Pharmacy Technician Academy

Fundamentals of Pharmacology VIL

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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

Intravenous (IV)

Intramuscular (IM)

Intra dermal (ID)

Subcutaneous (SC)

Intra peritoneal (IP)

Intra arterial (IA)

Intra cardiac (IC)

Intra thecal (IT)

Intra articular or joint (IJ)

Intra bone marrow (IBM)

Dose can be more accurately delivered in parental administration

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

Local anesthetic solution usually contains 1:100000 part epinephrine

Epinephrine is ineffective when given orally

Epinephrine is administered subcutaneously or intra muscularly.

Epinephrine is not given intravenously as it is highly dangerous

Amphetamine shows quite similar effects as cocaine

Amphetamine has both alpha and beta effects and are largely indirectly

Amphetamine increases both systolic and diastolic blood pressure

Narcolepsy is a rare sleep disorder

Prazosin is Alpha-Blocker agent

Propranolol is Beta-Blocker agent

The names of all β-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

Scopolamine is Antimuscarinic

Theophylline is Xanthine Oxidase Inhibitor

Rhinitis is an inflammation of the mucous membranes of the nose

Codeine decreases the sensitivity of cough centers in the central nervous system

Dextromethorphan is a synthetic derivative of morphine

A drug that increases the volume of urine produced is called diuretic

Diuretics can be used as first-line drug therapy for hypertension

Chlorothiazide is Thiazide Diuretic

Chlorothiazide inhibit Na+ reabsorption in distal convoluted tubule

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

Ergotamine constricts uterine muscles

Anthelmintics are drugs used for eradication of worms from the body

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