Introduction to Clinical Pharmacology

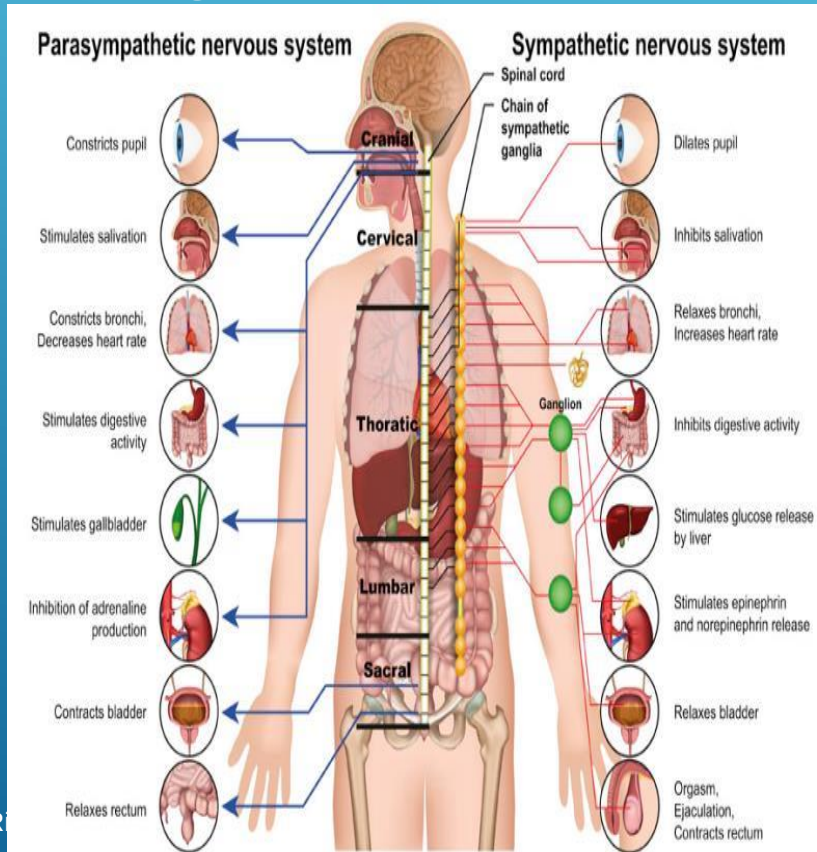
Chapter 25 Cholinergic Drugs

LEARNING OBJECTIVES

1. Discuss important aspects of the parasympathetic nervous system.
2. Explain the uses, drug actions, general adverse reactions, contraindications, precautions, and interactions of cholinergic drugs.
3. Distinguish important preadministration and ongoing assessment activities the nurse should perform on the client taking a cholinergic drug.
4. List nursing diagnoses particular to a client taking a cholinergic drug.
5. Examine ways to promote an optimal response to therapy, how to manage common adverse reactions, and important points to keep in mind when educating the client about the use of cholinergic drugs.

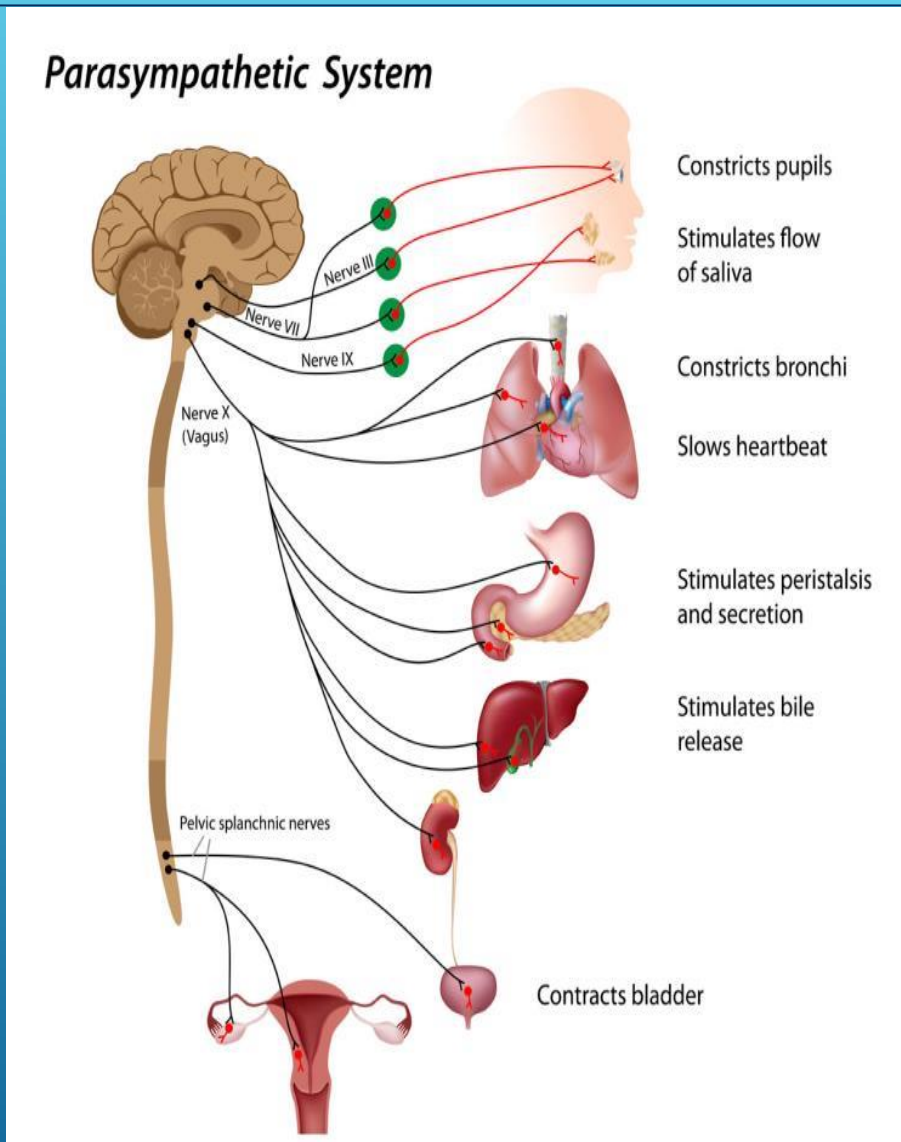
AUTONOMIC NERVOUS SYSTEM

- Division of the peripheral nervous system concerned with the functions essential to life of an organism and not consciously controlled (e.g., blood pressure, heart rate, and gastrointestinal activity)
- Divided into two branches:
  - Sympathetic
  - Parasympathetic



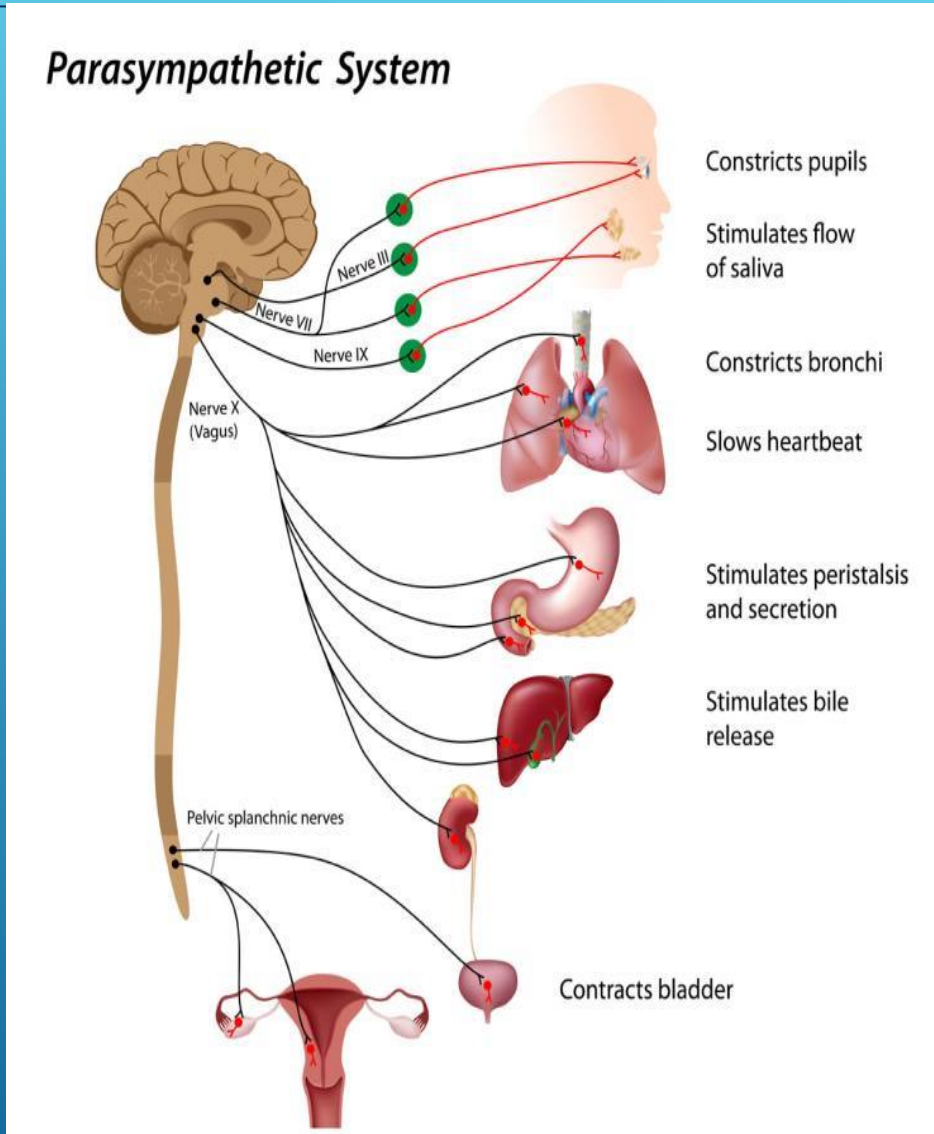
PARASYMPATHETIC NERVOUS SYSTEM #1

- Opposite reactions of sympathetic nervous system
- Rest and digest
- Acetylcholine (Ach) is the neurotransmitter of the parasympathetic branch of the autonomic nervous system



PARASYMPATHETIC NERVOUS SYSTEM #2

- Muscarinic receptors: stimulate smooth muscle
- Nicotinic receptors: stimulate skeletal muscle



CHOLINERGIC DRUGS—ACTIONS

- Mimic the activity of the parasympathetic nervous system.
- Cholinergic drugs act like the neurotransmitter Acetylcholine
- Acetylcholinesterase makes the parasympathetic nervous system function differently and results in the prevention of nerve synapses to continue nerve impulses
- Direct-acting versus indirect-acting

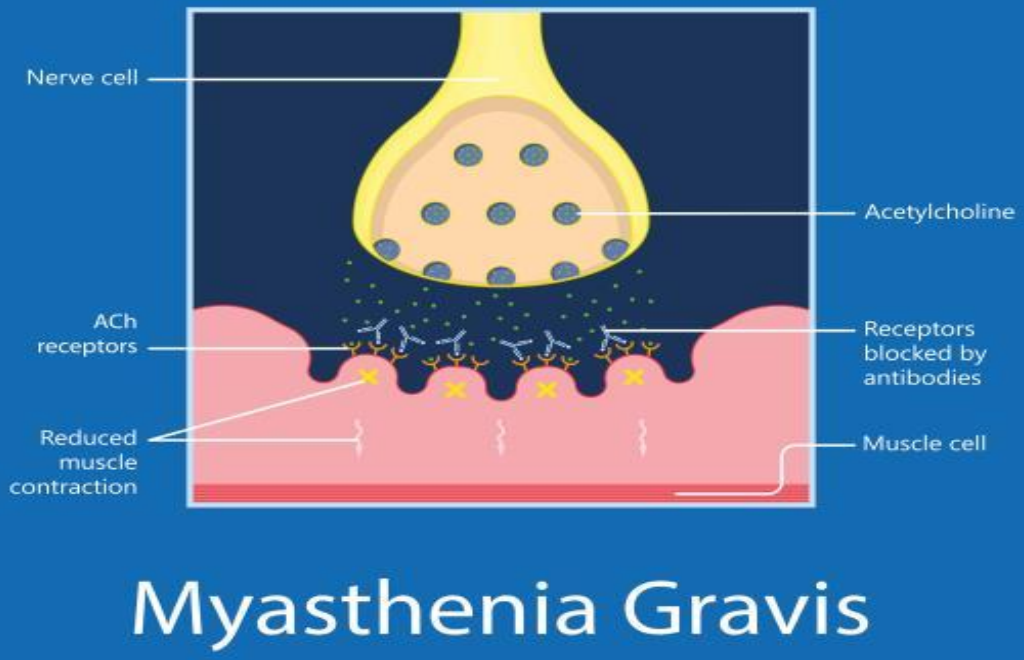
CHOLINERGIC DRUGS—ACTIONS

BOX 25.1 Demystifying the Autonomic Nervous System—Parasympathetic Branch

Terminology		Clue to Remembering
Anatomic Name	Parasympathetic	*Para*—beside, watches, not participate in the quick action
Functional Name	Cholinergic	Sounds like "colon"—digest connection
Primary Neurotransmitter	Acetylcholine (Ach)	
Enzymatic Blocker	Acetylcholinesterase (AChE)	

CHOLINERGIC DRUGS—USES

- Urinary retention
- Neurogenic bladder when retention is an issue
- Myasthenia gravis for symptom management



CHOLINERGIC DRUGS—ADVERSE REACTIONS

- General Adverse Reactions:
  - Nausea, diarrhea, abdominal cramping
  - Salivation
  - Flushing of the skin
  - Cardiac arrhythmias
  - Muscle weakness

CHOLINERGIC DRUGS—CONTRAINDICATIONS

- Contraindicated in clients with:
  - known hypersensitivity to the drugs
  - asthma
  - peptic ulcer disease
  - coronary artery disease
  - hypothyroidism
  - secondary glaucoma, iritis, corneal abrasion, or acute inflammatory disease of the eye (ophthalmic cholinergic preparations)

CHOLINERGIC DRUGS—PRECAUTIONS

- Use cautiously in clients with:
  - hypertension
  - epilepsy
  - cardiac arrhythmias
  - bradycardia
  - recent coronary occlusion
  - megacolon
  - pregnancy or lactation
  - use cautiously with children

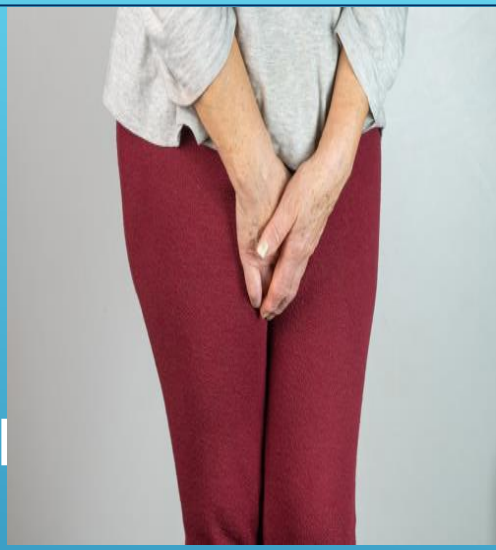
CHOLINERGIC DRUGS—INTERACTIONS

Interacting Drug	Common Use	Effect of Interaction
Aminoglycoside antibiotics	Anti-infective agent	Increased neuromuscular blocking effect
Corticosteroids	Treatment of inflammatory/respiratory problems	Decreased effect of the cholinergic
Other cholinergics	Treatment of urinary retention or myasthenia gravis	Synergistic effect, greater risk of toxicity. Antidote is atropine.

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #1

- Pre-administration Assessment
- Prior to administration for urinary retention.
- Objective Data
  - General observation and palpation of abdomen, swelling over the pelvis
  - Bladder scanning measurement of residual urine
  - Vital signs
  - Renal function tests
  - Urinalysis

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #2



- Pre-administration Assessment
- Prior to administration for urinary retention.
- Subjective Data
  - Client's description of retention, pain, incontinence
  - Type and duration of symptoms including bowel
  - Drug and surgical history
  - Remedies attempted before seeking care
  - When Bethanechol is administered, the client should void within 30-90 minutes. If not it should be reported to physician immediately

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #3

- Pre-administration Assessment
- Prior to administration for Myasthenia Gravis.
- Objective Data
  - Complete neurological assessment
  - Interdisciplinary assessments with speech or occupational therapy for signs of:
    - Muscle weakness
    - Inability to chew and swallow
    - Drooping of eyelids
    - Difficulty breathing
    - Extreme fatigue
    - Inability to perform repetitive movements

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #4

- Pre-administration Assessment
- Prior to administration for Myasthenia Gravis.
- Subjective Data
  - Client's description of muscle weakness symptoms
  - Drug and surgical history
  - Remedies attempted before seeking care

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #5

- Ongoing Assessment—Cholinergic Crisis
  - Monitor for drug toxicity or cholinergic crisis
  - Signs and symptoms of cholinergic crisis: severe abdominal cramping, diarrhea, excessive salivation, muscle weakness, rigidity and spasm, and clenching of the jaw
  - The antidote given for crisis is Atropine

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #6

- Ongoing Assessment—Urinary Retention
  - Measuring and documenting fluid intake and output
  - Palpate the bladder to determine size or use bladder scanner if urinary output is low or client fails to void
  - Notify the primary health care provider the amount of residual urine and if client is unable to void after drug administration

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #7

- Ongoing Assessment—Myasthenia Gravis
  - Document an increase in symptoms or adverse drug reactions
  - Monitor symptoms of myasthenia gravis before and after each drug dose
  - Document the symptoms and the client's response or lack of response to drug therapy
  - When taking Pyridostigmine look out for signs of underdosing such as difficulty breathing, rapid fatigability, and drooping of the eyelids

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #8

- Nursing Diagnosis
  - Diarrhea related to adverse drug reaction

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #9

- **Planning**
  - Expected client outcomes depend on the reason for administration of the cholinergic drug but may include:
    - Optimal response to therapy
    - Management of adverse drug reactions
    - Confidence in an understanding of the prescribed medication regimen

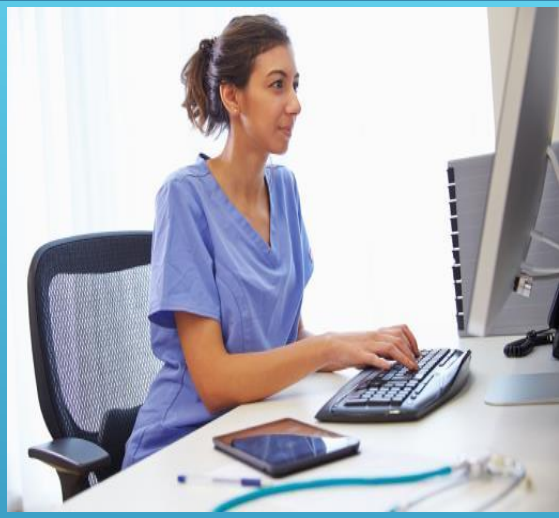
NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #10

- Implementation
  - Promoting Optimal Response to Therapy
    - Urinary retention: place call light, urinal, or bedpan near client after administration of drug; voiding occurs after 5 to 15 minutes of subcutaneous drug and after 30 to 90 minutes of oral drug
    - **Myasthenia gravis: drug dosing needs to be changed frequently;** provider may order sustained release tablets rather than dosing every 2 to 4 hours; observe the client closely for drug overdosage or underdosage

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #11

- Implementation
  - Monitoring and Managing Client Needs
    - Diarrhea
      - Educate the client about the side effects of excessive salivation, abdominal cramping, flatus, and diarrhea; tolerance usually develops in a few weeks
      - Provide appropriate toileting facilities (e.g., bedpan or commode)
      - Encourage client to ambulate to pass flatus

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #12



- Implementation
  - Monitoring and Managing Client Needs
    - Diarrhea
      - Rectal tube may be ordered to help client pass flatus
      - Document fluid intake and output and number, consistency, and frequency of stools
      - Notify provider if diarrhea is excessive—indicates toxicity

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #13

- Implementation—Educating the Client and Family
  - Emphasize the importance of uninterrupted drug therapy
  - Explore any problems that appear to be associated with prescribed drug regimen and then report to the primary health care provider
  - Review purpose of drug therapy with client and family, as well as adverse reactions that may occur

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG #14

- Implementation—Educating the Client and Family
- Myasthenia Gravis
  - Teach clients how to adjust their drug dosage according to their needs within the parameters of the primary health care provider order
  - Teach the client and family the signs and symptoms of underdosage and overdosage and provide printed educational materials
  - Client should keep a record of response to therapy
  - Client should wear a medical alert bracelet indicating they have myasthenia gravis

NURSING PROCESS—CLIENT RECEIVING A CHOLINERGIC DRUG

- Evaluation
  - Was the therapeutic effect achieved?
  - Were adverse reactions: identified, reported, and managed?
    - Client reports adequate bowel movements
  - Did client and family express confidence and demonstrate understanding of drug regimen?

PHARMACOLOGY IN PRACTICE EXERCISE #1

- Which of the following is he substance responsible for the transmission of nerve impulses across the parasympathetic nervous system?
  - a) Acetylcholine
  - b) Norepinephrine
  - c) Dopamine
  - d) Acetylcholinesterase

PHARMACOLOGY IN PRACTICE EXERCISE #2

- A primary health care provider has prescribed Bethanechol to treat a client for acute urinary retention. What should the nurse check for in the client before the administration of bethanechol?

a) Tachyarrhythmias

b) Myocardial infarction

c) Coronary occlusion

d) Fecal contents in the large intestine

PHARMACOLOGY IN PRACTICE EXERCISE#3

- What drug is used to counteract cholinergic crisis?
  - a) Zyban
  - b) Pyridostigmine
  - c) Corticosteroids
  - d) Atropine