

Learning unit: Cholinotropic agents

Impact of the learning unit

In medicine, cholinomimetics and cholinolytics have a prominent position. The knowledge of the cholinotropic substances and the pharmacology of these drugs is considered to be the basic knowledge of each student of medicine and requires the knowledge of biochemistry, physiology, pathological physiology and neuroanatomy of the central and peripheral autonomic nervous system.

Important terms

cholinotropic agents

direct cholinotropics

nicotinic receptor agonists

nicotine

depolarizing muscle relaxants

suxamethonium (practical lesson in 15th week of the syllabus)

muscarinic receptor agonists - parasympathomimetics

pilocarpine

carbachol

cevimeline

indirect cholinomimetics

acetylcholinesterase inhibitors

reversible ACHE inhibitors

tertiary ammonium bases

physostigmine

rivastigmine

donepezil

galantamine

quaternary ammonium bases

neostigmine

pyridostigmine

distigmine

ambenonium

edrofonium

irreversible ACHE inhibitors

organophosphates

insecticides, pesticides

contact nerve poisons

principles of the organophosphate intoxication therapy

direct cholinolytics

parasympatholytics – spasmolytics (blockers of muscarinic receptors)

agents with tertiary nitrogen (cross BBB)

indications, contraindications, adverse effects

atropine

hyoscine (scopolamine)

agents with quaternary ammonium

indications, contraindications, adverse effects
butylhyoscine (butylscopolamine)
otilonium
fenpiverinium
bronchial antispasmodics (SAMA, LAMA)
ipratropium
tiotropium
umeclidinium
aclidinium
urinary spasmolytics (selective M3 antagonists)
solifenacin
darifenacin

blockade of nicotinic receptor
ganglionic blockers (neural nicotinic (N_N) receptors)
non-depolarizing peripheral muscle relaxants (blockers of the
muscular nicotinic (N_M) receptors) (see 15th week of the syllabus)
indirect cholinolytics
botulinum toxin

Learning outcomes

Student knows basic pharmacological profile (mode of action, unwanted effects, indications and contraindications) of cholinotropic substances.

Student defines the cholinomimetic and the parasympathomimetic agent.

Student distinguishes between cholinomimetic and cholinolytic agents.

Student describes symptoms of poisoning/overdosing with organophosphates and suggests pharmacotherapy.

Student gives examples of topical use of cholinotropic substances (e.g. mydriatics/miotics, antiglaucoma agents in ophthalmology).

Study materials

Rang & Dale's Pharmacology, 8th edition, 2016, chapter 13, pp. 155-176 (Cholinergic transmission); Chapter 28, pp. 350 (Respiratory system); Chapter 30, pp. 367-368, 374-378 (The gastrointestinal tract); Chapter 39, pp. 474-476 (Other transmitters and modulators)

Study materials for courses aVLFA0721p and aVLFA0721c.

Exam questions

Special pharmacology: 3. Cholinomimetics, 4. Cholinolytics

Essential drugs: 11. atropin, 12. butylscopolamine, 14. pilocarpine, 15. rivastigmine, 16. physostigmine, 17. solifenacin