

Learning unit: Antispasmodics

Impact of the learning unit

Spasmolytic agents have a significant role in therapy of pain. Their indications include smooth muscle spasms and pain in the gastrointestinal, biliary and urogenital tract, including biliary and renal colic. They are used to relieve spasm visceral pains and to relieve spasms in diagnostic and therapeutic procedures such as gastroduodenal endoscopy, radiology, etc. Cholinotropic spasmolytics affect functions mediated by the neurotransmitter acetylcholine. Unlike muscle relaxants that affect the motor system and act on the nicotine N receptors of the neuromuscular junction, the neurotropic spasmolytics act through the muscarinic type (M) of the cholinergic receptors of the parasympathetic nervous system. The spasmolytics acting directly on the smooth muscle cells are called musculotropic spasmolytics. Parasympatholytics are a subset of cholinolytics and include substances that block the muscarinic receptors of the parasympathetic nervous system. The knowledge of spasmolytics and their pharmacology is essential for each student of medicine.

Important terms

spasmolytic agents (antispasmodic agents)

direct cholinolytics

muscarinic receptor blockers (antimuscarinics - neurotropic spasmolytics =
parasympatholytics)

agents with tertiary nitrogen (blood-brain barrier penetration)

atropine

agents with quaternary nitrogen

butylhyoscine (butylscopolamine)

otilonium

fenpiverinium

urinary antispasmodic agents

antimuscarinics

solifenacin (selective M3 antagonist)

darifenacin (selective M3 antagonist)

trospium (M1 and M3 antagonist)

tolterodine (non-selective antimuscarinic)

fesoterodine (prodrug)

adrenergic agents

beta 3 agonist

mirabegron

musculotropic spasmolytic (antispasmodic) agents

papaverine

drotaverine

mebeverine

alverine

pitofenone

antispasmodics with combined mode of action (neurotropic and/or muscolotropic)
oxybutinine
propiverine
other antispasmodics
antiflatulent (carminative) agents

Learning outcomes

Student distinguishes the spasmolytics (antispasmodic agents) according to their mechanism of action.

Student knows basic pharmacological profile (mode of action, unwanted effects, indications and contraindications) of parasympatholytics and muscolotropic spasmolytics.

Student gives examples of spasmolytic agents according to their indications.

Student describes symptoms of poisoning/overdose with parasympatholytics and proposes pharmacotherapy.

Student gives examples of common spasmolytic combinations.

Study materials

Rang & Dale's Pharmacology, 8th edition, 2016, chapter 13, pp. 155-167 (Cholinergic transmission) Section Antimuscarinic Agents, chapter 28, page 350 (Respiratory system), chapter 29 (The kidney and urinary system), chapter 30, pp. 367-368, 374-378 (The gastrointestinal tract), Section Antimotility and Spasmolytic Agents, chapter 39, pp. 474-476 (Other transmitters and modulators)

Study materials for courses aVLFA0721p and aVLFA0721c.

Exam questions

Special pharmacology: 5. Antispasmodics - GIT + UGT

Essential drugs: 12. butylscopolamine, 13. fenpiverine/pitofenon