What is Pharmacology?

Pharmacology is the science of drugs; it studies the effects and fate of drugs within the body. It is a vast discipline that encompasses the study of drugs from their development to their use after being marketed. Pharmacology includes, among other things, the study of the mechanism of drug action, defining its conditions of use, and evaluating its effectiveness and safety. More specifically, pharmacology includes:

Pharmacodynamics: which studies the mechanism of drug action.

Pharmacokinetics: which studies the fate of the drug in the body.

Experimental pharmacology: which studies the effects of drugs in vitro or in animals.

Clinical pharmacology: which studies the effects of drugs in humans. It evaluates the effects of a new drug in humans during clinical trials aimed at obtaining market authorization (MA). It continues after the drug is marketed by optimizing the use of certain drugs and monitoring adverse drug effects (pharmacovigilance).

Pharmacovigilance: which aims to detect, evaluate, understand, and prevent adverse effects that may occur when using a drug in a population after it is marketed. Pharmacovigilance centers provide physicians with independent information on drugs for issues such as specific usage conditions (pregnancy, renal insufficiency, etc.).

Pharmacogenetics: which studies the genes involved in drug metabolism or drug effects. It examines genetic variability in drug response.

Pharmacoeconomics: which evaluates all the medical-economic consequences attributable to drug use.

Pharmacoepidemiology: which assesses the effectiveness and risk of drug use in large populations. ---

What is the Purpose of Pharmacology in Medical Studies?

The objectives of pharmacology are to learn, understand, and apply the rules of proper drug use. It allows:

Establishing an appropriate drug prescription and justifying the choice of therapeutic medication. Explaining to patients the mode of action of prescribed drugs, their demonstrated benefits, and potential risks. Enabling medical practice for doctors. Analyzing and understanding data on new drugs. ---

What is a Drug?

Article L 115 of the Public Health Code defines a drug as follows: "A drug is any substance or composition presented as having curative or preventive properties for human or animal diseases, as well as any product that can be administered to humans or animals to establish a medical diagnosis or to restore, correct, or modify their organic functions."

--- Drug Naming

A drug has a chemical name, an International Nonproprietary Name (INN), and a brand name (commercial name). Example:

Chemical name: corresponding to the chemical formula, such as acetylsalicylic acid. International Nonproprietary Name (INN): aspirin.

Brand names: Aspegic\*, Kardegic\*, etc. The INN of the active molecule is assigned by the WHO following general guidelines that allow grouping products belonging to the same pharmacological class with similar-sounding names. For example, the INNs of proton pump inhibitors end in “prazole,” while those of protease inhibitors end in “navir,” etc. The brand name, or trade name, is defined when the molecule is marketed and may differ between countries. ---

Drug Classification

Drugs are classified according to their therapeutic effects and sphere of action into therapeutic classes. Within these therapeutic classes, there are several pharmacological classes. For example, the "anti-inflammatory" therapeutic class is divided into two pharmacological classes: steroidal anti-inflammatory drugs and non-steroidal anti-inflammatory drugs. ---

Receptor A macromolecule, often of protein nature, that interacts with an endogenous chemical mediator or a drug substance to generate a biological, pharmacological, or therapeutic action.

Formula: M + R ↔M-R → Therapeutic Action → Therapeutic Effect M: drug R: receptor M-R: drug-receptor complex T: therapeutic ---

Exercise 1:

Match the Term with the Definition Match each pharmacological term with its correct definition: 1. Pharmacodynamics

2. Pharmacokinetics

3. Pharmacovigilance

4. Pharmacogenetics

5. Pharmacoepidemiology

Definitions:

a. Study of genes involved in drug response and metabolism.

b. Study of the mechanism of drug action.

c. Monitoring and assessing adverse drug effects post-market.

d. Study of drug distribution and breakdown in the body.

e. Evaluation of drug effectiveness and risks in large populations.

--- Exercise 2:

Fill in the Blank Choose the correct term from the list below to complete each sentence.

Terms: pharmacology, receptor, clinical pharmacology, pharmacodynamics, therapeutic.

1. \_\_\_\_\_ is the science that studies the effects of drugs on the body.

2. A \_\_\_\_\_ is a protein that interacts with drugs to produce a biological response.

3. \_\_\_\_\_ examines the effects of drugs in humans, usually during clinical trials.

4. The \_\_\_\_\_ effect is the intended positive outcome of a drug.

5. \_\_\_\_\_ focuses on understanding how drugs act at the molecular level. ---

Exercise 3:

Synonym Match Match each term to a synonym or similar phrase.

1. Therapeutic

2. Adverse

3. Evaluation

4. Prevention

5. Variability Words/Phrases:

a. Diversity

b. Treatment

c. Protection

d. Negative

e. Assessment ---

Exercise 1

: Sentence Transformation Rewrite each sentence in the passive voice.

1. Pharmacologists study the mechanism of drug action.

2. Pharmacovigilance detects and prevents adverse effects in patients.

3. Researchers analyze drug efficacy and safety.

4. The WHO assigns International Nonproprietary Names to drugs.

5. Physicians prescribe medications based on the drug's therapeutic class. ---

Exercise 2: Complete the Sentence Complete each sentence by choosing the correct verb tense: present simple, present continuous, or present perfect.

1. Pharmacologists \_\_\_\_\_ (study) how drugs interact with the human body.

2. Currently, clinical pharmacology \_\_\_\_\_ (evaluate) new drug effects in trials.

3. Scientists \_\_\_\_\_ (analyze) genetic variability in response to medication over recent years.

4. Pharmacovigilance \_\_\_\_\_ (detect) any adverse effects after a drug is marketed.

5. The pharmacology team \_\_\_\_\_ (focus) on optimizing drug use in specific populations. ---

Exercise 3: Formulate Questions Create questions for the answers given. 1. Answer: Pharmacodynamics studies the mechanism of action of drugs. Question: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_? 2. Answer: A receptor is a protein that interacts with drugs to generate an effect. Question: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_? 3. Answer: Pharmacoepidemiology assesses drug effectiveness in large populations. Question: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_? --- Let me know if you'd like answers or additional types of exercises.