UNIT – 3

Pharmacology of Drugs Acting on the Peripheral Nervous System:

a. Organization and Function of ANS (Autonomic Nervous System):

1. **Organization of ANS:**
    - Divided into the sympathetic and parasympathetic divisions.
    - Sympathetic: "Fight or flight" response.
    - Parasympathetic: "Rest and digest" response.
2. **Function of ANS:**
    - Regulates involuntary bodily functions (heart rate, digestion, respiratory rate).
    - Maintains homeostasis.

b. Neurohumoral Transmission, Co-Transmission, and Classification of Neurotransmitters:

1. **Neurohumoral Transmission:**
    - Communication between nerve cells and target cells.
    - Involves release of neurotransmitters into synapses.
2. **Co-Transmission:**
    - Release of multiple neurotransmitters from a single nerve terminal.
3. **Classification of Neurotransmitters:**
    - **Acetylcholine (ACh):** Predominant in the parasympathetic system.
    - **Norepinephrine (NE):** Main neurotransmitter in the sympathetic system.
    - **Dopamine, serotonin, glutamate, GABA:** Also play key roles.

c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, Sympatholytics:

1. **Parasympathomimetics (Cholinergics):**
    - **Mechanism:** Enhance the effects of the parasympathetic system.
    - **Examples:** Acetylcholine, muscarine, cholinesterase inhibitors (e.g., physostigmine).
2. **Parasympatholytics (Anticholinergics):**
    - **Mechanism:** Block the effects of the parasympathetic system.
    - **Examples:** Atropine, scopolamine, antimuscarinic drugs.
3. **Sympathomimetics (Adrenergics):**
    - **Mechanism:** Enhance the effects of the sympathetic system.

- **Examples:** Epinephrine, norepinephrine, isoproterenol.

4. **Sympatholytics (Adrenergic Blockers):**
    - **Mechanism:** Block the effects of the sympathetic system.
    - **Examples:** Beta-blockers (propranolol), alpha-blockers (prazosin).

d. Neuromuscular Blocking Agents and Skeletal Muscle Relaxants (Peripheral):

1. **Neuromuscular Blocking Agents:**
    - **Mechanism:** Block transmission at the neuromuscular junction.
    - **Clinical Use:** Surgical procedures, tracheal intubation.
    - **Examples:** Pancuronium, vecuronium.
2. **Skeletal Muscle Relaxants (Peripheral):**
    - **Mechanism:** Act within the central nervous system to reduce muscle tone.
    - **Examples:** Baclofen, dantrolene.

e. Local Anesthetic Agents:

1. **Mechanism:**
    - Block voltage-gated sodium channels, preventing nerve conduction.
    - Used for local anesthesia, inhibiting pain sensation.
2. **Examples:**
    - Lidocaine, bupivacaine, procaine.

f. Drugs Used in Myasthenia Gravis and Glaucoma:

1. **Myasthenia Gravis:**
    - **Pathophysiology:** Autoimmune disorder affecting neuromuscular junction.
    - **Drug Treatment:** Acetylcholinesterase inhibitors (e.g., pyridostigmine), immunosuppressants (e.g., prednisone).
2. **Glaucoma:**
    - **Pathophysiology:** Increased intraocular pressure damaging the optic nerve.
    - **Drug Treatment:** Beta-blockers (e.g., timolol), prostaglandin analogs (e.g., latanoprost), alpha agonists (e.g., apraclonidine).

Understanding the pharmacology of these drugs is essential for their safe and effective use in various clinical conditions involving the peripheral nervous system.