

## UNIT – 5

### Antidiabetic Agents:

#### Insulin and its Preparations:

##### 1. Insulin:

- **Function:** Hormone that regulates blood glucose levels by facilitating glucose uptake into cells.
- **Clinical Uses:** Essential in the treatment of diabetes mellitus.

##### 2. Insulin Preparations:

- **Regular Insulin (Short-acting):** Rapid onset, short duration.
- **NPH (Intermediate-acting):** Slower onset, longer duration.
- **Lispro, Aspart, Glulisine (Rapid-acting Analogues):** Faster onset and shorter duration.
- **Glargine, Detemir (Long-acting Analogues):** Prolonged duration of action.

#### Sulfonylureas:

##### 1. Tolbutamide, Chlorpropamide, Glipizide, Glimpiride:

- **Mechanism of Action:** Stimulate insulin release from beta cells of the pancreas.
- **Clinical Uses:** Used in type 2 diabetes.

#### Biguanides:

##### 1. Metformin:

- **Mechanism of Action:** Reduces hepatic glucose production and improves insulin sensitivity.
- **Clinical Uses:** Mainly used in type 2 diabetes; also used in polycystic ovary syndrome (PCOS).

#### Thiazolidinediones:

##### 1. Pioglitazone, Rosiglitazone:

- **Mechanism of Action:** Enhance insulin sensitivity in peripheral tissues.
- **Clinical Uses:** Used in type 2 diabetes.

#### Meglitinides:

##### 1. Repaglinide, Nateglinide:

- **Mechanism of Action:** Stimulate insulin release from the pancreas.
- **Clinical Uses:** Used in type 2 diabetes.

Glucosidase Inhibitors:

1. **Acarbose, Voglibose:**

- **Mechanism of Action:** Inhibit enzymes that digest carbohydrates in the small intestine.
- **Clinical Uses:** Used in type 2 diabetes.

**Local Anesthetics:**

Structure-Activity Relationship (SAR) of Local Anesthetics:

**Common Structures:**

1. **Ester Linkage:**

- Example: Procaine.

2. **Amide Linkage:**

- Examples: Lidocaine, Mepivacaine, Prilocaine, Etidocaine.

**Common Features:**

1. **Aromatic Ring:**

- Important for lipid solubility.

2. **Intermediate Chain:**

- Determines hydrophilic/hydrophobic balance.

3. **Terminal Amine:**

- Contributes to the molecule's ionization.

Benzoic Acid Derivatives:

1. **Cocaine:**

- **Mechanism of Action:** Blocks sodium channels, preventing nerve impulse propagation.
- **Clinical Uses:** Local anesthesia, especially in ear, nose, and throat procedures.

2. **Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine:**

- Various derivatives with local anesthetic properties.

Amino Benzoic Acid Derivatives:

1. **Benzocaine:**

- **Mechanism of Action:** Blocks nerve conduction by inhibiting sodium channels.
- **Clinical Uses:** Topical anesthesia for mucous membranes.

2. **Butamben, Procaine, Butacaine, Propoxycaine, Tetracaine, Benoxinate:**

- Varied local anesthetics with different clinical uses.

Lidocaine/Anilide Derivatives:

1. **Lignocaine:**

- **Mechanism of Action:** Blocks sodium channels, leading to local anesthesia.
- **Clinical Uses:** Commonly used local anesthetic.

2. **Mepivacaine, Prilocaine, Etidocaine:**

- Different local anesthetics with varying durations of action.

Miscellaneous:

1. **Phenacaine, Dipherodon, Dibucaine:**

- Additional local anesthetics with distinct properties.

These medications play crucial roles in managing diabetes and providing local anesthesia. Always consult with a healthcare professional for personalized advice and information on these medications.