

Pharmacodynamics of Drugs in Relation to Human Body

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Abstract- *Pharmacodynamics shows what a drug does to the human body. It also involves receptor binding, postreceptor binding and chemical interactions. “Pharmaco “means “drug” and “dynamics” means “power”. There is another term called pharmacokinetics, it explains how the body processes the drug. It is mainly focused on the drug and the body. But pharmacodynamics shows the interactions between the drugs and the pathogen (which is responsible for the infection in the patient) present in the human body. Primary pharmacodynamics is based on the mode of action of drugs and effects in relation to its desired therapeutic target. Nowadays, pharmacodynamics is in pain management also. Their mechanism of action on the microorganism and other parasites within or on the body. There are several mechanisms (pharmacodynamics) by which drugs can interact as pharmacokinetics (absorption, metabolism etc..) or may be combined interaction. Pharmacodynamics shows the response of the body to the drugs given. It gives the relation between the concentration of the drug and the resulting effects on the body. Toxicodynamic is the toxicological part of pharmacodynamics. Both are important since the drug given to the patient lowers the serum concentration in the body. Here we can see the overview of the action of drugs.*

Indexed Terms- *Pharmacodynamics – toxicodynamic – pharmacokinetics – drug interaction – micro-organism – parasites – metabolism – drug interaction – receptor – target protein – post receptor.*

I. INTRODUCTION

Pharmacodynamics shows how the drug given impacts the body and the patient body. In the field of pharmacology, pharmacodynamics is the study of biochemical and molecular effects of drugs on the

human body and also it involves receptor binding and some chemical interactions. In relation with chemistry, it refers to the relation between drug concentration at the site of action and some resulting effects such as, intensity and time course and adverse effects. As a scientist or being a person, one must able to create things, rather than being destructive. They do not provide any new changes they just alter the phase of change in the ongoing process. The actions of drugs can include process such as stimulation, replacement, cytotoxic effect, depression, irritation. For example: adrenaline stimulates the hear cells, barbiturates depress the CNS, iron replaces for anemia, some are selective on parasites or cancer cells- penicillin, cholroquine. Mechanism of drug action includes enzymes, ion channels, transporters and receptors.

II. MECHANISM OF DRUG ACTION

It involves five types of functional proteins. Enzymes are very important functional protein in drug action. All biological actions occur through enzymes. Natural metabolites and secondary messengers are the two enzymatic stimulation. For example: adrenaline with the help of beta receptors and cyclic a and b increases the activity of hypatic glycogen phosphorylase. enzymatic reaction occurs in two ways enzyme induction and enzyme inhibition. Enzyme inhibition is the denaturation of proteins. There are two types competitive and non-competitive type. Competitive inhibition is equilibrium type, in which the drug and the substrate are structurally similar competitive to bind in the enzyme. Here the rate constant k is increased and maximum velocity Vmax is unchanged. If the concentration of the substrate increases it displaces the drug and the velocity is attained. Then in non-equilibrium type the drug and the substrate have same affinity to the binding site. the drug forms the covalent bond with the binding site, the affinity is more. The rate constant increases while the maximum velocity reduces. There is non-equilibrium reaction

hence they lose catalytic property. Ion channels are present between the membrane. They act as the receptors, in which the drug binds and affect the in and out movement. For example: local anesthesia that obstruct the sodium channel. Transporters are specific membrane carrier. Receptors are macro molecule or binding site located on the surface that serves to recognize the signal molecules. But itself has no other function. Agonist activates the receptor. There are 2 theories receptor occupation theory and two state receptor model.

III. ACTION EFFECT SEQUENCE

Drug action – initial combination of drug with its receptor. Drug effect is the consequence of drug action. They are seen through transducer. Receptors of the drugs have two functions namely, recognition and transduction. Recognition of specific ligand molecule, transduction of signal into response. Transducer mechanism – G-protein coupled receptors, there are seven helical amino acid structure with six loop. There is a agonist finding site. It floats in the membrane, it has a exposure in the cytosol. They have alpha, beta, and gamma subunits. There are 3 major pathways in this they are, adenylylase, phospholipase and channel regulation.

IV. SYNERGISM AND ANTAGONISM

This is the combined effect of drugs. Syn – “together” ergon – “work”. When the action of one drug is facilitated by the action of other drug, it is called synergistic drug pair. In this both drugs have action in same direction or one enhance action of other drug. There are two types, additive and superadditive synergism. In additive, the effects are just added. In superadditive, the effects are greater than the effect of individual component. Antagonism, the action of one drug decreases the effect of the other drug. This is the antagonist pair. In this one drug is inactive. There are 4 types of antagonism. It all explains the properties of the drugs we used.

CONCLUSION

The ongoing study of pharmacodynamics and drug interactions in person is critical for the development of safe and effective therapies and to prevent the adverse

drug reactions. The action and effects of drug in the body is identified then replaced by other without any side effects. Pharmacodynamics is also involved in pain management.

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