University of Mosul
Lecture No.: 2
College of Veterinary Medicine
Date:
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Website:

Lecture title: Adrenergic receptors

Lecturer Affiliation: College of Veterinary Medicine

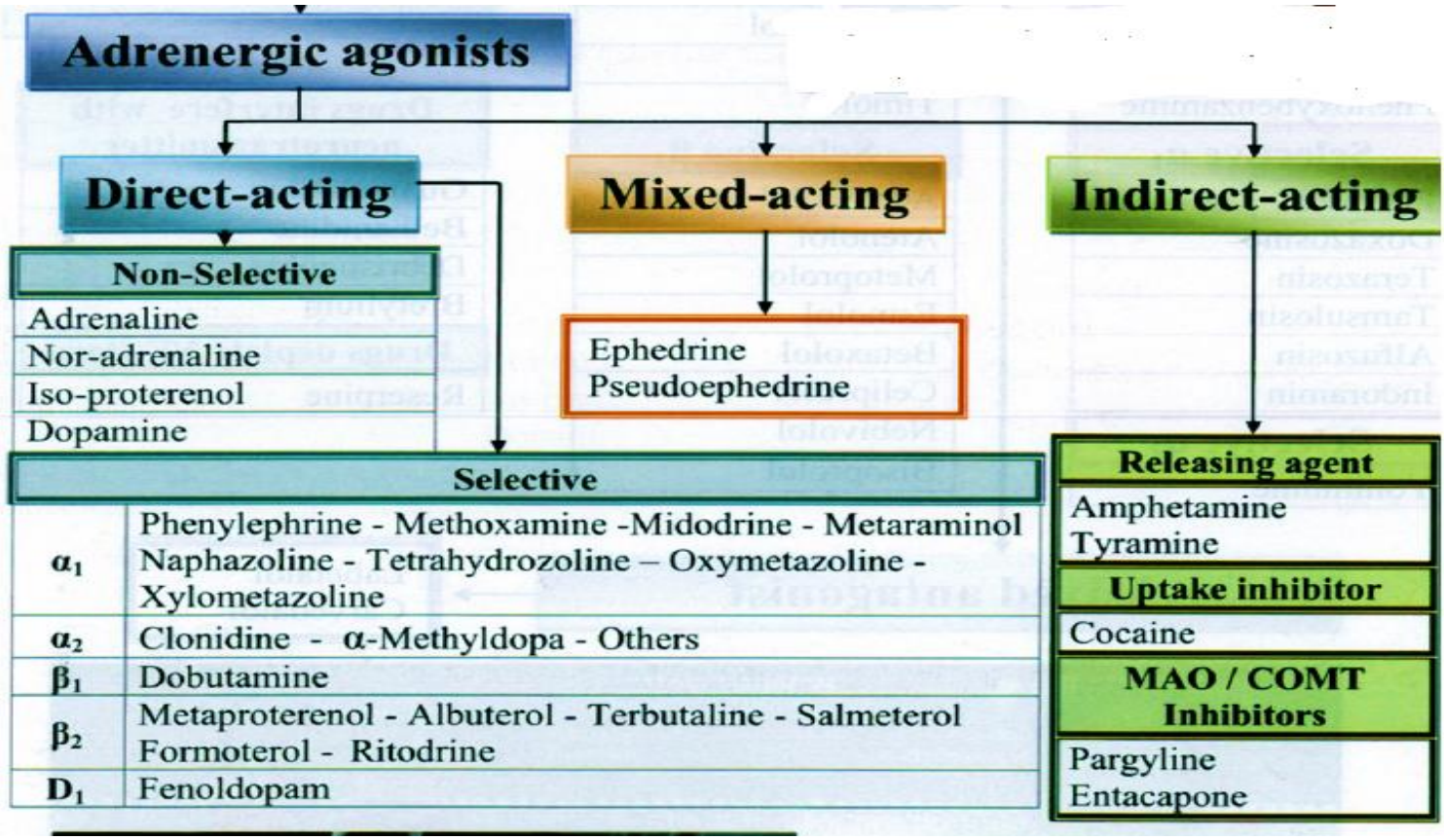
Summary:

Summary of adrenergic receptors

α1 (Gq)	α 2(Gi)	β1(Gs)	β2(Gs)	β3
1. Blood vessels(small): vasoconstriction 2. Uterus: contraction 3. Eye: contraction of radial M. leading to mydriasis 4. GIT and bladder: Wall → relaxation Sphincters → contraction 5. Sweat gland of palm and forehead: increase sweating 6. Salivary gland: ↑ salivation	1.Brain: ↓sympathetic discharge 2.presynaptic neurons: ↓NE and Ach release 3.Platelets: ↓aggregations Pancreas: ↓insulin release	Heart: increase heart rate leading to tachycardia Kidney: ↑renin release	1. Bronchodilation 2. Blood vessels of skeletal muscle and coronary artery: vasodilation 3. Liver: ↑ glycogenolysis → ↑glucose in blood 4. Make the N. receptor more sensitive to Ach 5. ↑ the intracellular K → hypokalemia 6. found presynaptically in the brain: increase NE release 7. Relaxation of uterus. 8. Skeletal muscle tremors.	ac tis lip

Summary of Cholinergic receptors

M1(Gq)	M2(Gi)	M3(Gq)	Nm	Nn
1- CNS 2-Stomach: increase HCL secretion	Cardiac: Bradycardia	Glandular 1-VD of most BV through synthesis of NO 2-Contraction of all wall smooth muscles and relaxation of all sphincters. 3-Increase all body secretions (sweating, salivation and lacrimation,etc. 4-Eye: miosis	NMJ: skeletal muscle contraction	Gangli



Direct acting sympathomimetic

I-Epinephrine (adrenaline)

1-Chemistry:

Adrenaline is a natural catecholamine, synthetic adrenaline characterized by poor absorption, not cross blood brain barrier, short acting and metabolized by MAO and COMT.

2-Pharmacokinetic:

Absorption:

- Not absorb orally
- In the skin cause vasoconstriction
- Eye: very low absorption because the tear contains MAO
- Can absorb well by inhalation

Distribution

Reach all the body except brain, brain have adrenaline but injectable adrenaline cannot cross the BBB.

Metabolism:

Like natural adrenaline.

Administration:

1- S/C→ slow absorption →long duration, less toxicity
2- IV……RISK ……dangerous arrhythmia
3- IM → rapid absorption → short duration, high toxicity
4- Intracardiac for resuscitation
5- Inhalation for asthma attack
6- Eye drops for glaucoma

Mechanism of action

Is potent agonist of α 1, α 2, β 1, β 2 and β 3.

Pharmacological effects

Heart: tachycardia → β 1

Blood pressure: ↑BP→ α 1

Lung: bronchodilation → β 2

CNS: X

EYE: mydriasis →↓IOP

Uterus: contraction → α 1

Relaxation → β 2

Depending on the state of estrus cycle, pregnancy and species

Liver: ↑glycogenolysis

Spleen: contraction → α 1 leading to ↑RBC in dogs.

Pilomotor muscles: contraction → α 1.

Kidney: β 1 activation → ↑ renin → ↑angiotensin II

Uses

1- Anaphylactic shock IM.
2- Acute bronchial asthma S.C, IM or inhalation
3- Cardiac arrest
4- Prolong the effect of local anesthetic.
5- Treatment of the open angle glaucoma
6- For emergency use only in treating anaphylactic shock in sheep, cattle, horses, dogs and cats.

Adverse effects

1- ↑BP and cerebral hemorrhage
2- Tremors
3- Tachycardia
4- Acute heart failure
5- Acute pulmonary edema
6- Gangrene of fingers

Contraindication

1. Hypertensive patient
2. Cardiovascular problem
3. Cardiac outflow obstruction
4. Hyperthyroidism