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pharmacodynamics part 1

Drug sources

The drugs can be obtained from :

1-nature : soil , animals , plants ,microorganism like Bacteria , from our_self like hormones that can be extracted from urine.

-90% of drugs come from plants . In the past all the treatments were depend on plants (herbs) , by the time we came able to extract the active ingredients from the plant and converted them to drugs (we converted the herbal medicine to pharmacology). ex: in the past the people used the poppy to reduce the pain because it has morphine but in 1800-1905 pharmacologists extracted the morphine from poppy .

2-synthesis .

Now ,what is the difference between herbal medicine & pharmacology ?

The herbal medicine depends on plant so patient take all the ingredients that present in it , these ingredients could be harmful or useful . Whereas in pharmacology the patient takes only the active ingredient .

*Herbal medicine is not preferred as pharmacology, because herbal medicine isn't standardized but the pill is standardized (we know the amount of active ingredient).Also, herbal medicine doesn't be considered as drugs because the side effects not known and it isn't allowed to be tested on human beings .

Drug Naming

When you enter the pharmacy to buy drug like paracetamol , you will find on rack paracetamol , panadol , revanin . All the previous names are related to the same drug (500 mg of paracetamol) but depend on the manufacture company .

Every manufacture company synthesized drug give it name which is written in large font and called trade name. There is another name

written below the trade name and called scientific name or generic name which is protected from 15-20 year by world trade organization .

Over the counter drug (OTC drugs)

OTC drugs can be taken without prescription and the pharmacist just take money .ex of these drugs : paracetamol , iburofen , antibiotics ,and analgesic drugs.

Note: OTC drugs not safe drugs & they may harm the patients like the patient with peptic ulcer if he take iburofen , it will lead to bleeding.

Mechanism of drug action

Most of drugs exert their effects by interacting with specialized target micromolecules receptor thar present on cell surface or intracellular . The receptor will transduce the signal to response by causing conformational changes or chemical effets.

The patient swallows the pill by mouth > stomach > upper part of duodenum where the most common absorption site in the body > bloodstream > receptor > drug_receptor complex > response could be activator or inhibitor (action).

The receptor has 3D shape .There are two fundamental property underlying specificity of drug_receptor interaction are :1- complementary of shape and charge between drug & receptor , 2- and complementary between electrostatic , hydrophobic , and H_bonding of each component .

-There are some drugs that form 1% of all drugs don't required receptors like rennie . The rennie is antacid drug which used in case hyperacidity . The patient takes rennie that contains base like Al(OH)3 or Mg(OH)2 , the base neutralize the excess amount of acid in stomach . So this mechanism doesn't required receptors. Another example , patient with poising , he will take osmotic diuretic drug by vein . This drug increase the osmolarity in kidney and kidney withdraws the water & toxins out of the body .

Example of drug requires receptor that form 99% of all drugs :

If I want to increase hearts beats (in normal case the adrenaline is responsible to do this job), I will give the patient **dobutamine** . This drug binds to β 1 receptor (adrenaline receptor) and activated it. So , by increasing the numbers of ligands that can bind with β1 receptor the heart beats increase. on the other hand , patient has tachycardia you will give him **propranolol** which is β blocker receptor .

Note: we have activators and inhibitors in our bodies that called endogenous material (activators are more percentage than inhibitors) . Pharmacologist try to mimic these molecules or to block the action of endogenous material .

Note: endogenous material doesn't bind permanently with receptor so once the chance for drug to bind with receptor will exploit it.

سنينُ الجَهدِ إن طالت ستطوى
لها أمدٌ وللأمد انقضاءُ
لنا بالله آمالٌ وسلوى
وعندَ الله ما خابَ الرّجاءُ
أمـانينـا لهـا ربٌ كريـم
إذا أعطى سيُدهشنا العطاء