



Medical Committee  
The University of Jordan



# PHARMACOLOGY

**Lecture No.:** 8

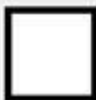
**SHEET**



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**SLIDES**





## PHARMACOLOGY

### A Word from the Doctor...

“Talk, play, do whatever you want, just be quiet about it.

I will give you 6 to 7 lectures, and then I'll come back to your antibiotics later on. Pharmacology is the most beautiful subject you will take. But, Pharmacology is Medicine, and Medicine is pharmacology. The relationship between you and your patients is drugs. It is complicated, yet simple. However, it requires a lot of memorization. We must understand and know all drugs. When taking histories, we must ask for previous drugs taken in the past. Pharmacology is essential in systems. Antibiotics are dealt with in 2<sup>nd</sup> year and have many clinical applications. We will suffer a bit, but we'll simplify it”

We took pharmacokinetics with Dr. Yaqoub, and a brief overview of that:

Taking a drug orally, goes to stomach, the stomach affects the drug (due to high acidity, whatever), the drug ends up in the duodenum, here is where most absorption occurs. Also, it is here where humans vary in absorption (first line in variation). Afterwards, the drug enters the blood stream, held on to by carriers in the blood like albumin. The drugs go to the tissues. They also go to the liver, where they undergo the first pass metabolism by Cytochrome p450. They leave the liver as active drugs and go to the tissues where they have a dynamic effect. (what the drug does to the body, the action) whereas kinetics is what the body does to the drug.

We vary in absorption, metabolism, and elimination of drug. So don't be shocked when you give two patients -who have the same disease- the same drug, same dose, same time, and one of them responds but the other doesn't.

\*\*This lecture is an introduction to our 6 lecture course with Dr. Malek. Its mainly easy-to- memorize terms and definitions, and the Doctor himself said they weren't too important, so make yourself a

cup of tea and enjoy :3

### **Slides 1-12**

Pharmacology is a keystone for prescriptions:

What **dose** (proper dose), how drug is **delivered** (intramuscularly, orally, IV, subcutaneously or sublingual), and what **time** it should be taken

You have to know these to be able to prescribe a drug, which is why you have to master pharmacology.

Ex. You can't prescribe tablets for a 4 yr old toddler.

"Forget marks people, all of you are gonna pass, our questions are easy, we want you to understand pharmacology."

### **What is pharmD?**

These people double check our prescriptions to be able to prescribe the best drugs at the best time.

They talk to patients about the prescribed drug. They also educate them on how to use them, and how to stick with them

Do you know, that 50% of all inhaler users in Jordan don't know how to use them?

Another story, quite recently, three months ago, a woman died from warfarin overdose. Her doctor prescribed 5mg for her when she should have only taken 3. This is a huge mistake.

PharmD would stop this and double check to make the drug is taken correctly.

They also catch drug-drug interactions, but most importantly they help doctors.

### **Drug:**

Used to treat patients with disease

### **Medication:**

A substance administered for diagnosis, cure, treatment, and prevention

Any intervention from outside patient's body. It includes diagnostic testing like giving a patient a pigment that is seen better with rays.

### **Prescription:**

The written direction for the preparation and the administration of the drug.

### **Therapeutic effect:**

The primary effect intended by the drug prescribed. For analgesia, we use profen. However, profen can cause epigastric distress (this is a simple adverse side effect) If the patient has ulcers, we shouldn't

give profen as the risk is greater than the effect of the drug, because this would cause bleeding in the stomach.

**Side effect:**

Secondary effect of the drug is one that is unintended and undesirable. Side effects are usually predictable and may be either harmless or not harmless.

100% of drugs have effects and side effects. The trick is to balance between them.

If the side effect is greater than the active drugs effect, then we shouldn't give a prescription

If the effect is greater than the side effect, then we should prescribe it.

Ex. Cancer.

We don't give normal patients anticancer drugs because anticancer drugs have severe side effects. But for cancer patients with life threatening situations, we must use drug since we have no other option.

**Drug toxicity:**

Deleterious effect of the drug on an organism or tissue, resulting from an overdose or external use. What is the difference between side effects and toxicity?

Toxicity is HUGE (toxic), side effects are small. For example morphine will produce respiratory depression (death), this is toxicity. Morphine also has some side effects that do not affect the patient's health.

**Drug Interactions:**

Occurs when administration of one drug before or after alter effect of one or both drugs.

Patients in Jordan are called "poly-pharmacies" This means they take more than 6-7 different drugs at the same time. These drugs all have many interactions with each other.

Don't hesitate to research a drug and its interactions with other drugs using the internet.

The drug's leaflet has everything on it.

**Drug Misuse:**

It is the improper use of common medications in a way that leads to acute or chronic toxicity.

Ex. A pregnant lady taking a drug that shouldn't be taken during pregnancy.

Ex. Taking hypnotic drugs for more than the prescribed period.

The patient shouldn't take excess of the drug, but he doesn't know.

Therefore this is unintentional.

### **Drug Abuse:**

This is an inappropriate intake of a substance either continually or periodically.

Ex. A heroin addict who steals from everywhere to get his drugs.

This is bad. It results from addictions, which starts with curiosity and ends with death. Your job as a doctor is to teach your patients and advise them to stay away from these addictives.

Here in Jordan we have many cases of addiction and drug abuse, like cocaine in Abdoun, marijuana in the University of Jordan, and even mu5ayyam al Hussein.

You, as a doctor, not only save lives, but you must teach life as well.

### **Drug Dependence:**

It is a person's reliance on or need to take a drug or substance.

Depending on drugs is very, very, very bad.

There are 2 types of dependence:

1- **Physiological:** This is due to biochemical changes in the body tissue which come to require substance for normal function. This can be treated easily by giving continuous doses, but each time less and less.

2- **Psychological:** This is emotional reliance on a drug to maintain a sense of wellbeing accompanied by feeling of need. It's a big problem.

Like smoking ALL THE TIME. When you're happy, when you're sad, after you wake up, when you sleep, after your meal, with your coffee, "cigarit al zafar". You can't be happy without it, its linking your life to a drug.

Also, mostly in western cultures, alcohol. Alcohol is such a deeply embedded drug in their cultures nowadays that they can't have any occasions without it.

You'll find the patient often saying, "I can't be happy without my pill."

### **Drug Naming:** 3 different names for each drug

1- **Chemical name:** This describes the chemical structure (not too important to us) Yir7am ayyam al organic. Hasan ma t3ok 3al nas - Haddadin.

2- **Generic:** A name assigned to drugs that can be used by anyone. (not proprietary)

3- **Trade name:** Proprietary name given to the drug by the



manufacturer.

*Proprietary*: noun. Belonging to an owner or company.

Ex. The drug Advil. Advil is the trade name, profen is the generic name.

In pharmacies, both the trade and generic names are used (ideally).

In Jordan, we only use the trade names.

We shouldn't use trade names because of marketing issues, because crooked doctors only support the drugs they prescribe, and when they do prescribe them, they get compensated.

To get out of any conflicts of interest, you should only write the generic name and leave the trade name for the pharmacist. So just write ibuprofen and the pharmacist will do the rest.

The safest drug is Paracetamol (generic) also commonly known as panadol (trade).

HOWEVER the most dangerous drug is also paracetamol.

How? Well it's extremely safe in the recommended doses, but taking too many pills (12) will result in liver toxicity, so be careful.

### Over the counter drugs.

Drugs without prescription. These drugs are a big problem. They

Table 1-1 EXAMPLES OF DRUG NOMENCLATURE		
Chemical	Generic (Nonproprietary)	Trade/Brand-Name (Proprietary)
<i>N</i> -Acetyl- <i>p</i> -aminophenol	Acetaminophen	Tylenol, Panadol, many others
3,4-Dihydroxyphenyl-L-alanine	Levodopa	Larodopa
5,5-Phenylethylbarbituric acid	Phenobarbital	Luminal, Eskabarb
7-Chloro-1,3-dihydro-1-methyl-5-phenyl-2H-1,4-benzodiazepin-2-one	Diazepam	Valium

aren't controlled, which means that anyone can take them without telling their doctor or pharmacist.

This problem is worldwide. OTC drugs (over the counter) are not necessarily safe to use, and abusing them can be fatal. They are not free from drug-drug interactions, and they have their side effects. Example: a patient has hypertension, profen and voltaren -which are over the counter drugs- reverse the activity of anti-haypertensive drugs by drug-drug interactions.

When taking a patient's history, be sure to ask them, "Do you take any drugs other than those prescribed to you?" "But be cautious, Jordanian patients will always be smarter than you".



### **Mechanisms of Drug Action:**

How do drugs perform their action?

We have receptors in our body. Everything has activity, due to receptors in our body. The drugs cause effects by interacting with these receptors. Receptors can be found both on the cell surface and inside it.

Agonize: means to stimulate/activate (you'll mimic the activity of the receptor)

Antagonize: Deactivate/inhibit activity of receptors. (you'll stop the activity of the receptor)

Endogenous Ligands: These are substances in the body of the patient that bind to receptors and either activate or deactivate them. Our bodies depend on balances between sympathetic and parasympathetic systems.

Neurotransmitters or endogenous ligands either activate or inhibit. Pharmacology is designing a drug that either mimics endogenous ligands or performs the opposite effect of endogenous ligands. Stimulation by mimicking ligand, and inhibition by preventing its action.

Receptors are large 3D shaped macromolecules found both extra and intracellularly.

Binding of drug to receptor will change the properties of the receptor, along with its shape. The binding will be transduced into a response by a change in shape (conformational changes) or biochemical effects. This process is called the transducing coupling between the drug and the receptor that ultimately results in our desired therapeutic effect.

It's simple. When we want to inhibit, we design a drug to block the receptor. (antagonize)

When we want to activate, we design a drug that will bind to the receptor. (agonize)

“This. Is. Pharmacology.”

“You will never win if you never try.”



Best of luck people ☺

By: Hasan Hammo.