Drug classification PDF

Fundamentals of Organic Chemistry (University of Central Punjab)

Drug:

- A drug is any substance that causes a change in an organism's physiology or psychology when consumed.
- a chemical substance used in the treatment, cure, prevention, or diagnosis of disease or used to otherwise enhance physical or mental well-being.
- A pharmaceutical drug, also called a medication or medicine, is a chemical substance used to treat, cure, prevent, or diagnose a disease or to promote well-being.

Classification Of Drugs :

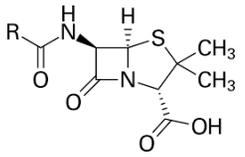
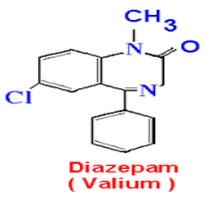
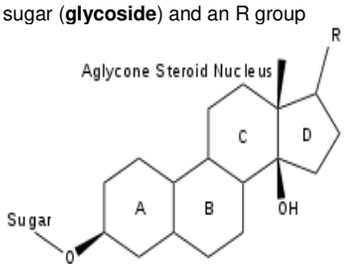
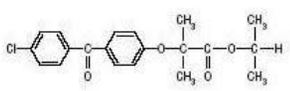
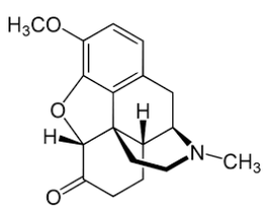
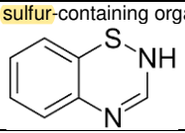
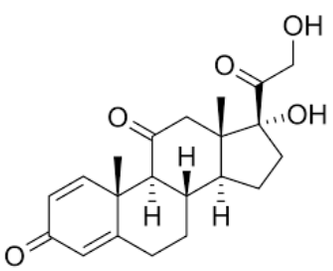
1. Classification based on chemical structure

2. Classification based on mechanism of action (pharmacological classification)

3. Classification based on mode of action (anatomical & functional change)

4. Therapeutic classification

CLASSIFICATION BASED ON CHEMICAL STRUCTURE

Class	Molecular structure	Actions/uses	Examples
Beta Lactam antibiotics	Have beta lactam ring 	• Kill bacteria by inhibiting cell wall synthesis. • First such antibiotic was penicillin.	• Penicilline • Cephalosporins • Augmentin
Benzodiazepine	Have fusion of benzene ring and diazepine ring 	Diazepam is used to treat anxiety, alcohol withdrawal, and seizures. It is also used to relieve muscle spasms and to provide sedation before medical procedures	• Dizepam (valium) • clonazepam (Klonopin)
Cardiac glycoside	consists of a steroid molecule attached to a sugar (**glycoside**) and an R group 	Cardiac glycosides are medicines for treating heart failure and certain irregular heartbeats.	• digoxin, • digitoxin
Fibrate	 A class of amphipathic carboxylic acids	Most commonly prescribed to reduce triglyceride levels Regarded as broad-spectrum lipid lowering drugs	• clofibrate (Atromid-S) • gemfibrozil (Lopid) • fenofibrate (Triglide)
Opioid		Act on the nervous system to relieve pain	• Codeine, • Morphine
Thiazide diuretics	sulfur-containing organic molecules 	To treat high blood pressure and congestive heart failure	• Chlorothiazide (Diuril) • Chlorthalidone.
Steroids	molecular structure of 17 carbon atoms arranged in four rings. 	The main treatment for certain inflammatory conditions, such as systemic vasculitis (inflammation of blood vessels) and myositis (inflammation of muscle). They may also be used selectively to treat inflammatory conditions	• prednisone • prednisolone

	prednisone	such as rheumatoid arthritis, , or gout.	

CLASSIFICATION BASED ON MECHANISM OF ACTION(PHARMACOLOGICAL CLASSIFICATION)

CLASS	MECHANISM	USES	EXAMPLES
5-Alpha Reductase inhibitor	A group of medicines that block the action of 5-alpha-reductase, the enzyme that converts testosterone into dihydrotestosterone.	may be used in the treatment of benign prostatic hyperplasia (**enlarged prostate** gland) and male-pattern **hair loss** (androgenic **alopecia**).	• Avodart • Proscar • Propecia
Angiotensin II Receptor Antagonist	Angiotensin II receptor blockers (ARBs) are medications that block the action of angiotensin II by preventing angiotensin II from binding to angiotensin II receptors on the muscles surrounding blood vessels. As a result, blood vessels enlarge (dilate) and blood pressure is reduced. Reduced blood pressure makes it easier for the heart to pump blood and can improve heart failure	ARBs are used for controlling high blood pressure, treating heart failure, and preventing kidney failure in people with diabetes or high blood pressure.	Telmisartan (Micardis)
Beta Blockers	Beta blockers, also known as beta-adrenergic blocking agents, are medications that reduce your blood pressure. Beta blockers work by blocking the effects of the hormone epinephrine, also known as adrenaline	eta blockers are used to prevent, treat or improve symptoms in people who have: • Irregular heart rhythm (arrhythmia) • Heart failure • Chest pain (angina) • Heart attacks • Migraine • Certain types of tremors	Propranolol (Inderal)
Dopamine Agonist	They bind to proteins on the neurons called **dopamine** receptors. There are several types of **dopamine** receptors and particular subtypes are more involved in movement. The **dopamine agonists** can be designed by chemists to bind to and activate particular **dopamine** receptors on neurons.	most often used to treat **Parkinson's disease**	Neupro Mirapex
Dopamine Antagonist (anti-**dopaminergic**)	A type of drug which blocks **dopamine** receptors by receptor **antagonism**.	They have found use in treating schizophrenia, [hallucinations (often hearing voices), delusions (having beliefs not shared by others), and disorganized thinking] Several other dopamine antagonists are antiemetics used in the treatment of nausea and vomiting.	Droperidol (an antipsychotic and antiemetic)
Proton Pump Inhibitors(PPIs)	inhibits gastric acid secretion by inhibiting the K^+/H^+ pump (potassium pump) located on the apical membrane of the gastric parietal cell, inhibiting secretion of H^+ into the stomach.	Proton pump inhibitors are used for the prevention and treatment of acid-related conditions such as: • Esophageal duodenal and stomach ulcers • NSAID-associated ulcer • Ulcers • Gastroesophageal reflux disease (GERD)	omeprazole esomeprazole

CLASSIFICATION BASED ON MODE OF ACTION

(ANATOMICAL & FUNCTIONAL CHANGE)

CLASS	MODE OF ACTION	USES	EXAMPLES
Diuretics	A diuretic is any substance that promotes diuresis, the increased production of urine.	to treat heart failure, liver cirrhosis, hypertension, influenza, water poisoning, and certain kidney diseases.	Demadex Microzide
Inotrope	An inotrope is an agent that alters the force or energy of muscular contractions. **Negatively inotropic** agents weaken the force of muscular contractions. **Positively inotropic** agents increase the strength of muscular contraction	**Positive inotropes** are used to support cardiac function in conditions such as decompensated congestive heart failure. **Negative inotropes** weaken the heart's contractions and slow the heart rate. These medicines are used to treat high blood pressure (hypertension).	**Positive inotropes** Digoxin. Berberine. Calcium. **Negative inotropes** Beta blockers Calcium channel blockers Quinidine
Bronchodilator	A bronchodilator or broncholytic is a substance that dilates the bronchi and bronchioles, decreasing resistance in the respiratory airway and increasing airflow to the lungs.	**Bronchodilators** are used for treating: Asthma. Chronic obstructive pulmonary disease	Vilanterol glycopyrronium
Decongestant	A decongestant, or nasal decongestant, is a type of pharmaceutical drug that is used to relieve nasal congestion in the upper respiratory tract.	allergies sinusitis.	Vicks (oxymetazoline) **pseudoephedrine**
Antithrombotics	An **antithrombotic** agent is a drug that reduces the formation of blood clots (thrombi).	**Antithrombotics** can be used therapeutically for prevention (primary prevention, secondary prevention) or treatment of a dangerous blood clot (acute thrombus).	**aspirin**, glycoprotein
Anti-fungal	An **antifungal** medication, also known as an antimycotic medication, is a pharmaceutical fungicide or fungistatic used to treat and prevent mycosis	prevent mycosis such as athlete's foot, ringworm, candidiasis (thrush), serious systemic infections such as cryptococcal meningitis, and others.	clotrimazole. econazole. miconazole.
Anti-microbials	An **ANTIMICROBIAL** is any substance of natural, semisynthetic or synthetic origin that kills or inhibits the growth of microorganisms but causes little or no damage to the host.	Most **antimicrobials** fall into one of four main categories, based on their site of activity. These include inhibition of cell wall synthesis, protein synthesis, nucleic acid synthesis, or disruption of cell membrane integrity.	All antibiotics are **antimicrobials**, but not all **antimicrobials** are antibiotics

THERAPEUTIC CLASSIFICATION

Class	Therapeutic Effect
Analgesics	An analgesic or painkiller is any member of the group of drugs used to achieve analgesia, relief from pain. Analgesic drugs act in various ways on the peripheral and central nervous systems.
Antibiotic	An antibiotic is a type of antimicrobial substance active against bacteria and is the most important type of antibacterial agent for fighting bacterial infections. Antibiotic medications are widely used in the treatment and prevention of such infections. They may either kill or inhibit the growth of bacteria.
Anticoagulant	Anticoagulants, commonly known as blood thinners, are chemical substances that prevent or reduce coagulation of blood, prolonging the clotting time.
Antidepressant	Antidepressants are medications used to treat major depressive disorder, some anxiety disorders, some chronic pain conditions, and to help manage some addictions.
Antipsychotic	Antipsychotics, also known as neuroleptics or major tranquilizers, are a class of medication primarily used to manage psychosis including delusions, hallucinations etc.
Antiviral	Antiviral drugs are a class of medication used specifically for treating viral infections rather than bacterial ones.Most antivirals are used for specific viral infections, while a broad-spectrum antiviral is effective against a wide range of viruses.
Sedative	They are CNS depressants and interact with brain activity causing its deceleration. Various kinds of sedatives can be distinguished, but the majority of them affect the neurotransmitter gamma-aminobutyric acid (GABA), which are brain chemicals performing communication between brain cells.
Antidiabetic	Drugs used in diabetes treat diabetes mellitus by lowering the glucose level in the blood.