

## HYPOGLYCEMIC AGENTS

Hypoglycemic agents are used in the treatment of Diabetes mellitus by lowering the blood glucose levels. With the exceptions of insulin, exenatide, liraglutide and pramlintide, all the other hypoglycemic agents are administered orally and are therefore known as oral hypoglycemic agents or oral anti-hyperglycemic agents.

### **CLASSIFICATION:**

#### **ORAL HYPOGLYCEMIC AGENTS**

##### **Sulphonylureas:**

Glibenclamide

Glimepiride

##### **Biguanides:**

Metformin

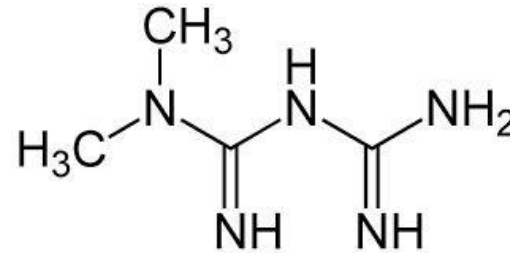
Phenformin

##### **Substituted benzoic acid derivatives (Meglitinides):**

Repaglinide

Nateglinide

METFORMIN



N, N, Dimethyl biguanide

### Thiazolidindiones (Glitazones):

Pioglitazone

Ciglitazone

### Sodium-glucose Cotransporter-2 (SGLT2) Inhibitors: (Glifozins)

Canagliflozin

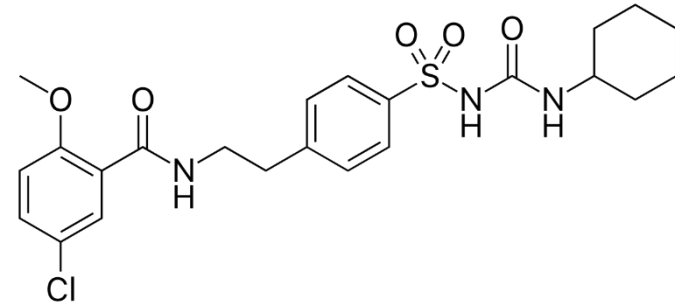
Dapagliflozin

### DPP-4 inhibitors: (Gliptins)

Sitagliptin

Vildagliptin

GLIBENCLAMIDE



5-chloro-N-[2-[4-(cyclohexylcarbamoylsulfamoyl) phenyl] ethyl]-2-methoxybenzamide

### INSULIN:

Insulin is a hormone produced in pancreas and permits the body to utilize sugar(glucose) from carbohydrates in the food.

Insulin restricts the blood sugar levels from getting too high(hyperglycaemia) or too low (hypoglycaemia).

Insulin occurs as a white or almost white colored crystalline powder. It is faintly soluble in water, soluble in dilute solution of mineral acids and with degradation in solutions of alkali hydroxide and almost insoluble in alcohol, chloroform and ether.

## **INSULIN PREPARATIONS:**

**Rapid-acting:( onset of action: 5-15 min & DOA: 1 to 5 hours)**

Insulin aspart

Insulin lispro

Insulin glulisine

**Short-acting: (DOA: 3 to 6 hours)**

Regular insulin

**Intermediate-acting: (DOA: 10 to 16 hours)**

NPH (neutral protamine hagedorn)

**Long-acting: (DOA: 6 to 24 hours)**

Insulin glargine

Detemir

**Combinations: (DOA: 10 to 16 hours)**

70% NPH + 30% Regular

70% Aspart Protamine + 30% Aspart

50% Lispro Protamine + 50% Lispro

75% Lispro Protamine + 25% Lispro

| <b>DRUG</b>   | <b>MECHANISM OF ACTION</b>  | <b>USES</b>  | <b>STORAGE CONDITIONS</b>            | <b>TYPES OF FORMULATIONS</b>     | <b>BRAND NAMES</b>   |
|---|---|--|--------------------------------------|----------------------------------|----------------------|
| <b>Metformin</b><br>Biguanide                       | Reduces gluconeogenesis<br>Decreases intestinal absorption of glucose<br>Increasing insulin sensitivity by increasing glucose uptake & utilization by peripheral tissues. | NIDDM<br>Polycystic ovarian syndrome                                     | Room temperature                     | Suspension<br>Tablet<br>Solution | Fortamet<br>Riomet   |
| <b>Glibenclamide</b><br>Sulfonyl urea derivative    | Stimulates the release of insulin from pancreas.  | Hypoglycemia<br>Hematologic agent<br>To treat impaired hepatic function. | >40°C or at 40°C for 90 days         | Tablets                          | Diabeta<br>Glyburide |
| <b>Glimepiride</b><br>Sulfonyl urea derivative      | Stimulates the release of insulin from pancreas.  | NIDDM  | 20-25°C                              | Tablets                          | Amaryl               |
| <b>Pioglitazone</b><br>Thiazolidindiones derivative | Selective agonist of Peroxisome Proliferator Activated Receptor- $\gamma$ present in the target tissues for insulin action.   | NIDDM  | 25°C<br>Excursion permitted: 15-30°C | Tablets                          | Actos                |

|   |   |               |                  |                     |                                 |
|---|---|---------------|------------------|---------------------|---------------------------------|
| <b>Repaglinide</b><br>Substituted benzoic acid derivative | These short acting insulin secretagogues bind to pancreatic $\beta$ cells for stimulating insulin release.  | NIDDM         | 15-25°C          | Tablets<br>Capsules | Enyglid<br>Gluconorm<br>Prandin |
| <b>Gliflozins</b>   | Blocks SGLT-2 protein from the site of proximal convoluted tubule in kidney which results in preventing reabsorption of glucose molecule.   | IDDM<br>NIDDM | Room temperature | Tablets             | Canagliflozin<br>Dapagliflozin  |
| <b>Gliptins</b>   | Inhibits Dipeptidyl peptidase IV enzyme<br>Thus, glucagon like peptide-1 (GLP-1) and glucose dependent insulinotropic polypeptide (GIP) remains active.<br>Insulin release increases. | NIDDM         | 20-25°C          | Tablets             | Januvia<br>Galvus               |