

**AIM:** To study the effect of drugs on the ciliary motility of frog buccal cavity.

**REQUIREMENTS:**

- Animal:- Frog
- Miscellaneous: Poppy seeds
- Equipment: Frog wooden board, Stop watch
- Drugs & Solution :
  1. Acetylcholine : Cholinergic agonist,
  2. Physostigmine : Anti-choline esterase inhibitor
  3. Atropine : Cholinergic antagonist
- Frog Ringer: Nutrient solution to keep the tissue viable.

**PRINCIPLE:**

Cholinergic drugs cause contraction of cilia and increased movement of this muscles. While anticholinergic drugs cause paralysis of cilia and decrease the movement of muscles. The ciliary movements of the oesophagus depends on the stimulating action of Ach. It is normally secreted in the trachea and caused onward contraction of cilia. Physostigmine acts by interfering with the metabolism of Ach and atropine works by blocking the action of ach. A neurotransmitter that helps move electrical impulses among nerve cells.

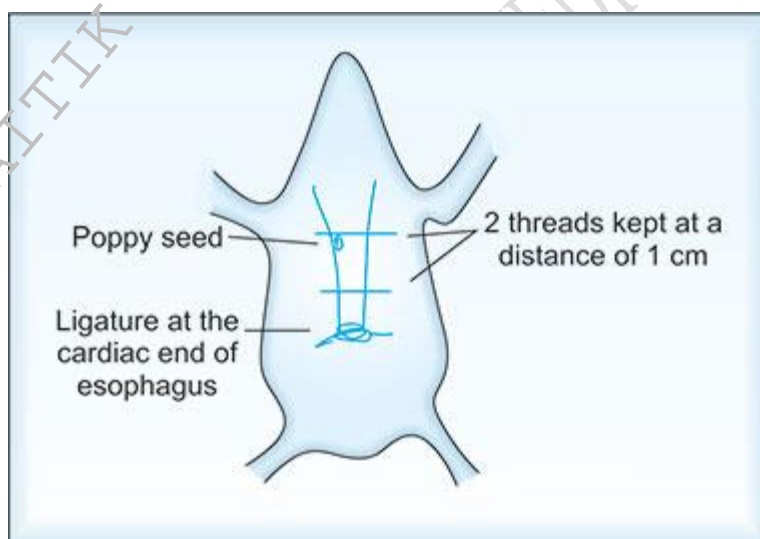
**THEORY:**

- Cilia in the buccal cavity helps in ciliary movement of food particles. Cilia (buccal cavity and oesophagus) help in the movement of food particles.
- Cilia exhibit a great degree of autonomy in that they are capable of functioning in the absence of nervous innervation.
- Acetylcholine present in the mucous membranes of trachea and buccal cavity helps in the ciliary movement.
- Physostigmine: Physostigmine is a highly toxic parasympathomimetic alkaloid, specifically reversible cholinesterase inhibitor. It occurs naturally in the calabar bean and the manchineel tree. Physostigmine acts by interfering with the metabolism of Ach. It is a covalent ( reversible-bond hydrolyzed and released) inhibitor of acetylcholinesterase, the enzyme responsible for the breakdown stimulates both nicotine and muscarinic acetylcholine receptors
- Atropine: Atropine is in a class of drugs known as anticholinergic. Its work by working blocking the actions of acetylcholine, a neurotransmitter that helps move electrical impulses among nerve cells. In general, atropine counters the “rest and digest” activity of glands regulated by the

parasympathetic nervous system. Atropine is a competitive antagonist of the muscarinic acetylcholine receptor types M1, M2, M3, M4, M5. it is classified a parasympatholytic

#### **PROCEDURE:**

1. Decapitate the frog and pin the frog to the frog board on its back.
2. The frog is put on the wooden board with its ventral surface facing the board. Dissection is carried out from above downwards to half way of the frog's back.
3. The posterior wall of the abdominal cavity is opened to about 2.5-3.0 cm. 2. Blood is removed by cotton wetted with frog's ringer solution. The oesophagus is opened from the buccal cavity (side up) right up to the stomach.
4. The frog is put in shallow chamber in which air is kept moist by swabbing with hot water cotton pads.
5. Poppy seeds of uniform size are used for the experiment.
6. Place two threads across the esophagus at a distance of 2.5 cm from each other marking them A and B
7. Keep the esophageal mucosa moist by irrigating it with saline, from time to time.
8. Place 5-6 poppy seeds along the line A. Turn on the stop watch and note the time taken by the poppy seeds to travel down B. Repeat this thrice.
9. Irrigate the mucosa with acetylcholine and repeat step 8.



10. Irrigate the mucosa with saline and carry out step 8 to ensure removal of acetylcholine.
11. Irrigate the mucosa with physostigmine and carry out step 8
12. Irrigate the mucosa with saline and carry out step 8 to ensure removal of physostigmine.
13. Irrigate the mucosa with atropine and carry out step 8.

14. Irrigate the mucosa with saline and carry out step 8 to ensure removal of atropine.
15. Find out the difference in the time taken by the poppy seed to move in the presence of saline, physostigmine and atropine.

**OBSERVATION TABLE:**

Sr. NO.	DRUG	Observations (sec)		Average time taken [Sec]
		Time taken to travel from A to B [Sec]		
1	Saline	1		
		2		
		3		
2	Acetylcholine	1		
		2		
		3		
3	Saline	1		
		2		
		3		
4	Physostigmine	1		
		2		
		3		
5	Saline	1		
		2		
		3		
6	Atropine	1		
		2		
		3		
7	Saline	1		
		2		
		3		

**INTERPRETATION**

- ✓ The most effective drug is Physostigmine, because the drug take short time to increase the movement.
- ✓ The order of the drugs depending on the shortest time as following : 1- Physostigmine 2- Acetylcholine 3- Atropine

**TEACHER'S SIGNATURE**