ANTI-CHOLINERGIC DRUGS

DR ATTIYA MUNIR

Sources:

Bertram G. katzung Basic & Clinical Pharmacology 15th Edition

Goodman and Gilman's The Pharmacological Basis of Therapeutics 13th edition.

MOTTO AND VISION

- To impart evidence based research oriented medical education
- To provide best possible patient care
- To inculcate the values of mutual respect and ethical practice of medicine

LEARNING OBJECTIVES

- At the end of the lecture, the students should be able to:

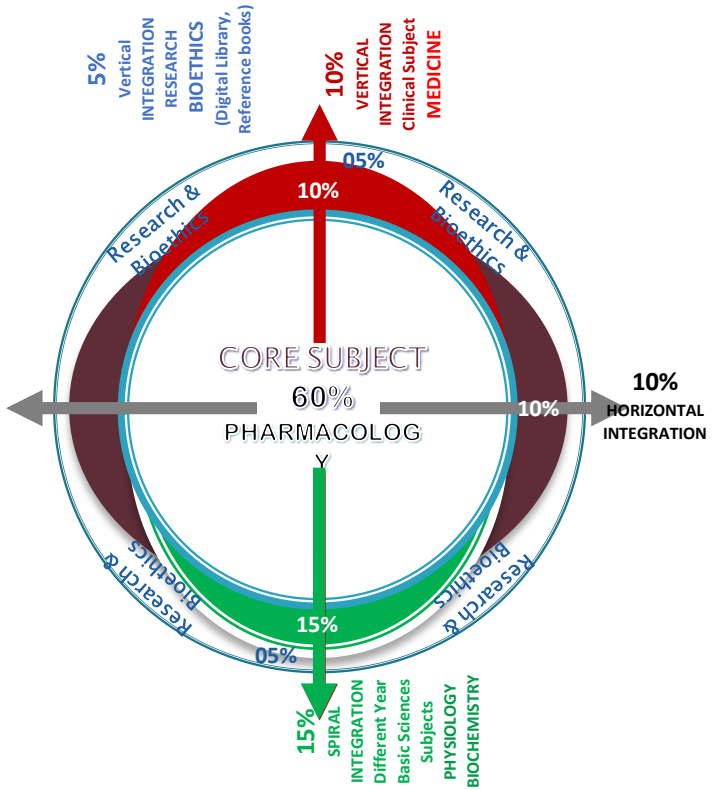
✓Differentiate between Anti cholinergic & Anti Cholinesterase

✓Therapeutically classify anti cholinergics

✓Discuss pharmacological effects, clinical uses and adverse effects of anticholinergics

✓Identify atropine toxicity with Pharmacological management

Prof. Umar's Clinically Oriented Integration Model
For Basic Sciences Interactive Lectures



3rd Year Pharmacology LGIS	
Core Subject – 60%	
Pharmacology	
Horizontal Integration – 10%	
Same Year Subjects	• Pathology (10%)
Vertical Integration – 10%	
Clinical Subjects	• Medicine (10%)
Spiral Integration – 15%	
Different Year Basic Sciences Subjects	• Physiology (10%) • Biochemistry (5%)
Vertical Integration – 05%	
Research & Bioethics	

PRE LECTURE ASSESSMENT

1. A 45-year old woman presents with symptoms of parasympathetic over activity. She is not currently taking any medication. Which drug could reverse the parasympathetic tone in this woman?

a. Atropine

b. Carbachol

c. Hexamethonium

d. Succinylcholine

e. Tubocuranine

2. A group of teenage boys comes to the emergency department after ingesting a plant they heard would make them high. One member of the group still had some plant parts in his pocket, which you use to identify deadly nightshade that contains compounds metabolized to atropine. Which of the following characteristic effect of atropine will be seen in these affected boys?

A. Bronchospasm
B. Lacrimation
C. Mydriasis
D. Salivation
E. Urination

3. Which of the following antimuscarinic drugs is often effective in preventing or reversing vestibular disturbances, especially in motion sickness?

A. Atropine
B. Cyclopentolate
C. Homatropine
D. Oxybutynin
E. Scopolamine

4. In case of atropine poisoning, cofusion and delerium is mediated through

a. M1 receptors
b. M2 receptors
c. M3 receptors
d. Nicotinic N1 receptors
e. Nicotinic N2 receptors

5. Why Physostigmine is preferred drug for Atropine poisoning?

a. It forms covalent bond with acetylcholine esterase for 30min to 6 hours

b. It chemically reacts with Atropine

c. It has better absorption

d. It has direct agonistic action on the receptors

e. It penetrates the blood-brain barrier

6. A group of teenage boys comes to the emergency department after ingesting a plant they heard would make them high. One member of the group still had some plant which you use to identify deadly nightshade that contains compounds metabolized to atropine. Which of the following characteristic effect of atropine will be seen in these boys?

A. Bronchospasm

B. Lacrimation

C. Mydriasis

D. Salivation

E. Urination

7. Which of the following is a common side effect of anticholinergic medications?

A. Increased salivation
B. Excessive sweating
C. Dry mouth
D. Diarrhea
E. Bradycardia

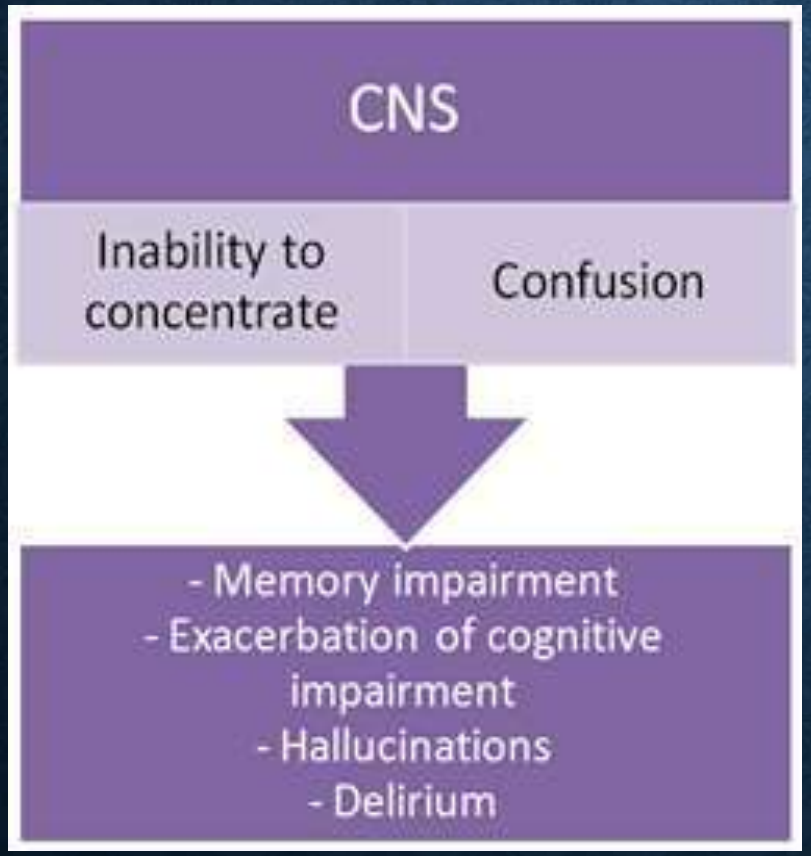
8. Which of the following is a contraindication for the use of anticholinergic drugs?

A. Chronic obstructive pulmonary disease (COPD)
B. Hypertension
C. Glaucoma
D. Asthma
E. Irritable bowel syndrome

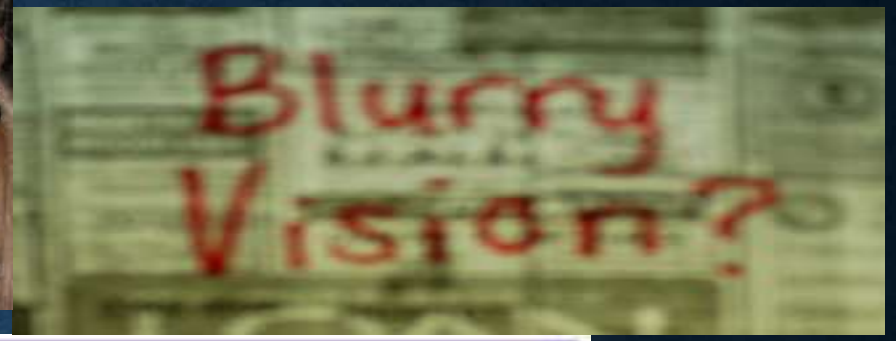
9. Which of the following CNSside effect of anticholinergic drugs?

A) Hyperactivity
B) Drowsiness
C) Seizures
D) Confusion
E) Depression

Central Nervous System Disorders



EYE



Eye

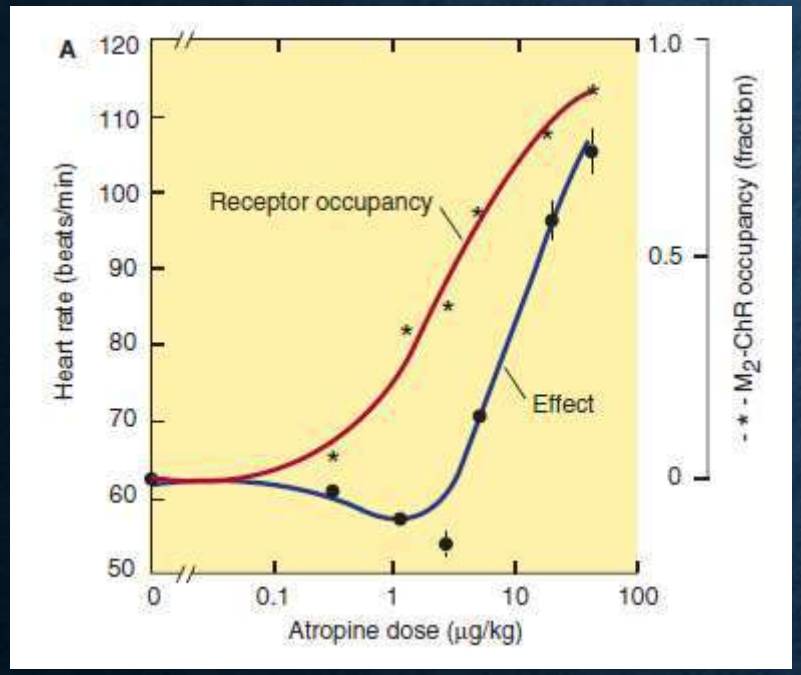
Mydriasis	Ciclopegia

Inability to accomodate

Vision disturbances

Exacerbation or precipitation of acute angle closure glaucoma

Cardiovascular System

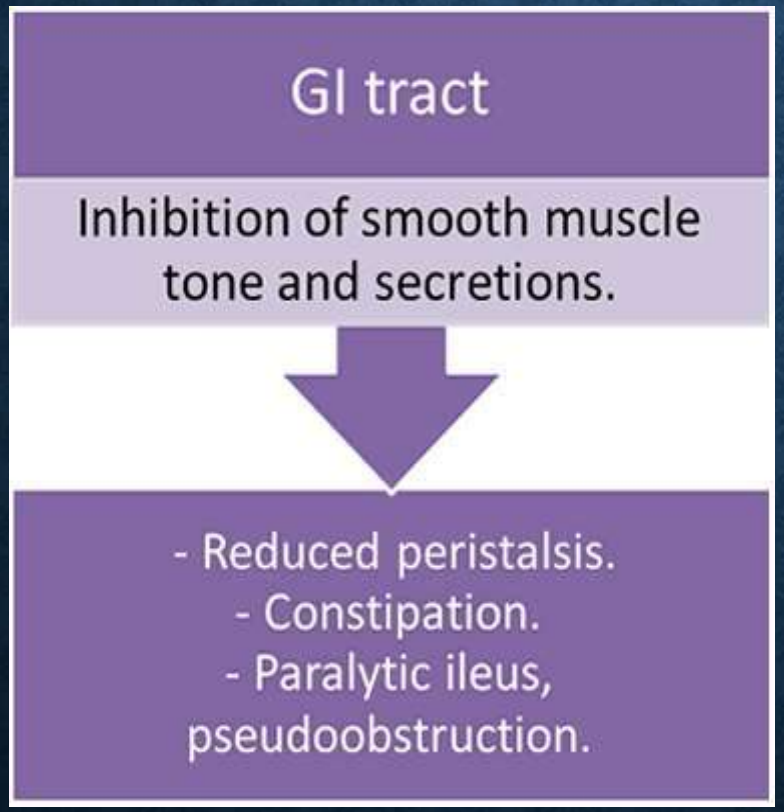


Heart

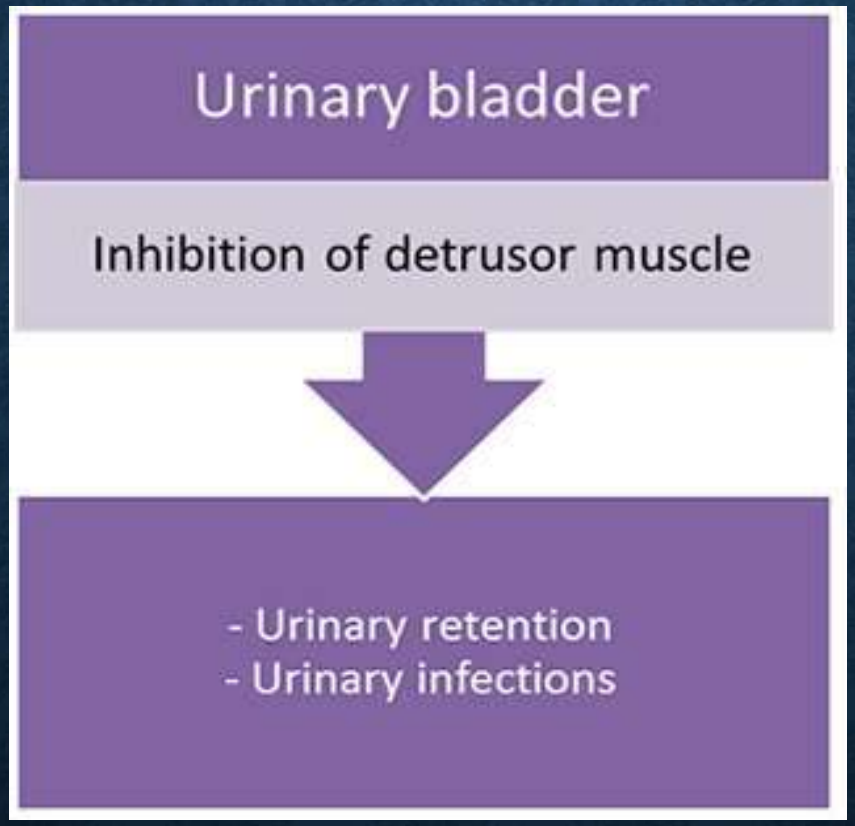
Increased conduction at SA and AV nodes. (M2 antagonism)

- Increased heart rate.
- Conduction disturbances, supraventricular tachyarrhythmias.
- Exacerbation of angina

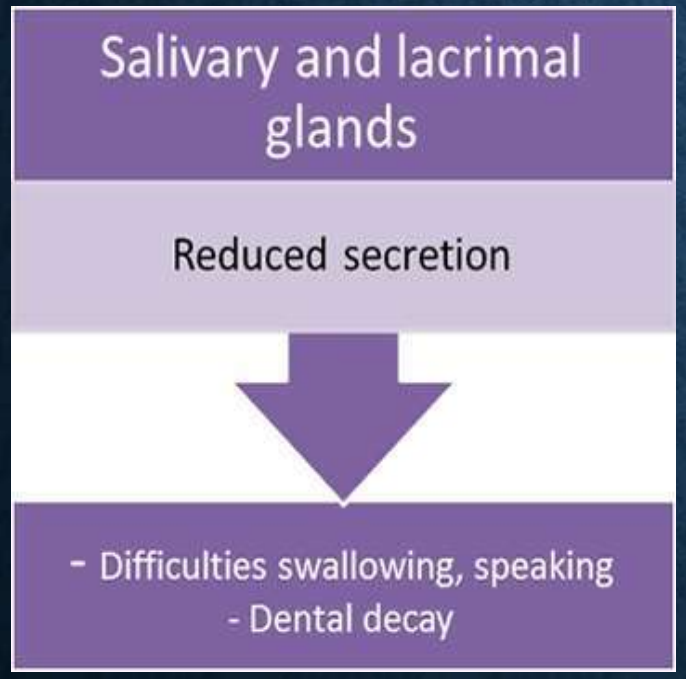
Gastrointestinal System

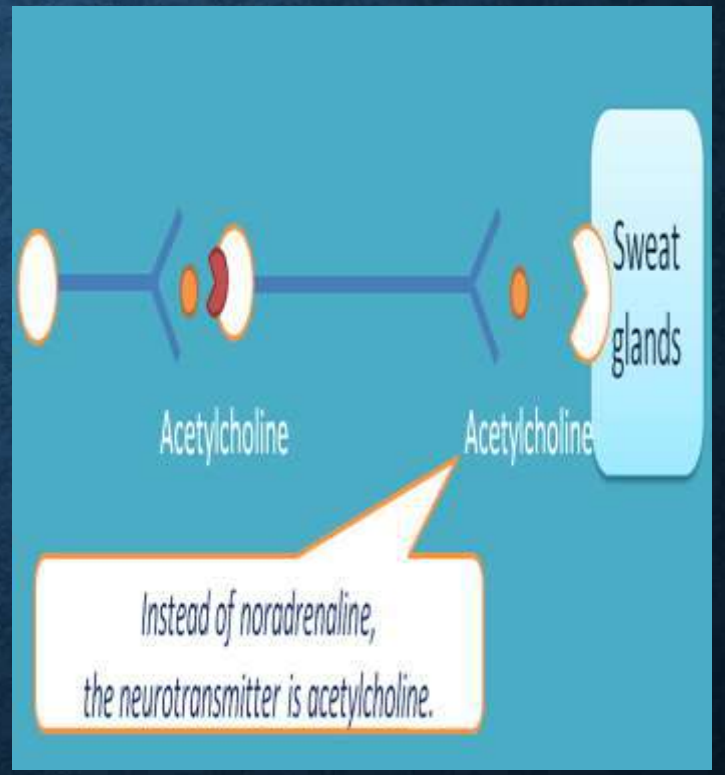


Urinary System

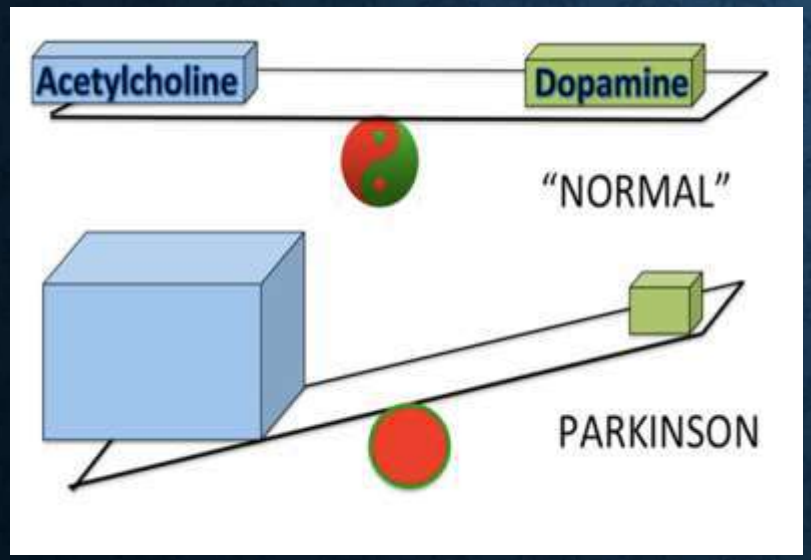


Sweat Glands





USES OF ANTIMUSCARANIC DRUGS
CNS Disorders



Ophthalmological Disorders

Drug	Duration of Effect
Atropine	5–6 days
Scopolamine	3–7 days
Homatropine	12–24 hours
Cyclopentolate	3–6 hours
Tropicamide	15–60 min

Respiratory Disorders

- COPD:

- Asthma:

Cardiovascular Disorders

- **Sinus bradycardia (Atropine)**

Gastrointestinal Disorders

Urinary Disorders

- M_2 &M_3 receptors
- Mainly M_3 receptors
- Oxybutynin, trospium, darifenacin, solifenacin

Cholinergic Poisoning

- Insecticide Poisoning/Chemical Warfare (Nerve Gas Poisoning)

Use In Anesthesia

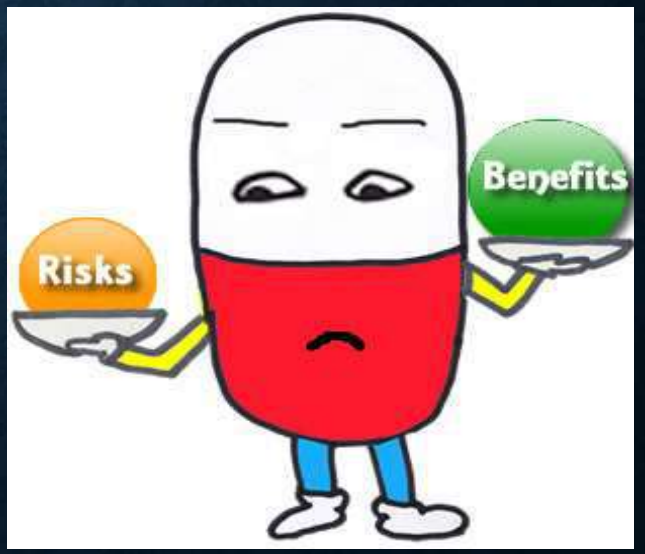
- As Pre-anesthetic medication: **Atropine/Scopolamine**

Adverse Effects

- Xerostomia
- Blurring of vision
- Photophobia
- Tachycardia
- Constipation
- Urinary retention
- Dyspepsia

Contraindications

- Relative not Absolute
- Always treat cholinergic poisoning with Atropine
  1)Angle Closure Glaucoma
  2)Prostatic Hyperplasia
  3)Urinary tract obstruction
  4)GI obstruction



Atropine Poisoning

Signs &symptoms

- Dry mouth
- Dysarthria
- Dysphagia
- Blurring of vision
- Photophobia
- Hot dry flushed skin
- Hyperpyrexia
- Palpitations/tachycardia

Management

- 1- Gastric lavage
- **Drug treatment should be Symptomatic**
- 2- Diazepam
- 3- Physostigmine….Only small doses…Neostigmine may be used as well
- 4- Control of hyperthermia
- 5- Mechanical Ventilation

BIOETHICS

Ethical duties of a doctor while handling a case of poisoning

- In case of poisoning , a doctor must attend and treat the patient on priority basis
- Counseling of the relatives regarding the condition of patient be done in clear words but with sympathy , explaining the best and worst outcomes that may occur.
- In case of suspicion of homicide, inform the nearest magistrate accordingly.

RESEARCH

- Tsubouchi K, Gunge N, Matsuoka W, Emoto T, Miyazaki T, Tominaga K, Okabe YU, Matsuzaki H, Aso S, Tachibana M, Nakagawa C. Drugs Showing Real-world Efficacy for Nocturia in Patients With Bladder Storage Symptoms. Anticancer Research. 2023 Jan 1;43(1):455-61.

ARTIFICIAL INTELLIGENCE

- Tsubouchi K, Gunge N, Matsuoka W, Emoto T, Miyazaki T, Tominaga K, Okabe YU, Matsuzaki H, Aso S, Tachibana M, Nakagawa C. Drugs Showing Real-world Efficacy for Nocturia in Patients With Bladder Storage Symptoms. Anticancer Research. 2023 Jan 1;43(1):455-61.

Thank you