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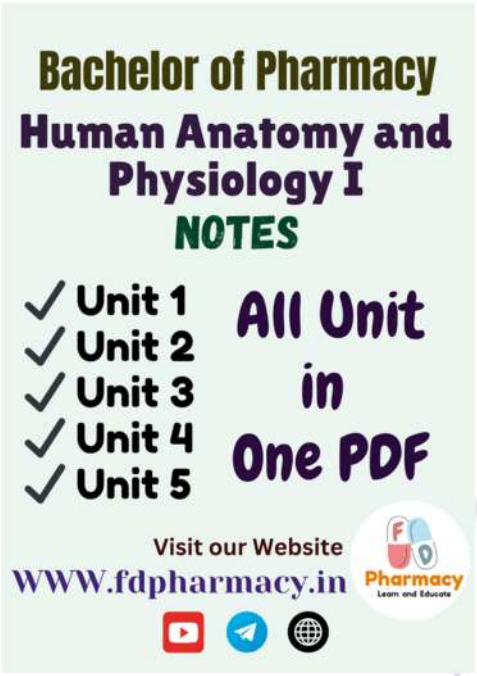
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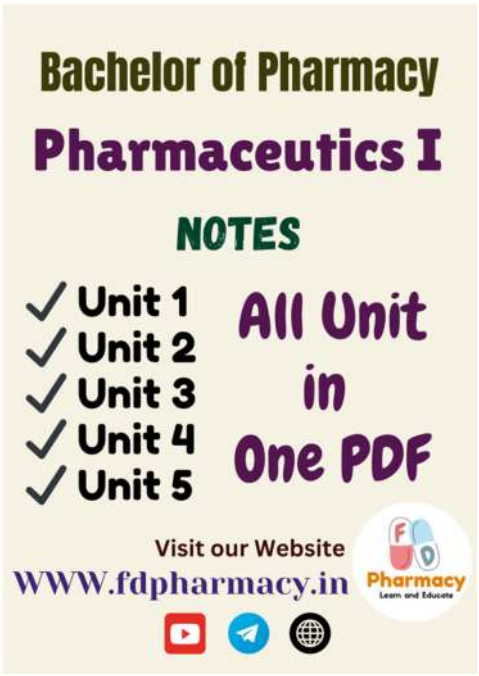
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Unit 1
Unit 2
Unit 3
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Unit 1
Unit 2
Unit 3
Unit 4
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Unit 2
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Unit 4
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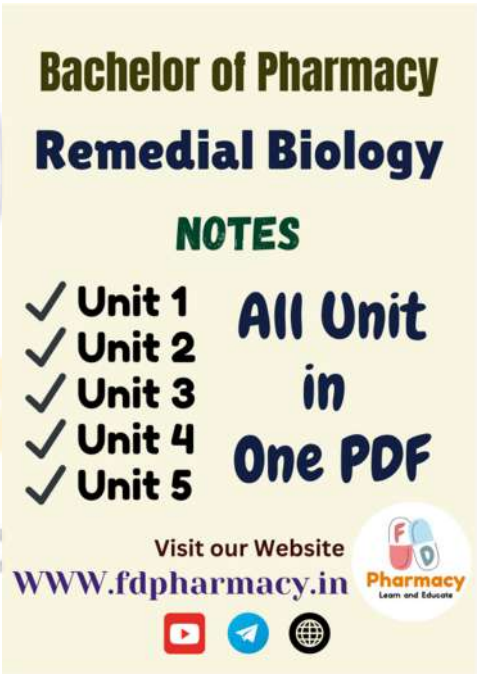
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Unit 1
Unit 2
Unit 3
Unit 4
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PHARMACEUTICAL INORGANIC CHEMISTRY

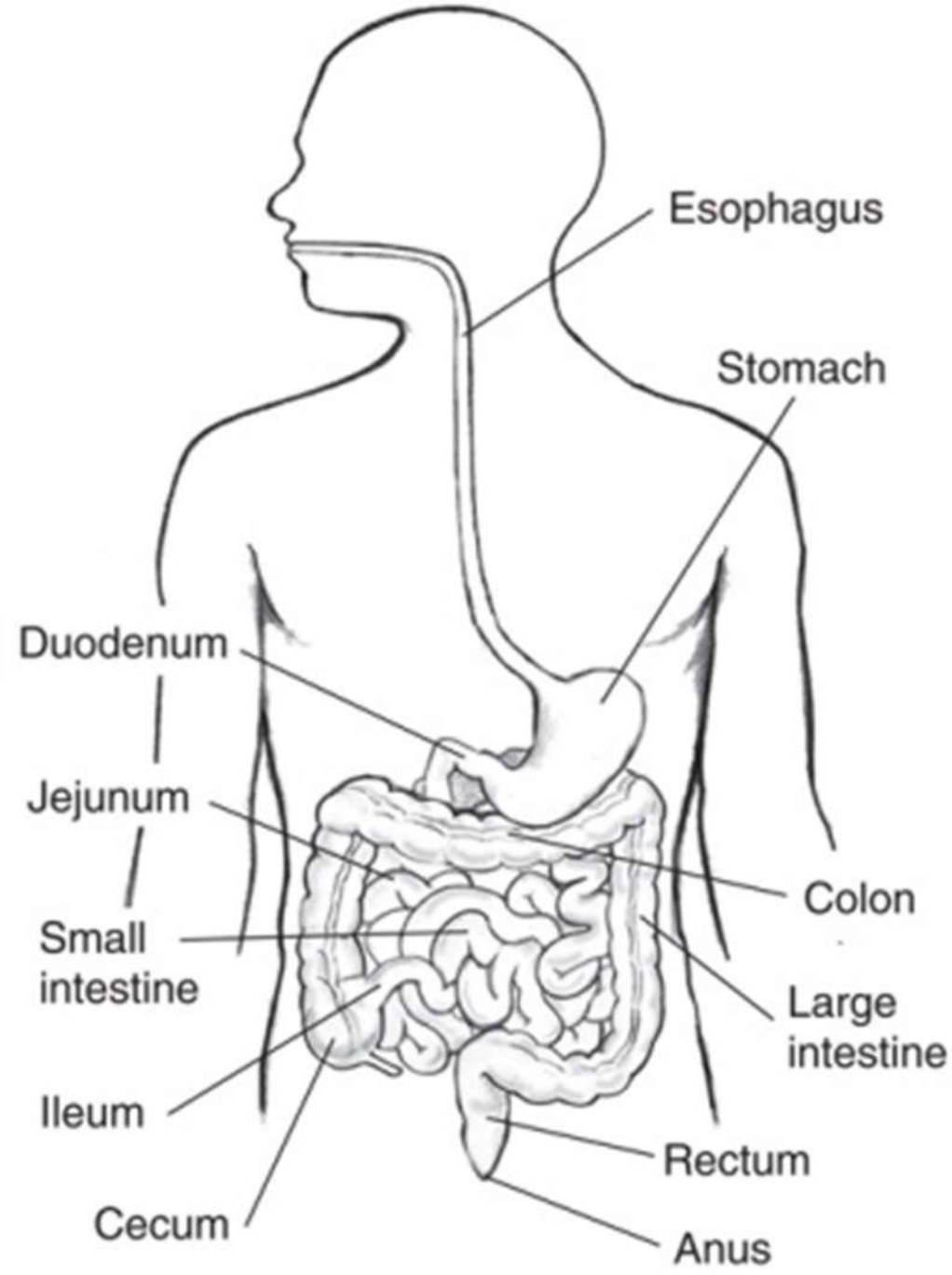
UNIT 3

TOPIC :

- **Gastrointestinal agents**
- **Acidifiers :** Ammonium chloride* and Dil. HCl

Gastrointestinal Tract (GIT)

→ The gastrointestinal tract is a continuous hollow muscular tube that begins at the mouth and ends at the anus. It forms the main pathway for the digestion of food, absorption of nutrients, and elimination of waste.



Diseases of Gastrointestinal Tract

- Insufficient secretion of acid in the stomach can cause Achlorhydria Or Hypochlorhydria.
- Too much secretion of acid in the stomach can cause Hyperacidity.
- The insufficient bowel movement in the intestine can leads to Constipation
- Also the growth of microbes/bacteria can affect the Gastrointestinal Tract.

Gastrointestinal Agents

→ Gastrointestinal (GI) agents are the pharmaceutical substances used to treat, manage, or relieve disorders and diseases related to the gastrointestinal tract (GIT) such as acidity, constipation, infections, and digestion-related problems.

→ These agents help maintain normal GIT function by controlling acid levels, improving bowel movements, fighting infections, or enhancing digestion.

→ The GIT is responsible for digestion, absorption, and elimination, and any disturbance in these processes leads to discomfort and disease. Gastrointestinal agents correct these disturbances and improve overall digestive health.

→ Agents that are used to GIT disorders includes :

- Acidifiers (Hypochlorhydria)
- Antacids (Hyperacidity)
- Cathartics (Constipation)
- Antimicrobials (Microbial Growth)

Acidifiers

- Acidifiers are inorganic substances that are used to increase the level of acidity (HCl) in the stomach or in body fluids.
- They are also called acidifying agents and are used to decrease the pH where needed.
- To restore gastric acid levels in conditions like Achlorhydria (no acid) or Hypochlorhydria (low acid).
- To maintain acidic pH in the stomach, urine, or body fluids.
- To help in digestion, kill microbes, and provide proper acidic environment for enzymes.

Importance of Stomach Acid

- Helps in breakdown of food.
- Kills harmful microorganisms in food.
- Activates digestive enzyme pepsin.
- Aids in absorption of nutrients like iron and calcium.

Types of Acidifiers

Type	Function	Examples
Gastric Acidifiers	Increase acidity in the **stomach**	Dilute HCl, Ammonium chloride
Urinary Acidifiers	Acidify **urine** to prevent infections or dissolve stones	Ascorbic acid, Ammonium chloride
Systemic Acidifiers	Correct **alkalosis** by decreasing overall body pH	Ammonium chloride, Arginine HCl

AMMONIUM CHLORIDE

- Molecular Formula = NH_4Cl
- Molecular Weight = 53.49 g/mol
- Synonym = Sal Ammoniac

Method of Preparation

Prepared by reaction of ammonia (NH_3) **with** hydrochloric acid (HCl):

$$NH_3 + HCl \rightarrow NH_4Cl$$

Physical Properties

- White crystalline powder
- Odourless
- Cool, saline taste
- Hygroscopic (absorbs moisture)

Chemical Properties

On decomposition ammonium chloride produces ammonia gas and hydrogen chloride.

$NH_4Cl \rightarrow NH_3$ (ammonia) + HCl (hydrogen chloride)

Uses

- Used as a gastric and urinary acidifier
- Used in fertilizers
- Used in buffer solutions
- Used in adhesives and glue formulations

DILUTE HYDROCHLORIC ACID (Dil. HCl)

- Molecular Formula = HCl
- Molecular Weight = 36.46 g/mol
- Synonym = Spirit of Salt

Method of Preparation

Prepared by action of sulfuric acid (H_2SO_4) on sodium chloride (NaCl):

$$NaCl + H_2SO_4 \rightarrow HCl + NaHSO_4$$

Physical Properties

- Colourless liquid
- Pungent odour
- Strongly acidic
- Soluble in water and alcohol

Chemical Reaction

On reacting with NaoH, it gives salt and water.

$$HCl + NaOH \rightarrow NaCl + H_2O$$

Uses:

- Used as gastric acidifier in Achlorhydria
- Used as a pharmaceutical aid
- Used in the preparation of buffer and solvent systems