

Learning unit: Sympathotropic agents

Impact of the learning unit

Adrenergic drugs are important for the treatment of many diseases of cardiovascular system, in pulmonary obstruction or in ophthalmology. In many indications, sympathotropic agents represents the most important part of pharmacotherapy and their knowledge is one of the basic pharmacologic skills.

Important terms

sympathotropic substances

direct sympathomimetic agents

non-selective sympathomimetics

indications

adverse effects

contraindications

adrenaline (epinephrine)

noradrenaline (norepinephrine)

dopamine

isoprenaline

selective sympathomimetics

α 1 selective sympathomimetic

indications

adverse effects

contraindications

phenylephrine

naphazoline

xylometazoline

α 2 selective sympathomimetics

indications

adverse effects

contraindications

methyldopa

clonidine

dexmedetomidine

β 1 selective sympathomimetics

indications

adverse effects

contraindications

dobutamine

β 2 selective sympathomimetic

indications

adverse effects

contraindications

hexoprenaline

terbutaline

salbutamol

fenoterol

salmeterol

clenbuterol

SABA, LABA, U-LABA, RABA

β₃ selective sympathomimetics
mirabegron

indirect sympathomimetic agents
pseudoephedrine/ephedrine

direct sympatholytic agents

α₁ lytics

indications
adverse effects
contraindications
doxazosin
tamsulosin
urapidil

non-selective α₁ lytic

β₁ lytics

cardio-selective β₁ lytic
metoprolol
atenolol
bisoprolol
esmolol
betaxolol

cardio-selective β₁ lytic with ISA (partial agonist)
acebutolol
celiprolol

non-selective β₁ lytic without ISA
propranolol
sotalol
timolol

non-selective β₁ lytic with ISA
carteolol

sympatholytics with combined effects (non-selective beta block,
selective alpha 1 block.)
labetalol
carvedilol

Learning outcomes

Student describes characteristics of sympathotropic drugs, their mechanisms of action, typical side effects, basic pharmacokinetic properties and their basic indications and contraindications.

Student distinguishes between direct and indirect mechanisms of action of sympathotropic substances and gives examples of concrete drugs.

Student distinguishes agents with sympathomimetic and sympatholytic effects.

Student distinguishes individual beta-blockers based on their potency (affinity) and efficacy (intrinsic activity).

Student gives examples of beta-lytics, which are competitive antagonists, partial agonists with intrinsic sympathomimetic activity (ISA) and representatives with combined alpha and beta effects.

Student knows basic pharmacological profile (mode of action, unwanted effects, indications and contraindications) of single subgroups of sympathotrophic drugs.

Study materials

Rang & Dale's Pharmacology, 8th edition, 2016, chapter 12, pp. 143-154; chapter 14, pp. 177-196; chapter 28, pp. 348-350; chapter 39, pp. 467-468

Study materials for courses aVLFA0721p and aVLFA0721c.

Exam questions

Special pharmacology: 1. Sympathomimetics - overview of single classes and their indications, examples of drugs, 2. Sympatholytics - overview of single classes and their indications, examples of drugs

Essential drugs: 1. adrenaline/noradrenaline, 2. dobutamine, 3. ephedrine/pseudoephedrine, 4. phenylephrine, 5. oxymetazoline, 6. methyldopa, 7. salbutamol, 8. doxazosine, 9. metoprolol, 10. timolol