Final-Term Assignment (Summer-2020) (BS-MLT)

Course Title: General pharmacology
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Q1) Define drug receptors, enumerate different receptor families and explain the receptor that shows its effect through second messenger system.

ANSWER...

Define drug receptors,

A complex protein, located on a cell membrane, is stimulated by drugs in the cell range, and translates this stimulus into an intracellular response.

Enumerate different receptor families

These receptors may be divided into four families:

- Ligand-gated ion channels,
- Enzyme linked receptors,
- Intracellular receptors.
- G proteins coupled recept.

Explain the receptor that shows its effect through second messenger system.

Second messengers are intracellular signaling molecules released by the cell in response to exposure to extracellular signaling molecules—the first messengers. (Intracellular signals, a non-local form or cell signaling, encompassing both first messengers and second messengers, are classified as paracrine, and endocrine depending on the range of the signal.) Second messengers trigger physiological changes at cellular level such as proliferation, differentiation, migration, survival, apoptosis and depolarization.

Pathways...

- CAMP pathway
- CGMP pathway
- IP / DAG pathway
- Calcium as a second messenger
- Eicosanoids

Q2) Define drug interactions, enumerate its various types, and explain pharmacokinetic drug interactions and its factors with examples.

ANSWER...

Define drug interactions,

A drug interaction is a reaction between two (or more) drugs or between a drug and a food, beverage, or supplement. Taking a drug while having certain medical conditions can also cause a drug interaction.

Enumerate its various types,

a. (drug-drug interaction) interactions between drugs

b. (drug-food interactions) interactions may also exist between drugs and foods

c. (drug-plant interactions) drugs and medicinal plants or herbs

d. (drug-disease interactions)

Essentially are two types of drug interactions.

1. Pharmacokinetics drugs interaction
2. Pharmacodynamics drug interactions

Explain pharmacokinetic drug interactions and its factors with examples.

Pharmacokinetics what the body does with drugs. These interactions occur when one drug changes the concentration of another drug (object) with clinical effects. The process of absorption, distribution, metabolism or elimination of drugs is rapidly replaced by drugs and for this reason such a reaction is also called ADME reaction. As a result, the effect of the drug changes the plasma concentration.

- **These are classified as**

i. Absorption interactions
ii. Distribution interactions
iii. Metabolism interactions
iv. Excretion interactions.

Absorption interactions,

Absorption is the process by which drugs enter the body. Given by any route other than intravenously, drug molecules must cross tissue membranes (e.g. subcutaneous tissue, capillary wall, skin epithelium,) to enter the blood.

Distribution interactions,

Distribution Pattern of scatter of specified amount of drug among various locations in the body.

Metabolism interactions,

Metabolism Enzyme catalysed chemical transformation of drugs within living organism.

Excretion interactions,

Elimination Excretion of drug metabolites outside the body.

Q3) Differentiate between general and local anesthesia, explain stages of anaesthesia in detail.

ANSWER…

Anesthesia,

Anesthesia is medicine given to cause loss of sensation and put the entire body to sleep.

Differentiate between general and local anesthesia,

General anesthesia causes a person to 'fall asleep' while the medical procedure takes place,

Local anesthesia is applied to a specific region in the body where the procedure will be performed.

Explain stages of anaesthesia in detail.

There are the following four stages of anesthesia,

1) Analgesia In stage 1, the patient becomes less aware of the pain, sometimes with anemia. Consciousness can be bad but not lost.
2) Surgical Anesthesia in Stage 2, the patient is unconscious and does not feel pain. Breathing is very regular, and blood pressure is maintained.
3) Disinhibition/ excitement In Stage 2, the patient looks funny and excited. Amnesia occurs, reflexes increase, and breathing is usually irregular. Stretching and irregularities can occur.
4) Medullary Depression In stage 4, the patient develops severe respiratory and cardiac depression that require mechanical and pharmacological support.

Q4) (a) what does heart failure means, explain the pathophysiology of heart failure

(b) Classify the drugs used for the treatment of heart failure, explain along with mechanism.

ANSWER…

What does heart failure means?

Heart failure means that the heart is unable to pump blood properly around the body. This usually happens because the heart has become too weak or hard. It is sometimes called heart failure, a heart attack does not mean that your heart has stopped working.

Explain the pathophysiology of heart failure,

Heart failure, the heart does not provide adequate blood tissues adequate for metabolic needs, and pulmonary or systemic vascular pressures can result in congestive heart failure. This condition can be caused by an abnormal state of systolic or diastolic function, or both. Although a basic abnormality may be a change in cardiomyopathy function, there are also changes in the collagen turnover of the extracellular matrix. Cardiac structural defects (e.g. congenital defects) abnormalities in rhythm (including heart rate), and high metabolic demands (such as due to thyrotoxicosis) can also cause heart failure.

Classify the drugs used for the treatment of heart failure, explain along with mechanism.

Beta blockers, (Classifying, drugs for the chronic failure)

Therefore these drugs normalize the sympathetic stimulation of the heart and help reduce the heart rate (negative chronotropic effect) and myocardial contraction force (negative inotropic effect).

Cardiac glycoside; (Classifying; positive inotropic drugs)

Increases Ca+, increases cardiac contractility

Diuretics (classifying, loop of diuretics ACE inhibitors nesiritide)

Diuretics work by preventing the restoration of sodium from the nephron, which, in turn, reduces the amount of water that is normally reabsorbed by sodium, thus increasing water excretion.

Q5) (A) Differentiate between broad spectrum and narrow spectrum antibiotics, classify antibiotic drugs
(B) Explain briefly the mechanism of action of antiviral agents.

ANSWER…

Differentiate between broad spectrum and narrow spectrum antibiotics,

Broad-spectrum antibiotics;

Broad-spectrum antibiotics work against a variety of strains and different bacterial forms that combine common structures and metabolic functions that can be attacked and induced to kill.

Narrow-spectrum antibiotics;

Narrow-spectrum antibiotics are more specific in their course and work against only a few bacteria as a more targeted approach.

Classification of antibiotic

Antibiotics can be classified into different types based on different classification methods. The first classification is by spectrum: Spectrum means the number of organisms affected by the same drug.

Spectrum antibiotics: Broad spectrum antibiotics affect a wide variety of bacteria and fungi and are commonly used where specific types of microorganisms are not known.

Narrow Spectrum Antibiotics: Narrow spectrum antibiotics are used only when we know the specific type of microorganism. They are more effective on certain microorganisms but less effective on others.

Bactericidal antibodies: They kill bacteria by inhibiting cell wall synthesis.

- For examples
- -Beta-lactam antibiotics
- -Cephalosporin

Bacteriostatic antibiotics: They limit the growth of bacteria by interfering with bacterial protein production, DNA replication, or other aspects of bacterial cellular metabolism. They need to work with the immune system to remove microorganisms from the body. However, there is not always a clear distinction between them and antibacterial antibiotics. Some bacteriostatic agents also cause high levels of disinfection, while some low levels of bactericidal agents cause disinfection.

Another classification is according to the chemical structure:

- Penicillin's such as penicillin and amoxicillin.
- Cephalosporin's such as cephalexin.
- Fluor quinolones such as ofloxacin levofloxacin etc.

- Sulphonamides such as co-trimoxazole.
- Tetracycline such as tetracycline and doxycycline (Vibramycin)
- Aminoglycosides such as gentamicin (Garamycin)

Explain briefly the mechanism of action of antiviral agents.

Unlike other antimicrobials, antiviral drugs do not inactivate or destroy microbes (in this case, viruses) but act by blocking replication. In this way, they prevent the viral load from reaching the point where it can lead to pathogenesis, which neutralizes the body's immune system.

The end