

**AIM:** To study the effect of spasmogens and spasmolytics using rabbit jejunum.

**APPARATUS:**

- Reservoir, tubing, hemostatic forceps, isolated organ bath, aeration tube, isotonic frontal writing lever and recording drum.

**EXPERIMENTAL CONDITION:**

- Physiological Salt solution (PSS) : Tyrode solution
- Animal : Rabbit [120-150 gm, overnight fasted]
- Temperature : 37 (+ or -) 10C
- Aeration : Carbogen (95% O<sub>2</sub> and 5% CO<sub>2</sub>)
- Basal tension on the tissue : 500 gm
- Magnification of the response : 10 times
- Drug:
  1. Epinephrine (Adrenaline) (10 µg/ml),
  2. Propranolol (200 µg/ml),
  3. Acetylcholine (10 µg/ml),
  4. Physostigmine (10 µg/ml),
  5. Atropine sulphate (100 µg/ml),
  6. Barium chloride (10 mg/ml)

**PRINCIPLE:**

Rabbit intestine is a smooth muscle which shows regular pendular movement (i.e. continuous contraction and relaxation). Therefore, to study the effect of drugs on the intestinal movement rabbit intestine is an ideal preparation. Rabbit intestine is supplied by autonomic nervous system. It consists of muscarinic (M<sub>3</sub>) and adrenergic ( $\alpha_1$ ,  $\beta_1$  and  $\beta_2$ ) receptors.

A substance which induces spasms are called spasmogens and the drugs which decrease the spasm or relax the tissues are called spasmolytics.

Muscarinic receptor agonists like ACh produces contraction of rabbit intestine and physostigmine increases the spasm and pendular movements. These muscarinic actions and effects are blocked by muscarinic blockers like atropine.

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Barium chloride ( $\text{BaCl}_2$ ) acts by increasing tone of rabbit intestine and thereby increasing spasm and pendular movements of intestine. Adrenaline acts on  $\alpha$  and  $\beta$  adrenoceptors and exhibits an inhibitory influence of pendular movements of intestine. These actions of adrenaline are blocked by  $\alpha$ - and  $\beta$ -blockers (Propranolol).

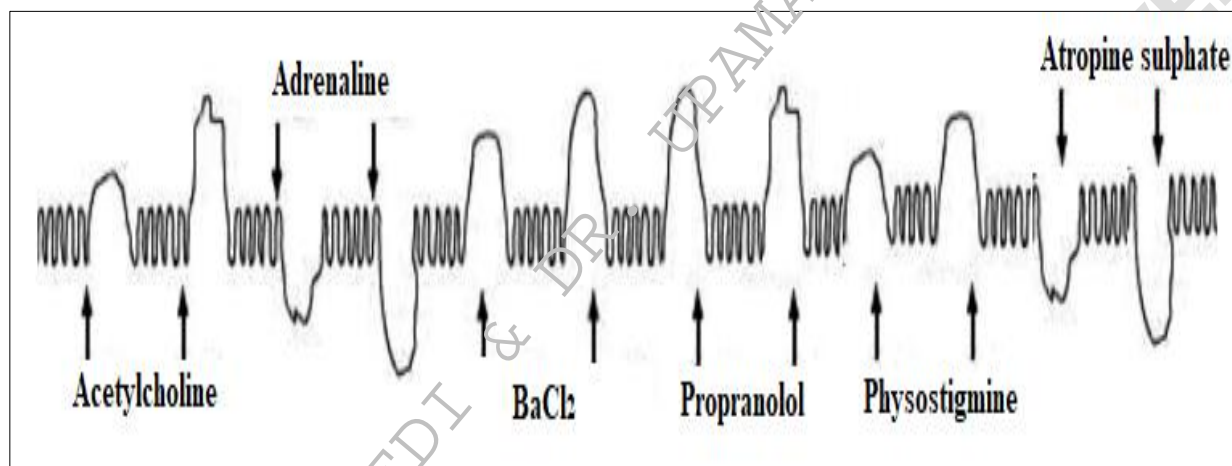
**PROCEDURE:**

1. Fast a rabbit for 12 hour period.
2. Set up the assembly for rabbit intestine experiment.
3. Fill the outer jacket of student organ bath with water.
4. Set the thermostat of the student organ bath at  $37^\circ\text{C}$  and switch on the organ bath.
5. Fill the reservoir with Tyrode solution and control the flow of Tyrode solution to the inner organ tube through glass spiral using haemostatic forceps.
6. Once the temperature of Tyrode solution reaches  $37^\circ\text{C}$ , kill a rabbit by giving a blow on its head and cutting the carotid artery. Open the abdominal region and identify the intestine.
7. Cut and remove a few centimeter long of the intestine portion and immediately place it in the watch glass containing Tyrode solution.
8. Trim the mesentery and with gentle care clean the contents of the intestine by pushing the Tyrode solution into the lumen. Utmost care should be taken to avoid any damage to the gut muscle.
9. Take a piece of intestine of 3-4 cm long and tie the thread to the top and the bottom ends without closing the lumen, and mount the tissue in the inner organ tube containing Tyrode solution maintained at  $37^\circ\text{C}$  and bubbled with  $\text{O}_2$  or air or carbogen. A tension of 0.5 g is applied and the tissue is allowed to equilibrate for 30 minutes before adding the drugs to the inner organ tube.
10. Record the normal pendular movement of rabbit intestine on the kymograph fixed on Sherrington's drum for 30 seconds.
11. Follow the washing period 3 times after recording the response by removing the Tyrode solution present in inner organ tube and adding the fresh Tyrode solution for 60 seconds. Due to washing, the writing point of frontal lever comes to the level of normal pendular base line.
12. Observe the effect of drugs whether Force of contraction of tissue is increased (spasmogens) or decreased (spasmolytics).

13. Precautions:

- i. Give sufficient time for the intestine to recover between drug administrations.
- ii. Always note the parameter readings before and after giving drugs.
- iii. Record frequency of contraction when there is maximum effect of drug.

STANDARD GRAF OF SPASMOGENS & SPASMOLYTICS



OBSERVATION TABLE:

SR. NO	DRUGS	FORCE OF CONTRACTION (Increase/Decrease)	INFERENCE (spasmodgens/spasmolytics)
1.	Acetylcholine (10 µg/ml)		
2.	Adrenaline (10 µg/ml)		
3.	Barium chloride (10 mg/ml)		
4.	Propranolol (200 µg/ml)		
5.	Physostigmine (10 µg/ml)		
6.	Atropine sulphate (100 µg/ml)		

DISCUSSION:

Ach, Physostigmine BaCl<sub>2</sub> and Propranolol produce contractile effect. These drugs are spasmogenics. Atropine and Adrenaline do not produce any effect of their own but inhibit the response to Ach, Propranolol respectively. These drugs are called spasmolytics.

**QUESTIONS:-**

1. Define spasmogenic and spasmolytic
2. Write a short note on following drugs
  - a. Acetylcholine
  - b. Adrenaline
  - c. BaCl<sub>2</sub>
  - d. Propranolol
  - e. Physostigmine
  - f. Atropine