



# **SNS COLLEGE OF ALLIED HEALTH SCIENCES**

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**DEPARTMENT : CARDIO PULMONARY PERFUSION CARE  
TECHNOLOGY**

**COURSE NAME : PHARMACOLOGY**

**UNIT : DIURETICS**

**TOPICS : DEFINITION, TYPES, MECHANISM OF ACTION,  
PHARMACODYNAMICS, PHARMACOKINETICS,  
INDICATIONS, CONTRAINDICATIONS, SIDE EFFECTS**



# DIURETICS



- Diuretics are medications used to increase the production of urine, promoting the removal of excess sodium (salt) and water from the body.
- They are primarily employed in treating conditions like hypertension (high blood pressure), edema (fluid retention), heart failure, kidney disorders, and certain liver conditions.
- Diuretics work by affecting the kidneys, modifying the way they filter fluids and electrolytes from the bloodstream.



## TYPES OF DIURETICS



- **Thiazide Diuretics:** These medications act on the distal convoluted tubule of the kidney, inhibiting the sodium-chloride symporter.
- This action reduces sodium reabsorption, increasing the excretion of sodium, chloride, potassium, and water. Examples include hydrochlorothiazide, chlorthalidone, and indapamide.



- **Loop Diuretics:** Loop diuretics target the thick ascending limb of the loop of Henle in the kidney.
- They inhibit the sodium-potassium-chloride cotransporter, leading to increased excretion of sodium, chloride, potassium, and water. Commonly used loop diuretics are furosemide, torsemide, and bumetanide.



- **Potassium-Sparing Diuretics:** These diuretics work in the collecting ducts and distal convoluted tubules of the kidney.
- They promote diuresis without causing potassium loss, unlike other diuretics. There are two types: aldosterone antagonists (e.g., spironolactone, eplerenone) and non-aldosterone antagonists (e.g., amiloride, triamterene).



- **Osmotic Diuretics:** These drugs create an osmotic force in the renal tubules, preventing water reabsorption and leading to increased urine production. Mannitol is an example used in specific clinical settings, such as reducing cerebral edema.



## MECHANISM OF ACTION



- **Thiazides** : Inhibit sodium reabsorption in the distal tubule, leading to increased sodium and water excretion.
- **Loop Diuretics** : Block sodium, potassium, and chloride reabsorption in the loop of Henle, promoting the excretion of these electrolytes and water.



- **Potassium-Sparing Diuretics** : Act on different parts of the nephron to either inhibit aldosterone or block sodium channels, thus reducing potassium loss.
- **Osmotic Diuretics**: Create an osmotic gradient, preventing water reabsorption and increasing urinary output.





# PHARMACODYNAMICS



- Diuretics exert their effects by altering electrolyte and water balance in the kidneys, leading to increased urine output.
- They help reduce blood pressure by decreasing blood volume through enhanced urinary excretion of water and electrolytes.



# PHARMACOKINETICS



- **Administration:** Oral, intravenous, or sometimes intramuscular depending on the specific diuretic.
- **Absorption:** Varies among different diuretics. Some are well-absorbed orally, while others may have erratic absorption.



- **Metabolism:** Metabolism also varies, with some diuretics undergoing extensive hepatic metabolism, while others are excreted primarily unchanged in the urine.
- **Elimination:** Primarily excreted via the kidneys.



## INDICATIONS



- Hypertension
- Edema associated with heart failure, liver cirrhosis, or kidney disorders
- Certain kidney stone prevention strategies
- Certain hormonal imbalances



# CONTRAINDICATIONS



- Allergy or hypersensitivity to specific diuretics
- Severe electrolyte imbalances
- Anuria (lack of urine production)
- Severe renal failure
- Pregnancy (specific diuretics may be contraindicated)



## SIDE EFFECTS



- Electrolyte imbalances (hypokalemia, hyponatremia)
- Dehydration
- Dizziness or lightheadedness
- Muscle cramps
- Increased urination
- High blood sugar (especially with thiazides)
- Allergic reactions
- Changes in blood pressure



## TECHNICIAN ROLE



Monitoring : Regular monitoring of electrolytes, kidney function, and blood pressure is essential when using Diuretics due to its potential for electrolyte disturbances.



# ASSESSMENT



- What is Diuretics ?
- What all are the Types of Diuretics ?