9. GENERAL AND LOCAL ANAESHTHETICS

(Experimental pharmacology)

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Objectives:

- At the end of practical class the student shall be able to:
  - Demonstrate the effect of general anaesthetics with and without pre-anaesthetic medication in rat.
  - Demonstrate the effect of intravenous anaesthetics.
  - Evaluate the local anaesthetic property of drugs.

General anaesthesia (inhalation)

- **Experimental animal:** Albino rats (2)
- **Procedure:**

    1. Rats of equal weight are placed under glass bell jars. The following observations are made during the resting period.

        - **Posture**: Limbs Flexed/Extended
        - **Consciousness**: Normal/Dull/Unconscious
        - **Reflex activity:** Response to touch, corneal reflex, pinching of skin/ extremity, pricking or pushing by glass rod.

    - **Respiration**: Normal respiratory rate- 80-150 strokes/ min.
        - Fast = +++, Moderate = ++, Inhibited = +, Absent= 0
    - **Righting reflex:** Presence of this reflex is indicated by *return of animal to normal posture, when animal is quickly turned on its back.*
    - **Tone:** Watch position of head (held away from surface or is lowered on the surface) and ascertain the tone in extremities. Normal tone = + ++. Record flaccidity, if any, by appropriate gradation.

2. Into the bell jar 'A' a cotton swab soaked with 5ml of ether inserted and the stop watch started. The induction of anaesthesia is indicated by a loss of righting reflex. All the above observations are recorded, when the anaesthesia is induced (Table-1). The bell jar and cotton swab are removed and the stop watch started to mark off recovery time (time between loss and reappearance of righting reflex).

3. Rat 'B' is injected with (4 mg/kg) diazepam intraperitoneally. Various points of observation recorded after 20-25 min. The rat is anesthetised with 5 ml of ether and the induction and recovery times noted. (Table-2).


Jar with tight fitting lid and known volume (1L)
Wire mesh floor to keep animal from coming in contact with isoflurane
Cotton ball soaked with known volume of isoflurane

b.Induction of anesthesia by inhalation anesthetics

Requirements- Measuring jar, cotton, bell jar, chloroform/anesthetic ether,

Observations

Table-1

- Weight: Rat A Rat B
- Observations before and after anaesthesia

Animal	Posture	Consciousness	Reflex activity	Respiration	Righting reflex	Muscle tone
A. 1) Normal						
2) Ether						
B. Pre-anaesthetic medication 1) Normal						
2) Diazepam						
3) Diazepam+ Ether						

Table-2
Induction and recovery time

Animal	Time required for anaesthesia (min and sec.)	Time for recovery (min and sec.)
A		
B		

- Conclusions:

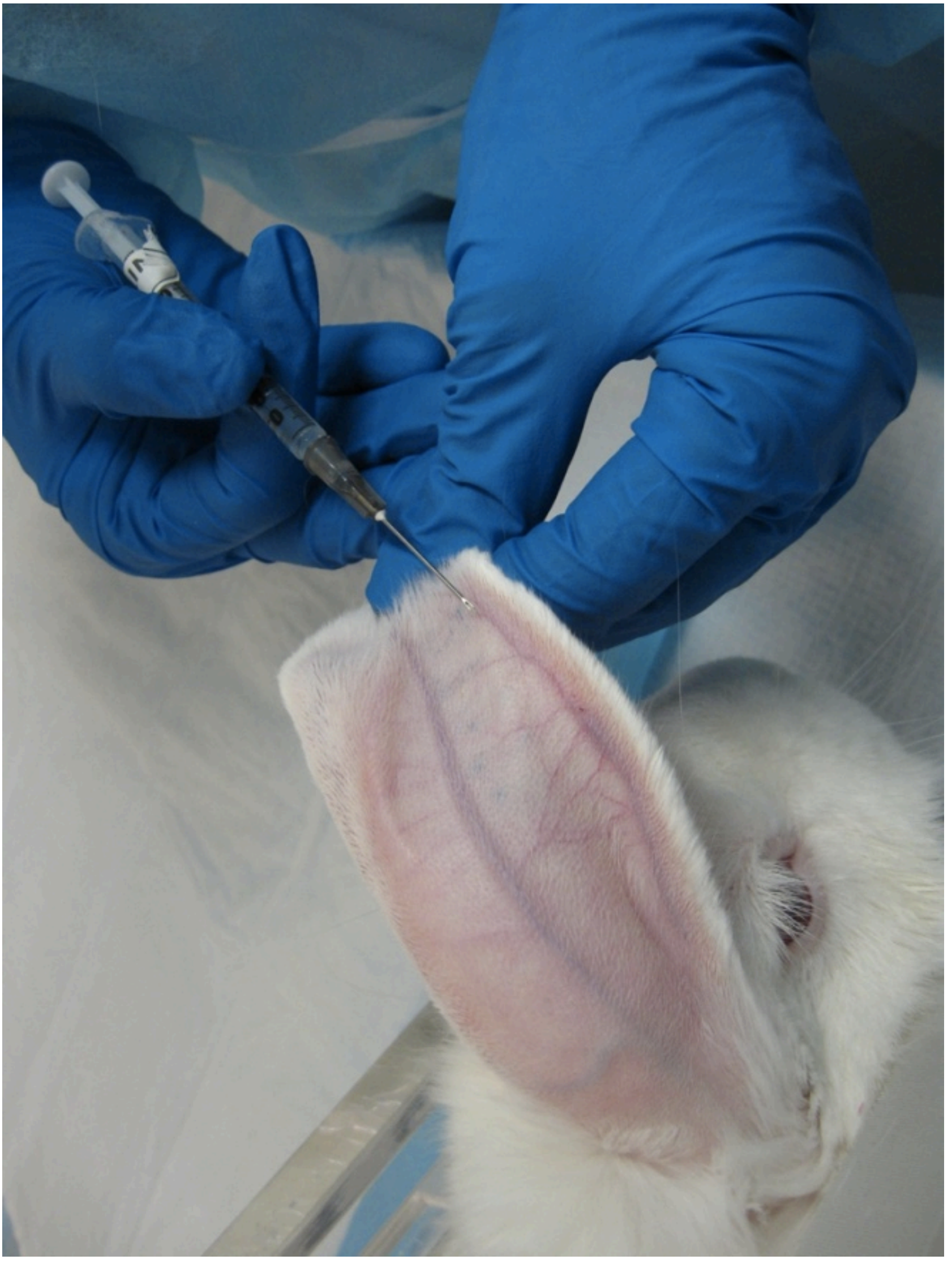
General anaesthesia (Intravenous):

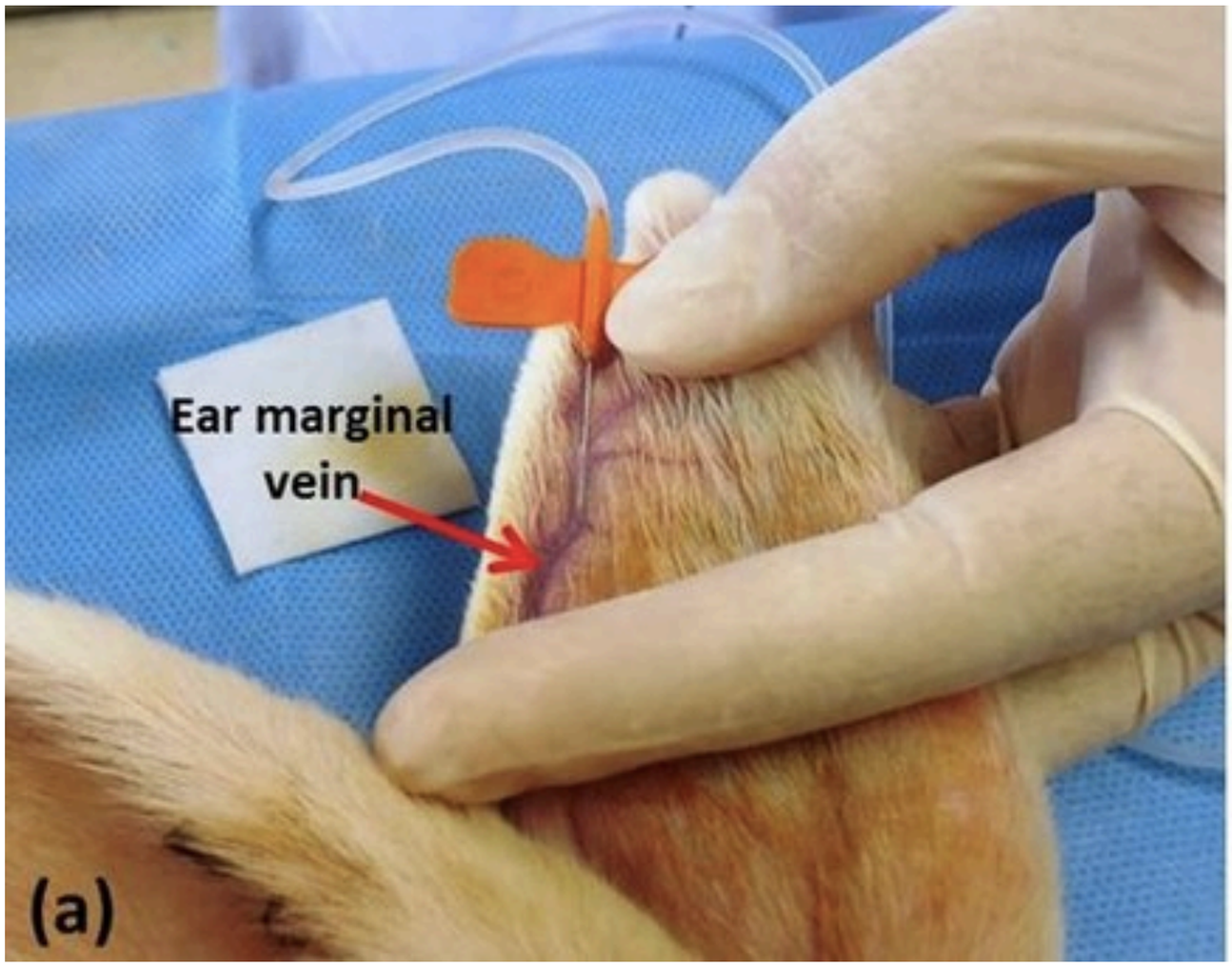
- **Anaesthetic agent:** Pentothal sodium/ Ketamine.
- **Experimental animal:** Rabbit.
- **Procedure:**

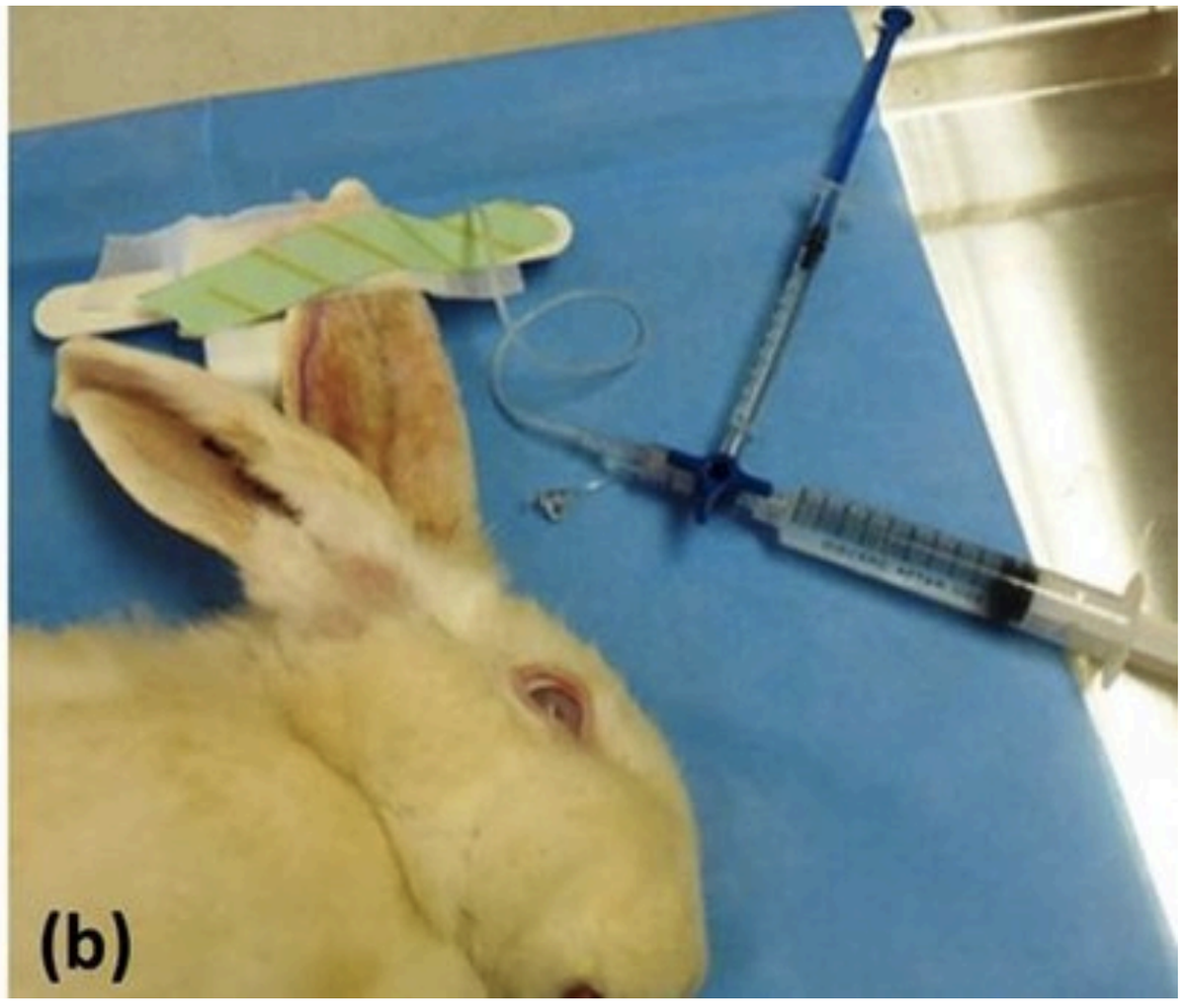
1. A rabbit (weighing 1.7 to 2.5 kg) with big ears and prominent ear veins is selected. The area over the anterior marginal vein on one side is prepared for injection.
2. Various parameters such as posture, consciousness, respiration, pupils, corneal reflex and muscle tone are recorded when animal is resting quietly.

3. To facilitate the injection, the ear vein is made prominent by applying bull dog clamp over the vein near the base of the ear or by applying xylol. A small bore needle is attached to a syringe which is filled with freshly prepared 1% solution of Pentothal sodium. The solution is slowly injected intravenously (through anterior marginal vein) over the period of 3-6 seconds. During and after injection a close watch on various parameters mentioned in point 2 above and it is ascertained if the animal is anaesthetised. Additional small quantities of the anaesthetic agent may be required to induce anaesthesia. Various signs of anaesthesia and the quantity of drug required are recorded.

4. The time required for complete recovery and post-anaesthetic sequel, if any, is recorded.




Ear marginal
vein
(a)


(b)

Observations:

- Freshly prepared intravenous administration of 1% Pentothal sodium (20mg/kg):
- Weight of rabbit Volume of anaesthetic used
- Time of induction Time of recovery

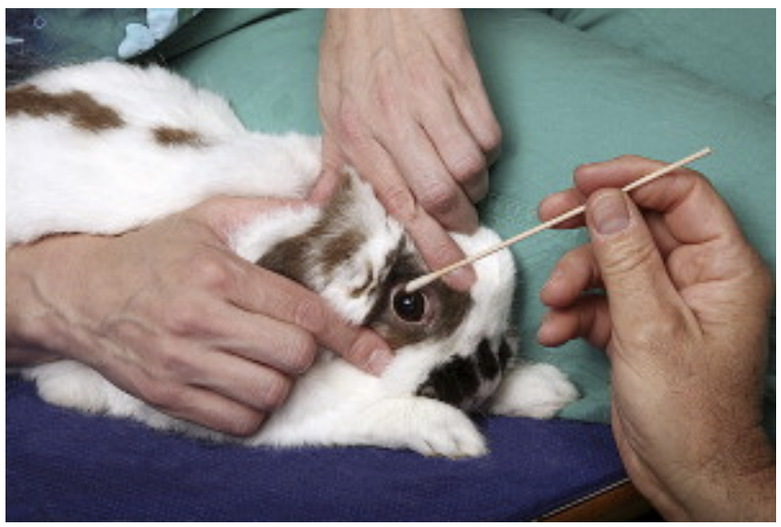
Parameter	**Before induction of anaesthesia**	**After induction of anaesthesia**
Posture		
Consciousness		
Respiration		
Pupil		
Corneal reflex		
Righting reflex		
Other reflex activity		
Muscle tone		

Conclusion:

Assignment:

- What is pre-anaesthetic medication? Mention drugs used for pre anaesthetic medication and therapeutic purposes served by them.
- Name commonly used general anaesthetic agents in patients undergoing surgical procedures.
- Which plane of anaesthesia is ideal for surgical procedures? Why?
- Compare and contrast Pentothal sodium and ketamine as anaesthetics.
- Name the anaesthetic agents used only in animal experiments.

Local anaesthesia



- **Methods of testing:** Surface anaesthesia in rabbit
- **Experimental animal:** Rabbit
- **Procedure:**
    - An adult rabbit is restrained in a rabbit box, exerting light pressure on flanks behind the hips. A horse hair mounted on a glass rod (cotton can also be used like we are using in human) is used to touch the centre of cornea to elicit 'blink reflex' in both the eyes. The solution of local anaesthetic procaine and lignocaine 0.1% is instilled in right and left eye respectively, so the space between eye lids contains visible film of solution. Blink reflex is elicited in both the eyes at different time intervals.

Time of testing	30 sec.	1 min.	2 min.	3 min.	4 min.
Eye (right) Procaine 0.1%					
Eye (left) Lignocaine 0.1%					

In this manner, by using a large number of animals, 'mean % response' can be obtained for this concentration. By employing other concentrations, similar means can be obtained and data plotted to find the mean effective concentration, which can be compared with that of the standard drug.

Conclusion:

Assignments:

1.Mention local anaesthetic drugs and their important clinical uses.

2.Which are methods of local anaesthesia?

3.How can you prolong the effect of a local anaesthetic drug?

Thank you