

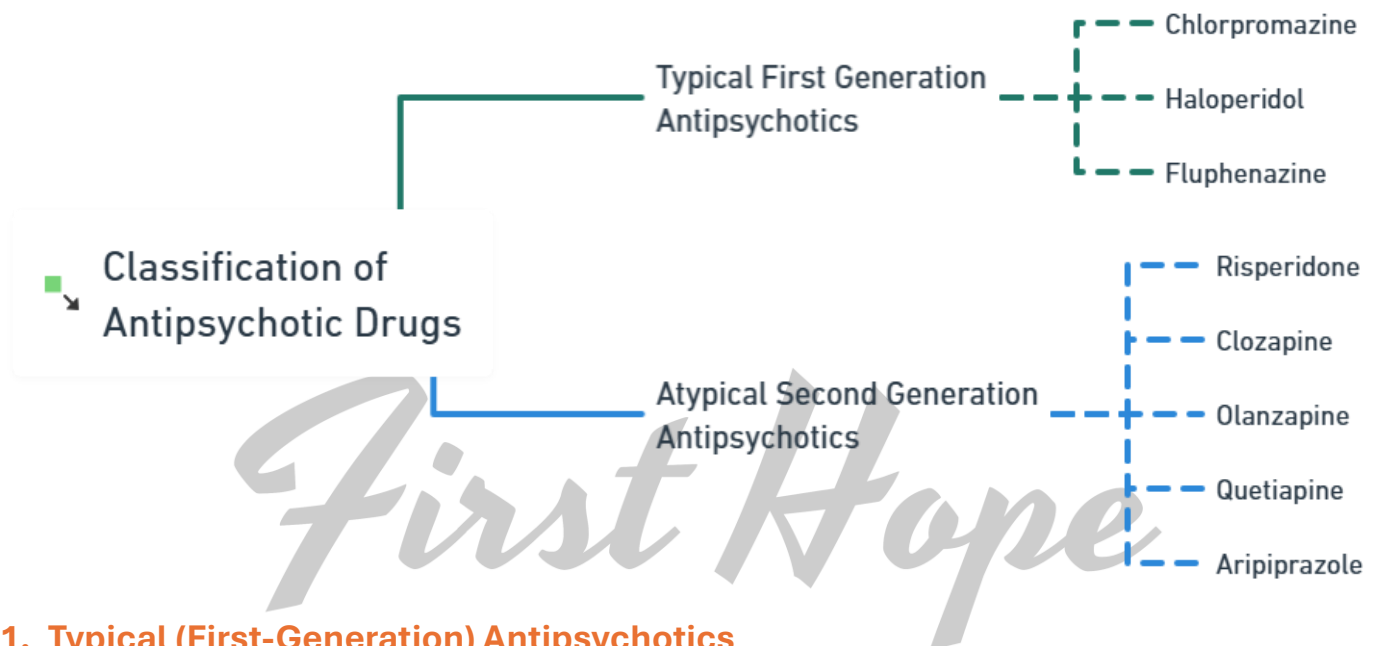
Pharmacology of Drugs Acting on Central Nervous System

Antipsychotics

Definition

- Antipsychotics are drugs used primarily to manage psychotic disorders, such as schizophrenia, bipolar disorder, and delusional disorders.
- They are also known as neuroleptics or major tranquilizers.

Classification & Mechanism of Action



1. Typical (First-Generation) Antipsychotics

- These are the older class of antipsychotics, primarily known for their strong action on dopamine receptors and their potential for movement-related side effects.

Examples

- Chlorpromazine, Haloperidol, Fluphenazine

Mechanism of Action

- These drugs act as potent D2 receptor antagonists, primarily in the mesolimbic pathway, and by blocking these receptors, they effectively reduce positive symptoms such as hallucinations and delusions.

Side Effect Mechanisms

- Because these drugs are non-selective, they also block D2 receptors in other pathways:
 - **Nigrostriatal Pathway:** Leads to Extrapyramidal Symptoms such as tremors and rigidity.
 - **Tuberoinfundibular Pathway:** Causes Hyperprolactinemia, leading to galactorrhea and amenorrhea.

Clinical Uses

- Schizophrenia
- Acute psychosis
- Tourette syndrome (Haloperidol)

Dose Example

- Haloperidol is typically dosed at 2–10 mg/day.

2. Atypical (Second-Generation) Antipsychotics

- Newer drugs that treat both positive and negative symptoms and cause fewer movement side effects.

Example

- Risperidone, Clozapine, Olanzapine, Quetiapine, Aripiprazole

Mechanism of Action

- These drugs block D2 receptors (less strongly than typical ones) and block 5-HT_{2A} serotonin receptors.
- This dual action:
 - Improves **negative symptoms** (e.g., social withdrawal)
 - Decreases risk of **EPS**
- **Aripiprazole** is special because it is a partial D2 agonist, helping stabilize dopamine rather than fully blocking it.

Clinical Uses

- These medications are used for schizophrenia, Bipolar disorder mania, and delirium.

Major Side Effects

- **Metabolic effects** (especially with Clozapine, Olanzapine):
 - Weight gain
 - Diabetes
 - High cholesterol

Clozapine Warning

- Can cause **agranulocytosis (dangerously low WBC count)** → requires regular blood tests.

Dose Examples

- **Risperidone:** 2–6 mg/day
- **Olanzapine:** 5–20 mg/day

Systemic Pharmacokinetics and Pharmacodynamics

Pharmacokinetics

- Well absorbed orally
- Highly lipid-soluble, easily cross the blood-brain barrier
- Metabolized in the liver (CYP450 enzymes)
- Depot injections available for patients with poor compliance

Other Pharmacodynamic Effects

- **Sedation** because of H1 blockade
- **Low blood pressure** from alpha-blockade
- **Anticholinergic effects** such as dry mouth and constipation

Safety, Contraindications, and Interactions

Extrapyramidal Symptoms (EPS)

- These include acute dystonia, parkinsonism, akathisia in the form of restlessness, and tardive dyskinesia with involuntary facial movements.

Neuroleptic Malignant Syndrome (NMS)

- This is a rare but fatal reaction characterized by fever, muscle rigidity, and autonomic instability.

Contraindications

- These drugs should be strictly avoided in patients with Parkinson's disease, severe CNS depression, or existing bone marrow suppression, which is especially important for Clozapine.

Drug Interactions

- Alcohol increases sedation, and CYP inhibitors can raise drug levels to toxic ranges.

Antidepressants

- Used to treat depression and anxiety disorders.

Definition:

- Drugs that elevate mood in depression, anxiety, OCD, and PTSD.
- Used to treat major depressive disorder (MDD), anxiety disorders, OCD, PTSD, and some types of chronic pain.

Classification & Mechanism of Action

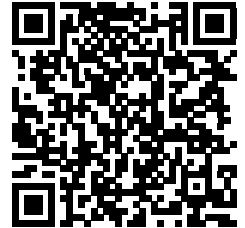


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