Pharma lecture 2 summary
Pharmacodynamics

Done by: Abd Al Rahman Musa

DOPAMINE
SCIENTIFIC TEAM

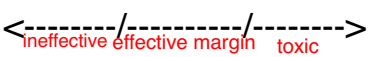
وَتَوَكَّلْ عَلَى الْحَيِّ الَّذِي لاَ يَمُوتُ وَسَبِّحْ بِحَمْدِهِ ۚ وَكَفَىٰ بِهِ بِذُنُوبِ عِبَادِهِ خَبِيرًا

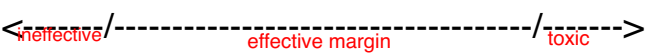
What is the pharmacodynamics ?

the study of how the drug exert their effect on body ---> mechanisms of actions such as : drug-receptor interaction (very specific)

dealing with the drug includes —>
predicting doses for different patients (age, gender, **history of diseases**)

concept of the therapeutic window/index :





why is this better ?
lower risk = بالمنطق

Therapeutic Index (TI):The ratio between the toxic dose and the therapeutic dose of a drug.

- Wide TI: Safe drug (e.g.,penicillin).
- Narrow TI:Narrow safety margin (e.g., warfarin).

Potency : strength of the drug

Ex: the potency of 1mg of strong drug > the potency of 1mg of weak drug

However, strong drugs have narrower therapeutic windows,

Drug-receptor interactions :

drug + receptor = effect ,

Where can it happen? -->

1) on the cell surface

2) intracellular

Why do we like drugs that bind to **specific receptors** on **specific organs**?

1) it will be more specific

2) reduced side effects (simply because it wont affect other organs)

Ex: some breast cancer and prostate cancer drugs

Ex for drugs that binds to many organs : Revanin and Panadol

affinity vs efficacy vs potency

Affinity = how well the **drug binds**.

Efficacy = how well the drug works **after binding**.

Potency = **how much** drug you need **to see an effect**.

Type of receptor	Ion Channel Receptors	• G-protein Coupled Receptors (GPCRs	Enzyme-linked Receptors	Intracellular Receptors
Example	GABA,nicotinic receptors	adrenergic receptors, morphine	insulin receptors	steroid hormone receptors
Extra info	based on attraction between positive and negative charged.			Steroid hormones include estrogen, progesterone and testosterone. The drug must enter the cell in order to bind to the receptor

Before going into the Agonists, Antagonists, and Partial Agonists concepts , we need to know the following :

The purpose of pharmacology : return pathology --> to physiology

How ?

Simply by using specific drugs to cure certain conditions

Ex:

atherosclerosis --> cause plastic vessels --> no stretch + more pressure --> explosion

solution : block B1 receptors --> reduce heart contraction --> back to the normal physiological state

	Agonists	Antagonists	Partial Agonists
Definition	Adrug thatbinds to a receptor and activates it	A drug that binds to a receptor and blocks it	A drug that binds and partially activates a receptor
Example	Adrenaline, β2 stimulants in inhalers	beta-blockers	buprenorphine
Extra info	They do the same effect of adrenaline	They do the opposite of what adrenaline does	Remember the **Efficacy** concept

Note : B1 molecules act on heart

B2 molecules act on respiratory system

Drug Interactions:

1) Synergistic effects (when drugs enhance each other)

-positive effect mainly- (sometimes can be negative)

Simple explanation : both help each other in order to perform the desired goal

Ex:

salt + antibiotics

carbidopa + levodopa

2) Antagonistic effects (when drugs oppose each other)

-negative effect-

What is the biggest triggers of drug-drug interactions ? -->

Alcohol ,

Why?

Eliminating the effect of antidepressants and oral contraceptives

Food-drug interactions can occur

Ex:

Grapefruit+ anticoagulants(heparin)

antibiotics that end with mycin + dairy products

Concepts in Clinical Practice

Ex 1:Antihypertensives (beta-blockers) decrease blood pressure

Ex 2:Anticoagulants (warfarin)inhibit vitamin K-dependent clotting factor

Ex 3:Insulin binds to receptors on muscle and fat cells to facilitate glucose uptake