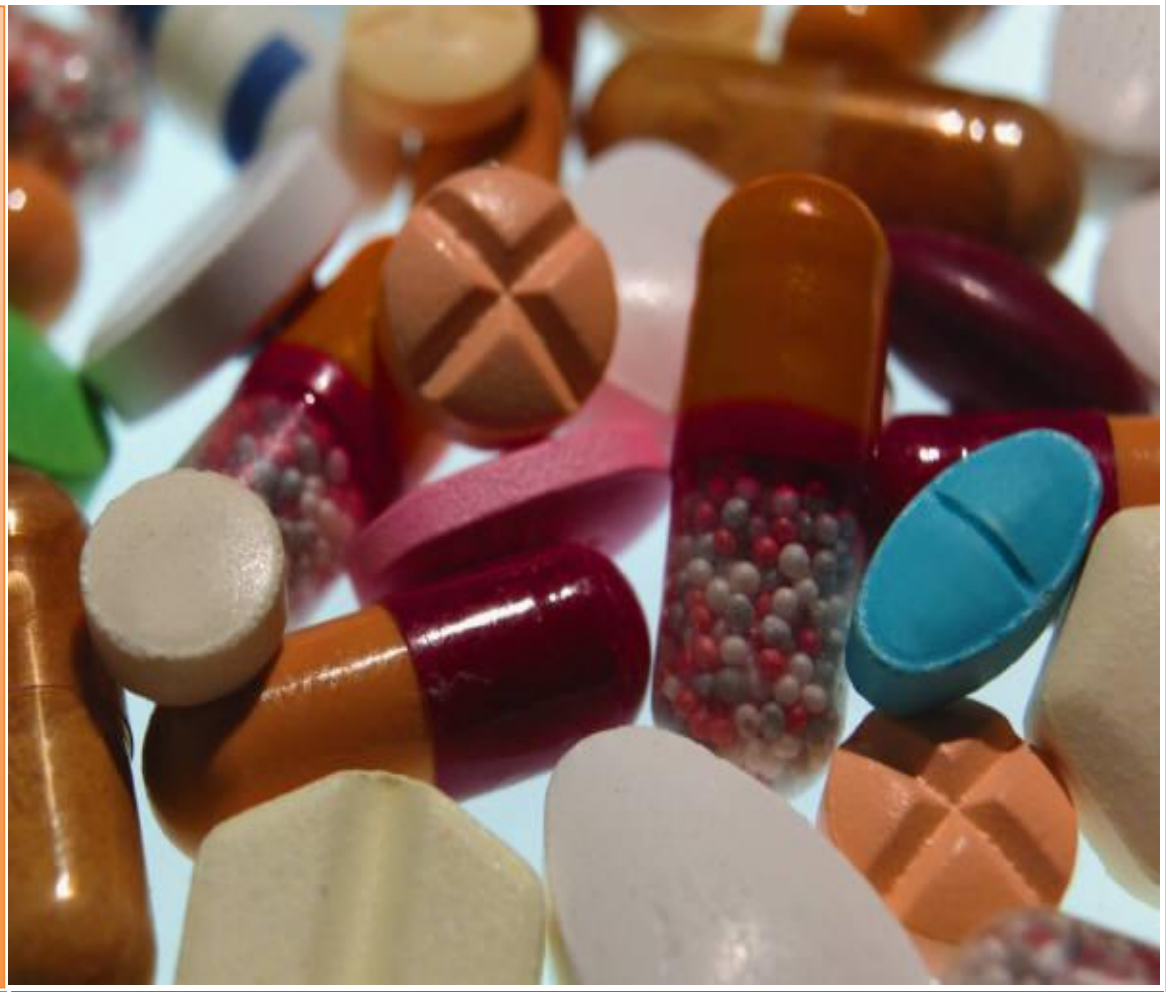
pharmacology



By:.

Team of pharmacology

2nd Pharmacology lecture "Quantitative Aspect Of Drug Action"

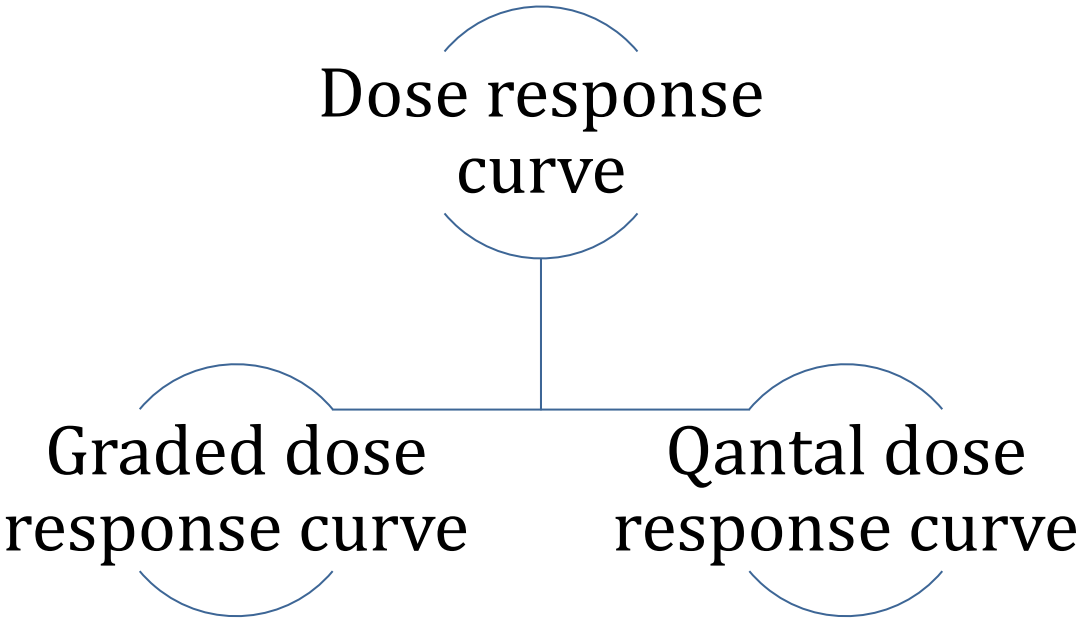
Lecture objectives :

1- Determine quantitative aspects of drug receptor binding

2- Recognize different dose response curves

3- Distinguish the therapeutic utility of each of these curves

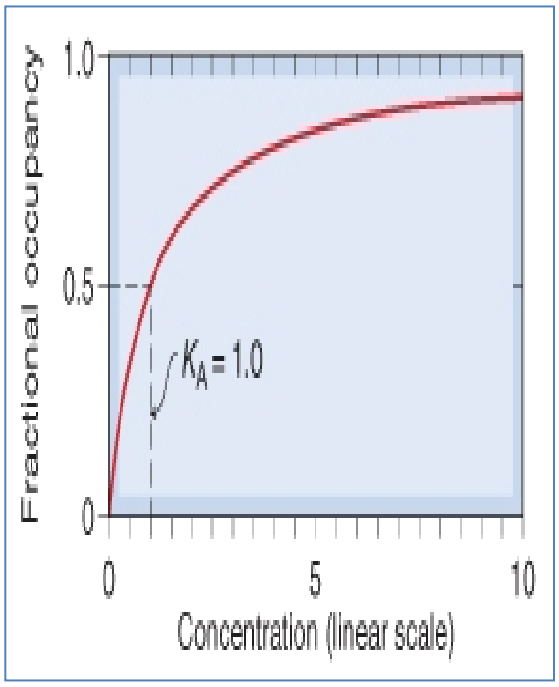
4- Classify different types of antagonism

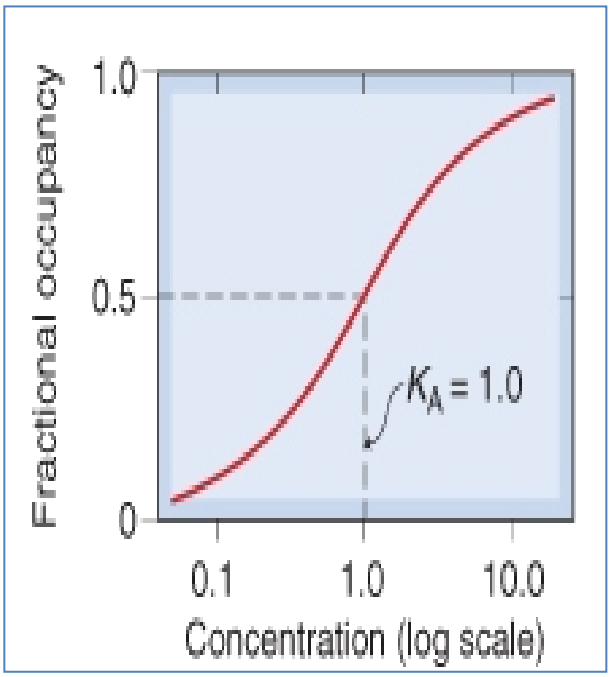


QUANTIFY ASPECTS OF DRUG ACTION

A- AFFINITY (Bind Occupy)

Concentration-Binding Curve





بعض الرموز اللي لازم نعرفها :

1- Bmax: total receptors in the tissue.

2- KD: the concentration of drug that need to bind to 50% of receptors.

بعض الاحيان يكتبه لك كذا

KD50%

ميزته اقدر من خلاله احسب

affinity

والعلاقه بينهم عكسيه

كل ما كان قدره ارتباط الدواء بالريسيبتور عاليه كل ماكان التركيز اللي احطه من الدواء عشان يرتبط بالريسيبتور قليل.

فبالتالي ما يحتاج احط تركيز عالي من الدواء لانو اصلا قدره ارتباطه عاليه

High affinity .... Means low Kd

الفائده من هذا الكيرف انو :

1- knowing Bmax (binding capacity)

2- The effinity of Drug to bind to Receptor

The higher the affinity of D for R the lower is the KD i.e. inverse relation

B- EFFICACY (Initiate Activate)

Dose Response Curve:

و ينقسم الى قسمين:

1.Coutinuous responce

تكون الاستجابه للجرعه او الدواء تكون بنسب عديده زي مثلا

BP (blood pressure)

يعني انو له نسب كثيره ممكن يكون ١٠٠ او ٩٠ او ٧٠ ...الخ ، وامثله عليه اللي هو

BP, FBG, HR, cholesterol.

و نمثلها بكيرف اسمه

Graded dose-response curves

2.prevention convulsion

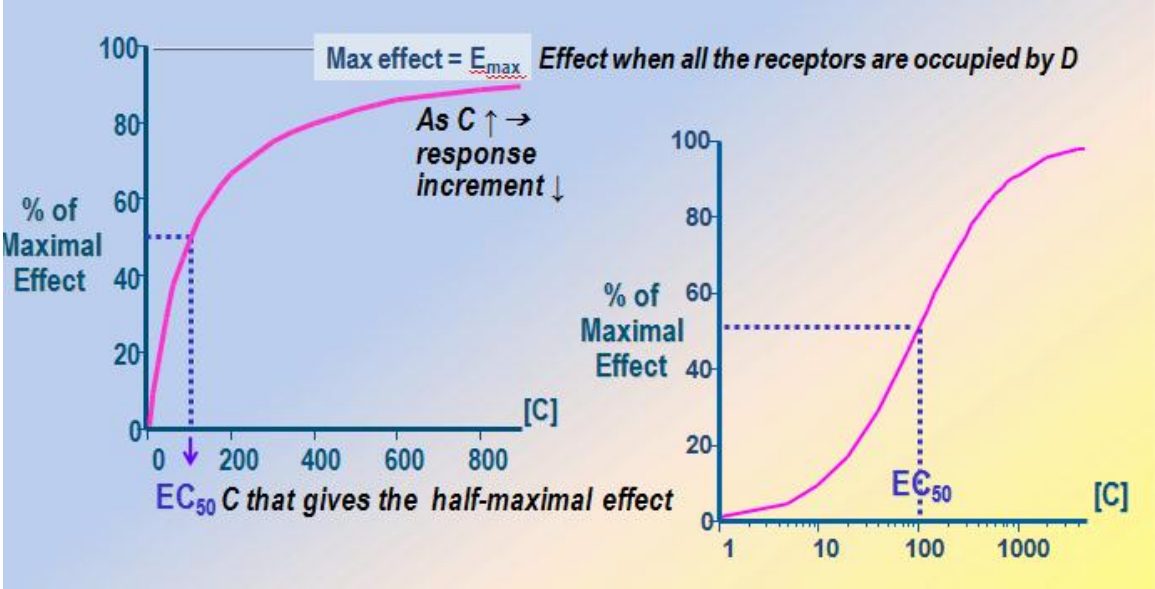
النوع الثاني الاستجابه تحمل نسب محدده يا اما يصير استجابه او ما تصير او يموت الانسان او يعيش

زي مثلا ايقاف التشنج يا اما يصير استجابه او لا ونمثله بكيرف اسمه

QUANTAL DOSE RESPONSE CURVE

1- GRADED DOSE RESPONSE CURVE (A continuous response ↓BP, HR, FBG, Cholesterol… etc)

It show us the affinity



اول شي نعرف بعض الرموز:

Emax(max effect):

Effect when all the receptors are occupied by Drug

EC50

the concentration of the drug that produces 50% effect and it's the measure of (potency).

So the low (EC50) means> the high potency

Potency

هو تركيز الدواء اللي نعطيه المريض عشان يعطينا استجابه معينه

كل ماكان الدواء قوي او عنده potent كل ماكنا **ما نحتاج** تركيز عالي والعكس صحيح

الاشياء اللي بحسبها من الكيرف او اعرف حسابها من الكيرف هي :

1- The max efficacy (Emax) → highest limit of dose-response relationship

2- The potency = EC50

اكثرانواع المواد لها potent هو agonist لانو نحتاج منه تركيز قليل عشان نوصل لمرحله maximum biological response

3- Compare the relative potency and efficacy of drugs that produce the same effect.

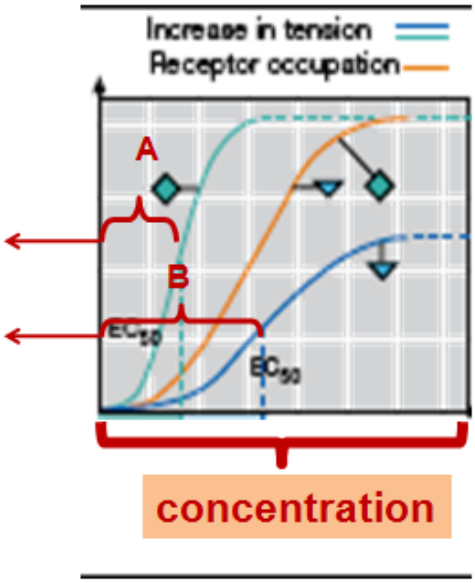
كمان انو مثلا عندي علاجين لهم نفس التأثير بس ابي اعرف الاحسن فالكيرف هذا يبين لي انو واحد منهم عنده potency اكثر من الثاني و بالتالي يكون هو الاحسن

<u>للتوضيح</u> :

(A) is more potent than (B), WHY?
Because it has low EC_{50}
And what is EC_{50} ..?
It's the **CONCENTRATION** of the drug that produces 50% effect

(A) Needed less conc. Than (B)To produce an effect which means (EC_{50}) of (A) is lower than (B) …. So (A) is more potent than (B)

(B) Is partial agonist .. Because it has less efficacy.



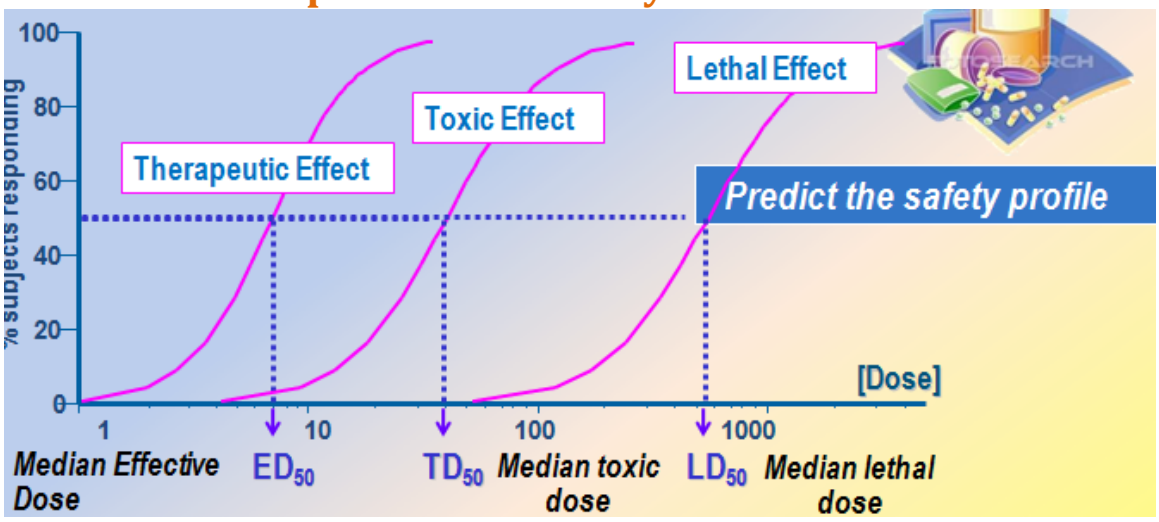
2- QUANTAL DOSE RESPONSE CURVE (All-non responses)

*** Specified therapy Response.**

*** Adverse response.**

*** Lethal outcome.**

show us the response and efficacy



بعض الرموز مفروض نعرفها

1- ED50: the dose of the drug require to produce therapeutic effect in 50% of the population

2- TD50: the dose of the drug require to produce toxic effect in 50% of the population

3- LD50: the dose of the drug require to produce lethal effect in 50% of the population

لمعرفة مدى آمنية الدواء من خلال المعادلة

***Therapeutic index:** $\frac{TD_{50}}{ED_{50}}$

HIGH = more safety
Like : Diazepam

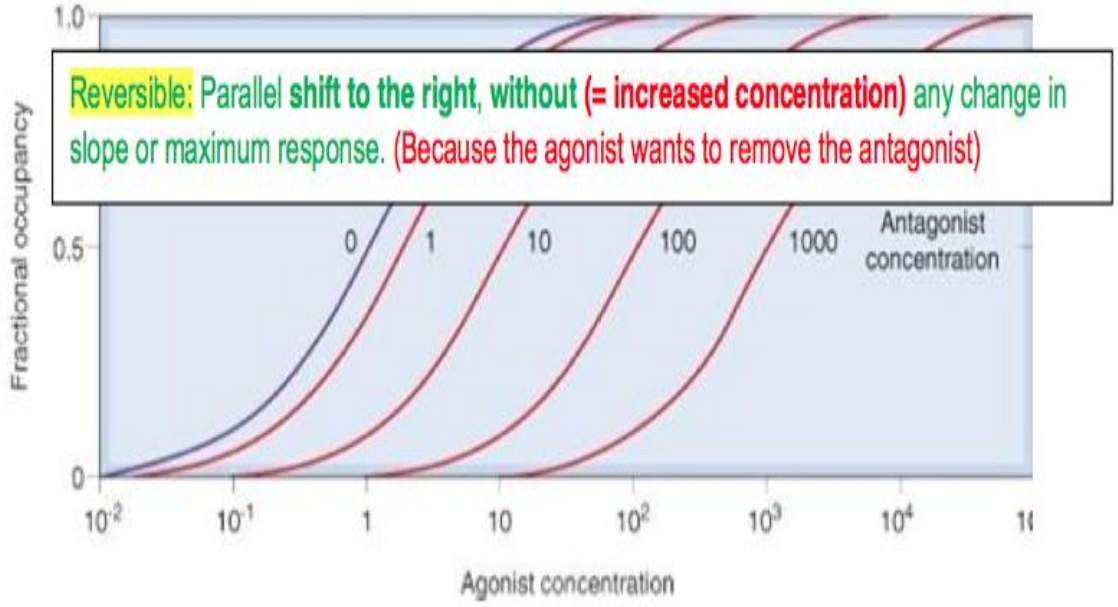
LOW = less safety
Like : digoxin

ANTAGONISM

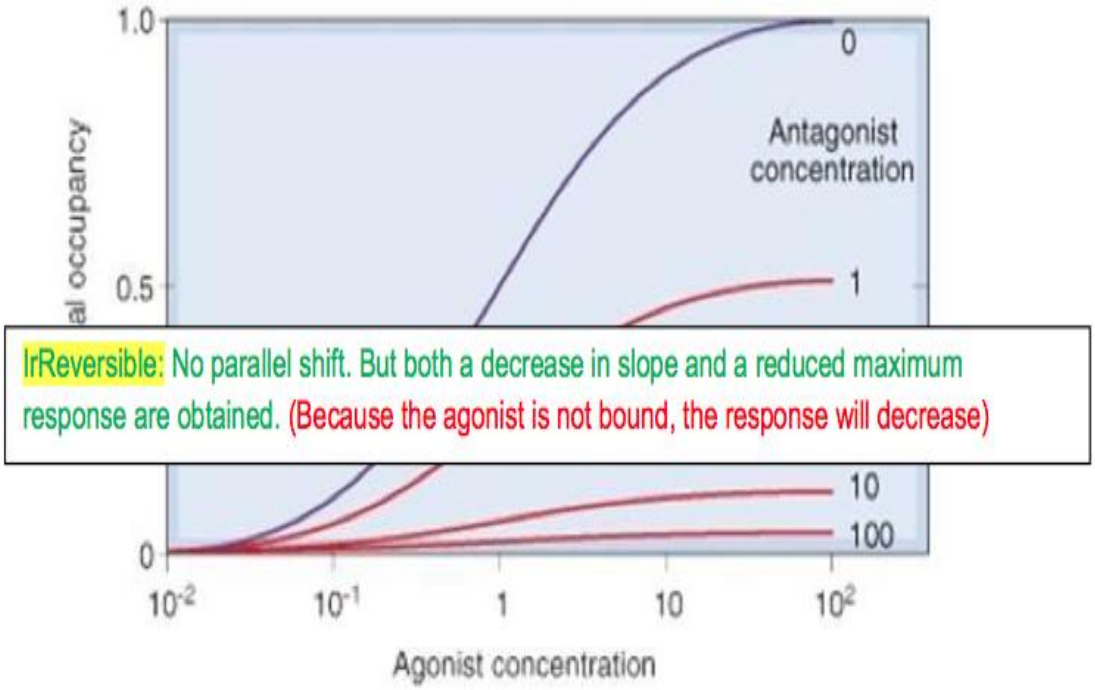
It is the diminution or the complete abolishment of the effect of one drug in the presence of another.

Name	Type	Function
Dimercaprol	**Chemical antagonize drug**	**Reduces heavy metal toxicity**
Omeprozole **(agonist)** & histamine **(antagonist)**	**Physiological antagonize drugs**	**Both of them lose their functions**
Phenobarbitone	**Pharmacokinetic antagonize drug**	**accelerates hepatic metabolism of warfarin**
Atropine Vs. Ach	**Reversible receptor blocked competitive antagonize drugs**	**Compete each other to bind in the binding site of the receptor**
Phenoxybenzamine & Noradrenaline	Irreversible receptor blocked competitive antagonize drugs	Compete each other to bind in the binding site of the receptor
Verapamil Vs. noradrenaline	**Receptor blocked non-competitive antagonize drugs**	**Don't compete each other**

Surmountable



Non-surmountable



	SURMOUNTABLE يمكن التغلب عليه	NON-SURMOUNTABLE
Can it be overcomed?	Antagonism can be overcomed by increasing concentration of agonist	Antagonism cannot be overcomed by increasing concentration of agonist
When will it happen?	Agonist + **reversible competitive antagonist**	Agonist + irreversible competitive antagonist Agonist + non-competitive antagonist
Changes in graph? (shift + slope/max. response)	shift: parallel to the right Slope/max. response : no change	shift: No parallel shift Slope/max. response: decrease in slope and max. response. If some receptors are spare: Shift: +/- rightward & reduced max. response