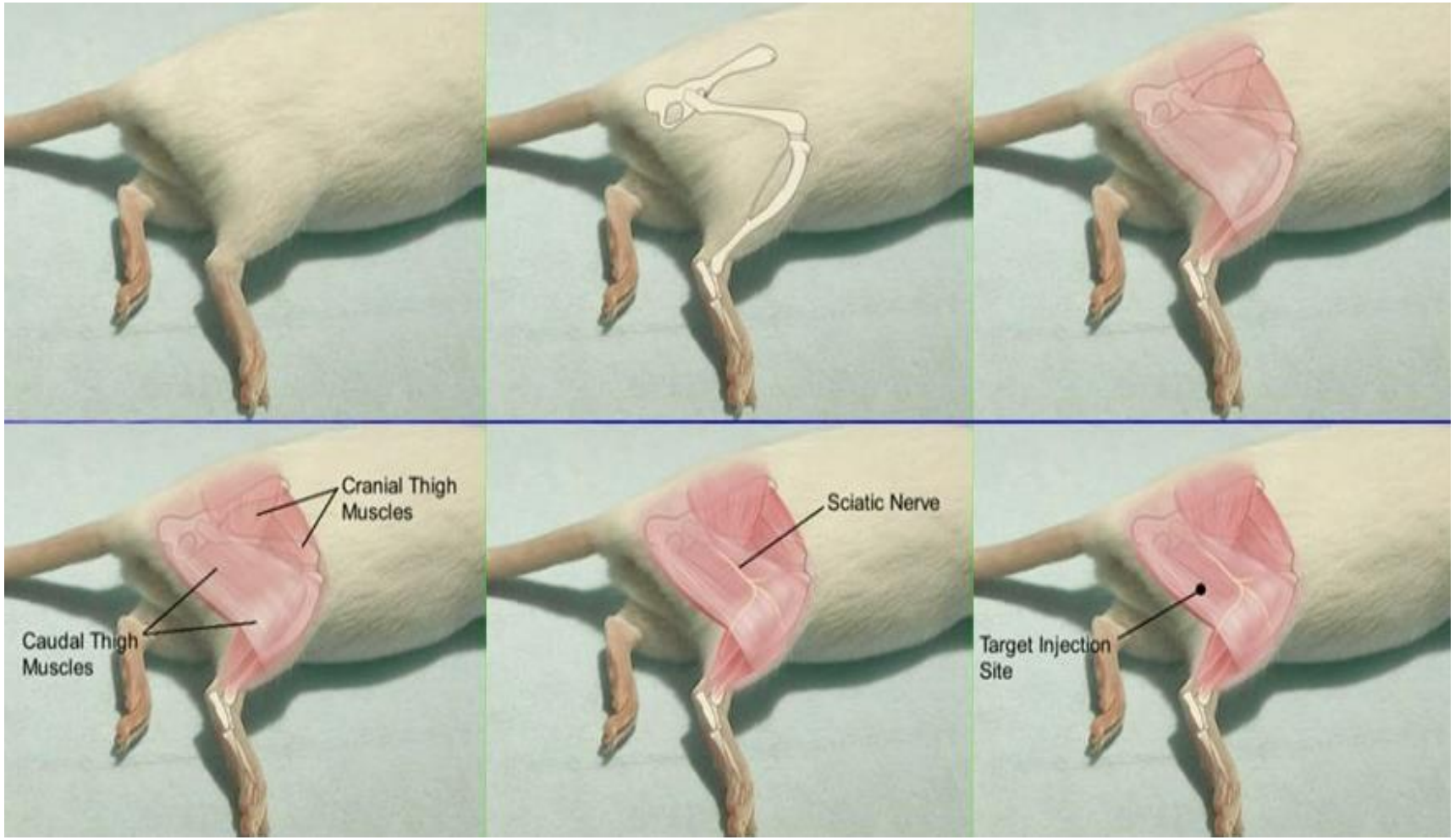


5. Intramuscular IM: thigh muscle limited in use.

6. Subcutaneous SC: skin of the flank region or the back.

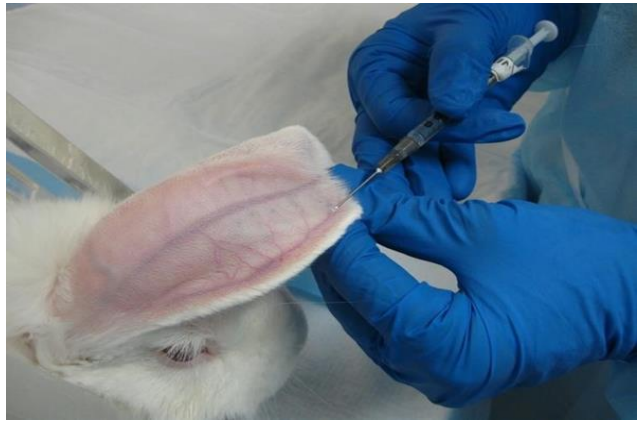
Administration of Drugs and Experimental Compounds in (Rabbits)

1. Oral Feeding
2. IM: in thigh muscle
3. SC: in the lateral side
4. IV: the marginal ear vein will be used.
5. IP: in the peritoneal cavity and the injection side is at the midline of the abdominal wall.

1. Oral Feeding

2. Thigh muscle

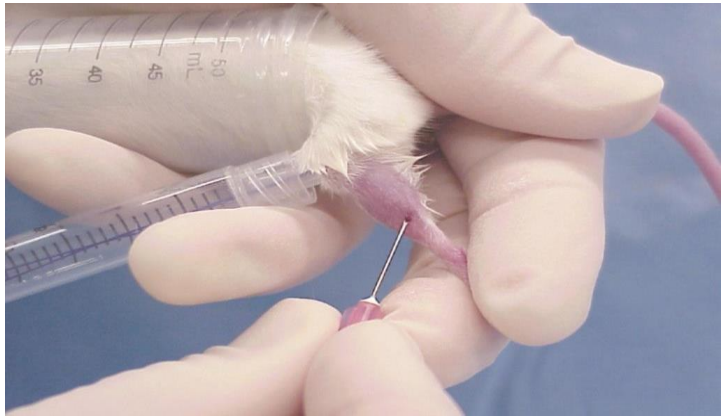
3. Lateral Side Injection



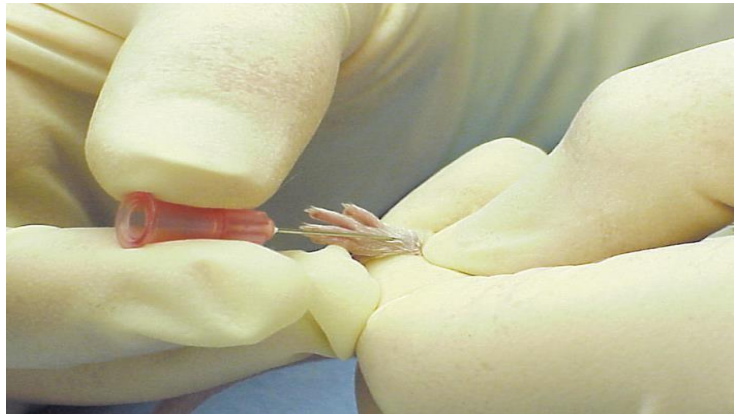
4. Marginal Ear

Sites of blood collection in Rodents

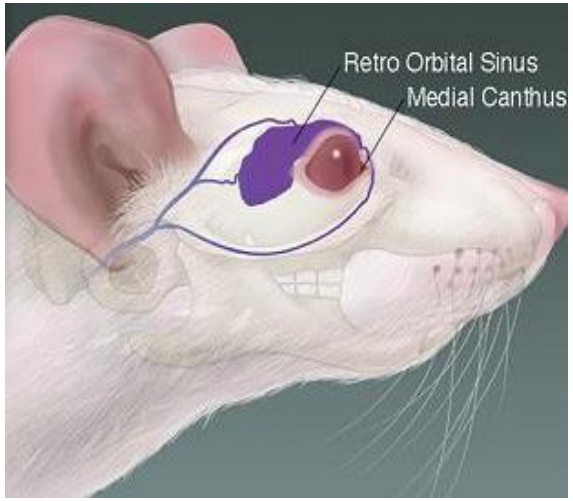
1. Saphenous vein,
2. Dorsal pedal vein,
3. Retro-orbital blood collection,
4. Jugular Vein,
5. Tail vein,
6. Facial Vein and Submandibular,
7. Marginal ear vein/ Auricular artery (rabbit)



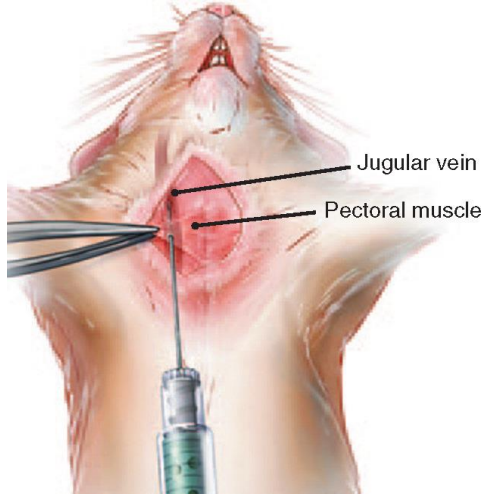
1. Saphenous vein



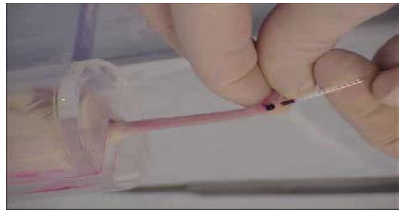
2. Dorsal pedal vein



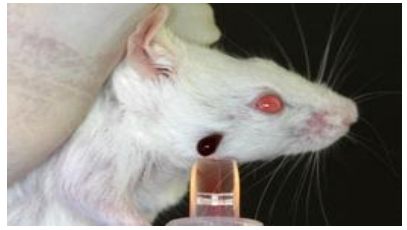
3. Retro-orbital



4. Jugular Vein



5. Tail vein



6. Facial Vein

7. Auricular artery

References

- Patra, J. K., Das, S. K., Das, G., & Thatoi, H. (2019). A practical guide to pharmacological biotechnology. Springer Singapore.
- Parasuraman, S., Raveendran, R., & Kesavan, R. (2010). Blood sample collection in small laboratory animals. Journal of pharmacology & pharmacotherapeutics, 1(2), 87–93. https://doi.org/10.4103/0976-500X.72350.
- https://www.clodrosome.com/