Aim: Study of Laboratory Animals (a) Mice; (b) Rats; (c) Guinea pigs; (d) Rabbits

Study of Laboratory Animals:

The use of laboratory animals is integral to experimental pharmacology, providing valuable models for understanding the effects of drugs and other substances on living organisms. Different species of laboratory animals serve specific purposes in research. Here, we delve into the detailed study of four commonly used laboratory animals: mice, rats, guinea pigs, and rabbits.

(a) Mice:

1. Physiological Characteristics:

Mice (Mus musculus) are small rodents known for their adaptability and reproductive efficiency.

Weight: Typically 20-30 grams.

Lifespan: Around 2-3 years.

2. Behavioral Characteristics:

Social animals, requiring group housing.

Nocturnal behavior, active during the night.

Excellent exploratory behavior, making them suitable for behavioral studies.

3. Uses in Research:

Commonly used in genetics, immunology, and cancer research.

Genetically modified strains available for specific research purposes.

Ideal for drug screening due to cost-effectiveness.

4. Considerations:

High breeding rate, leading to easy maintenance of experimental populations.

Small size requires careful handling to avoid stress.

(b) Rats:

1. Physiological Characteristics:

Rats (Rattus norvegicus) are larger than mice, providing a larger blood volume and tissue samples.

Weight: Varies from 200-600 grams.

Lifespan: Approximately 2-3 years.

2. Behavioral Characteristics:

Social animals requiring companionship.

Omnivores with a varied diet.

Highly trainable, enabling complex behavioral studies.

3. Uses in Research:

Commonly employed in toxicology, neurobiology, and cardiovascular research.

Rat models for disease studies, including diabetes and hypertension.

Behavioral studies due to their ability to learn complex tasks.

4. Considerations:

Larger size facilitates surgical procedures and blood collection.

Social housing is essential for their well-being.

(c) Guinea Pigs:

1. Physiological Characteristics:

Guinea pigs (Cavia porcellus) are larger rodents with specific physiological features.

Weight: Typically 700-1200 grams.

Lifespan: Around 5-7 years.

2. Behavioral Characteristics:

Social animals requiring companionship.

Exhibit vocalization as a form of communication.

Limited climbing ability.

3. Uses in Research:

Frequently used in immunology, allergy, and respiratory research.

Unique susceptibility to certain infections makes them valuable for vaccine studies.

Limited applicability in drug metabolism studies.

4. Considerations:

Unique metabolic characteristics, including the inability to synthesize vitamin C.

Prone to respiratory infections, requiring careful environmental management.

(d) Rabbits:

1. Physiological Characteristics:

Rabbits (Oryctolagus cuniculus) are larger mammals with distinctive physiological features.

Weight: Varies from 2-5 kg.

Lifespan: Approximately 5-10 years.

2. Behavioral Characteristics:

Social animals with complex social structures.

Herbivores with a specialized digestive system.

Well-adapted to burrowing behaviors.

3. Uses in Research:

Commonly used in cardiovascular, ophthalmic, and reproductive studies.

Valuable for antibody production due to their large size.

Limited use in certain toxicology studies.

4. Considerations:

Unique digestive system with cecotrophy, requiring specific dietary considerations.

Requires careful handling due to their powerful hind limbs.

Understanding the physiological and behavioral characteristics of laboratory animals is crucial for designing and conducting experiments in experimental pharmacology. Mice, rats, guinea pigs, and rabbits each offer specific advantages and considerations, making them valuable models for diverse areas of research. Ethical considerations and appropriate care are paramount to ensure the well-being of these animals and the reliability of experimental outcomes.