**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

 physo**stigmine**

 riva**stigmine**

 donepezil

 galantamine

 quaternary ammonium bases

 neo**stigmine**

 pyrido**stigmine**

 di**stigmine**

 amben**onium**

 edrof**onium**

 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)

 ipra**tropium**

 tio**tropium**

 ume**clidinium**

 a**clidinium**

 urinary spasmolytics (selective M3 antagonists)

 soli**fenacin**

 dari**fenacin**

 blockade of nicotinic receptor

 ganglionic blockers (neural nicotinic (NN) receptors)

 non-depolarizing peripheral muscle relaxants (blockers of the muscular nicotinic (NM) 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