pharmacology

◉ Sheet ○ Slides

number : 1

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correction : 2 records are enough

Introduction to Pharmacology

Drugs have effects and side effects , pharmacology we attempt to balance between them

Medicine is based on 1- diagnosis and 2- prescribe medication which depends on pharmacology

Slide #2

Drug: It is any chemical[1] that affect living processes. It modifies an already existing function, and does not create a new function[2] .

[1] : In other words it is any toxic material - because it's not endogenous- and toxicity depends on dose (جرعة)

[2]: drugs modify (increase / decrease) or enhances an existed function and don't create a new one . example : when the heart rate is low we raise it

Slide #3

Pharmacology: The science of drugs.

It is the knowledge of history, source, physical and chemical properties, absorption, distribution, excretion, biotransformation, actions and therapeutic uses of drugs. (or toxic effects on microbes and cancer cells).

In other words pharmacology is the study of drugs from the moment when you would give a tablet (قرص دواء) to a patient , until it comes out of his body

Pharmacology includes toxic effects because they are actions in our bodies

Pharmacology includes 2 major functions :

1) The effect of drug in the body = pharmacodynamics (actions and therapeutic uses) التأثير الدوائي
2) How does the body deal with the drug = pharmacokinetics (absorption, distribution, excretion …) حركية الدواء

Slide #4

Medical (or Clinical) Pharmacology:

Is the science that deals with the use of drugs for diagnosis, prevention , mitigation, and treatment of human disease. Here we are concerned in the medical effect of the drug not in how the drug is produced or discovered .

Slide #5

Pharmacy:

Is that branch of the health sciences dealing with the preparation, dispensing, and proper utilization of drugs. It is how to use Pharmacology in population , preparing and giving drugs by proper utilization means putting drug in the appropriate usage .

Doctors make diagnosis and prescribe medication but pharmacists don't diagnose patients . instead , they may change the drug that the doctor suggested. Ex : the doctor gave a child a tablet drug but the pharmacists changed it to oral or syrup .

Doctor of Pharmacy (Pharm.D) : is needed in the huge production of drugs . he combines the huge knowledge which is found in the pathophysiology of the disease with the drug .

We combine many resources of knowledge to write the best prescription (وصفة دوائية)

Slide #6

Toxicology:

Is that aspect of pharmacology which deals with adverse effects of drugs and the toxic effects produced by household, environmental and industrial chemicals.

Slide #7

Clinical Toxicology:

Is the study of the toxic or adverse effects of toxins on the human body, including the diagnosis and treatment of human poisoning.

It is concerned in toxins which is produced from drugs , not from environmental and industrial chemicals. Ex : Biological weapons such as sarin gas

In medicine we study Clinical pharmacology and Clinical Toxicology

Analytical toxicology:

Is a branch of analytical chemistry concerned with the measurement of toxic chemicals in biological and environmental materials.

Ex : we test doping (منشطات) in blood and addicted people by Clinical Toxicology

Forensic Toxicology: الطب الشرعي المعني بالسموم

Deals with the medico-legal aspects of toxicity. It is concerned with <u>proving</u> the relationship of the health condition of the patient (including death) with a particular poison.

Environmental toxicology :

Deals with the movement of toxins into the environment and contamination of food chain.

Industrial toxicology is a specific area of environmental toxicology that deals with the work environment which is part of industrial hygiene. Such as in factories .

<u>Slide #11</u>

Pharmacotherapeutics: التداوي

Is the use of drugs in the prevention and treatment of disease (or the medical uses of drugs).

Chemotherapeutics:

Is the use of drugs to stop the growth or kill microorganisms or cancer cells (not to reduce a disease like in Pharmacotherapeutics)

<u>Slide #12</u>

If a population of people were given an identical dose of drug, different responses will appear due to factor include genes (called : interindividual difference in drug response)

Pharmacogenetics:

Interindividual variation in drug response that is due to genetic influences (specific gene).

Pharmacogenomics[1]:

The relation between the individual's genetic makeup to his/her response to specific drugs (entire genome).

[1]Genome is the whole genetic makeup of the subject (not only 1 gene)

Terms

Prescription: the written direction for the preparation[1] and the administration of the drug .

[1] dispensing drugs in its appropriate form : oral , injection , intranasal …

The therapeutic effect: (it is the desired effect)

It is the primary effect that the drug is prescribed for such as morphine for analgesia.

Adverse effect: = side effect (we should use 'adverse' in order to show its seriousness –it could be fetal)

It is the undesirable effects of the drug.

There are now drug without a side effect

When the therapeutic effect outweigh the side effect we prescribe the drug

When the side effect outweigh the therapeutic effect we don't prescribe the drug

It differs between adults , children and elderly people (some side effect of drugs outweigh the therapeutic effect for children or elderly people but not for adults)

Drug-Drug interaction: التداخلات الدوائية

When administration of one drug affect the action of another drug, or when co-adminstered drugs affect the action of each other.

we are very reluctant to give an elderly patient a new drug because of Drug-Drug interaction . this patient who takes many drugs is called polypharmacy patient .

Drug-Drug interaction may be beneficial in reducing a drug side effects .

doctors must know the drug's effect , side effect and Drug-Drug interaction .

As we mentioned , toxicity depends on dose and the concentration of the drug in the plasma which depends on drug interaction

Drug misuse: is related to people mistakes which end up with health problems

People who misuse drugs don't tend to harm them selves so it's not a crime in law . such as antibiotic misuse

' Is the improper use of medications concerning dose, frequency, and duration of administration; or unvalid indication. All may lead to acute and chronic toxicity '

Ex**:** some ladies , to relieve the pain associated with their household activities, use ibuprofen. This drug on long term use is associated with hepatic or renal problems ,that's why these ladies should be advised to avoid long term use or over dosage (i.e misuse).

Drug abuse: is related to drugs addiction

' It is an inappropriate and habitual intake of drugs either continually or periodically for recreational but not medical reasons.' Such as smoking and alcohol abuse (which we know their bad effects)

Tolerance:

Is a decrease in the responsiveness to the drug with continued drug administration . So " don't consider a pill for every ill "

Ex : high usage of asthma sprayer

Tachyphylaxis:

Similar to tolerance but more rapid. Occurs in minutes or hours .

Idiosyncratic drug response:

<u>Unusual response</u>, infrequently observed in most patients. Usually caused by genetic differences in metabolism of drug, or by immunologic mechanisms including allergic reactions . so you have to monitor your patient .

Pharmacokinetics:

Is what the body does to the drug.

Deals with absorption, distribution, biotransformation and excretion of drugs:

1. **Absorption:** Is the movement of drug molecules from the site of administration into the circulation.
2. **Distribution**: Is the movement of drug molecules from the circulation to tissues and between different parts of the body.
3. **Biotransformation:** Is conversion of the drug from one chemical structure into another by the action of metabolic enzymes (metabolism).
4. **Excretion:** Is the movement of drug molecules out of the body.