

AUTONOMIC NERVOUS SYSTEM DRUGS

A. Autonomic Nervous System Review

1. Sympathetic

- a. fight or flight
- b. increased heart rate
- c. bronchial dilation
- d. decreased secretions

2. Parasympathetic

- a. anabolic (the constructive phase of metabolism)
- b. conserves energy
- c. decreased heart rate
- d. increased GI function
- e. is the dominate system in the resting human

3. Neurotransmission

a. sympathetic

- 1. norepinephrine and epinephrine are primary neurotransmitters
- 2. act on adrenergic receptors (alpha and beta)

b. parasympathetic

- 1. acetylcholine is the only neurotransmitter

c. acetylcholine

- 1. also the neurotransmitter for ganglionic transmission, neuromuscular transmission, and central neurotransmission

B. Therapeutic Agents

1. Agents which **ENHANCE** neurotransmission

- a. receptor agonists
- b. agents which induce neurotransmitter release
- c. agents which prevent neurotransmitter degradation

2. Agents which **SUPPRESS** neurotransmission

- a. presynaptic nerve blockers
- b. receptor antagonists
- c. ganglionic blockers

C. Sympathetic System

1. Adrenergic Agonists (sympathomimetics)

- a. direct acting: react with alpha and beta receptors and turn on the second messengers in cell

1. Epinephrine is the prototype

-adrenaline is another name for epinephrine

-main effects:

-relaxation of smooth muscle of bronchial tree (useful in asthma and allergic reactions)

-cardiac stimulation (useful in cardiac arrest)

-dilatation of skeletal muscle vasculature at small doses and constriction at larger doses

-also has metabolic effects (causes hyperglycemia)

-Pharmacokinetics

-Absorption: rapidly metabolized when given orally; best given IM or SQ; also given by oral inhalation for its local effects on the bronchial tree. Has a rapid onset and short duration of action.

-Distribution: throughout the body, but doesn't cross the blood-brain barrier

-Metabolism and Elimination: terminated by reuptake and

metabolism in sympathetic nerve endings; excreted in urine as metabolites

-Clinical Uses

- bronchospasm
- allergic reactions
- cardiac arrest and arrhythmias
- used with local anesthetics to increase duration of effect

-Adverse Effects

- tachycardia
- fear
- anxiety
- nervousness

-Precautions

- use with caution in cardiac patients and diabetic patients
- best not to self-administer the oral inhalation without the advice of a physician

-Brand Names

- Primatine Mist
- Bronkaid

-Drug Interactions

- other sympathomimetics
- alpha and beta blockers
- antiarrhythmics

-Other catecholamines that have similar action to epinephrine

- norepinephrine
- isoproterenol
- dobutamine
- dopamine

-Non-catecholamines that have actions similar to epinephrine

- phenylephrine, methoxamine, metaproterenol, albuterol, terbutaline, bitolterol, ritodrine, isoetharine
- these agents have a longer half-life (time required by the body, tissue, or organ to metabolize or inactivate half the amount of a substance taken in) than epinephrine