بسم الله الرحمٰن الرحيم

(وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ)

Pharmacology | FINAL 3

Cholinergic drugs pt.1

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وَلِلَّهِ الْأَسْمَاءُ الْحُسْنَى فَادْعُوهُ بِهَا

المعنى: (الخالق) هو المبدع للخلق المخترع له على غير مثال سابق، و(الخلاق) تدل على كثرة خلق الله تعالى وإيجاده وكماله فيه.

الورود: ورد اسم الخالق (٨) مرات، أما اسم الخلاق فورد مرتين.

الشاهد: ﴿ هُوَ ٱللَّهُ ٱلْخَٰلِقُ ٱلْبَارِئُ ٱلْمُصَوِّرُ ﴾ [الحشر:٢٤]، ﴿ إِنَّ رَبَّكَ هُوَ ٱلْخَلَّٰقُ ٱلْعَلِيمُ ﴾ [الحجر:٨٦].

اضغط هنا لشرحٍ أكثر تفصيلًا

Cholinergic Drugs

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نقلا عن دكتور يعقوب :" بالنسبة للغياب من يغيب ال15%عن المحاضرات فهي عادات غيرسليمة يلي مسموحلكم تعطلوهم فقط للحالات الطارئة ولبعدين بعد التخرج رح تصيرو غير قادرين على التعامل مع المرضى يعني باختصار داوموا"

مرة try ومرة cry وهي ماشية كده

Cholinergic Drugs

Cholinomimetics:

1. Acetylcholine receptor stimulants

- Agonists that stimulate acetylcholine muscarinic and nicotinic receptors.
- Muscarinic receptors are located on smooth muscle, heart & exocrine glands
- Nicotinic receptors are located in autonomic ganglia.

The mechanism of termination of action of acetylcholine is hydrolysis by cholinesterase

Cholinergic Drugs

2. Cholinesterase inhibitors:

- **Drugs which inhibit the hydrolysis of acetylcholine leading to its accumulation at its receptors.**
- **The excess acetylcholine stimulates cholinoceptors (not selective) to evoke increased response.**
- act in the ANS and at neuromuscular junctions in skeletal muscle, but have limited effects in the CNS because they do not cross the blood–brain barrier (BBB)

يقول الأستاذ قصي العسيلي:
المعلشة ليست دواءً ولا إبرةً ولا
مخدّرًا فلا تُمَعلِشوا أحدًا،
لكن منمشيها للكاتبة

Direct-Acting Cholinomimetics

1) **Choline esters (is indeed a quaternary ammonium compound) :**

- **Acetylcholine**
- **Methacholine**

2) **Alkaloids (naturally occurring** مشتق من الكائنات الحيّة كالنباتات **):**

- **Muscarine -considered toxins not drugs-** (The name Muscarine comes from the ***mushroom*** Amanita muscaria (previously called Agaricus muscarius), from which the compound was first isolated.)
- **Pilocarpinelt -considered drugs.**

Direct-Acting Cholinomimetics

Pharmacokinetics:

- **Choline esters are quaternary ammonium compounds, charged, highly water soluble and insoluble in lipids.**

  That means it is charged (**ionized**), does not cross cell membranes easily, has **poor distribution** in the body, does not enter the brain (**action limited to the periphery**) and is rapidly hydrolyzed by cholinesterase , its not given orally because its **hydrolyzed in GI tract**.

- **They are poorly absorbed and poorly distributed into most tissues.**

Direct-Acting Cholinomimetics

- **They are hydrolyzed in the GIT and not active by the oral route.**
- **The tertiary natural cholinomimetic alkaloid pilocarpine** Lipid soluble **is well absorbed from most sites of administration.**
- **The alkaloid muscarine is a quaternary amine and is less completely absorbed from GIT than tertiary amines but is toxic when ingested.**

Muscarine causes toxicity after oral administration because it is a potent, direct agonist of muscarinic receptors, leading to massive parasympathetic overstimulation, even with partial absorption.

Direct-Acting Cholinomimetics

Pharmacodynamics: (Pharmacological action)

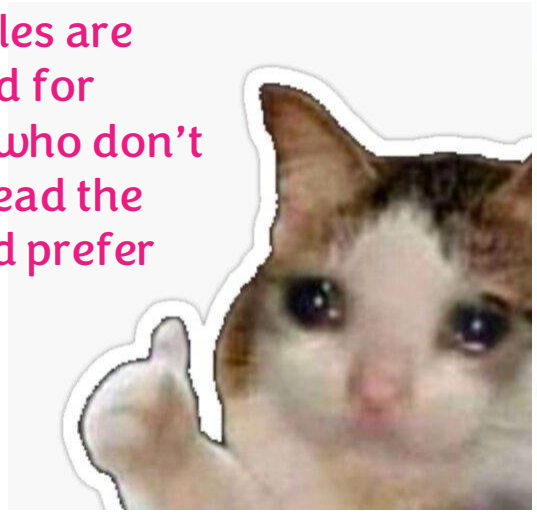
- **Most of the direct organ-system effects of cholinomimetics can be predicted from knowledge of the effects of parasympathetic nerve stimulation and the distribution of muscarinic receptors.**

each organ system depends entirely on the type and distribution of the muscarinic receptor present in that organ, and the function of that receptor in that organ.

Direct-Acting Cholinomimetics

Organ	Response
Eye	
Sphincter muscle of iris	Contraction (miosis)
Ciliary muscle	Contraction for near vision
Heart	
Sinoatrial node	Decrease in rate (negative chronotropy)
Atria	Decrease in contractile strength (negative inotropy). Decrease in refractory period
Atrioventricular node	Decrease in conduction velocity (negative dromotropy). Increase in refractory period
Ventricles	Small decrease in contractile strength
Blood vessels	
Arteries, veins	Dilation (via EDRF). Constriction (high-dose direct effect)

These tables are duplicated for students who don't want to read the tables and prefer texts.



Direct-Acting Cholinomimetics

Lung	
Bronchial muscle	Contraction (bronchoconstriction)
Bronchial glands	Stimulation
Gastrointestinal tract	
Motility	Increase
Sphincters	Relaxation
Secretion	Stimulation
Urinary bladder	
Detrusor	Contraction
Trigone and sphincter	Relaxation
Glands	
Sweat, salivary, lacrimal, nasopharyngeal	Secretion

EDRF, endothelium-derived relaxing factor.

*Only the direct effects are indicated; homeostatic responses to these direct actions may be important (see text).

بعد إذن الاستمرارية
في السعي
أنا عايز أعيّط

Direct-Acting Cholinomimetics

Eye: [M_3 receptors]

1. **Contraction of the smooth muscle of the iris sphincter → miosis, pupillary constriction.** Iris contains **two opposing muscles**. The circular sphincter pupillae muscle is under **parasympathetic** control and utilizes muscarinic (M3) receptors, whereas the radial muscle is controlled by the **sympathetic** nervous system and actually utilizes adrenergic receptors.
2. **Contraction of the ciliary muscle →accommodation for near vision.**
3. **Facilitation of aqueous humor outflow, which reduces intraocular pressure.** The M3 receptors facilitate the drainage of aqueous humour from the eye by contracting the ciliary muscle. This mechanism is utilized as a treatment for glaucoma.

Direct-Acting Cholinomimetics

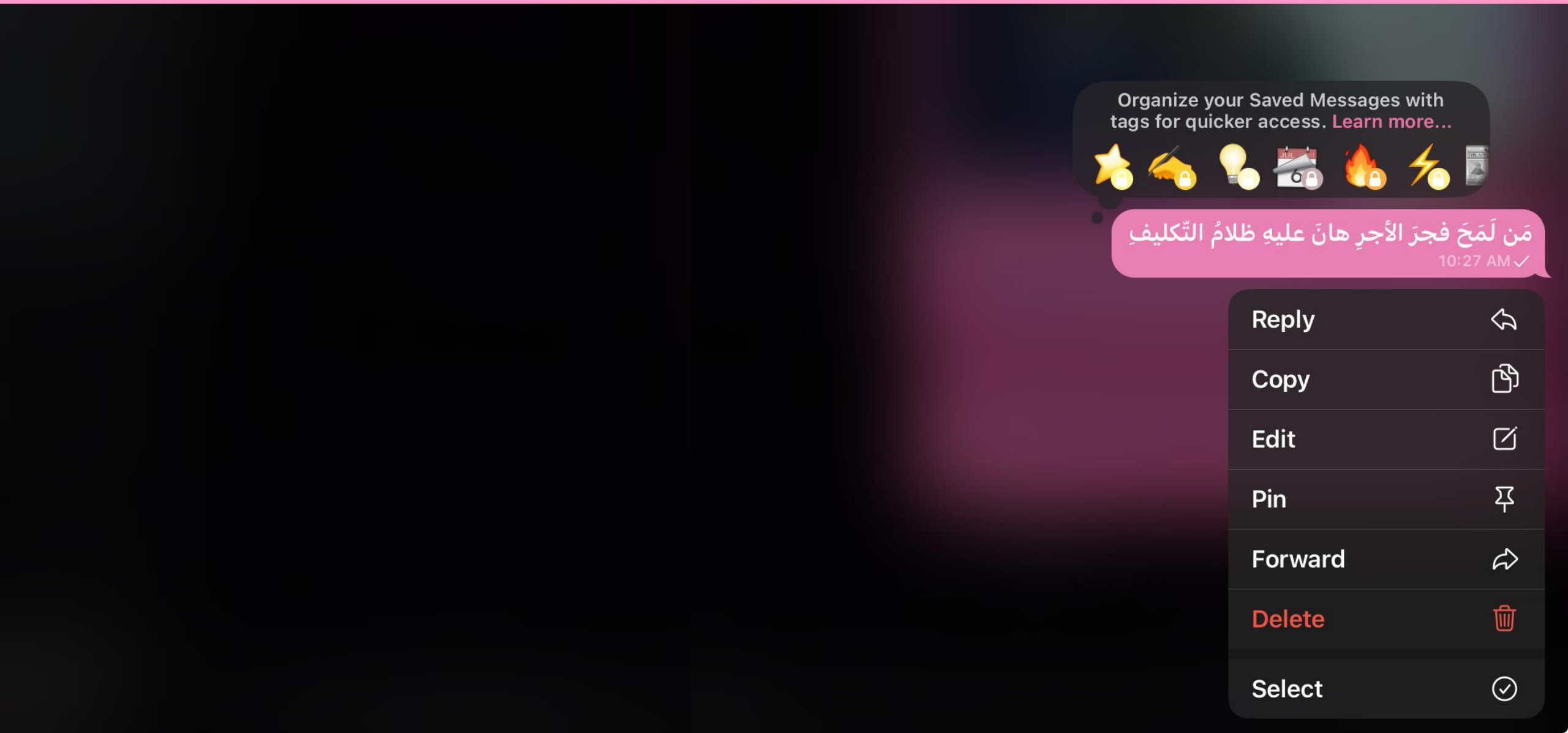
Cardiovascular System [M_2 receptors]:

1. **Reduction of heart rate → bradycardia (negative chronotropy)**
2. **Decreased AV node conduction velocity (negative dromotropy)**

   Its beneficial for treating certain Supraventricular Tachycardias , it decrease to be transferred into the ventricle.

3. **Decreased contractility of atrial muscle (negative inotropy), and decreases its refractory perioid** (Opposite of Sympathetic)
4. **Effects on ventricles are negligible** because Parasympathetic innervation to the ventricle is scarce.

رسالة من الفريق العلمي:



For any feedback, scan the code or click on it.

Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1			
V1 → V2			