# Effect Of Spasmogens And Spasmolytics On Rabbit Jejunum Preparation

Spasmogens and spasmolytics play a crucial role in modulating gastrointestinal motility by either inducing or inhibiting smooth muscle contractions. The isolated rabbit jejunum preparation serves as a valuable ex vivo model for studying these effects, as it exhibits spontaneous rhythmic contractions due to its intrinsic myogenic activity. Spasmogens, such as acetylcholine and histamine, enhance contractility by stimulating specific receptors, whereas spasmolytics, like atropine and papaverine, inhibit these contractions through different mechanisms, including receptor blockade or direct smooth muscle relaxation. By evaluating these agents on rabbit jejunum, we can gain insights into their pharmacological actions, receptor involvement, and potential therapeutic applications.

## EQUIPMENT REQUIRED

| | |
|---|---|
| Animal :- | Rabbit |
| Drug:- | Acetylcholine stock solution (1mg/ml) |
| | Adrenaline |
| | Barium chloride |
| | Atropine |
| Instrument:- | Student Organ Bath, kymograph. |
| Physiological salt solution:- | Tyrode's solution |

## PRINCIPLE

The experiment is based on the intrinsic myogenic activity of the isolated rabbit jejunum, which exhibits spontaneous rhythmic contractions due to its enteric nervous system. The effects of different pharmacological agents—spasmogens (which enhance contractions) and spasmolytics (which inhibit contractions)—are studied to understand their influence on smooth muscle physiology.

- Acetylcholine (ACh) (Spasmogen): A neurotransmitter that stimulates muscarinic receptors ($M_3$) in the intestinal smooth muscle, leading to increased contraction by enhancing calcium influx.
- Barium Chloride ($BaCl_2$) (Spasmogen): A direct smooth muscle stimulant that depolarizes the membrane, increasing intracellular calcium levels and causing sustained contractions.
- Atropine (Spasmolytic): A competitive muscarinic antagonist that blocks the effects of acetylcholine, leading to smooth muscle relaxation and inhibition of jejunal contractions.
- Adrenaline (Spasmolytic): A sympathomimetic agent that stimulates $\beta_2$-adrenergic receptors, leading to relaxation of intestinal smooth muscle by decreasing intracellular calcium levels.

By observing the contractile responses of the rabbit jejunum in the presence of these drugs, we can study their mechanisms of action on smooth muscle and their potential therapeutic implications.

**PROCEDURE:**

**1)** Sacrifice rabbit and isolate intestine and prepare tissue by taking jejunum part and place it in Tyrode solution
**2)** Setup organ bath and tie ends of stomach strip to the aeration tube and isotonic lever.
**3)** Stabilize the tissue and allow it to withstand in the physiological salt solution for 30minutes. And change the solution at intervals of 10minutes.
4) Introduce spasmogens (Acetylcholine and barium chloride) and spasmolytics (Atropine and Adrenaline) take baseline at 30sec, record concentration using isotonic writing lever.
5) The contact time of tissue maintained should be of 30seconds.
6) Wash the tissue 2 times after administering doses one after the other respectively, in graded response with washing time of 60sec.
7) Total time cycle should be maintained for 180 sec.
8) Repeat the process of introducing spasmogens followed by spasmolytics respectively.

**CONCLUSION**

The experiment demonstrates the differential effects of spasmogens and spasmolytics on the isolated rabbit jejunum, highlighting their mechanisms of action on intestinal smooth muscle.

- **Acetylcholine and Barium Chloride** acted as **spasmogens**, increasing the frequency and amplitude of contractions by stimulating muscarinic receptors and directly depolarizing smooth muscle, respectively.
- **Atropine and Adrenaline** functioned as **spasmolytics**, inhibiting contractions through muscarinic receptor blockade (atropine) and $\beta_2$-adrenergic receptor activation (adrenaline), leading to smooth muscle relaxation.

**IDEAL OBSERVATION**

| Drug injected | Amount added to organ bath (mL) | Curve | |
|---|---|---|---|
| | | Response (mG) | Appearance |
| Acetylcholine | 0.1 | 12 | Upward |
| Acetylcholine | 0.2 | 19 | Upward |
| Acetylcholine | 0.4 | 24 | Upward |
| Acetylcholine | 0.8 | 35 | Upward |
| Adrenaline | 0.1 | 18 | Downward |
| Adrenaline | 0.2 | 22 | Downward |
| Adrenaline | 0.4 | 28 | Downward |
| Adrenaline | 0.8 | 32 | Downward |
| Barium chloride | 0.1 | 14 | Upward |
| Barium chloride | 0.2 | 19 | Upward |
| Barium chloride | 0.4 | 24 | Upward |
| Barium chloride | 0.8 | 29 | Upward |
| Atropine | 0.1 | 19 | Downward |
| Atropine | 0.2 | 26 | Downward |
| Atropine | 0.4 | 33 | Downward |
| Atropine | 0.8 | 36 | Downward |

**RESULT:**

- **Acetylcholine (ACh):** Increased the frequency and amplitude of jejunal contractions (spasmogenic effect).
- **Barium Chloride ($BaCl_2$):** Induced strong, sustained contractions by direct smooth muscle stimulation.
- **Atropine:** Significantly reduced or abolished acetylcholine-induced contractions by blocking muscarinic receptors (spasmolytic effect).
- **Adrenaline:** Decreased the spontaneous contractions of the jejunum by stimulating $\beta_2$-adrenergic receptors, leading to relaxation.
  These results confirm the excitatory effects of spasmogens and inhibitory effects of spasmolytics on rabbit jejunum contractions.

**DISCUSSION:**

The experiment demonstrates how spasmogens and spasmolytics influence the contractility of isolated rabbit jejunum. Spasmogens enhance smooth muscle contractions by stimulating specific receptors or directly depolarizing the muscle

membrane, leading to increased motility. In contrast, spasmolytics inhibit contractions by blocking receptor activity or inducing muscle relaxation through secondary messenger pathways.