Pharmacy Technician Academy



Fundamentals of Pharmacology VIL

Ву

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Study of effects the body has on drugs, called Pharmacokinetics

Study of effects of drugs on the body is called Pharmacodynamics

There are **three major routes** of drug administration are Enteral (oral, sublingual), Parenteral (IV, IM, SC etc.), Others (inhalation, intranasal, topical etc)

Oral route is used for local as well as systemic action of drugs

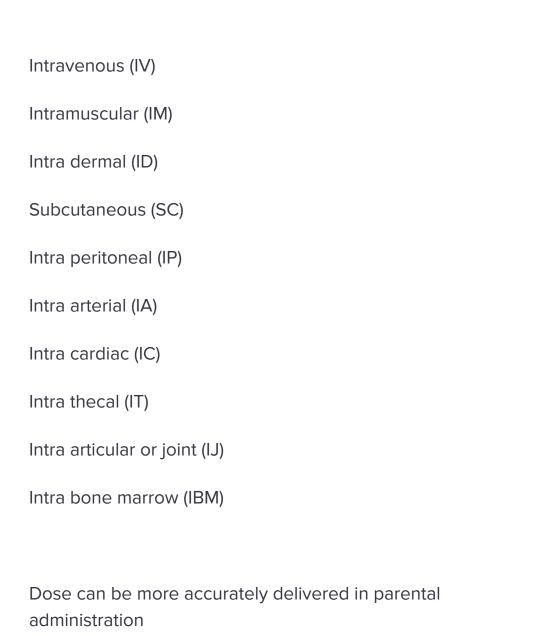
Oral route do not require sterile techniques for administration

In oral route, Extensive hepatic metabolism (first pass effect) may occur before the drug reaches its site of action

First pass metabolism not occurs in sublingual

Parenteral administration is used for drugs that are poorly absorbed from the GIT

Parenteral administration is used for treatment of unconscious patients and under situations that require a rapid onset of action



The vast majority of drug gains access to the body by passive diffusion

Endocytosis involves engulfment of a drug molecule by the cell membrane and transport into the cell Exocytosis is the reverse of endocytosis and is used by cells to secrete many substances Blood flow to the brain, liver, and kidney is greater than that to the skeletal muscles In brain capillary endothelial cells are continuous and have no slit junction Drug molecules may bind to plasma protein (usually albumin) Bound drugs are pharmacologically inactive Free unbound drug can act on target site in the tissues Volume of Distribution (VD) = Dose administered / Plasma Concentration of drug

Drugs are most eliminated by biotransformation and/or excretion into the urine or bile

Metabolism transforms lipophilic drugs into more polar readily excretable products

The liver is the major site for drug metabolism

Phase-I reaction convert lipophilic molecules into more polar molecules

Phase II consists of conjugation reactions

Ligand gated ion channels receptors are responsible for regulation of the flow of ion across cell membrane

G protein-coupled receptors contain a single peptide

G protein has three subunits, alpha, beta, and gamma subunit

Enzyme linked receptor have cytosolic enzyme activity

Intracellular receptors are either in the cytoplasm or in the nucleolus gives response by increasing the gene transcription

Posology deals with dosage of drugs

Placebo refers to an inactive substance or preparation given to satisfy the patients symbolic need (psyche need) for drug therapy

Amount of drug taken each time by an individual or a quantity to be administrated at one time is called dose

The amount of a drug given to an individual per unit body weight is called dosage

Average dose for an adult to produce a therapeutic effect is called therapeutic dose

A large dose initially used to produce an effective concentration as quickly as possible is called loading dose

A dose used to maintain the therapeutic effect or concentration in blood is called maintenance dose

Largest dose of a drug that can be taken safely is called Maximal Tolerated Dose

Amount of drug, which produces undesirable harmful effect of serious nature, is called toxic dose

A dose that produces death is called fatal dose

Adult dose is for a person between the age of 18-60 years

Young's formula is used to calculate doses for children (2-17 years old) by using age

Clark's formula is used to calculate doses especially for infants (birth to 1-year old) by using weight of infant in pounds (lbs)

ANS is concerned with regulation of visceral function

ANS is also called involuntary nervous system

Neuron does not have centrosome, so it cannot undergo division

On the basis of functions the nerve cells are classified into two types,

Motor Neuron (Efferent),

Sensory Neuron (Afferent)

Motor Neurons have long axons and short dendrites

Sensory neurons have short axons and long dendrites

The first nerve cell is called preganglionic neuron

Second nerve cell is called postganglionic neuron

Preganglionic neuron makes a synaptic connection in ganglia

Ganglia function as relay station between preganglionic neuron and a second nerve cell

Cell body of second neuron is originates from ganglion

A first or preliminary form of drug from which other forms of drugs are developed or copied is called prototype drug Colinergic agonist are also called parasympathetomimetic

Colinergic antagonist are also called parasympathetolytic

Acetylcholine is a directed acting cholinergic agonist

Acetylcholine is a quaternary ammonium compound

Acetylcholine cannot penetrate membrane

Acetylcholine has both muscarinic and nicotinic activities

Physostigmine is an indirect Acting (reversible) drug

Echothiophate is an indirect Acting (irreversible) drug

Injection of acetylcholine causes vasodilation and lowering the blood pressure

Acetylcholine (1% solution) is instilled into the eye to produce miosis during ophthalmic surgery

Physostigmine is a natural alkaloid obtained from the plant physostigmine venenosum Physostigmine is a tertiary amine Physostigmine reversibly block acetylcholine esterase enzyme and prevent its breakdown Physostigmine has acts on muscarinic and nicotinic receptors as well as on neuromuscular junction Physostigmine have duration of action is about 2 to 4 hours Echothiophate is an organophosphate that covalently binds with acetylcholinesterase Atropine is Anti Muscarinic Agent Mecamylamine is a Ganglionic Blocker agent Succinylchoine and Tubocurarine are Neuromuscular **Blockers**

Atropine is a tertiary amine belladonna alkaloid

Atropine has high affinity for muscarinic receptors

Atropine dilate the pupil of eye (mydriasis)

Atropine is used for the treatment of overdoses of acetylcholinesterase inhibitors, insecticides and some types of mushroom poisoning

Ganglionic blockers rarely used therapeutically

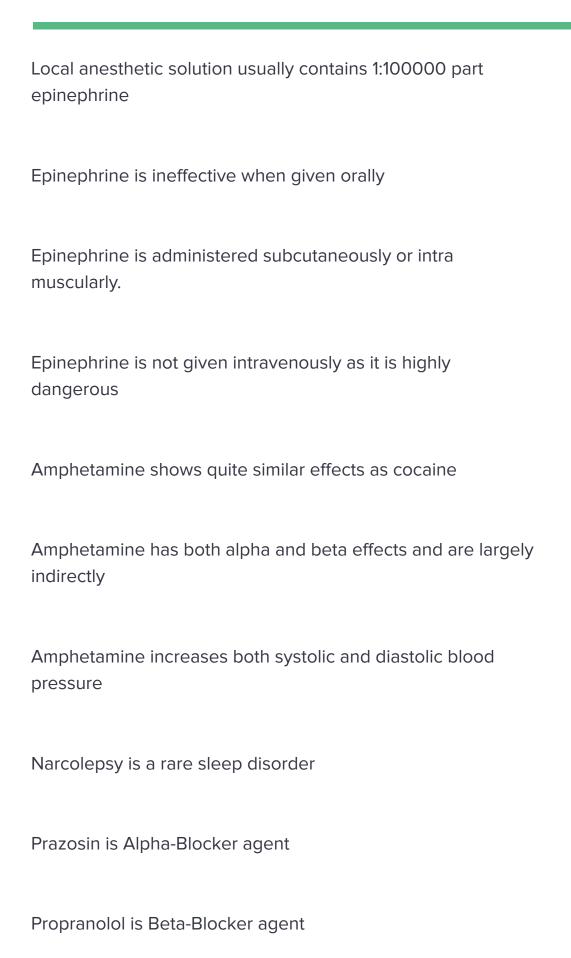
Neuromuscular blockers are useful during surgery for producing complete muscle relaxation

All neuromuscular blocking agents are injected intravenously

Succinylcholine initially produces short lasting twitching of the muscle

Succinylcholine is injected intravenously given by continuous infusion

Ephedrine is Mixed Action Adrenergic Agonists



The names of all $\beta\text{-Blockers}$ ends in 'olol' except for labetalol and carvedilol

CNS depressants are more important pharmacologically and therapeutically than stimulants

Levodopa is a metabolic precursor of dopamine

Dopamine itself does not cross the blood brain barrier

Levodopa has an extremely short half-life (1 to 2 hours)

Buspirone is Anxiolytic drug

The targets of benzodiazepine actions are GABAa receptors

At high doses, the benzodiazepines relax the skeletal muscles

At low doses, barbiturates produce sedation

At higher doses barbiturates cause hypnosis, followed by anesthesia

Buspirone is useful in the treatment of generalized anxiety disorder
Cocaine and Nicotine are Psychomotor Stimulants
LSD stands for Lysergic Acid Diethylamide
Hyperthermia can also cause by cocaine
Cocaine has a local anesthetic action
Cocaine is the only local anesthetic that causes vasoconstriction
Nicotine is the active ingredient in tobacco
Nicotine is most widely used CNS stimulant
In low doses, nicotine causes ganglionic stimulation by depolarization

At high doses, nicotine causes ganglionic blockade

Fluoxetine is Selective Serotonin Re-uptake Inhibitor
All Selective Serotonin Re-uptake Inhibitor have half-life range between 16 to 36 hours
Duloxetine is Serotonin/norepinephrine Re-uptake Inhibitor
Serotonin/norepinephrine Re-uptake Inhibitor have half-life is 12 hours.
Mirtazapine is Atypical Antidepressant agent
Amitriptyline is Tricyclic Antidepressant agent
Tricyclic Antidepressant have variable half-lives from 4 to 17 hours
Phenelzine is Monoamine Oxidase Inhibitor

Neuroleptics drugs are used primarily to treat schizophrenia

During schizophrenia, glutamic acid activity in mid brain is decreased

Seizures have been classified into two groups
Partial seizures involve one portion of the brain
Generalized seizures may begin locally
Gabapentin is a GABA Analogue
Phenytoin block voltage-gated sodium channels
Sodium nitroprusside is Direct Vasodilator
Angiotensin-II is a powerful vasoconstrictor
ACE inhibitor is fetotoxic
Angina can lead to ischemia
There are three types of angina
Nitroglycerine is an Organic Nitrate

Verapamil is Ca2+ Channel Blocker

Quinidine is Class I (Na+ channel blocker) Propranolol is Class II (B-Adrenoceptor blocker)/ B-Blocker Amiodarone is Class III (K+ channel blocker) Verapamil is Class IV (Ca2+ channel blocker) Quinidine is an alkaloid Quinidine blocks sodium channels. Amiodarone contains iodine Amiodarone have prolonged half-life of several weeks Misoprostol increases secretion of mucus and bicarbonate Sucralfate creates a physical barrier in stomach

H-pylori is a Gram-negative microaerophilic bacterium

Chlorothiazide have half-life is 40 hours

Bumetanide and Furosemide are Loop Diuretics
Loop Diuretics inhibit Na, K, Cl contrasport in the ascending limb of loop of Henley.
Spironolactone is Potassium Sparing Diuretic
Acetazolamide is Carbonic Anhydrase Inhibitor
Mannitol is Osmotic Diuretic
Ritodrine is a selective beta-2 receptor agonist used as a uterine relaxant
Oxytocin increase in intracellular calcium levels
Oxytocin used as a smooth muscle (uterine muscle) contractant

Anthelmintics are drugs used for eradication of worms from the body

Ergotamine constricts uterine muscles

Anesthesia is insensitivity to pain
Anesthetic drug effects can be divided into four stages
Inhaled (Halothane) and Intravenous (Benzodiazepines) are General Anesthetics
Lidocaine is Local Anesthetics
Halothane is a potent bronchodilator
Halothane relaxes both skeletal and uterine muscle
Autacoids formed by tissues on which they act, thus they function as local hormones
Prostaglandins are unsaturated fatty acids derivatives
Prostaglandins used as abortifacients (agents causing abortion)

Histamine binds with histamine receptors H1, H2, H3, and H4.

H1 and H2 receptors are targets of clinically useful drugs

Serotonin being found in plant and animal tissues

Serotonin is a component of the platelet clotting process

Study of the adverse effects of chemicals on living organisms is called toxicology

All the chemicals, drugs have some degree of toxicity

Antidotes are drugs that counteract the effect of a poison