AIM: TO STUDY THE EFFECTS OF VARIOUS DRUGS ON RABBIT EYE

REQUIREMENTS:
Rabbits, Eye Droppers, rabbit holder, Drug Solution (0.1% Adrenaline, 2% Physostigmine, 1% Atropine, 1% Cocaine, 0.5% Ach)

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](image1)  ![Pupil Dilate](image2)  ![Constricted Pupil](image3)  ![Blinking of eye](image4)
**OBSERVATION TABLE:**

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Drug Solution</th>
<th>Pupil Size</th>
<th>Light Reflex</th>
<th>Touch Reflex</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Saline</td>
<td>No Change</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>2</td>
<td>Ephedrine</td>
<td>Increase</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>3</td>
<td>Carbachol</td>
<td>Decrease</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>4</td>
<td>Physostigmine</td>
<td>Decrease</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td>5</td>
<td>Atropine</td>
<td>Increase</td>
<td>Absent</td>
<td>Present</td>
</tr>
<tr>
<td>6</td>
<td>Lignocaine</td>
<td>No Change</td>
<td>Present</td>
<td>Absent</td>
</tr>
</tbody>
</table>

**DISCUSSION:**

- Acetylcholine/Carbachol binds to muscarinic receptors of sphinctor muscles in the iris due to which the sphinctor muscle contract and pupils size is reduced causing miosis.
- Physostigmine is a reversible cholinesterase inhibitor drug which inhibits destruction of acetylcholine. This result in the increase in concentration of acetylcholine which binds to the muscarinic receptors in sphincter muscles and causes miosis.
- Ephedrine binds to alpha receptors in radial muscles in the alpha receptor to which the sphinctor muscles dilate and pupil size get 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 sphinctor muscles. This causes paralysis of the sphinctor muscles and resultant increase in pupil size. Due to paralysis of sphinctor muscles, pupil does not show light reflexes.
- Lignocain/Cocain is a local anesthetics agent hence corneal reflexes are loss if Lignocain/Cocain is instilled. The mydriatic effects of drugs are due to its noradrenaline uptake blocking activity. Since uptake of noradrenaline is blocked more noradrenaline is available at the site to produce mydriasis.