



SNS COLLEGE OF ALLIED HEALTH SCIENCES

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**DEPARTMENT : CARDIO PULMONARY PERFUSION CARE
TECHNOLOGY**

COURSE NAME : PHARMACOLOGY

UNIT : ORAL HYPOGLYCEMIC DRUGS

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



ORAL HYPOGLYCEMIC DRUGS



- Oral hypoglycemic drugs, also known as oral antidiabetic drugs, are medications used to manage and control blood sugar levels in individuals with diabetes mellitus.
- These drugs are administered orally and play a crucial role in the treatment of both type 2 diabetes and, in some cases, gestational diabetes.



BIGUANIDES



Examples: Metformin

Mechanism of Action:

- Reduces glucose production in the liver.
- Improves insulin sensitivity in peripheral tissues.
- Slows glucose absorption in the intestines.

Pharmacodynamics:

- Decreases hepatic gluconeogenesis.
- Increases peripheral glucose uptake.



Pharmacokinetics:

- Metformin is absorbed in the small intestine and excreted unchanged in the urine.

Indications:

- First-line therapy for type 2 diabetes.



Contraindications:

- Renal impairment, liver disease, and certain cardiovascular conditions.

Side Effects:

- Gastrointestinal symptoms (nausea, diarrhea).



SULFONYLUREAS



Examples: Glyburide, Glipizide, Glimepiride

Mechanism of Action:

- Stimulates insulin release from pancreatic beta cells.

Pharmacodynamics:

- Increases insulin secretion.

Pharmacokinetics:

- Absorbed in the gastrointestinal tract, metabolized in the liver, and excreted in the urine.



Indications:

- Type 2 diabetes, usually when lifestyle modifications and metformin are insufficient.

Contraindications:

- Sulfa allergy, pregnancy, and breastfeeding.

Side Effects:

- Hypoglycemia, weight gain.



MEGLITINIDE



Examples: Repaglinide, Nateglinide

Mechanism of Action:

- Stimulates insulin release from pancreatic beta cells (similar to sulfonylureas).

Pharmacodynamics:

- Rapid onset and short duration of action.

Pharmacokinetics:

- Rapidly absorbed, metabolized in the liver, and excreted in bile.



Indications:

- Type 2 diabetes, especially for postprandial glucose control.

Contraindications:

- Severe liver disease.

Side Effects:

- Hypoglycemia, weight gain.



THIAZOLIDINEDIONES(TZDs)



Examples: Rosiglitazone, Pioglitazone

Mechanism of Action:

- Enhances insulin sensitivity in peripheral tissues.

Pharmacodynamics:

- Improves glucose utilization in skeletal muscle and adipose tissue.

Pharmacokinetics:

- Absorbed well after oral administration, extensively metabolized in the liver.



Indications:

- Type 2 diabetes, often in combination with other agents.

Contraindications:

- Heart failure, liver disease.

Side Effects:

- Edema, weight gain, increased risk of fractures, potential cardiovascular risks.



ALPHA - GLUCOSIDASE INHIBITORS



Examples: Acarbose, Miglitol

Mechanism of Action:

- Inhibits alpha-glucosidase enzymes in the small intestine, delaying carbohydrate digestion and absorption.

Pharmacodynamics:

- Reduces postprandial glucose levels.

Pharmacokinetics:

- Poorly absorbed from the gastrointestinal tract.



Indications:

- Type 2 diabetes, especially for postprandial glucose control.

Contraindications:

- Inflammatory bowel disease, intestinal obstruction.

Side Effects:

- Gastrointestinal symptoms (flatulence, diarrhea).



DIPEPTIDYL PEPTIDASE - 4 (DPP-4) INHIBITORS



Examples: Sitagliptin, Saxagliptin, Linagliptin

Mechanism of Action:

- Inhibits the enzyme DPP-4, which inactivates incretin hormones.

Pharmacodynamics:

- Enhances incretin effect, increasing insulin release and decreasing glucagon secretion.

Pharmacokinetics:

- Well-absorbed, primarily excreted unchanged in the urine.



Indications:

- Type 2 diabetes, often as an add-on therapy.

Contraindications:

- Renal impairment.

Side Effects:

- Generally well-tolerated; may cause upper respiratory tract infections.



SODIUM - GLUCOSE CO - TRANSPORTER 2 (SGLT2) INHIBITORS



Examples: Canagliflozin, Dapagliflozin, Empagliflozin

Mechanism of Action:

- Inhibits SGLT2 in the proximal renal tubules, reducing glucose reabsorption and promoting urinary glucose excretion.

Pharmacodynamics:

- Lowers blood glucose levels and may have additional cardiovascular and renal benefits.



Pharmacokinetics:

- Well-absorbed, primarily excreted in the urine.

Indications:

- Type 2 diabetes, often as an add-on therapy.

Contraindications:

- Severe renal impairment.

Side Effects:

- Genital mycotic infections, urinary tract infections, increased urination.



COMBINATION PRODUCTS



Some medications combine two or more classes of oral hypoglycemic drugs to enhance efficacy and simplify dosing.



TECHNICIAN ROLE



- Monitoring blood glucose levels regularly.
- Assessing hemoglobin A1c to gauge long-term glycemic control.
- Evaluating renal function, especially with drugs excreted through the kidneys.
- Monitoring for side effects, particularly hypoglycemia.



ASSESSMENT



- What all are the Indications of Oral Hypoglycemic Drugs ?
- What all are the Oral Hypoglycemic Drugs ?