

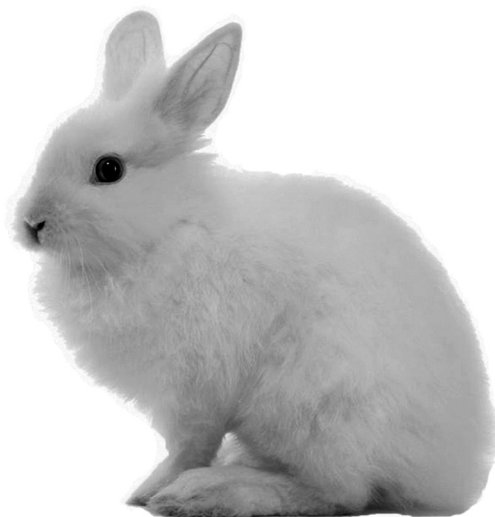


Fig. 1.5: Experimental animal—rabbit

7. **Biomedical research studies:** Genetics, nutrition, toxicology, physiology, immunology and reproduction.
8. **Reproduction research:** Non-spontaneous ovulation.
9. Commonly used to study the effect of drugs on pupil.
10. Animal of choice for many cardiac studies—because of its very simple cardiac conductive tissue.

DOG (CANIS FAMILIARIS)

Dog is the most preferred large experimental animal after monkey. The advantages being it has a small alimentary tract and can be trained easily. Most commonly used strains of dogs are Mongrel and Beagles. They are preferred for the experimental purposes due to manageable size, moderate length of hair coat, docile nature and ease to handle. Classical work of Pavlov's on conditioned reflexes was on dog.

Uses

1. Cardiovascular research is preferred in the dogs. Drugs acting on blood pressure and vascular system are preferably screened.

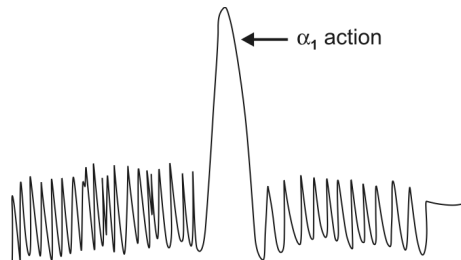


Fig. 2.2: Effect of noradrenaline on BP

Isoprenaline: Initial slight rise (β_1) followed by sustained fall (β_2) is seen as isoprenaline is predominant β_2 agonist.

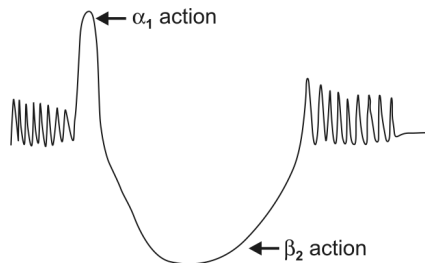


Fig. 2.3: Effect of isoprenaline on BP

Histamine: Fall in blood pressure because of stimulation of H_1 receptor on vascular smooth muscle.

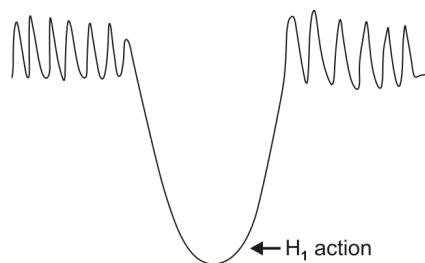


Fig. 2.4: Effect of histamine on BP

Acetylcholine: Sharp and short-lasting fall in blood pressure (M_3) receptor action. It is degraded by acetylcholinesterase enzyme.

Advantages: No special arrangement is required. It does not affect the physiological functions of animal.

Disadvantages: Require skilled person for administration.

Onset time is 15 minutes and last for 45 minutes.

General anaesthesia: In this type animal is made unconscious.

General condition of animal including renal, hepatic, cardiac and pulmonary function has to be assessed.

This can be induced by inhalational or injectable route.

Inhalational: Volatile gases like halothane, isoflurane, enflurane are used. Ether has disadvantage of high inflammability, still it was used till recently. Inhalational mixture should include 21% of oxygen. N_2O can be added with O_2 and inhalational agent. this reduces the requirement of agent. This technique requires special instrument like vaporizer. It is short lasting. It has minor role in small animals and used for larger animals.

INTRAVENOUS AGENTS

Barbiturates

In this group agents like pentobarbitone and thiopentone are used. Pentobarbitone is short and rapid acting. It has vagolytic effect, hence it is not used for CVS drugs. Thiopentone is ultrashort acting.

Chloralose

Compound of chloral and glucose. Alpha chloralose is the active form. Soluble in hot water, alcohol and ether. It is prepared as 1% solution and administered IV or intraperitoneal. Preferred for rapid onset and irreversible anaesthesia in dog and cat.

Advantages

- Uniform depth
- No effect on respiration and circulation
- ANS—reflexes not depressed.

Urethane

Water soluble and use in 25% concentration. It is preferred for short-term experiments. As it has hepatotoxic effect, it also causes agranulocytosis and pulmonary adenoma. It has slight

Bioassay

ASSAY

Estimation of concentration of active principle in unit quantity of the given preparation.

Different Types of Assays

1. **Chemical assay:** Estimation of potency by chemical methods, e.g. spectrophotometry.
2. **Immunoassay:** Estimation of potency by immunological methods, e.g. radioimmunoassay.
3. **Bioassay:** Estimation of potency by biological means.

Definition of Bioassay

It is defined as estimation of relative potency of active principle in the test solution by comparing with standard solution on living tissue (intact animal/isolated tissue).

Bioassay was started in the late 18th century, when standardization of diphtheria antitoxin was done by **Paul Ehrlich**.

Principles of Bioassay

1. Biological response produced by the active principle (to be bio-assayed) has to be same in all animal species.
2. **Sensitivity:** Quantity of response produced by particular dose should be same in same animal when tested at different times or all animals of same species at same time, provided that the conditions are constant, e.g. degree of rise in BP by particular dose of adrenaline should be same.