

Goel Institute of Pharmacy & Sciences

Assignment - 1 (Antidiabetic Agents)

- Submitted to - Mr. Salil Tiwari Sir.
- Submitted by - Pushpa Gupta
- Subject - Medicinal Chemistry
- Roll no. - 2003920500079
- Year & Section - 3rd year 'B'

Signature → *Salil*

Antidiabetic Agents

These agents which are used in the treatment of diabetes mellitus are called antidiabetic agents.

- These agents are used to lower the blood sugar level to patients suffering from hyperglycemia.
- These agents are also known as anti-hyperglycemic agents.

* Diabetes mellitus -

- It is a metabolic disease in which there are high blood sugar level over a prolonged period of time.
- In this condition, a person's body cannot control the level of sugar in the blood.

* Causes of diabetes -

- Defect in insulin formation, secretion & action.
- Obesity & inactive lifestyle.
- Family history.
- Excessive intake of glucose.

* Symptoms →

- Glycosuria
- Fatigue

* Types of diabetes -

Type-I [Diabetes mellitus] :

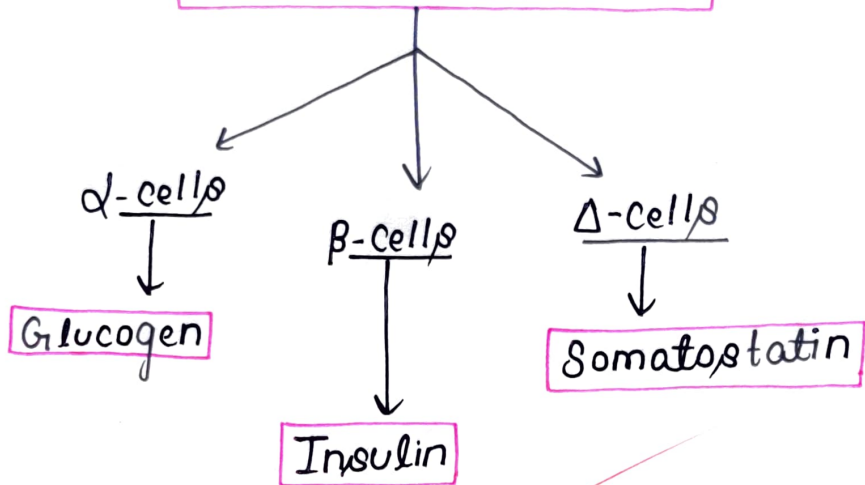
- It is an insulin dependent diabetes mellitus [IDDM].
- A chronic condition in which the pancreas produce little.
- Mostly occurs in children.
- Pancreatic β -cells are destroyed.

Type-II [Non-insulin dependent diabetes mellitus]

- A chronic condition that affect the way the body processes blood sugar.
- Mostly occurs in adults.

INSULIN & ITS PREPARATIONS

Pancreas → ISLET OF LANGERHANS



INSULIN

- Insulin is a peptide hormone produced by β -cells of the pancreatic islets encoded in humans by the INS gene.

* Synthesis of Insulin →

- It is synthesized in pancreatic β -cells.
- Firstly through RER, preproinsulin is produced which further is stored in golgi apparatus in the form of proinsulin [inactive form].

- Now, this proinsulin is secreted into blood is the active form.
- Now, synthetic insulin is prepared through Porcine, Recombinant Human Insulin.

Antidiabetic agents

↙ Insulin & its preparation
 ↘ Oral hypoglycemic agents

☆ Classification Of Insulin →

Short acting	Intermediate acting	Long acting
Regular	Isophane (NPH)	Protamine zinc
Lispro	Lente	ultra lente
Insulin zinc	Biphasic insulin aspart	Insulin glargine
Insulin aspart		Insulin detemir
		Insulin deglydec

* Regular insulin →

- Also called as neutral insulin. Rapid acting with 0.5-1 hour duration of action.

* Lispro insulin →

- Rapid acting with 6-8 hr. duration of action. In the carboxyl terminal of β -chain, lysine & proline residues are reversed.

* Insulin zinc →

- It is a suspension of insulin where and zinc chloride, having 6-8hr duration of action.

* Insulin aspart →

- Synthetic form of insulin where a single amino acid, proline (β -29) is replaced by aspartic acid. (3-5hr. action).

* Isophane insulin →

- Also called as Neutral Protamine Hagedorn insulin. It is intermediate acting with 18-24 hr. duration of action.

* Lente insulin →

- It is intermediate acting with 18-24hr duration of action. It is composed of acetate buffer zinc & regular insulin.

* Protamine zinc insulin →

- It is composed of insulin, zinc chloride & protamine. It has duration of action upto 36hr.

* Ultra lente insulin →

- It contains 65% of lente insulin, having duration of action upto 36 hr.

* Insulin glargine →

- It is obtained by addition of two arginine residues in β -chain carboxy terminal & by replacement of asparagine with glycine in A-21 position of human insulin.

* Insulin detemir →

- It is obtained by addition of fatty acid to lysine residue in β -29 position of human insulin.

It has duration of action upto 24 hrs.

* Insulin degludec →

- It is obtained by addition of hexadecanedioic acid to lysine residue in β -29 position of human insulin.

- It has duration of action upto 24 hrs.

ORAL HYPOGLYCEMIC AGENTS

- Those agents which are used for Type-II diabetes mellitus and are used orally are known as oral hypoglycemic agents.

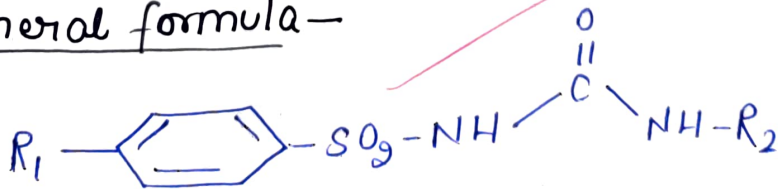
* Classification →

- ① Sulfonylureas — ~~Tolbutamide~~, Chlorpropamide, Glibipizide, Glimepiride.
- ② Biguanides — ~~metformin~~
- ③ Thiazolidinediones — Pioglitazone, Rosiglitazone, meglitinides,
- ④ Glycosidase inhibitors — Acarbose, voglibase

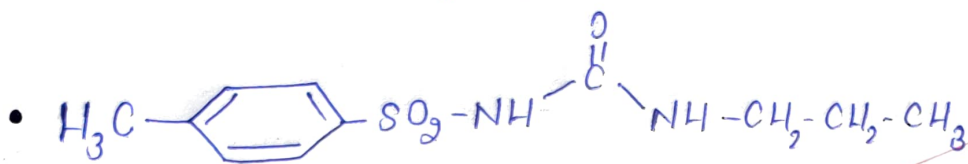
① Sulfonylureas

- First class of oral hypoglycemic drugs are used for the treatment of Type-II diabetes mellitus.

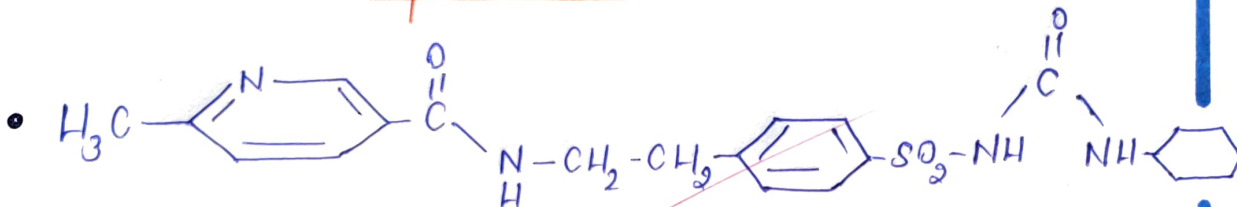
* General formula —



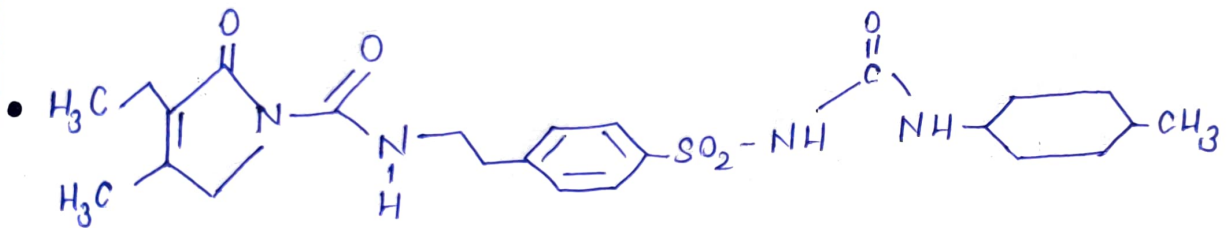
* Chlorpropamide



* Glipizide

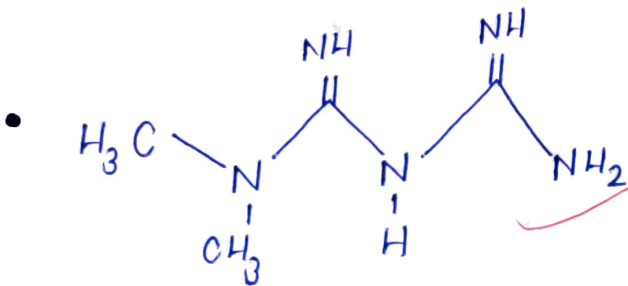


* Glimepiride



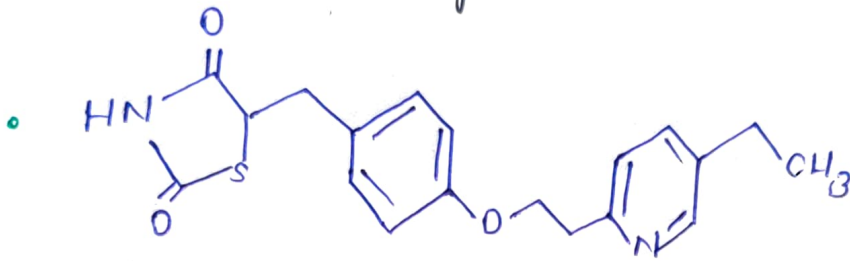
[2]. BIGUANIDES

⊙ Metformin



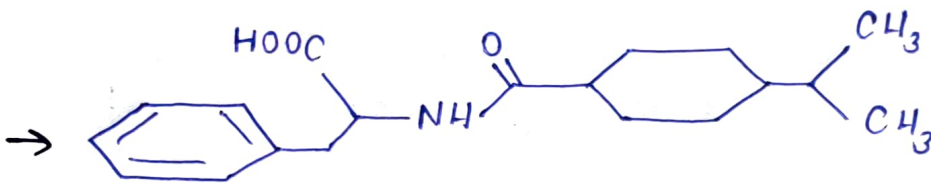
[3] THIAZOLIDINEDIONES

- Plaglitazone



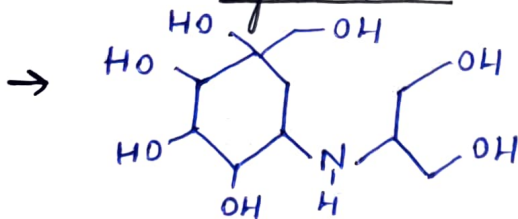
[4] MEGLITINIDES

- Nateglinide



[5] GLUCOSIDASE INHIBITORS

- Voglibase



- Tolbutamide

