

EXPERIMENT NO.: 7**DATE:****AIM: TO STUDY THE EFFECTS OF VARIOUS DRUGS ON RABBIT EYE****REQUIREMENTS:**

Rabbits, Eye, Droppers, rabbit holder,

DRUG :

Acetylcholine, carbachol, physostigmine, atropine, ephedrine, lignocaine

THEORY:

- Iris contains two types of smooth muscles.
- Sphincter pupillae and dilator pupillae (Radial muscles).
- Contraction of sphincter pupillae constricts pupil produce meiosis and contraction of radial muscles produces dilation of pupils known as mydriasis.
- Additionally eye contains ciliary muscles that are involved in adjustment of lens for distance and near vision.

PROCEDURE:

Keep the rabbit in a rabbit holder in such a way that the head will be protruding outside. Consider its right eye as control eye (in each case 2-3 drops of normal saline are instilled in this eye) and left eye as the Test eye (in each case 2-3 drops of normal saline are instilled in this eye).

Testing of reflexes:

- 1) **Corneal touch reflexes:** Can be studied by touching the cornea of eye with a cotton pledget or a piece of paper and observing whether the rabbit blinking the eyelids or not. Check in both control eye and test eyes.
- 2) **Light reflexes:** it is studied by focusing a torch on the eye and observing whether the pupil is constricted in response to the light or not. Check in both control eye and test eye.
- 3) **Effects of drug on diameter of pupils:** the dilation or constriction of pupil after adding the drug solution is observed and compared with the diameter of pupil in the both eye.



Normal Eye



Pupil Dilate



Constricted Pupil



Blinking of eye

OBSERVATION TABLE:

Sr.No	Drug Solution	Pupil Size	Light Reflex	Touch Reflex
1	Saline	No Change	Present	Present
2	Ephedrine	Increase	Present	Present
3	Carbachol	Decrease	Present	Present
4	Physostigmine	Decrease	Present	Present
5	Atropine	Increase	Absent	Present
6	Lignocaine	No Change	Present	Absent

DISCUSSION:

- Acetylcholine/Carbachol binds to muscarinic receptors (M3) of sphincter muscles in the iris due to which the sphincter muscle contracts and pupil size is reduced causing **meiosis**.
- Physostigmine is a reversible cholinesterase inhibitor drug which inhibits destruction of acetylcholine. This results in the increase in concentration of acetylcholine which binds to the muscarinic receptors in sphincter muscles and causes **meiosis**.
- Ephedrine binds to alpha receptors (α_1) in radial muscles and constricting of radial muscles dilates the pupil and pupil size gets increased causing **mydriasis**.
- Atropine is a competitive antagonist of acetylcholine at muscarinic receptors. Atropine binds to muscarinic receptors and inhibits action of acetylcholine on these receptors in the sphincter muscles. This causes paralysis of the ciliary muscles and resultant increase in pupil size and produces **mydriasis**. Due to paralysis of ciliary muscles, pupil does not show light reflexes.
- Lignocaine/Cocaine is a local anesthetic agent hence corneal reflexes are lost if Lignocaine/Cocaine is instilled. There are no changes in size of the pupil but touch reflex shows negative result means touch reflex absent in lignocaine-treated eye. But when we focus light in to eye pupil size gets increased and decreased so it gives positive result with light reflex.

TEACHER'S SIGNATURE