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Pharmacology I

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Q1no Define drugs receptors, enumerate different receptor families and explain the receptors that shows it effect through Second messenger System.

Receptors:- Receptors is a macromolicule in the membrane or Inside the cell that Specifically (chemically) bind a ligand drugs,

Receptor families:-

① Ligand-gated ion channels (inotropic receptors

② G-protein Coupled receptors (metabotropic receptors)

③ Enzymatic receptors.

④ Receptor regulating gene expression (transcription factors) or the nuclear receptor.

Explaination of the receptors that show it effect through Second messenger. System:-

G-protein Coupled receptors Shows its effect through Second massanengar Systems. They are Coupled to intracellular effectors through G proteins. G proteins are membrane proteins and have three subunits (α, β, γ) with GDP bound to α Subunit.

- G protein Coupled Receptors • Effector pathways and Second messangers.

G protein Coupled receptors (GPCRs) Control Cell function via adenylyl cyclase phospholipase C and Ion channels.

The agonist that ~~receptor~~ binds to the receptors is the first messenger. it results in the generation or recruitment of molecules (second messanger) that initiate that Signaling mechanism in a Cell. Examples of second IP_3-DAG (gererated by phospholipse C) nitric Oxide. etc.

Binding of agonist to Receptors → Coupling of G protein to the Receptors → GDP bound to α Subunit exchanger with GTP

↓

Dissociation of G-protein Subunits from occupied receptor: α GTP also dissociates from by Subunit

↓

↑ GTP and by subunits are released

↓

Bind to target enzyme / ion channale -

↓

Effect produced depends on the type of G protein (G_s, G_i, G_q and G_o) which associates with agonist occupied receptor (see below)

Stimulation of GTPase associated with α subunit

↓

GTP – GDP

↓

α associates with by subunit

... magnesium

... cyclines ... ...fere with ...

Q2:- Define drug Interaction enuerate its varius types, and explain pharmacolcinetic drug Interactions and its factors with example.

- Drug Interaction:- A drug interaction is a change in the action or side effects of a drugs caused by concomitant administration with a food, beverage, supplement or another drug.

Different types of drug interaction.

1. pharmaceutical Interactions:-
2. pharmacokinetic Interaction.
3. pharmacodynamic interactions.

- pharmacokinetic Interaction:- These occur when drugs alters the absorption, distribution metabolism or excretion of another drug.

- Absorption:- Antacids (containing aluminium, magnesium and Calcium) iron, etc Interfere with the absorption of tetracyclines by forming

unabsorbable Complexes with it.
Some drugs effect absorption of other drugs by altering gastrointestinal motility. Metoclopramide Increases the rate of gastric emptying and promotes absorption of aspirin.

- Distribution: plasma protein binding can Cause displacement Interaction. More than one with lower affinity This result in increase in Concentration of unbound drug eog Salicylates displace warfarin from binding Sites resulting in increased free warfarin levels and enhanced anticoagulant effect.

Metabolism: This occurs when metabolism and ~~Conding~~ of the drugs is Increased (enzyme Induction) or decreased (enzyme Inhibition) by another drugs eog Carbamazepine Induces that metabolizing enzyme of warfa-rin thus enhancing ~~Inhibits~~ its metabolism and leading to decreased anticoagulant effect.
Erythromycin inhibits the metabolizing enzyme of Carbamazepine and may Increase it toxicity.

- Excretion:- Most of them occur in the kidneys.
  - Salicylates interfere with the excretion of methotrexate and potentiates it toxicity
  - probenecid decreases renal tublur secretion of penicillins and prolongs duration of action of pencillins (beneficial Interaction).

Q3 Differentiate between general and Log local anesthesia. Explaing Stages of anesthesia in detail.

Differntiate between general and local anesthesia.

Features	Gen Anaesthsia	Local anesthesa.
Site of action	CNS	peripheral nerv
Area of body Involved	whole body	Restricted area
Consciousness	Lost	Unaltered
Care of vital function	Essential	ussually not neded
poor health patients	Risky	Safer
use in non Cooperative patients	possible	Not possible.
↑ Major Surgery	preferred	Cannot be prefere
Minor Surgery	Not preferred	preferred.

Stages of Anesthesia:-

There are four ↑ Stages of Ansthesia.

① Stage of analgesia:- The patient is conscious but drowsy.

② Stage of excitement:-

- patient losses consciousness
- Sympathetic activity is increased.
- ↑ Heart rate (HR)
- ↑ blood preassure (BP)
  pupils are dilated
  muscle tone is increased breathing is irregular.

③ Stages of surgical anesthesia.

- Respiration becomes regular
- Muscle relax
- Reflexes are gradually lost
- Intercostal muscles are paralyzed.

④ Stage of medullary paralysis.

Pispiration and vaso motor centre are depressed death occours with in a few minitues.

Q4:- a) what does heart failure means explain the pathophysiology of heart failure.

Heart failure:- Heart failure is a patho pathophysiologyical state in which the hurst is unable to pump sufficiently to maintain blood flow to meet the body needs.

pathophysiology of heart failure:- Heart failure is caused by any condititon which reduces the efficiency of the heart muscle through damage or ~~oreld~~ overloading. Over time these increase in workload which are mediated by long term activation of neurohormonal System leads to fibrosis dilation and structural change in the shape of the left ventricle from ~~of~~ elliptical to spherical.

The heart of a person with heart failure may have a reduced force of contraction due to overloading of the ventricle In a normal heart increased filling of the ventricle. In a nurmal heart, Increased Contraction force by the Frank-Straling law of the heart and thus an rise in Cardiac output In heart muscle Contraction becomes less efficient. This is due to reduced ability

to cross link actin and myosin filaments in over stretched heart muscle.

(B) Classify the drugs used for the treatment of heart failure explain along with mechenism.

① Diuretics:- They promote Na^+ and water excretion thus decresss preload on heart.

② Vasodilators:- They decresses both preload and after load on ~~heart~~ heart.

③ Beta Adrenergic Blockers:- They reduces the heart rate and thus reduces the oxygen demond of the heart.

④ Sympathomimetic amines:- They provide Symptomatic relief in patient with ventricular dysfunction.

⑤ Cardiac glycosides:- They Increasecte aviablity of Ca^{2+} for excitation — Contraction Coupling thus increasing myocardial Contractility and Cardiac output.

Q 5:- (a) Differentiate between broad spectrum and narrow Spectrum antibiotics classify antibiotic drugs.

Difference

~~Difference~~ between narrow and broad Spectrum Antibiotics:-

- Narrow antibiotics can only fight & against certain types of bacteria.
  eog:- penecillins, aminoglycosides

- Brod Spectrum antibiotics are effective when used against many different types of Bacteria.
  eog:- Tetracyclines
  Chloramphenical

(B) Explain briefly the mechanism of action of antiviral agents

Mechanism of action of antiviral agents:-

① Drug use against herpetic Infection.
~~eog Ay Asy~~

eog Acyolovir
it in habbit viral DNA synthesis.

(2) antiretroviral agents:-
These drugs after entering HIV infected cells are converted to their active triphosphate forms by cellular kinases and competitively inhibits HIV reverse transcriptase. They get incorporated into the growing viral DNA and cause termination of chain elongation of proviral DNA

(3) Antiinfluenza agents :-
For example:- Amanatadine. it interferes with the release of infectious viral nucleic acid into the host cell through interaction with the transmembrane domain of the M2 protein of the virus.

(4) Interferons:- Antiviral activity of interferons is due to the inhibition of viral penetration, synthesis of mRNA, translation of viral proteins, assembly of viral particles and their release.

⑤ Ribavirin: it Competitively Inhibits the viral ~~mRNA AA~~ mRNA Synthesis.