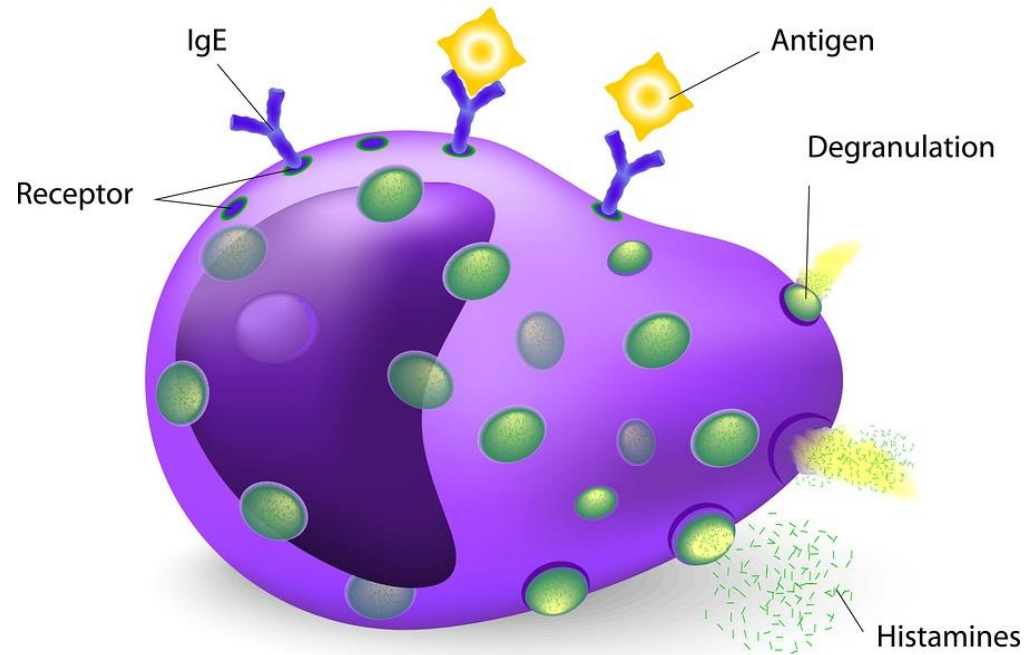


Autacoids

MAST CELL



Enumerate 2 drugs can release histamine (histamine liberators):

- Morphine
- Dextran
- Hydralazine
- D-tubocurarine

These drugs are contraindicated in respiratory diseases such as **Bronchial asthma**



The physiological antagonist of histamine is **adrenaline** so it's of choice in treatment of **anaphylactic shock**



This drug is **first generation** antihistaminic.

Mention 2 adverse effects:

1-sedation

2-atropine like action (blurring of vision – dry mouth-constipation-urine retention)



This drug is **second generation** antihistaminic

Mention two advantages :

- no sedation
- no atropine like action
- more potent



VS



To which class does each drug belong?

- Fexofenadine : second generation antihistaminic
- Diphenhydramine: first generation antihistaminic

What is the main difference between them ?

- Fexofenadine : Doesn't pass BBB so no sedation and no atropine like action
- Diphenhydramine : pass BBB so sedation and atropine like action



- These drugs act as **H1** blockers

Which one is avoided during driving ? Why?

- Diphenhydramine, because it's first generation antihistaminic thus pass BBB causing sedation that may cause road accidents and death to drivers and atropine like action (blurring of vision) leading to more accidents



Partial 5-HT₁ agonist ,used as selective anxiolytic
What is the drug ?

Buspirone



**Migraine
Headache**

**Partial 5-HT₁ agonist used for treatment
of migraine headache**

What is this drug ?

Sumatriptan



Dry cough is a common side effect during use of ACE inhibitors

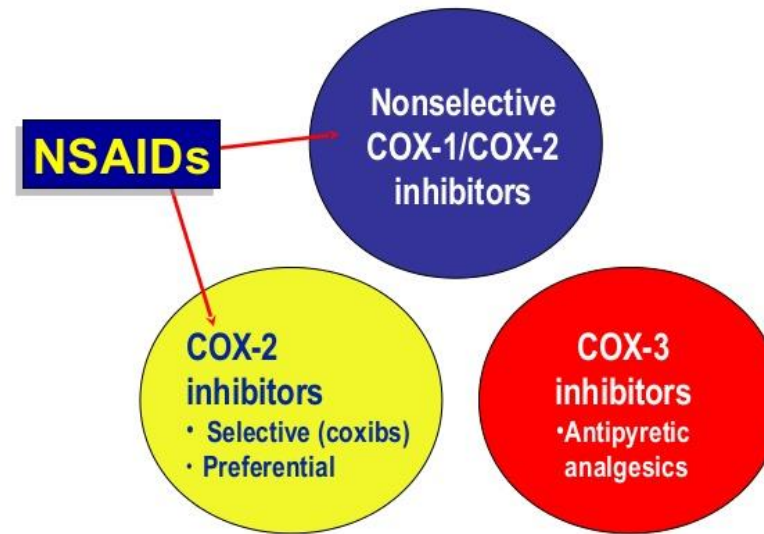
Why ?

Accumulation of bradykinin causes laryngeal spasm and laryngeal edema

How to control ?

- 1-stop the drug
- 2-change to ARBs
- 3-NSAIDs

COX inhibitors



Mention one example for each category

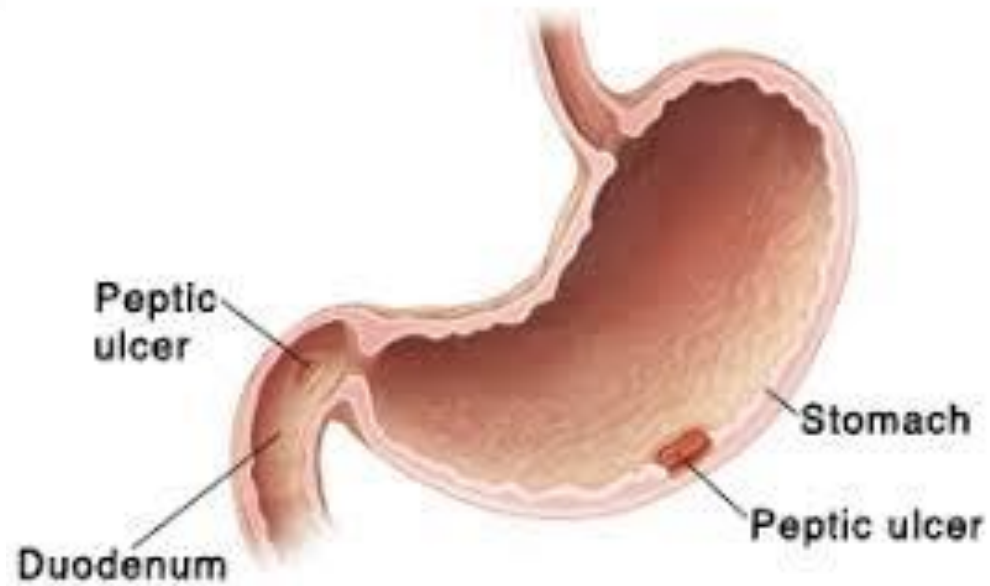
- Non selective: aspirin
- Selective COX 2 : Meloxicam , celecoxib
- Selective CoX 3 : Paracetamol



How to reduce the irritant effect of Salicylates on gastric mucosa ?

The irritant effect can be reduced by :

- Giving them after meals
- Adding alkalis
- Giving enteric coated tablets (sodium salicylates)





This child has a fever due to viral infection is aspirin allowed in this case or not ? Why?

- No it's contraindicated
- Due to the risk of Reye's syndrome (hepatocellular damage and encephalopathy in children up to 12 years with fever due to viral infection)

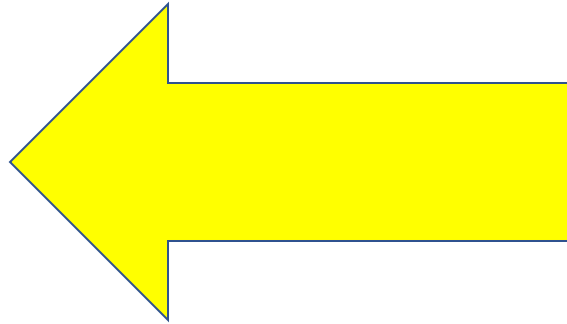
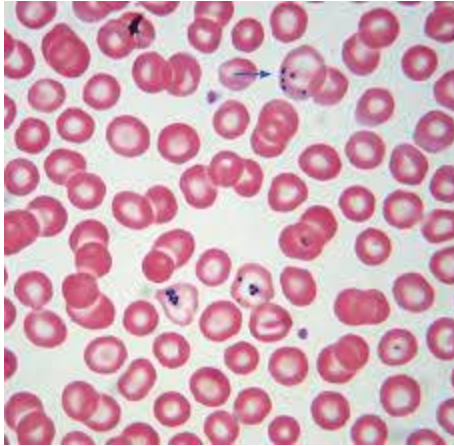


If a pregnant female has headache . Is aspirin suitable as analgesic for her ? Why?

- NO ,because :
- In early pregnancy (1st trimester) causes septal defect
- In late pregnancy causes premature obliteration of ductus arteriosus
- Antiplatelet anticoagulant
- Increase bleeding tendency

Safest analgesic during pregnancy : Paracetamol





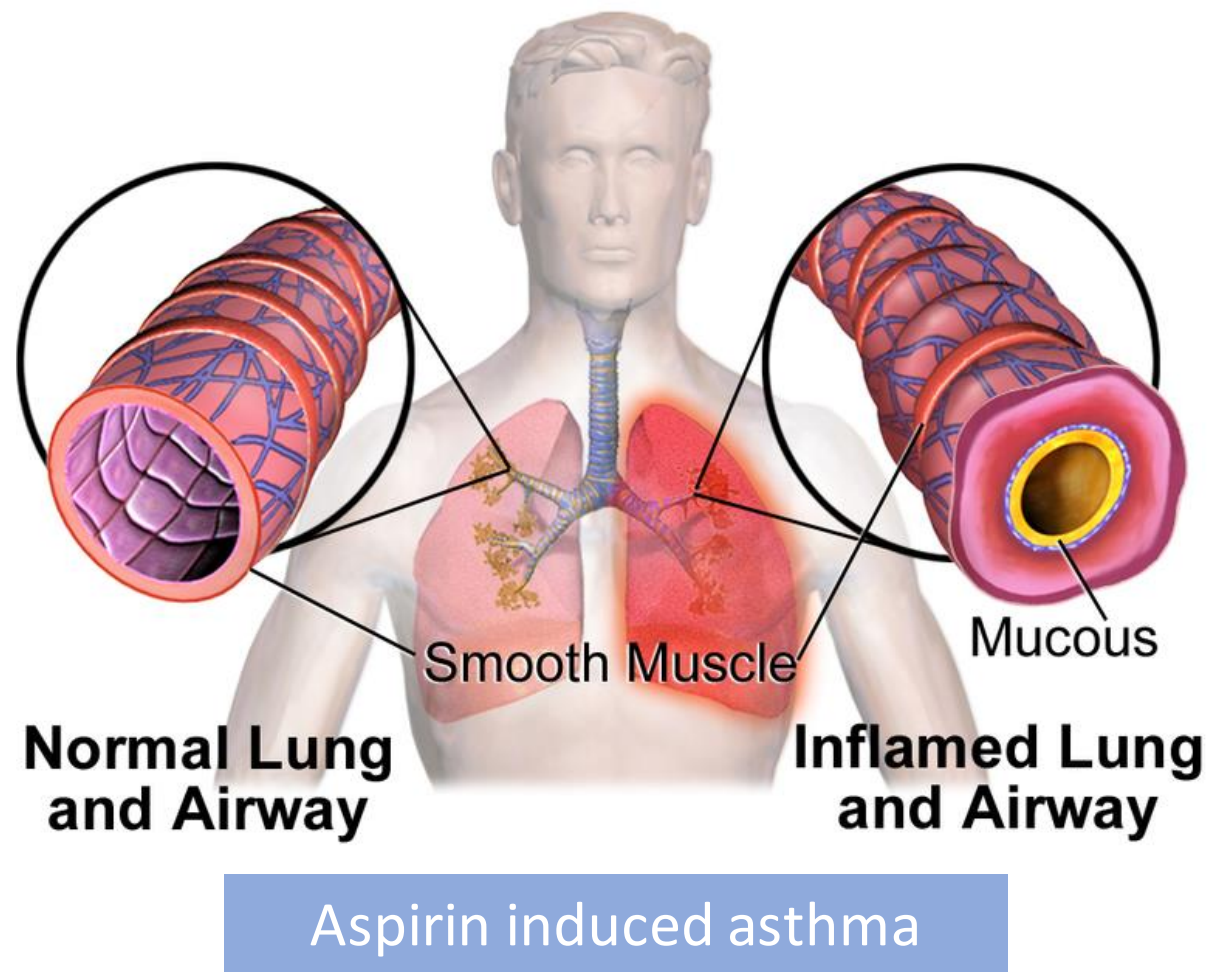
What is the effect of aspirin on RBCs ?

- It causes hemolysis

In which type of patients ?

- People with genetic disorder (Idiosyncrasy)

This reaction is due to G6PD deficiency



Aspirin can precipitate attacks of bronchial asthma due to inhibition of COX so decrease PG (bronchodilators) and shift of arachidonic acid to synthesis of leukotrienes (LTs) that are bronchoconstrictors



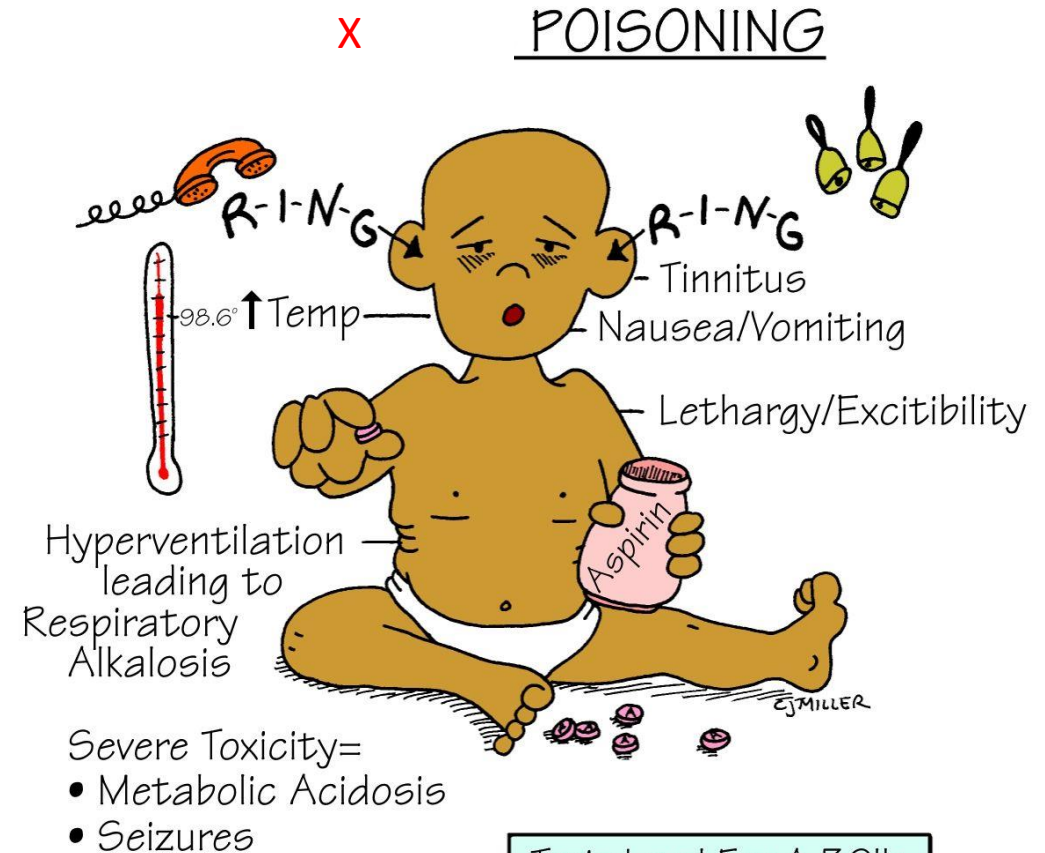
Could aspirin affect the antihypertensive action of beta blockers and thiazides ? How ?

Yes ,It decreases PG synthesis so decrease RBF leading to salt and water Retention so antagonize their action

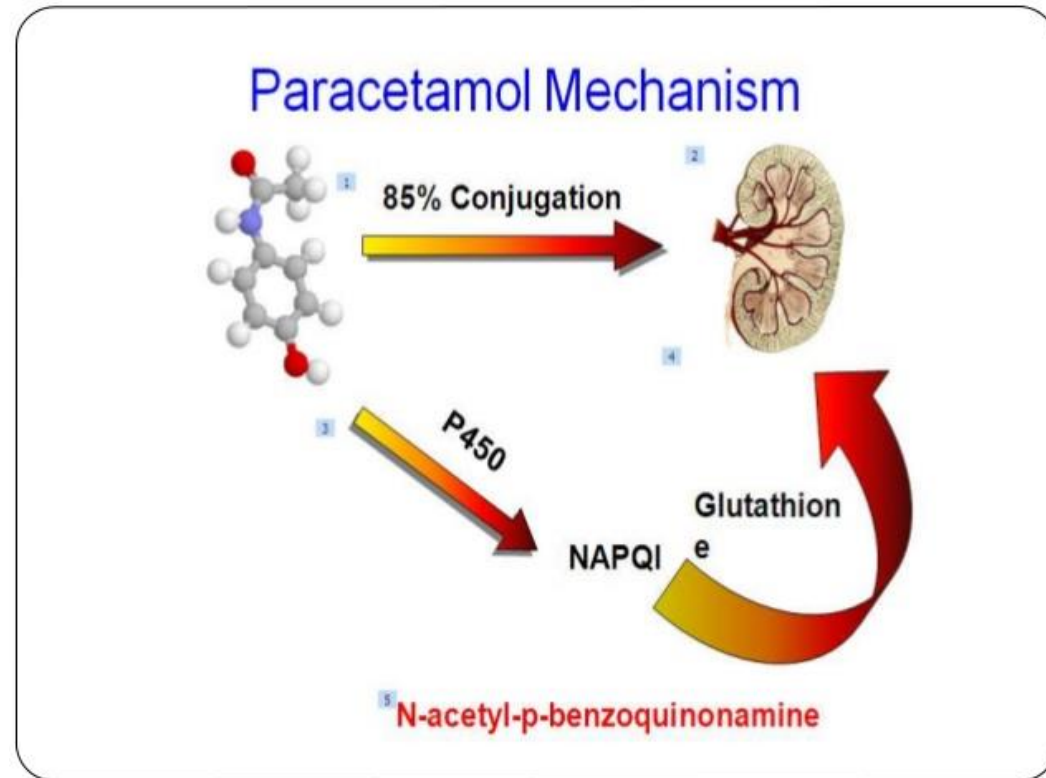


X : aspirin

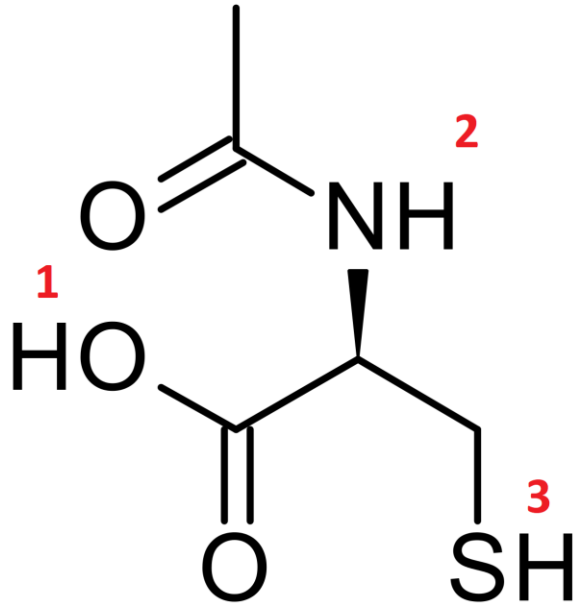
It causes hyperthermia by uncoupling of oxidative phosphorylation



Toxic Level For A 30lb.
Child = 12 Adult Aspirin
or 48 Baby Aspirin.

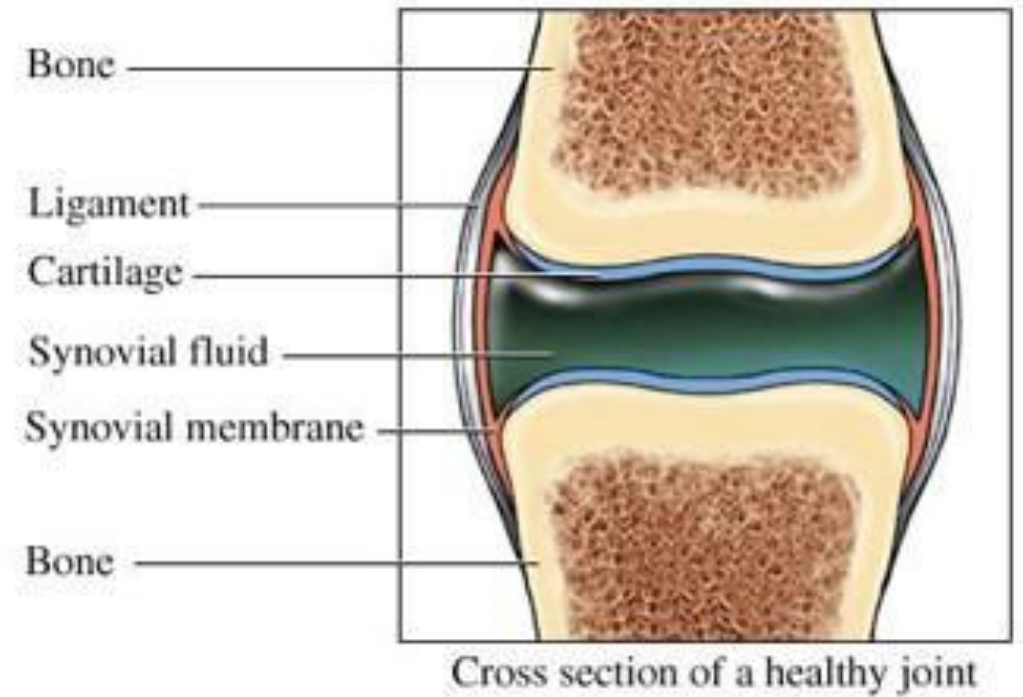


Paracetamol Toxicity is due to accumulation of metabolite called **NAPQI** and depletion of **glutathione**
Toxic dose is **10-15 gm** for adults and **4 gm** for children
Specific antidote is **N-acetyl cysteine**



It is the specific antidote administered by **IV** in treatment of acute hepatotoxicity caused by **Paracetamol**. Which group is responsible for its action? Why?

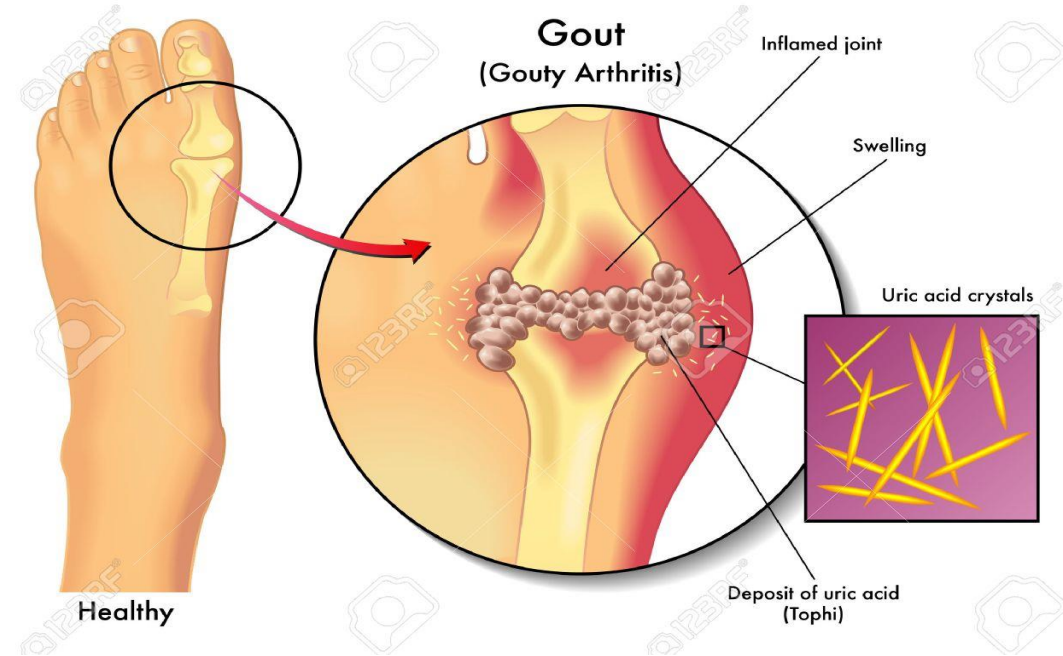
- 3 (SH), because it helps reform glutathione to detoxify NAPQI in liver



What is the concentration of diclofenac in synovial fluid ?

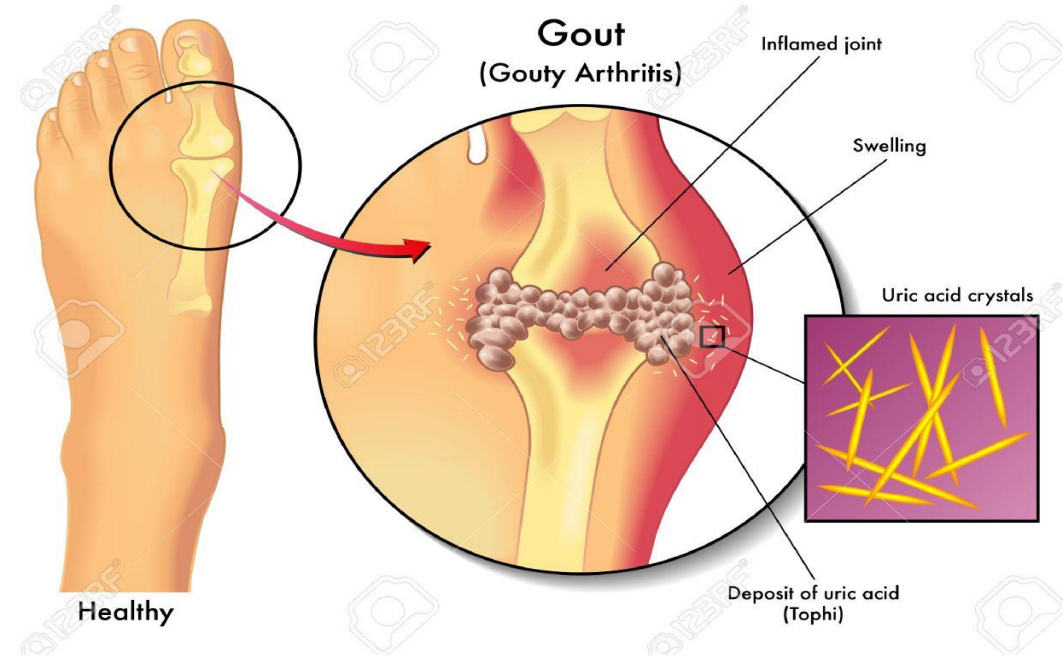
- 4-5 times as its concentration in plasma

Iatrogenic ulcers are better prevented and treated by prostaglandin analogues as misoprostol and proton pump inhibitors



Which dose is used to treat gout ? Why?

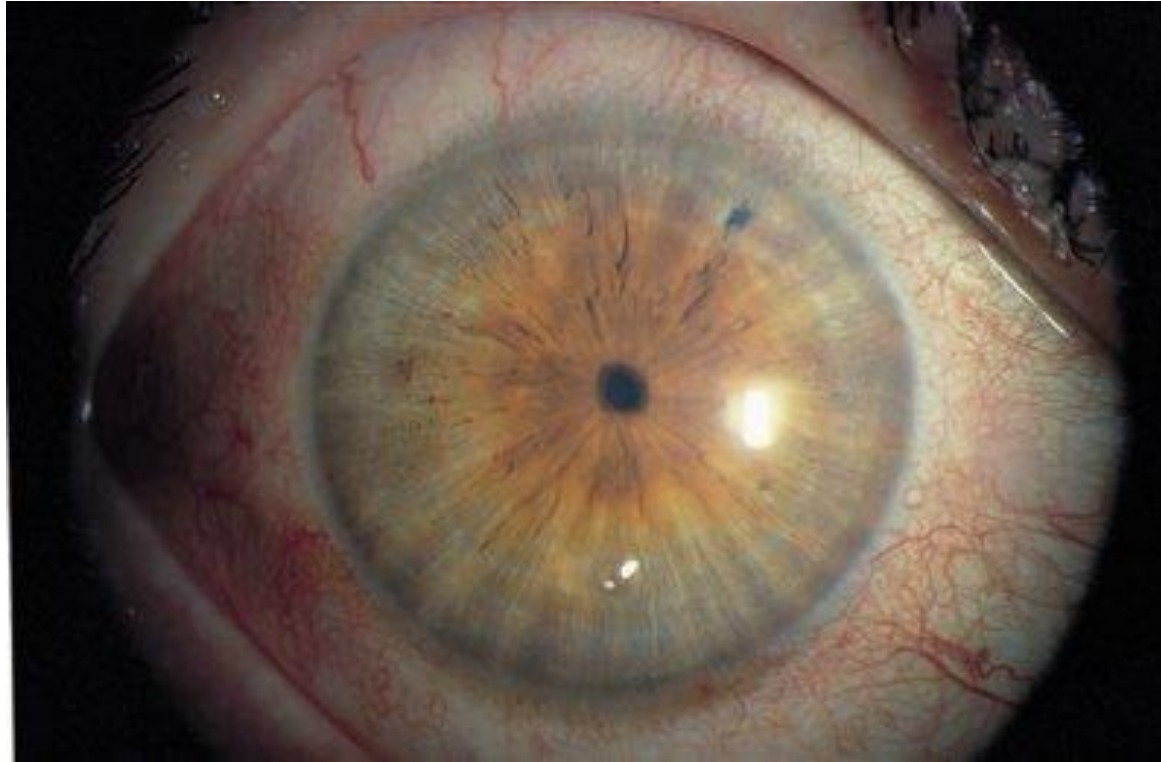
- High dose (>5gm/day) : it leads to decrease plasma uric acid level (uricosuric) by inhibition of uric acid reabsorption



Which dose is contraindicated in Gout ? Why ?

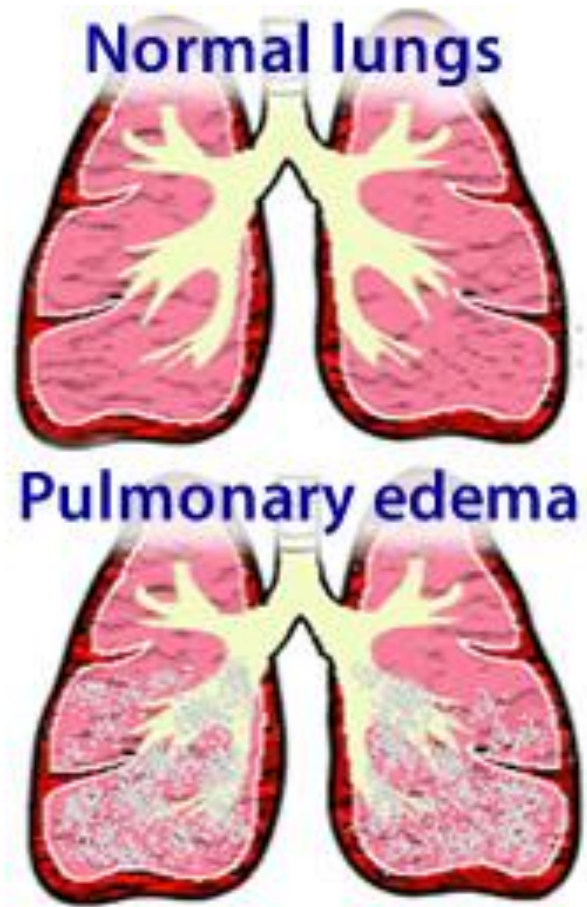
Low dose (<5 gm / day), because it increases plasma level of uric acid by inhibition of its secretion by proximal renal tubules

N



The miotic action of morphine is due to central mechanism : activation of mu receptors in edinger westphal nucleus leading to activation of oculomotor nerve and ciliary ganglion

It can be antagonized by Naloxone (opiate antagonist) or atropine (parasympatholytic)



Role of morphine in acute left ventricular failure (pulmonary edema)

- Sedate patient
- Sedate respiration
- Veno and arterio dilatation decrease in pre and after load on heart



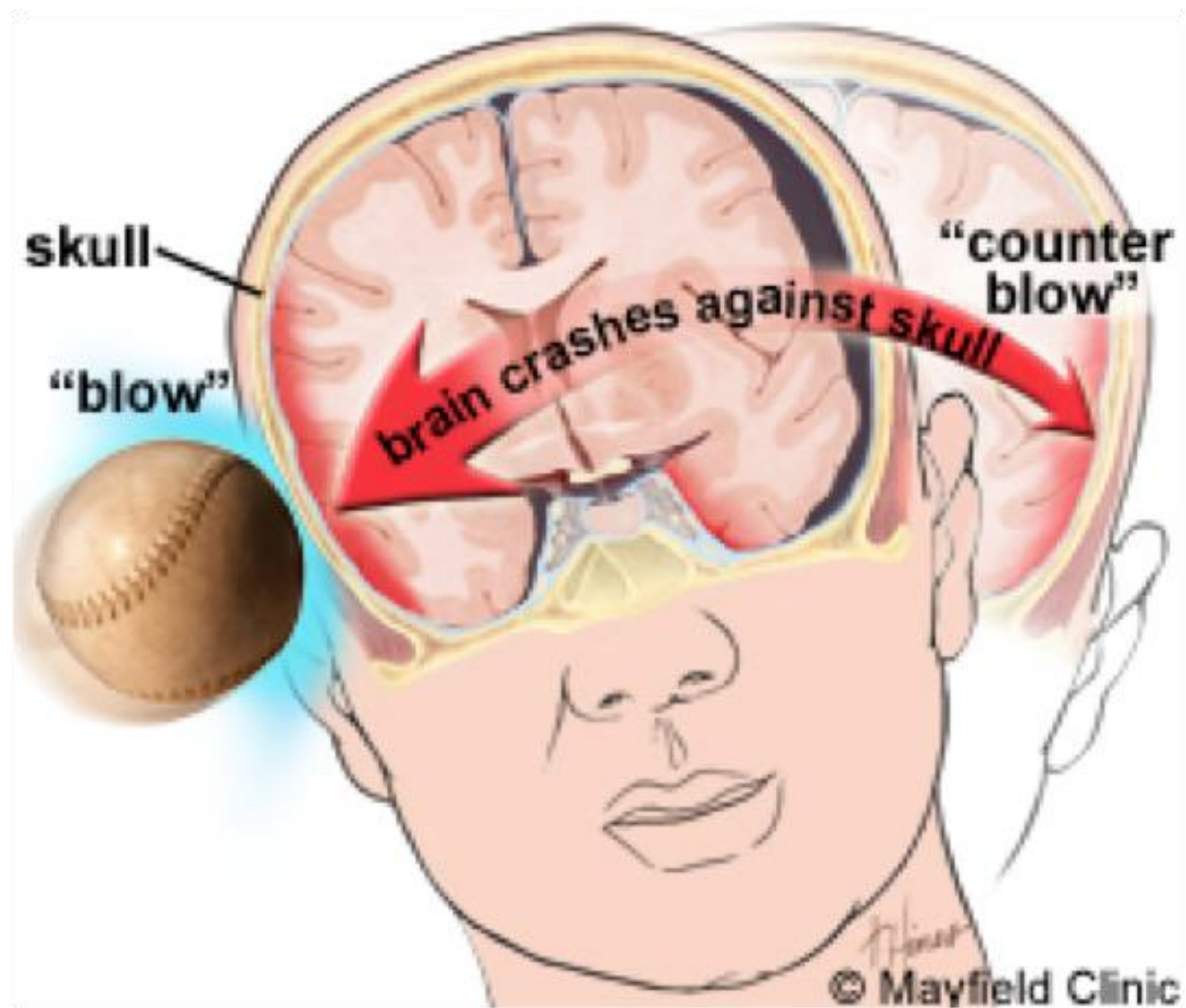
Why morphine isn't preferred as pre anesthetic medication ?

- Depression of respiratory center
- Nausea and vomiting
- Bronchospasm
- Post-operative constipation and urine retention
- Miosis that interferes with stages of anesthesia



What are the advantages of methadone in treatment of morphine addiction ?

- Taken orally with longer duration of action than morphine
- Same potency
- Less liable to tolerance and addiction
- Less withdrawal symptoms



Morphine is contraindicated in head injury due to Masking of diagnosis by miosis and R.C depression increasing ICP



Why morphine is contraindicated in extremes of age ?

- They have defects in liver conjugation increasing risks of its super sensitivity



Meperidine

Why meperidine doesn't produce miosis but may cause mydriasis ?

- Due to atropine like action



Meperidine

Why meperidine is preferred than morphine as pre anesthetic medication ?

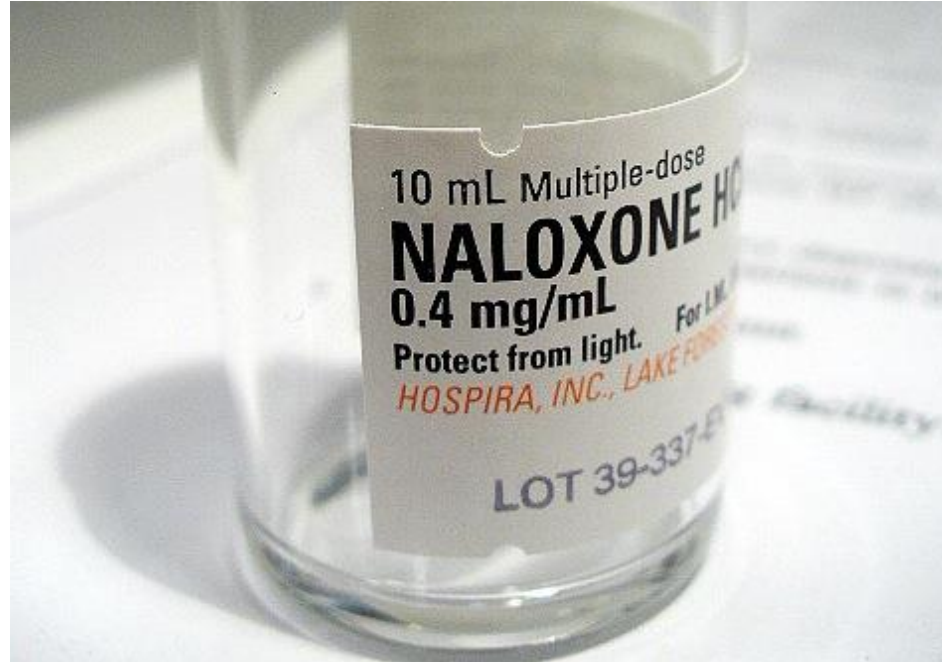
- Less RC depression
- Less emetic
- Less constipation



Why meperidine is preferred than morphine in case of renal and biliary colic ?

- Meperidine has atropine like action so relaxes wall (spasmolytic)
- But morphine is spasmogenic

Description of a drug acting as antagonist on μ receptors and agonist on κ receptors.
Mixed agonist antagonist
Mention one example (e.g. Pentazocine)



May naloxone be used in neonatal asphyxia of addict mother or not ?

- Yes , it is antagonist on opiate receptors

Routes of administration :

- Mother IM
- Baby Intra umbilical



VS



Meperidine	Morphine
Dysphoria	euphoria
synthetic	natural
Less RC depression	More RC depression
Less vomiting	More vomiting
Less addiction	More addiction

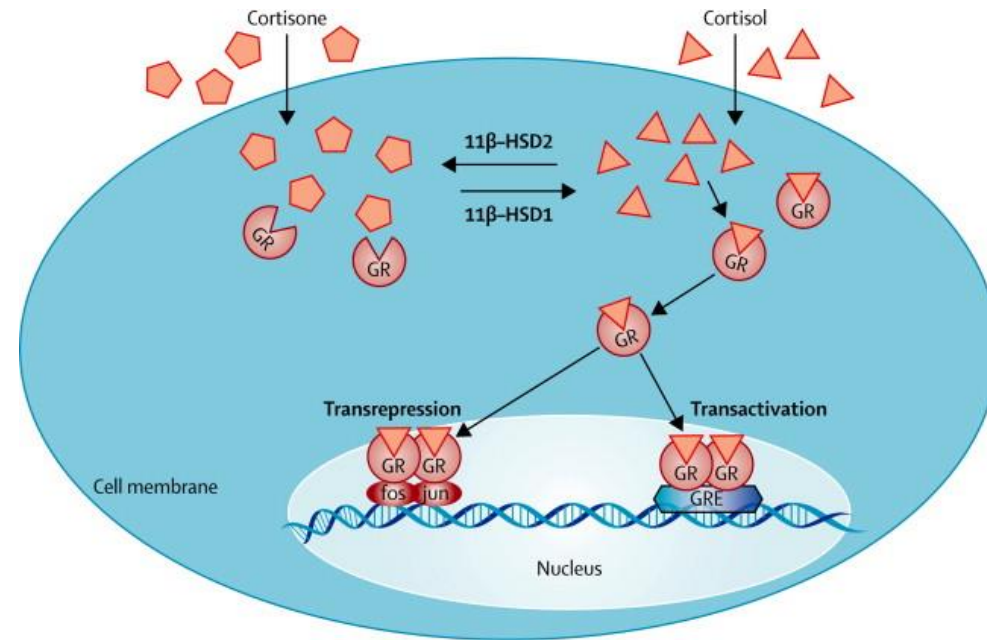
Methadone is the drug of treatment of morphine addiction Why ?

- Taken orally with longer duration of action than morphine
- Same potency
- Less liable to tolerance and addiction
- Less withdrawal symptoms



IV naloxone is the specific antidote for acute morphine poisoning
Is gastric lavage useful in treating IV morphine poisoning ? Why ?
Yes , because morphine is excreted through stomach

Corticosteroids



Cortisol is **steroid** hormone
 Cortisol binds to **intracellular** receptors
 Cortisol is the **active** form



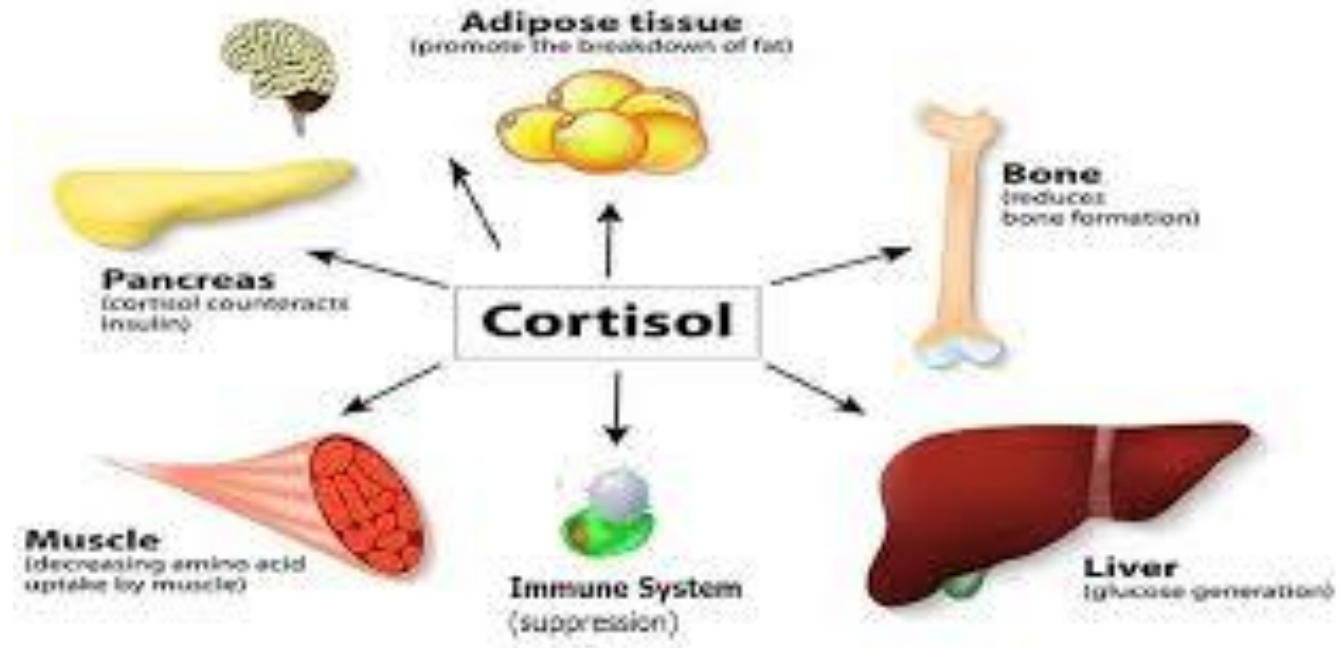
What is the effect of cortisol on bone and skeletal muscle ?

- Bone :catabolic – osteoporosis
- Muscle : myopathy

Repeated intra-articular injection can lead to **Joint subluxation**

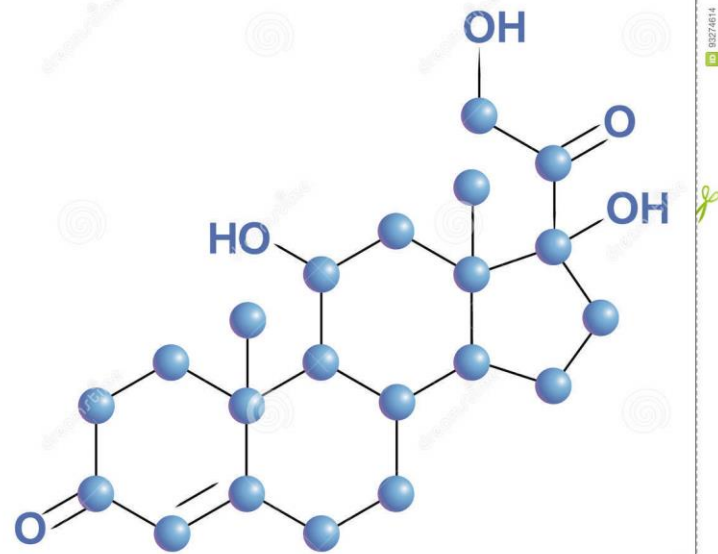
Cortisol is known for its potent anti-inflammatory and immunosuppressant effect mention 2 uses for each ?

- Anti-inflammatory :
 - Arthritis – carditis – nephritis
- Immunosuppressant :
 - autoimmune disease as SLE
 - Hematological disorders as anemia – thrombocytopenia
 - Graft rejection



3 precautions should be followed during long term use of cortisol :

- Gradual withdrawal
- Measure blood pressure
- Weight estimation
- Add anabolic



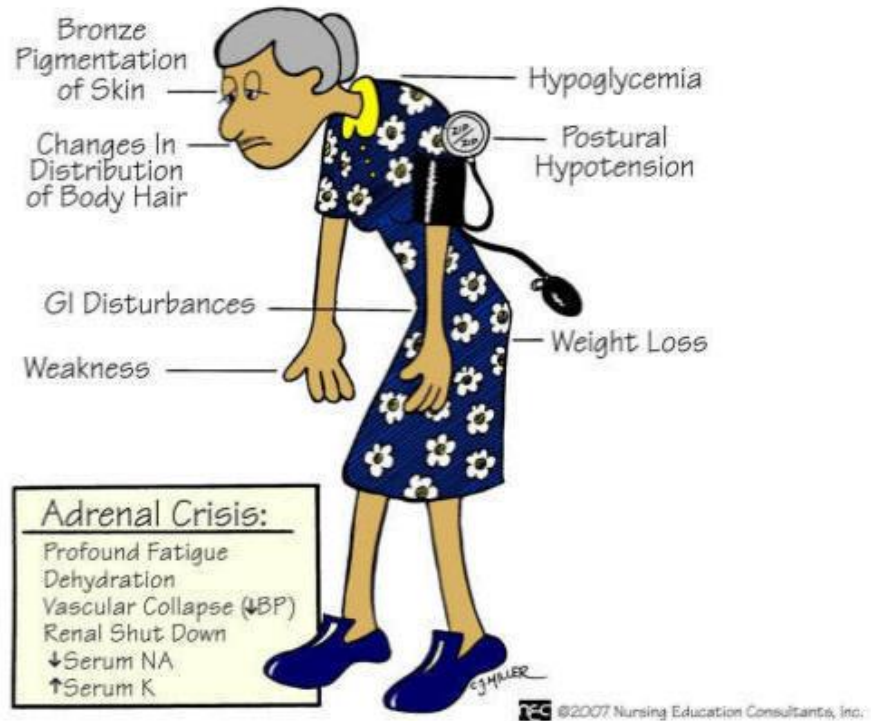
Cortisol

Cortisol **increases** blood glucose level
Cortisol **decreases** potassium plasma levels
Cortisol **decreases** blood calcium level



Can corticosteroids be stopped suddenly if given for >1 week ? Why ?
No , It leads to acute Addisonian crisis

ADDISON'S DISEASE



Addison's disease is treated by giving Cortisol (Fludrocortisone acetate or Des-oxy corticosterone with glucocorticoid)

Enumerate 3 side effects of the drug used :

- Moon face and buffalo humps
- Hypokalemia
- Hyperglycemia and DM



Predinsolone is a preparation of **glucocorticoids** which is the **active** form

NDC 0591-5443-10

Prednisone Tablets USP

20 mg 5443

Watson. 1000 Tablets Rx only

Each tablet contains:
Prednisone USP (anhydrous), 20 mg

Dosage: See package insert for dosage and full prescribing information.

Dispense in a well-closed container with child-resistant closure.

Store at 20°-25°C (68°-77°F). [See USP controlled room temperature.]

Manufactured By:
Watson Pharma Private Limited
Verna, Salcette Goa 403 722 INDIA
Code No. GO/DRUGS/741 173665

Distributed By: **Watson Pharma, Inc.**

3 0591544310 3

LOT: EXP:

Prednisone is a preparation of **glucocortisone** which is the **inactive** form



Hydrocortisone is an **active** form of corticosteroids and has **short** duration of action



Mention 3 preparation of corticosteroids used by inhalation in bronchial asthma ?

- Fluticasone
- Beclomethasone
- Ciclesonide
- budesonide

What are precautions during use ?

- Washing mouth after to avoid :
 - Oropharyngeal candidiasis
 - Hoarseness of voice

Chemotherapy

Augmentin

1. It is a combination of amoxicillin and Clavulanic acid
2. The benefit of this combination is overcoming the B-lactamase sensitivity of amoxicillin by clavulanic acid which is B-lactamase inhibitor



The most common side effect of penicillin is allergy.

1- How to avoid ?

- By using erythromycin and skin test before administration of drug to test allergy

2- Could you use cephalosporins as alternative ? Explain why?

- No due to cross allergy between them (10%) , use erythromycin instead



CeftriaxONE

1-To which generation does it belong?

- Third generation

2-Mention its route of administration.

- Parenteral



This diagram shows bacteria cell structure

**Mention ONE antibiotic acting on each
of the indicated site on the diagram**

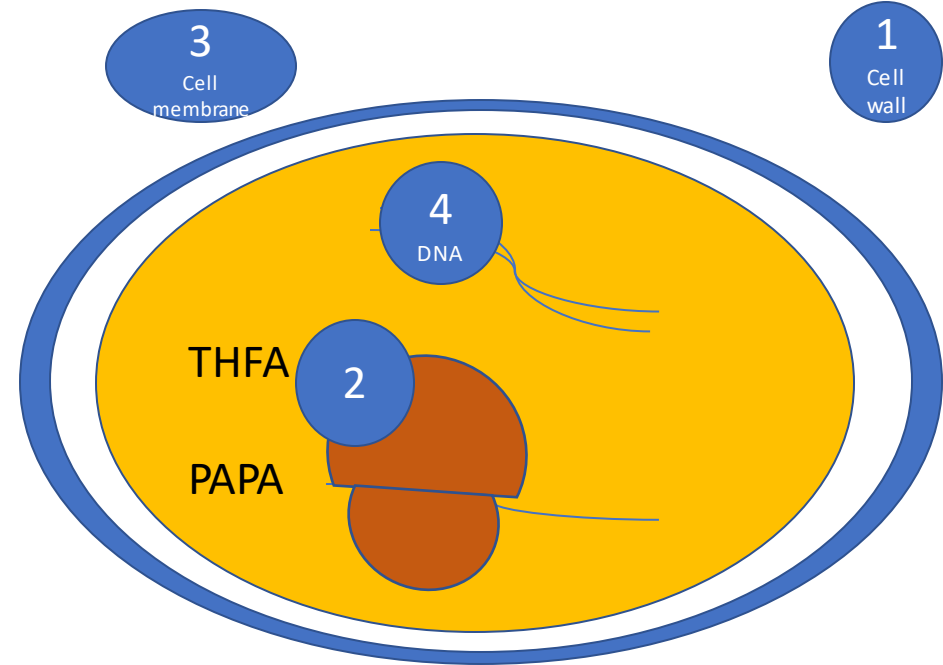
1-B-lactams (penicillin)

2-Aminoglycosides (30s)

Erythromycin(50s)

3-isoniazide

4-Metronidazole

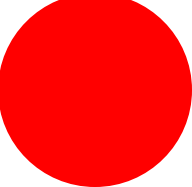


1-Mention **THREE** antibiotics known for their Ototoxicity

- Vancomycin
- Aminoglycosides
- Erythromycin

2- Which **ONE** is more dangerous ? Explain Why ?

- Aminoglycoside
- Because it causes irreversible ototoxicity and permanent 8th cranial nerve damage



1-Mention THREE antibiotics known for their Nephrotoxicity

- Cephalosporin
- Imipenem
- Vancomycin
- Aminoglycosides

2-What is the precaution to avoid that for ONE of them ?

- Dose adjustment
- Avoid in renal impairment
- Using cilastatin with imipenem
- Avoid concurrent usage with frusemide and cephalosporins



© Can Stock Photo - csp15738507

Mention TWO antibiotics contraindicated in children.

- Fluoroquinolones
- Tetracycline

Explain why ?

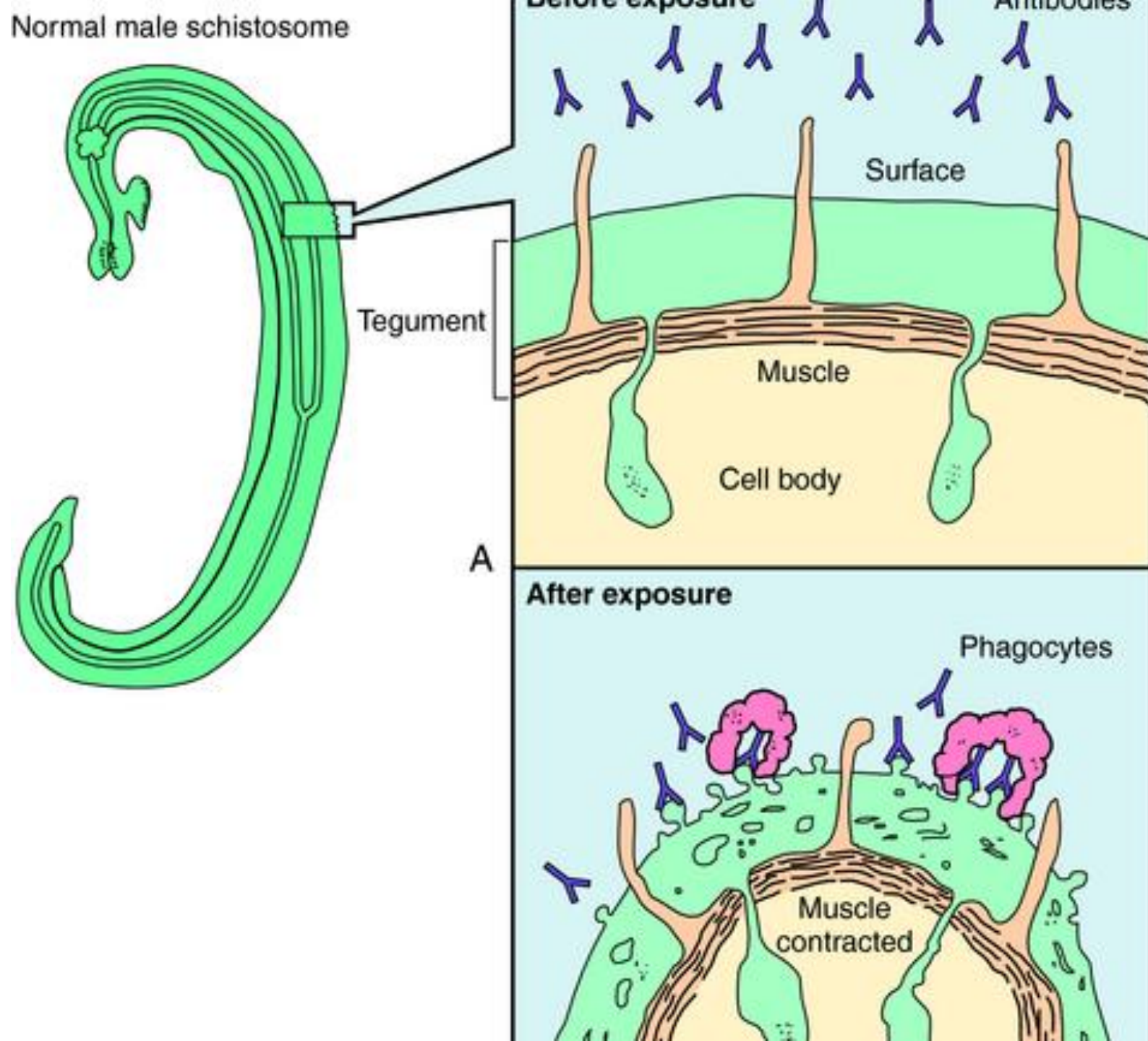
- Fluoroquinolones : chondrolytic
- Tetracycline : permanent yellow brownish discoloration of teeth and bone deformity



1- What is the gold standard anti-bilharzial drug ?

- Praziquantel

2- It affects **living (adult and cercaria)** stages, with a success rate of **90%**





1- Mention the class of each.

Erythromycin: Macrolide

Clindamycin: lincosamides

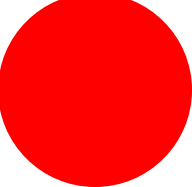
Streptomycin: aminoglycoside

2-Which is bactericidal & Which is bacteriostatic.

Erythromycin: bacteriostatic (low concentration) - bactericidal (high concentration)

Clindamycin: bacteriostatic

Streptomycin: Bactericidal



Septin (cotrimoxazole) is a combination of TWO antibiotics, those are
Trimethoprim & Sulfamethoxazole

Explain the value of their combination.

These antibiotics work together in different ways to prevent bacteria from producing a substance called folate By sequential inhibition of folate synthesis

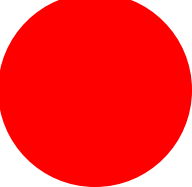
Synergism

More potent

Wider spectrum

Less bacterial resistance





This drug is effective against anaerobic bacteria

It's weak luminal and potent tissue amoebicidal

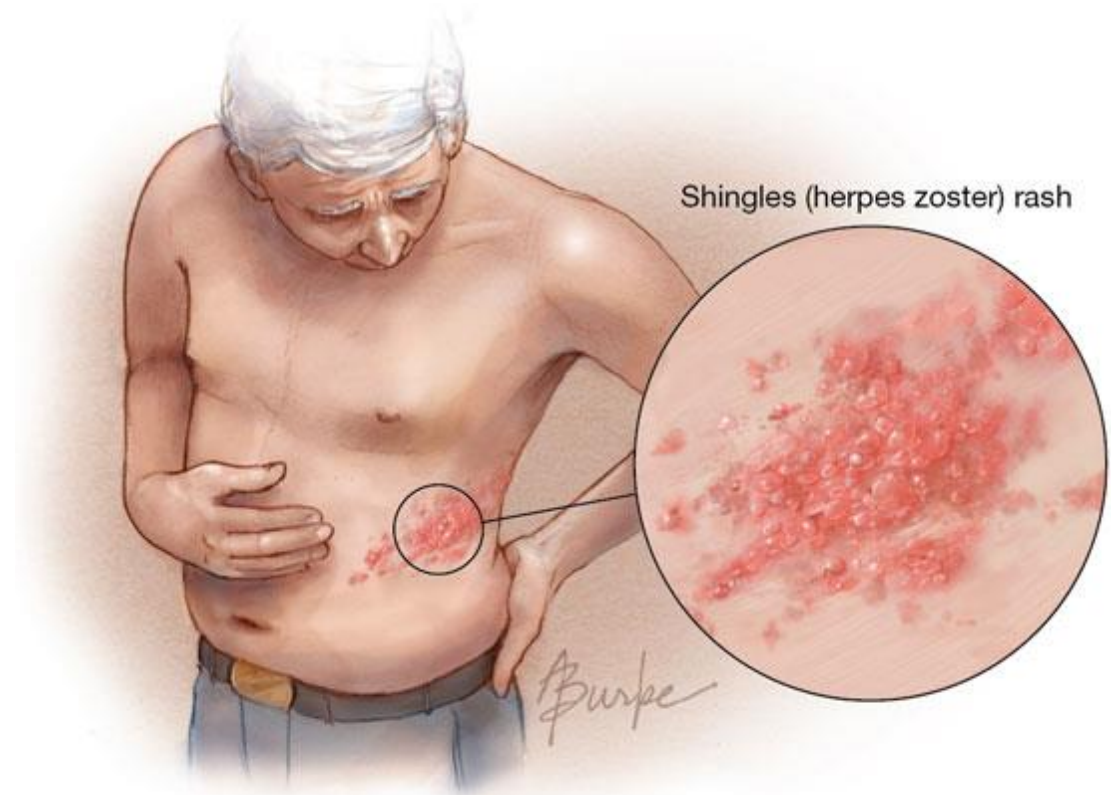


1. Mention suitable antiviral drugs.

- Acyclovir & Ganciclovir

2. What is its route of administration?

- Oral-parenteral and topical

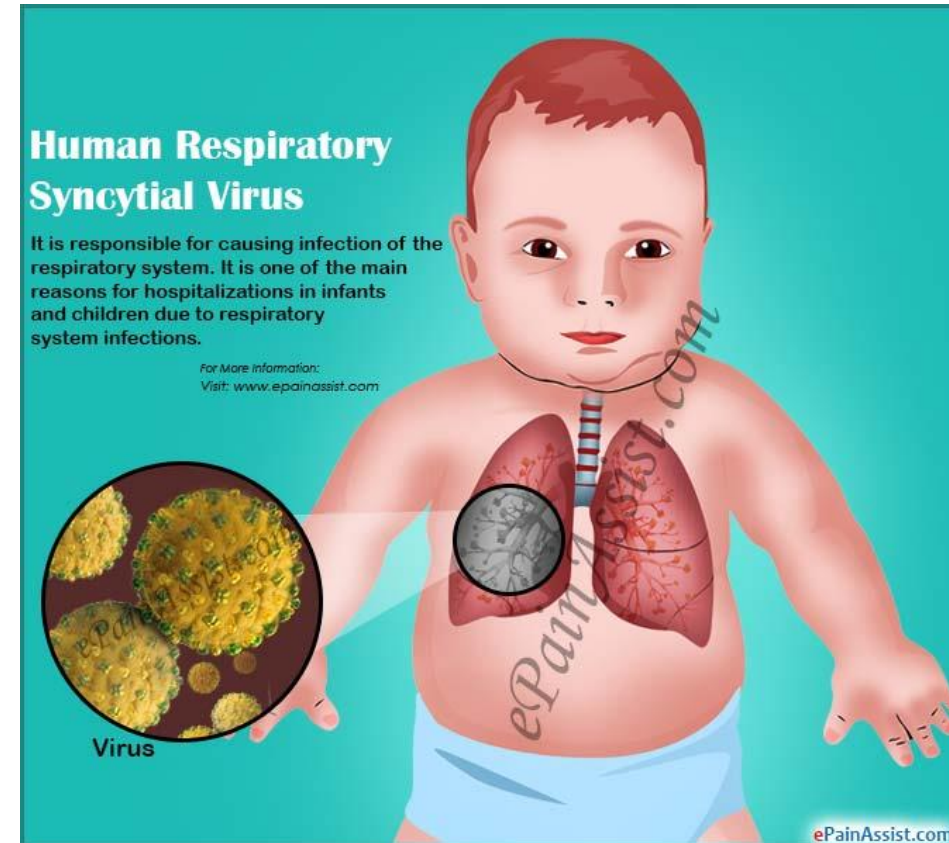


1. Identify an antiviral of choice for this case.

- Ribavirin

2. Could it be used in pregnancy?

- No it's teratogenic



Oral thrush

Mention antifungal used only by topical application for this case .

- Nystatin

Explain why?

- Not absorbed orally and too toxic if taken parenterally



leprosy

Enumerate 3 drugs used in therapeutic regimen of this case.

Dapsone-Clofazimine-Rifampicin

This should be for at least 2 years



Mention one anti-TB drug that can cause this condition?

- Isoniazid

How can you treat this condition?

- By Vitamin B6 supplementation



Mention one antibiotic that may result in this condition.

- Rifampicin

Mention the prophylaxis use of this drug.

- Meningococcal infection

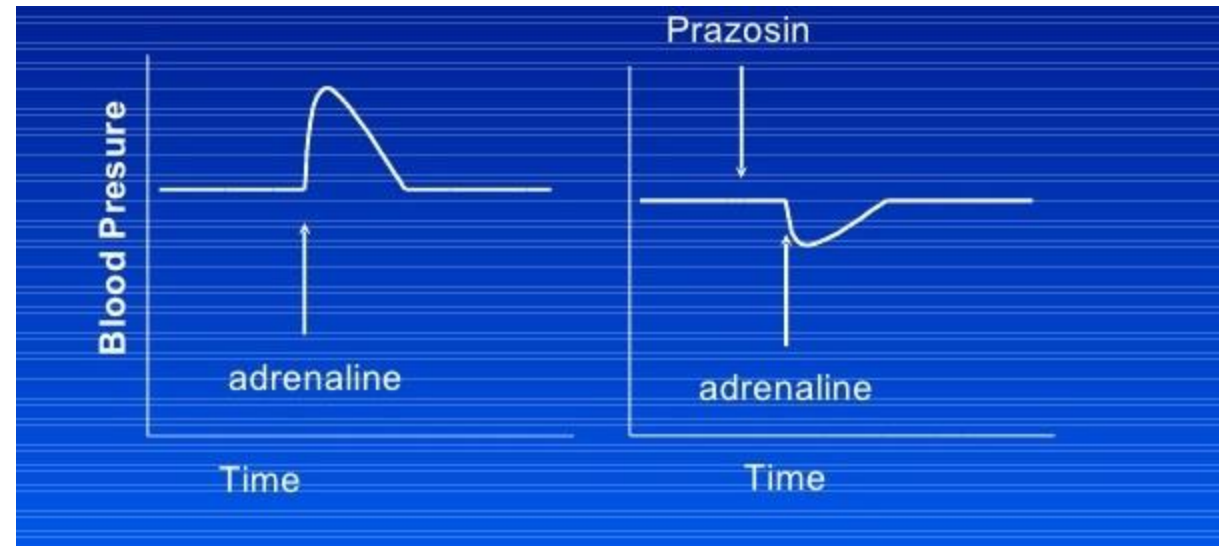


What is this reaction?

- Adrenaline Reversal

Explain

- After administration of a blocker (Prazosin) adrenaline only stimulates B receptors leading to generalized VD and so hypotension instead of hypertension



In which of those types of shock Adrenaline is indicated and contraindicated respectively ?

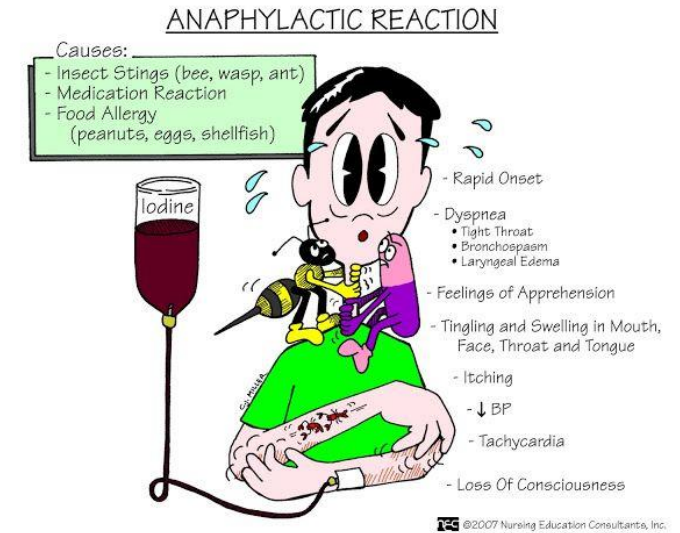
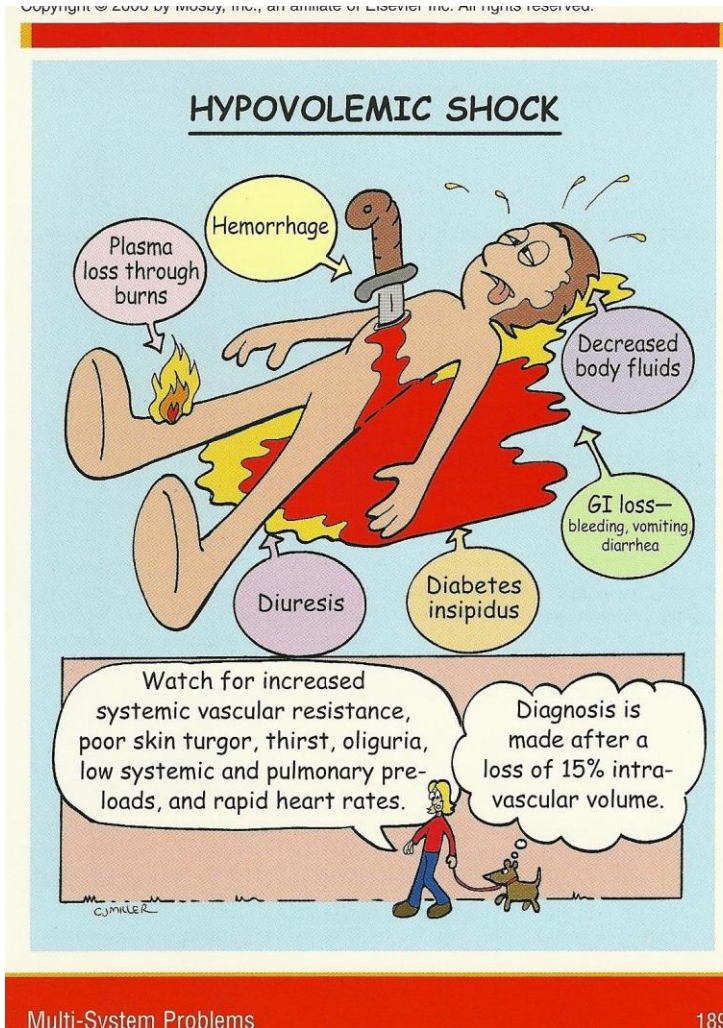
Indicated :Anaphylactic shock

Contraindicated : hypovolemic shock

Why?

Indicated in anaphylactic because its physiological antagonist of histamine opposing bronchoconstriction and vasodilatation actions of it

Contraindicated in hypovolemic because it causes Vasoconstriction that decreases blood flow to organs leading to their failure (e.g. renal failure)



What are the precautions during administration of this drug?

- Avoid sudden stop
- Avoid extravasation
- Monitor vital signs as blood pressure and ECG



Mention 4 drugs in which sudden stop
should be avoided ?

B-blockers

Corticosteroids

Noradrenaline

Nitrates



Ritodrine is prescribed for pregnant female to Relax uterus and prevent premature labor by its action as B2 stimulant (Agonist)

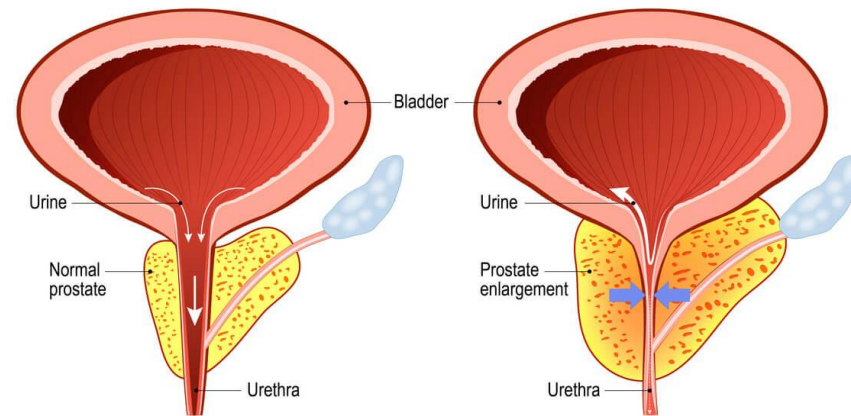


Please share your
Ritodrine
Stories



This disease could be treated by α_1 -blocker
such as Prazosin

BENIGN PROSTATIC HYPERPLASIA



Which member of B-blockers is of choice and prescribed for thyrotoxicosis ?

- Non selective B-blockers as propranolol

Why?

- Treat tachycardia and decrease cardiac work
- Inhibition of T3 – T4
- Treat nervous manifestations as anxiety and tremors
- No ISA

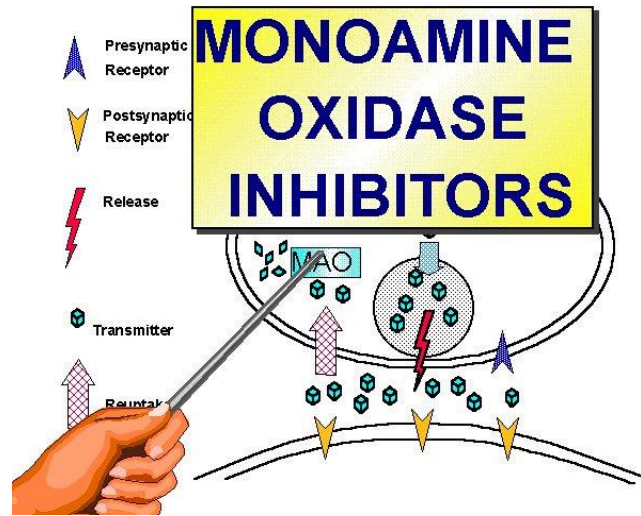


What will happen if this drug is given with MAOIs?

- Severe hypertension

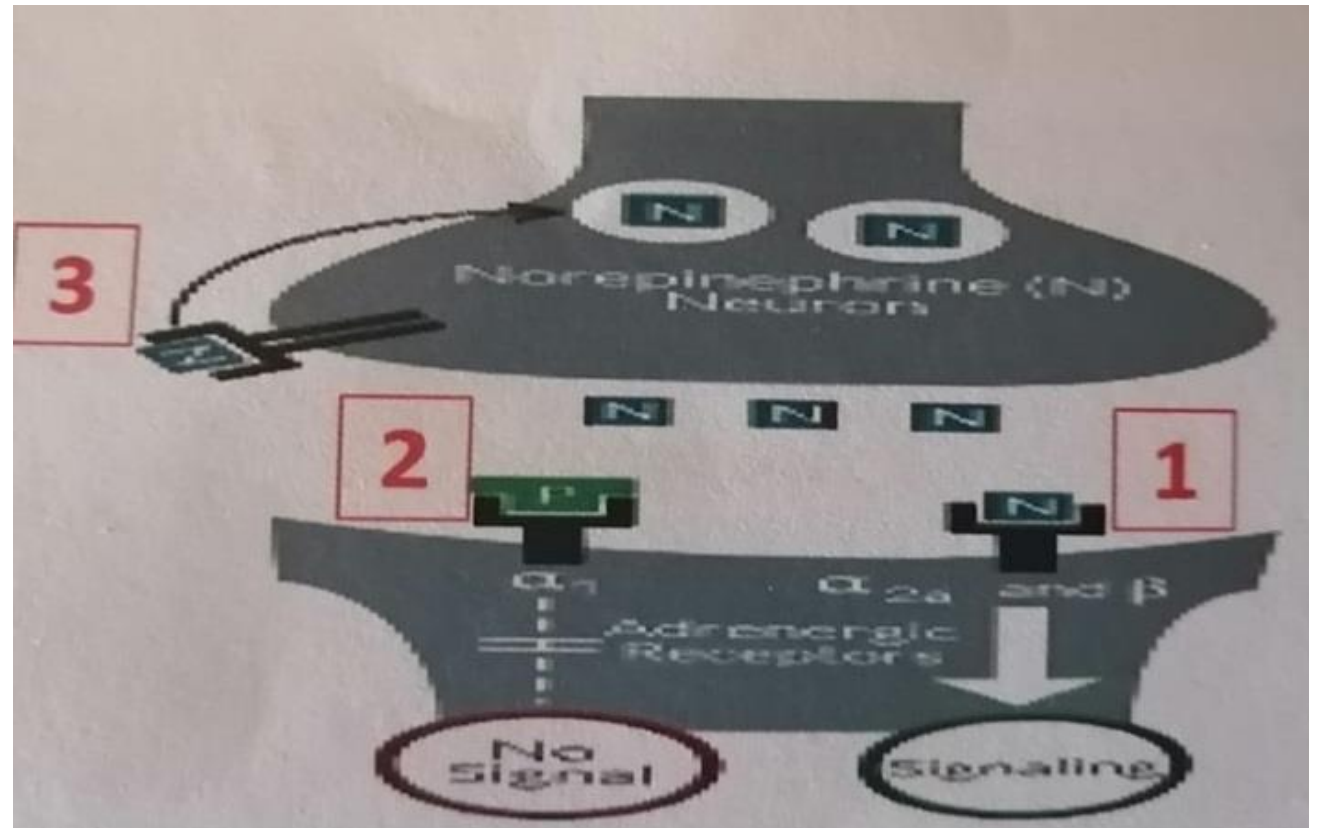
Why?

- Due to reserpine reversal due to blocked noradrenaline metabolism



1,2,3 are classes of autonomic drugs with different mechanisms . Mention example for each

1. Adrenaline
2. Prazosin
3. α -methyl DOPA



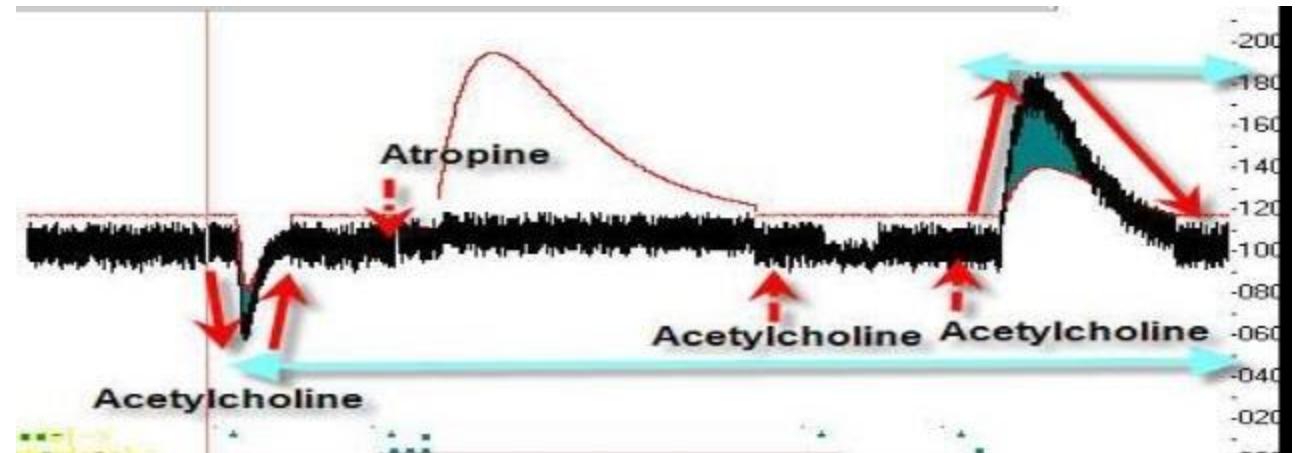
The following diagrammatic presentation of blood pressure changes in a dog.

What is the effect called ?

- A.Ch reversal

How?

- Atropine blocks muscarinic receptors making A.Ch only acts on nicotinic receptors as that of adrenal medulla (Nn) releasing adrenaline and noradrenaline causing hypertension instead of hypotension caused by A.Ch under normal condition

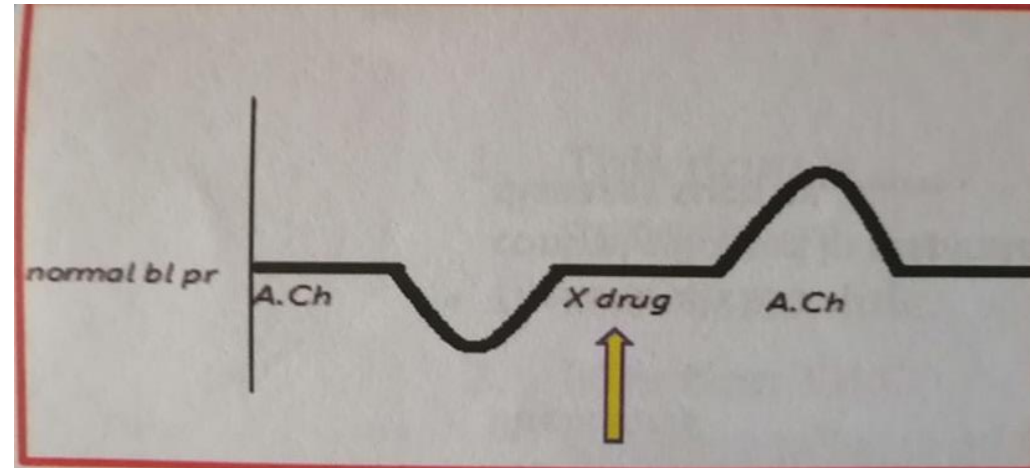


What is the drug X?

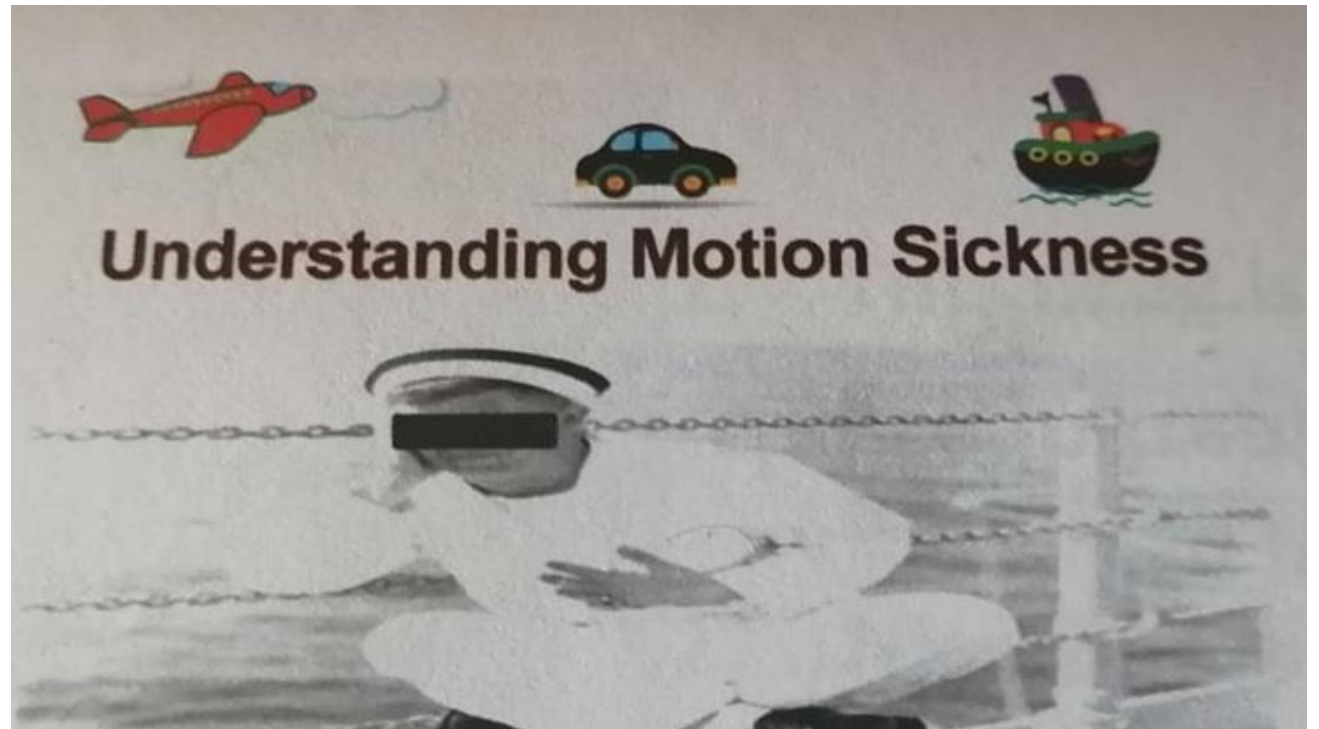
- Atropine

Why A.Ch increase blood pressure after addition of X?

- Atropine blocks muscarinic receptors making A.Ch only acts on nicotinic receptors as that of adrenal medulla (Nn) releasing adrenaline and noradrenaline causing hypertension instead of hypotension caused by A.Ch under normal condition



Dimenhydrinate(Dramamine) is the drug of choice for treatment of this condition. It belongs to first generation antihistaminic class of drugs



Mention 2 drugs of atropine substitutes used in renal and intestinal colic?

- Hyoscine butyl bromide
- Oxphenonium

What is the advantage over atropine?

- They are quaternary ammonium compounds so don't pass BBB less systemic side effects especially on CNS



Mention one atropine substitute better used in nocturnal enuresis?

- Solifenacin

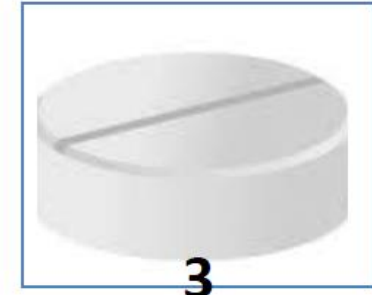
Explain its mechanism

- Blocks M3 receptor leading to relaxation of the UB wall and contraction of the sphincter



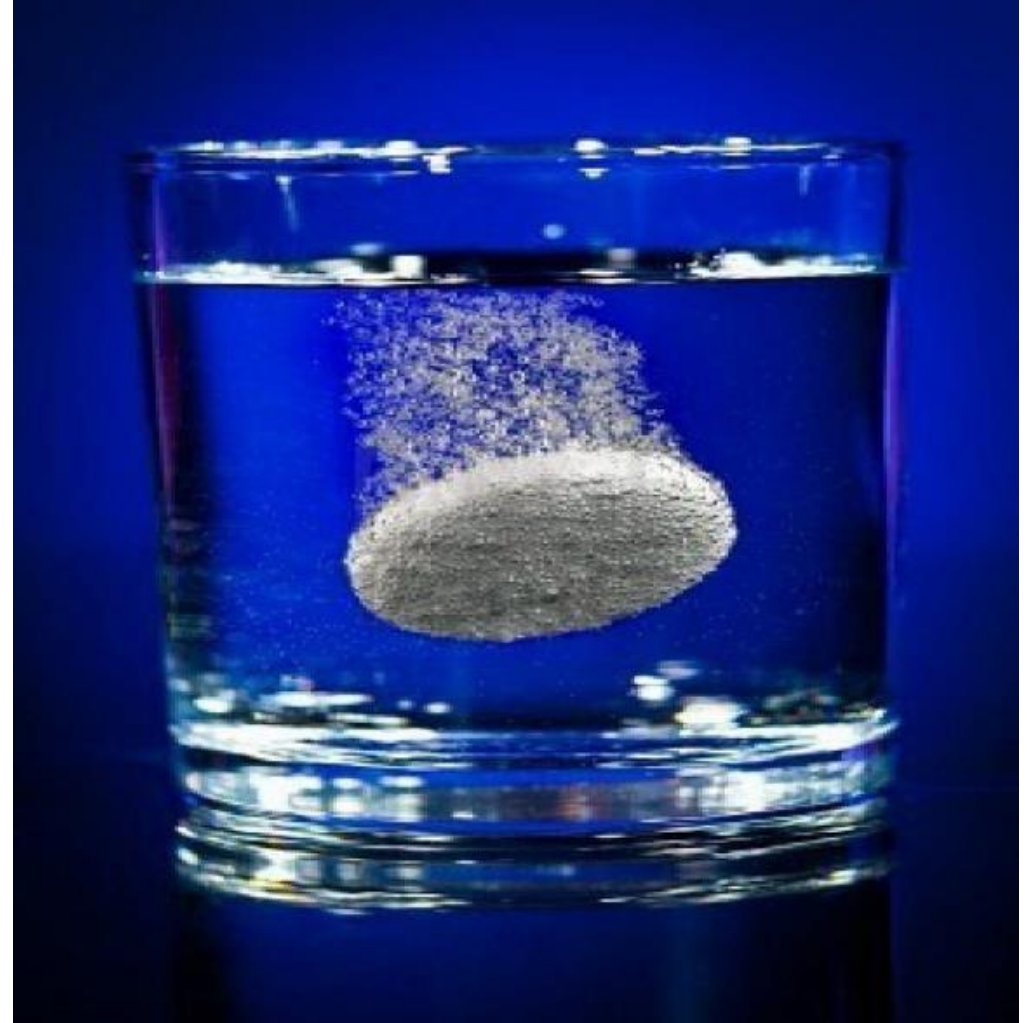
Each image shows dosage form Mention them

1. Powder
2. Effervescent tablets
3. Tablet
4. Hard gelatin capsule
5. Soft gelatin capsule



What are the advantages of this drug form ?

- Mask Bad taste of drug
- Ensure complete dissolution



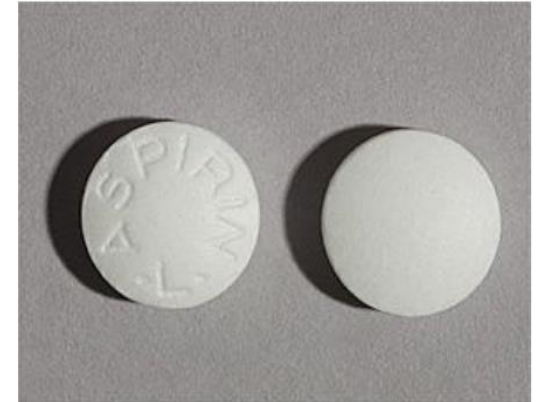
What is the difference between the two tablet forms ?

- Enteric coated aspirin is covered by acid resistant coat to dissolve in alkaline intestine and protect stomach from aspirin irritant effects

Aspirin enteric coated



Aspirin (non-coated)



What is the dosage form of each image and what is the difference ?

1. Suspension: insoluble powder suspended in water by aid of emulsifying
2. Syrup: sweetened ,colored ,flavoured aqueous solution

1



2



What is the dosage form of each image and what is the difference?

1. Ampule: for single use
2. Vial : for singled or multiple uses

1



2



What is the dosage form ?

- Transdermal patch

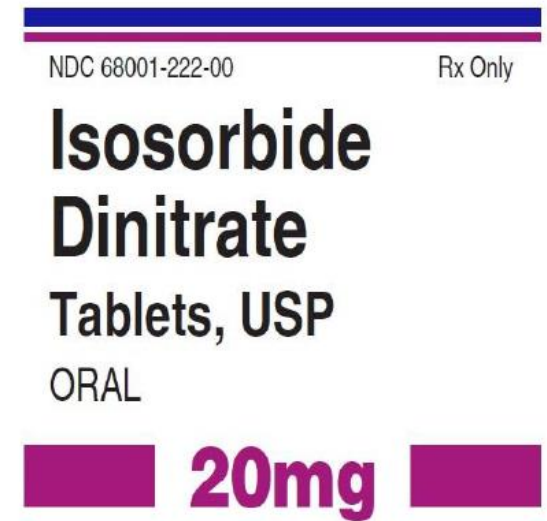
Mention 3 drugs used by this route ?

- Nicotine
- Hyoscine
- Nitroglycerine



What is the advantage of extended release tablet over usual tablets ?

- Drug is enclosed with coats of different dissolution rates so slow uniform absorption with long duration ,less fluctuation in serum level and better patient compliance



What are the advantages of rectal drug administration ?

- Useful in vomiting ,uncooperative or comatose patients
- Escape gut and liver first pass
- Useful in mild irritant drugs



What is the advantage of sublingual route of drug administration ?

- Absorption is relatively rapid
- Escape first pass metabolism and pass directly to systemic circulation
- One can spit or swallow the drug after obtaining desired effect

Mention 3 drugs used by his route ?

- Nitroglycerine
- Nifedipine
- Captopril



What are the criteria of the drug used by this route ?

- Non-irritant
- Aqueous
- Fine suspension

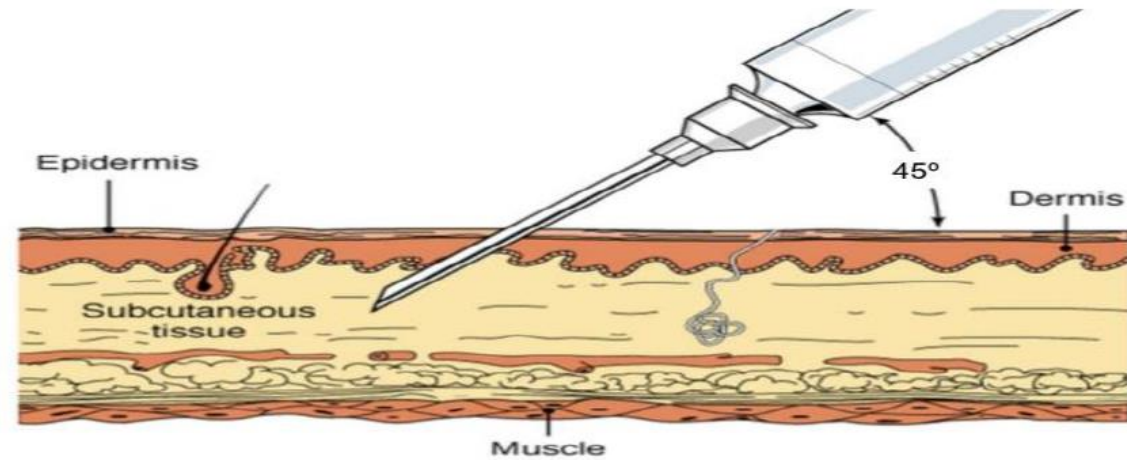
How to enhance absorption from this route ?

- Solution
- Massage
- Heat
- Hyaluronidase enzyme

How to slow absorption through this route?

- Suspension
- Cold
- VC drugs (e.g. adrenaline)
- Shock
- Gelatin

Subcutaneous Injection

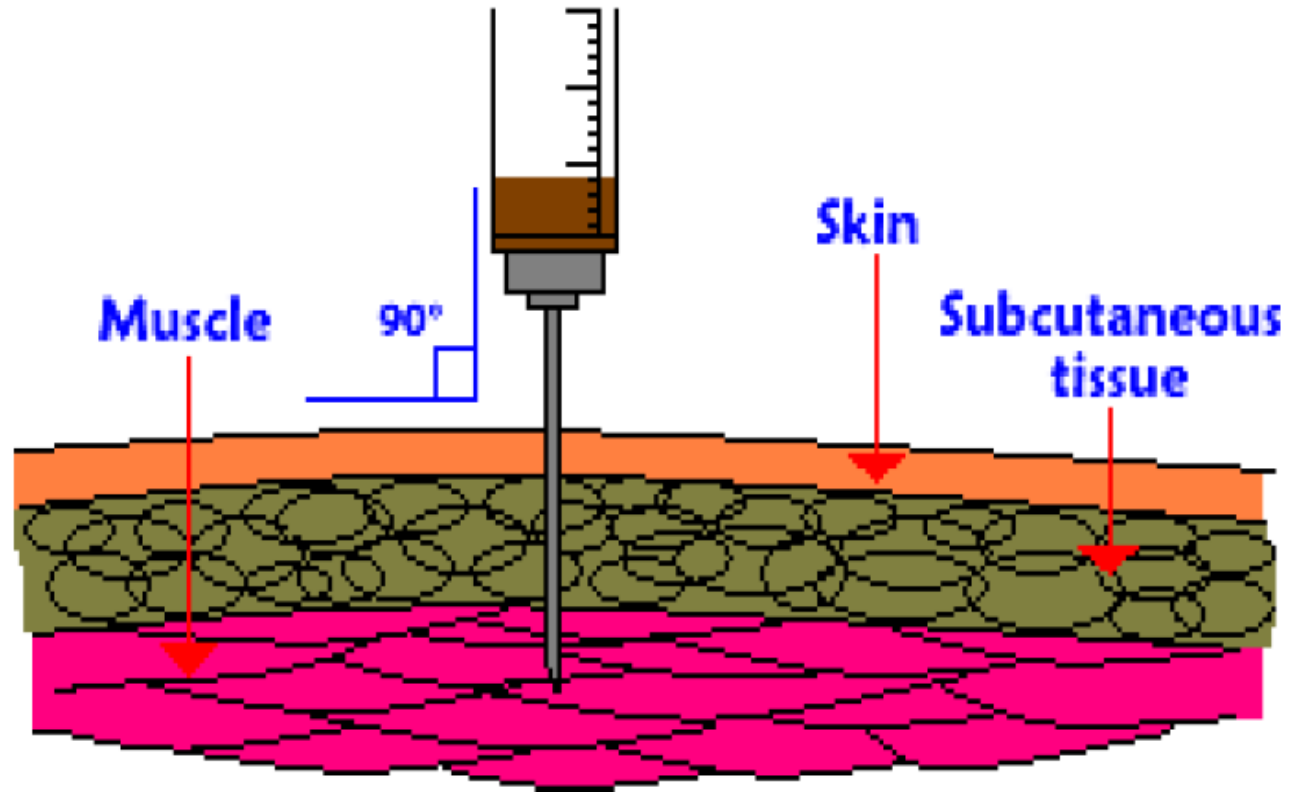


What are disadvantages of IV route of administration?

- If extravasated or very irritant may cause thrombophlebitis ,severe pain and inflammation
- Transmission of serious diseases (viral hepatic infections and AIDS)
- Rapid IV may cause velocity reactions as cardiac arrhythmia with aminophylline
- May cause anaphylactic shock
- Air embolism
- Higher concentration and toxicity for vital organs



Some drugs aren't suitable for IM injection ,
for example **Diazepam** and **Phenytoin**
because they bind to muscle protein and
cause erratic absorption



Mention 2 drugs used by this route ?

- Salbutamol
- General anesthesia

Why this route results in excellent absorption ?

- Due to high vascularity and high surface area of alveoli and thin porous membranes





What is the name of this route ?

- Subcutaneous pellet implantation

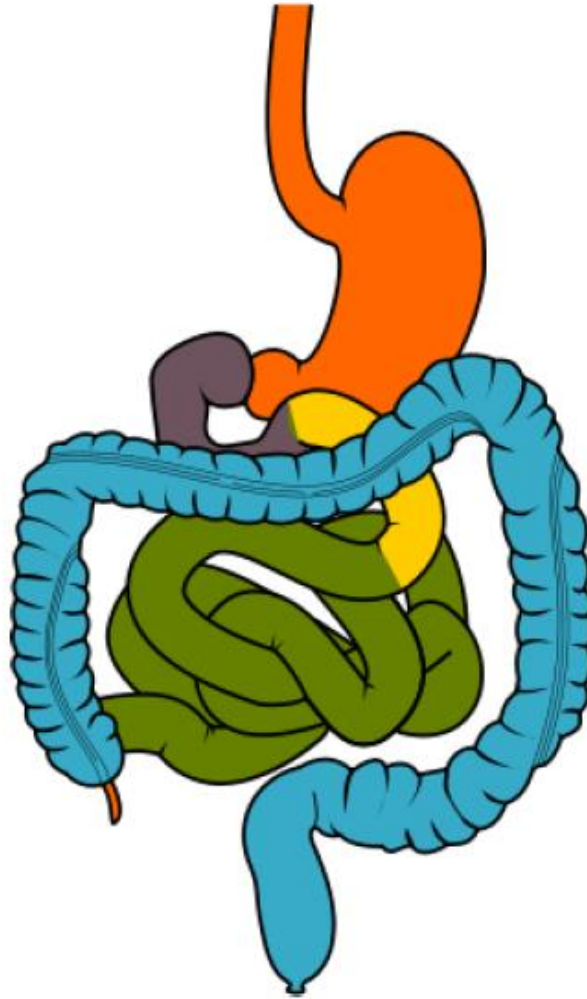
Mention drug example of this route and how drug reaches blood ?

- DOCA – contraceptives - testosterone
- this provides sustained release of the drug over months or weeks slowly and uniformly to blood



What are the differences between free and protein bound drugs ?

- Free : active , metabolized , filtered and excreted
- Bound : not active , not metabolized , not filtered and not excreted

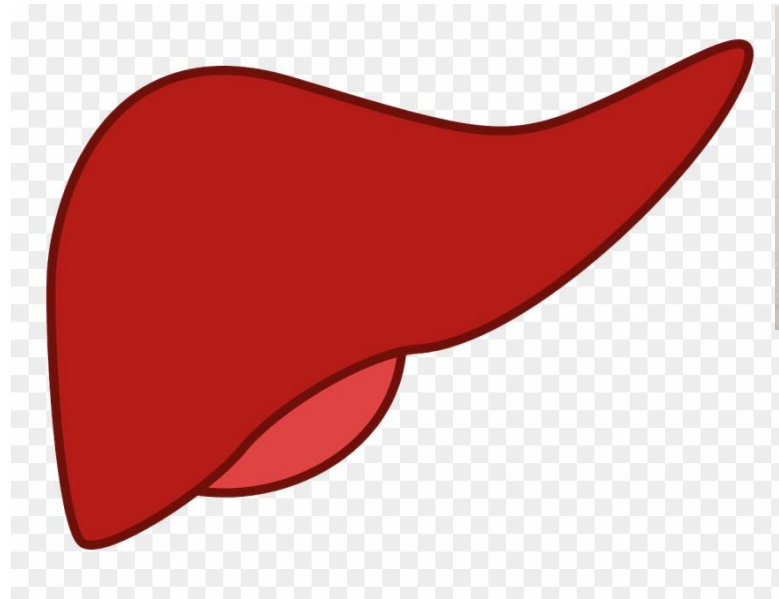


How the pH of stomach and intestine affect drug absorption ?

- Acidic stomach increases absorption of acidic drugs (e.g. aspirin and barbiturates)
- Intestinal alkalinity increases absorption of alkaline drugs (e.g. ephedrine and amphetamine)

Mention two examples of hepatic microsomal enzyme inducers ?

- Phenytoin
- Carbamazepine
- Tobacco smoke

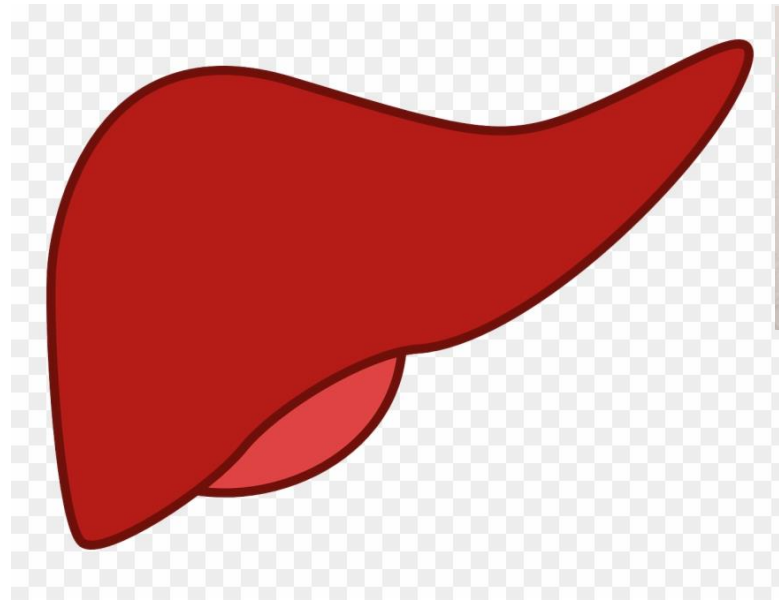


**Cytochrome
p450**



Mention two examples of hepatic microsomal enzyme inhibitors ?

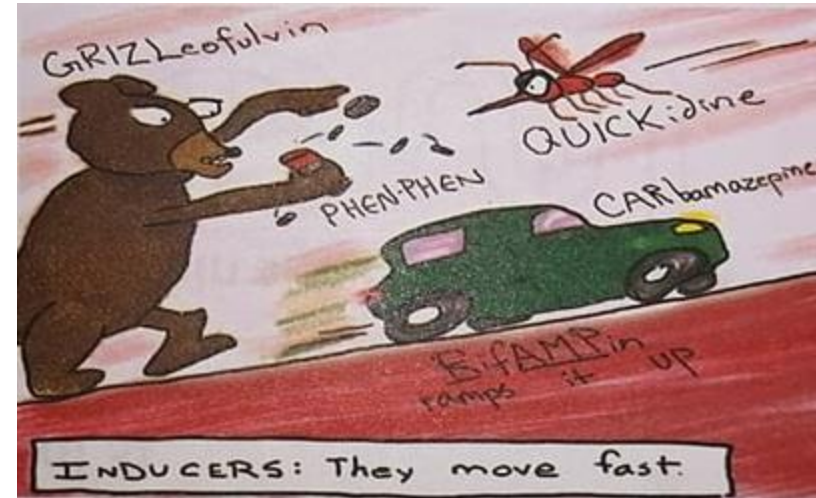
- Erythromycin
- Cimetidine
- Chloramphenicol



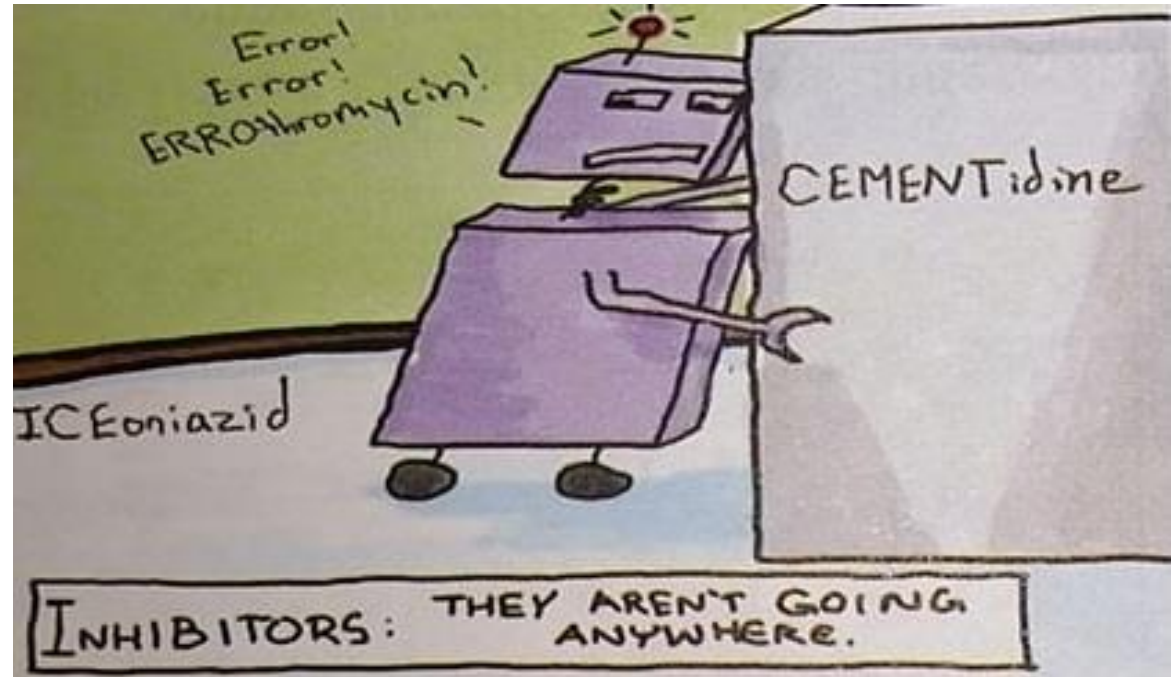
**Cytochrome
p450**



With any of those HME inducers the dose of concurrent drug should be **increased**



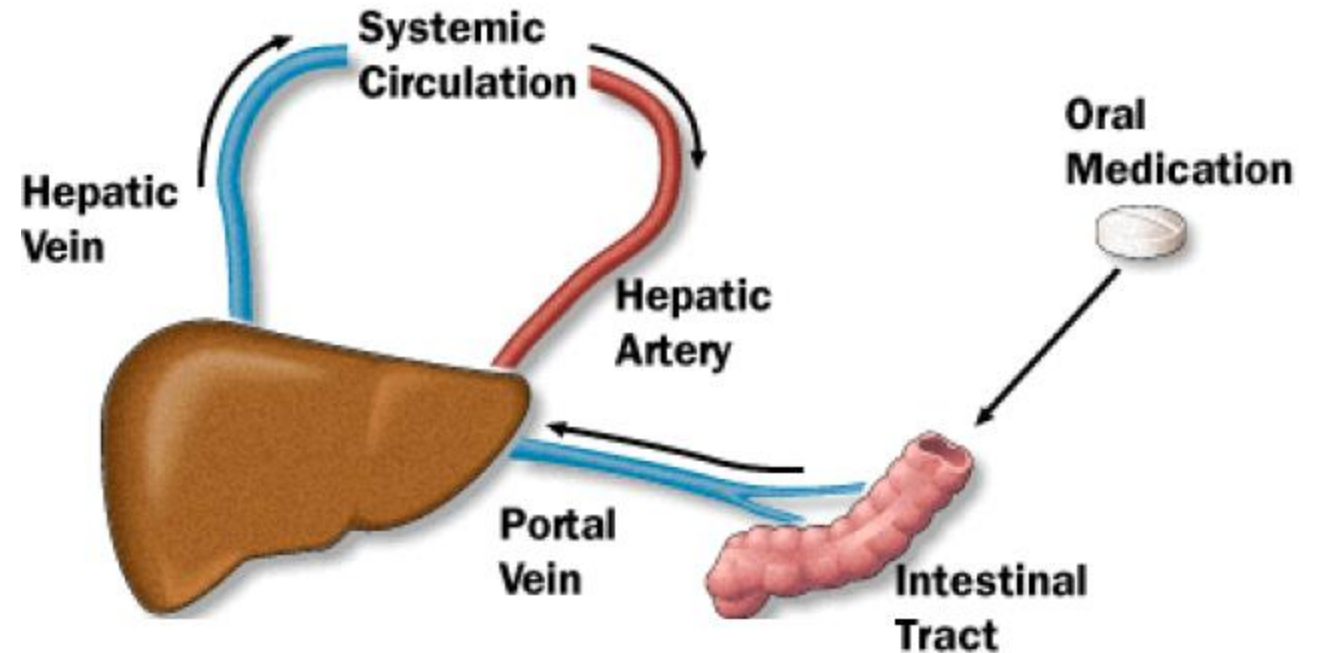
With any of those HME inhibitors the dose of concurrent drug should be **decreased**

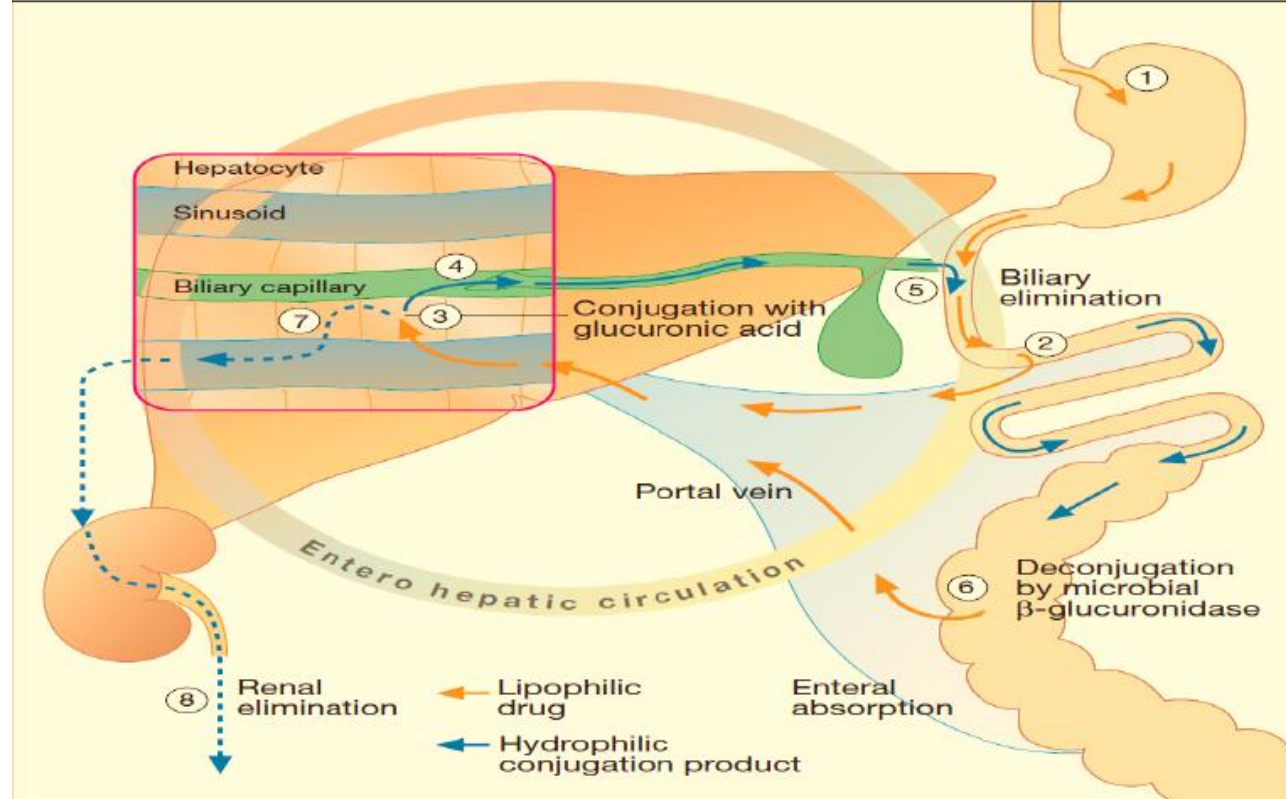


1. This is called **first pass metabolism** and leads to decrease concentration of the drug in systemic circulation / bioavailability
2. Mention 3 drugs that undergo this effect
 - Morphine
 - Nitroglycerine
 - Propranolol
 - Lidocaine

How to overcome this effect ?

- Increase oral dose or use another route that escapes this effect (e.g. parenteral)



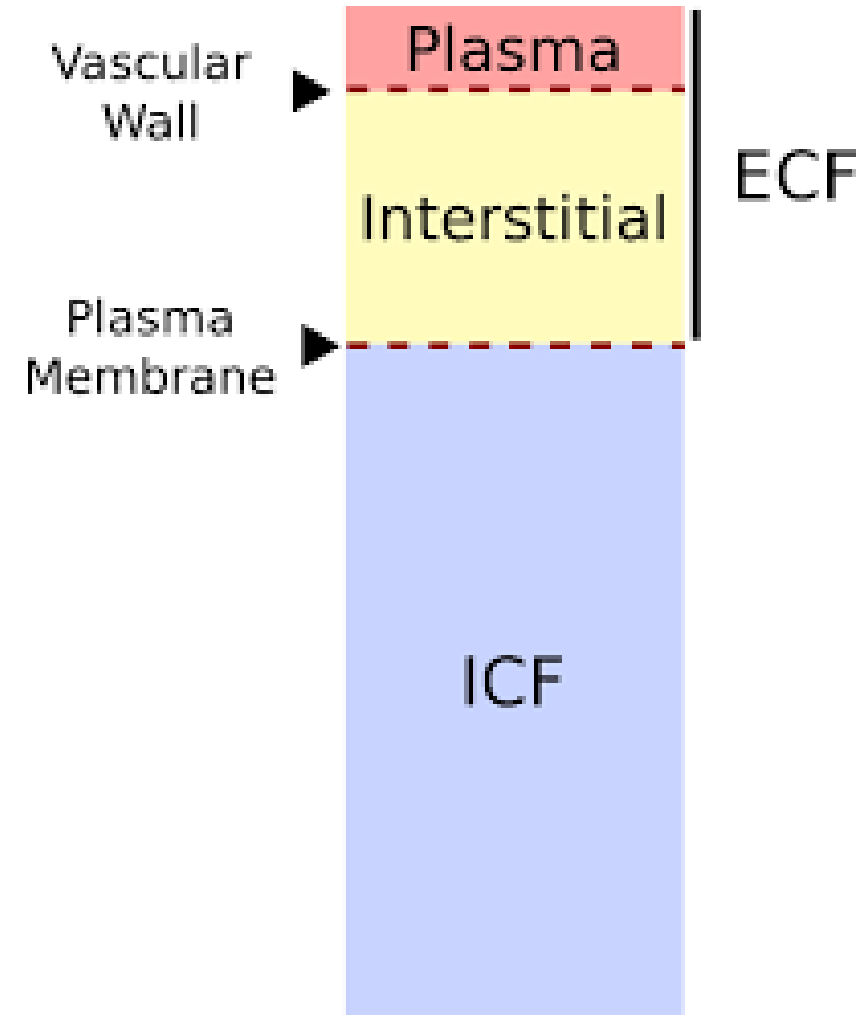


Mention three drugs that undergo enterohepatic circulation

- Rifampicin
- Morphine
- Digoxin

If certain drug has volume of distribution of 3L , so the main site of distribution is **plasma** (intravascular) (Low Vod)

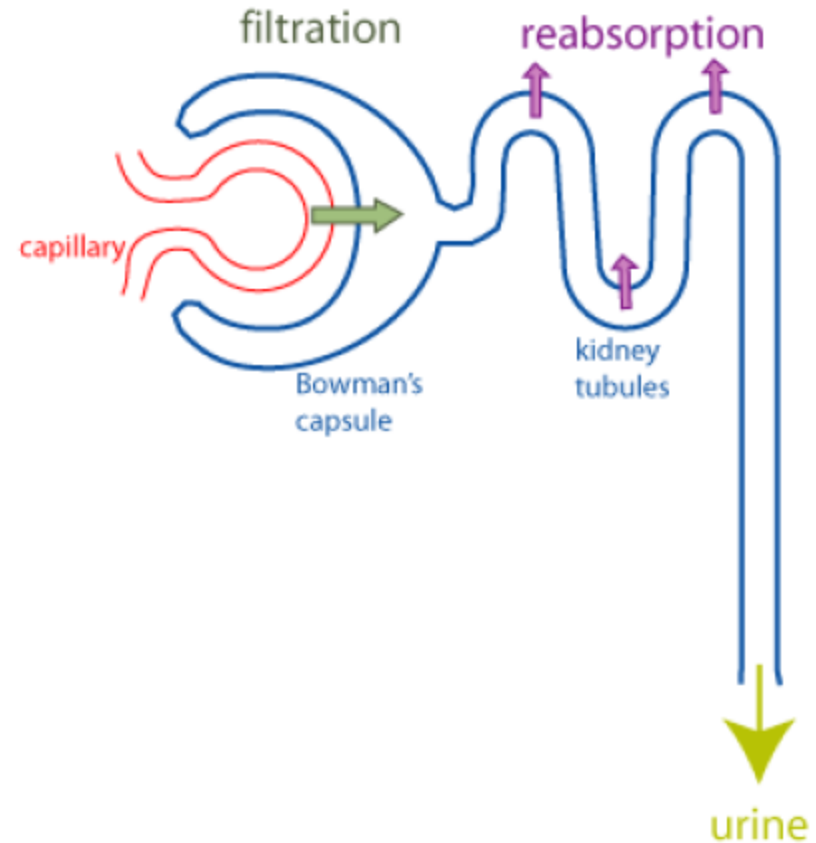
If certain drug has volume of distribution of 300L , so the main site of concentration is Intracellular fluid (ICF) (tissue protein) (high Vod)

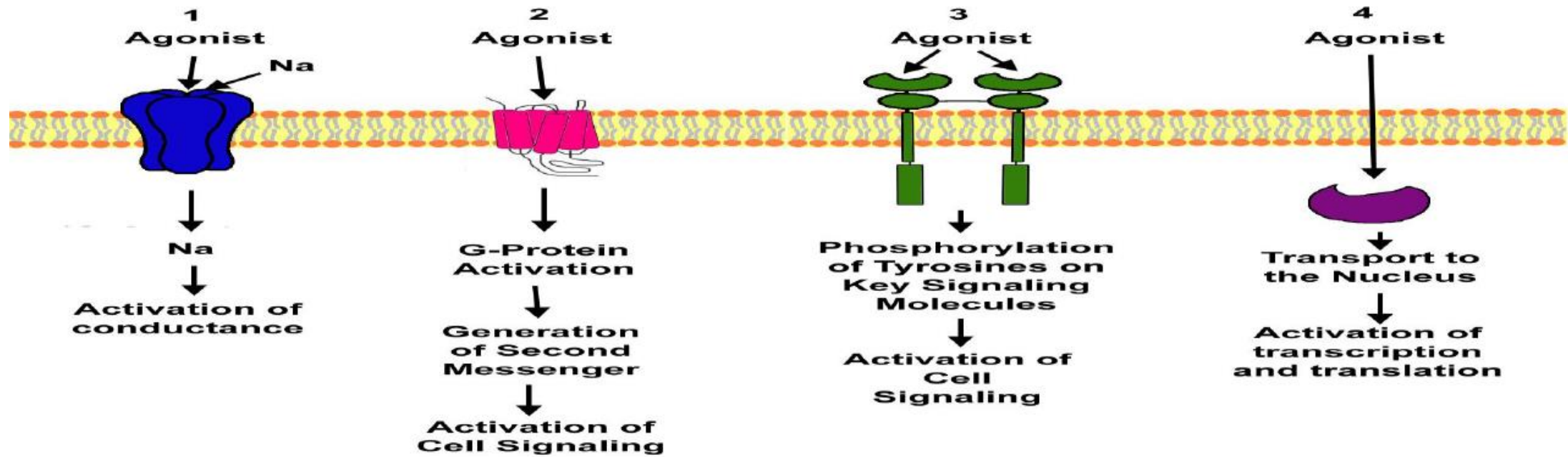


Mention how pH of urine affects drugs excretion? Mention example

- Weak bases ionize more and are less reabsorbed in acidic urine e.g. amphetamine
- Weak acids ionize more and are less absorbed in alkaline urine e.g. aspirin

Urine is alkalinized in barbiturate and salicylate poisoning to increase their excretion

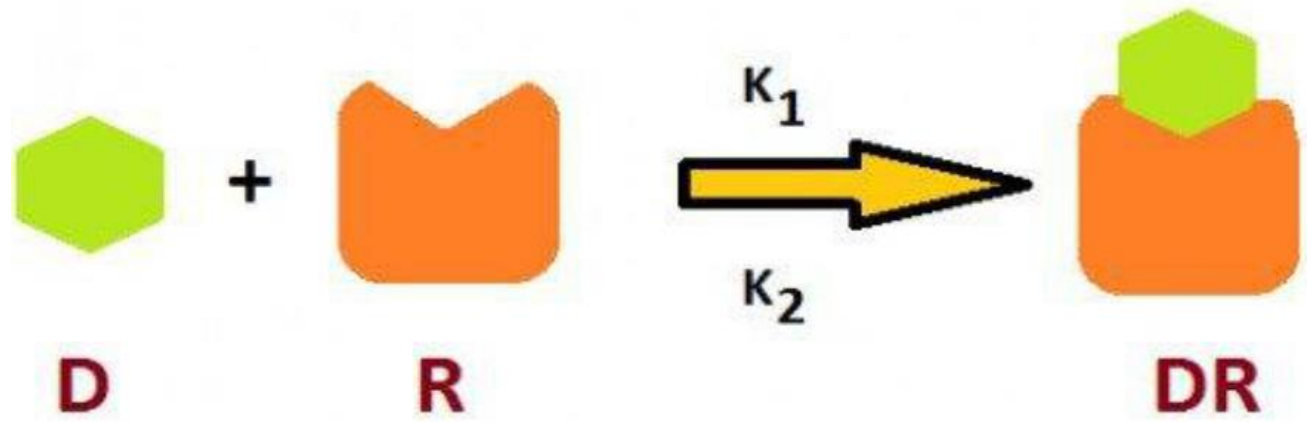




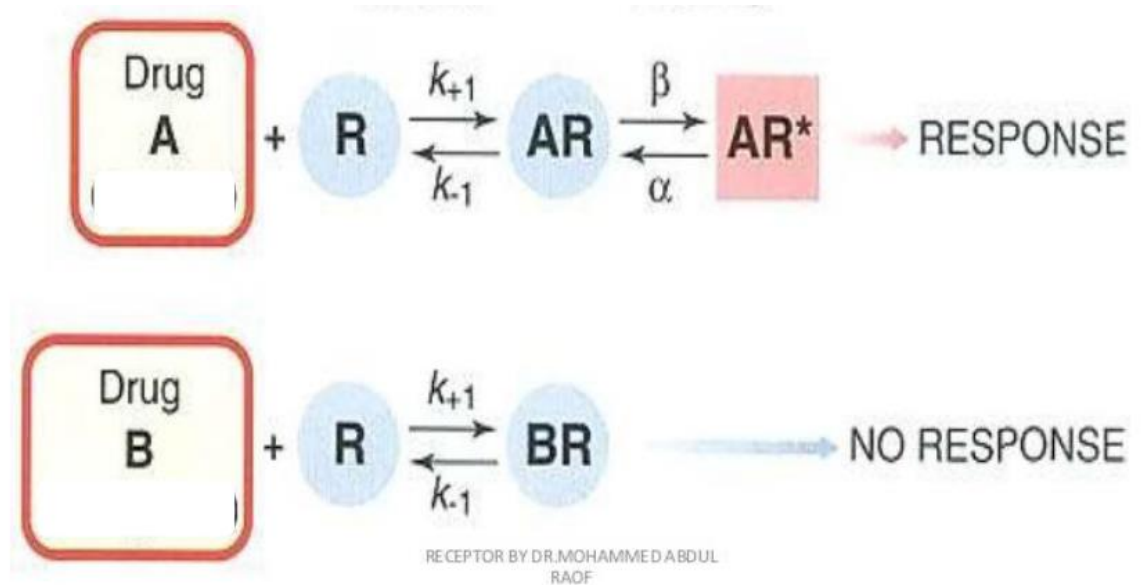
Mention drugs agonists examples acting on these receptors

1. A.ch on nicotinic receptors
2. Adrenaline on beta receptors
3. Insulin
4. Corticosteroids

The ability of drug to fit into receptor is called **affinity**, and the ability of drug receptor complex to give response is called **efficacy**



Drug A is considered **Agonist** , while drug B is considered **Antagonist**

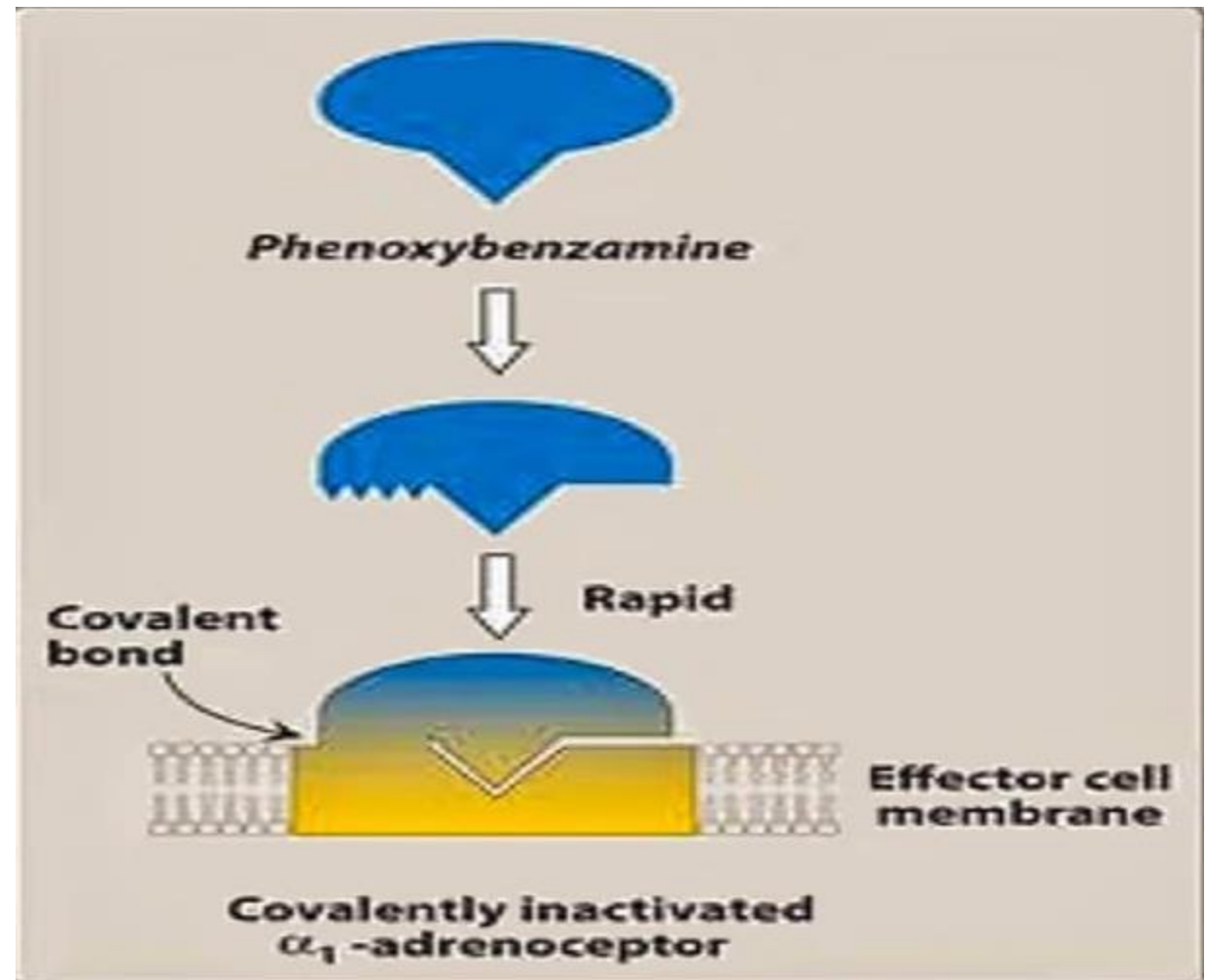


What is the type of block by phenoxybenzamine ?

- Irreversible noncompetitive by covalent bond

How it ends ?

- By resynthesis of new receptors



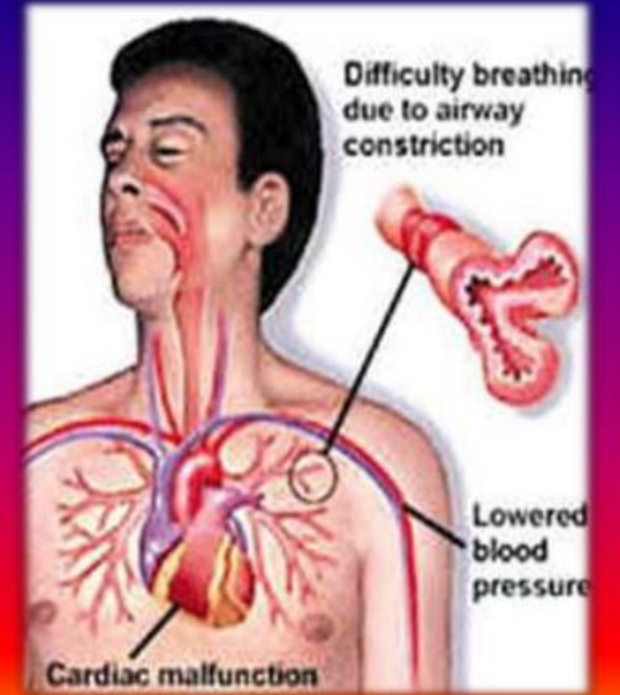
How to antagonize the effect of histamine without any effect on H1 receptors ?

- By Adrenaline

Which type of antagonism ?

- physiological

HISTAIME
↓
Anaphylactic Shock



Which kind of blockers is drug B is considered ?

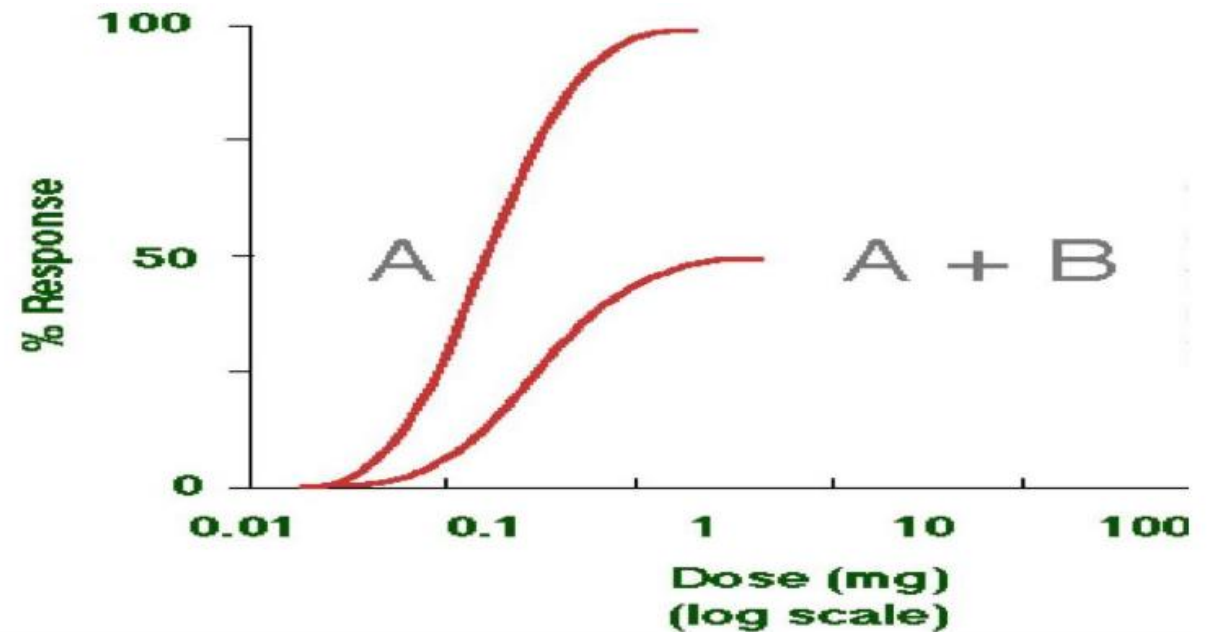
- Non competitive

What are the criteria of this type of blockers ?

- Decreased potency and efficacy
- Non parallel shift
- Not displaced by excess agonist

Mention 3 examples .

- Phenoxybenzamine
- Organophosphorus compounds
- Succinylcholine

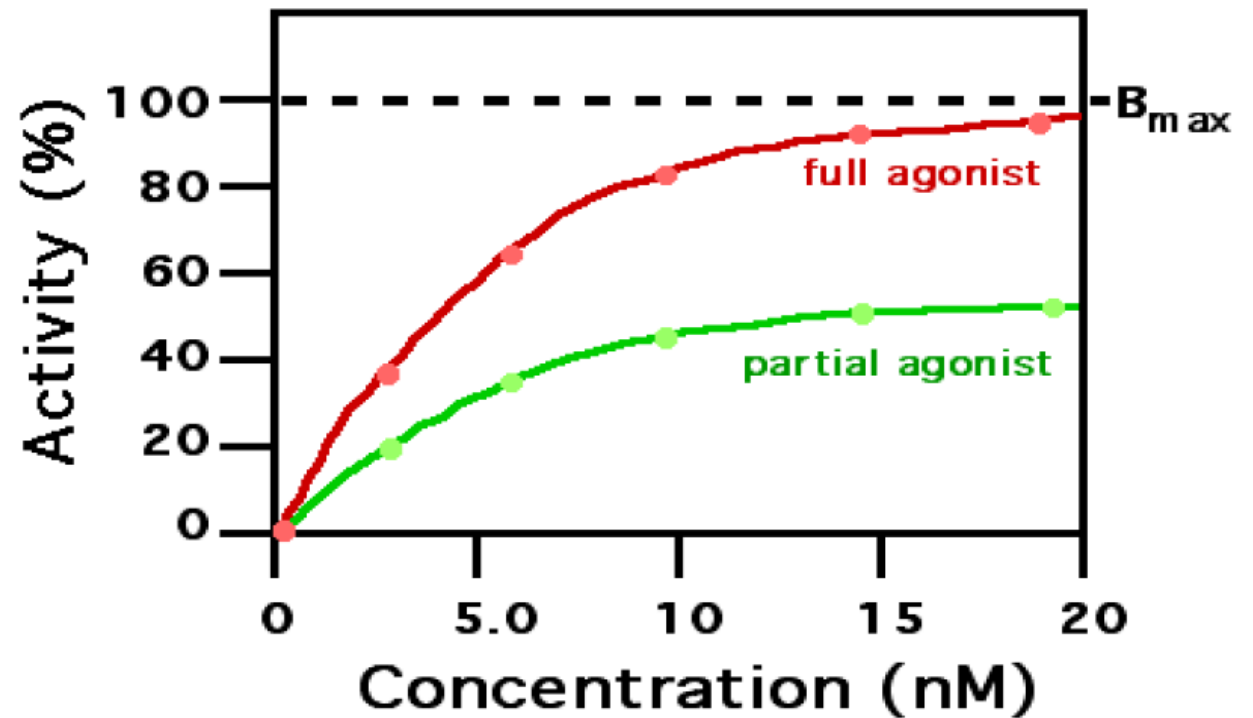


What are the criteria of partial agonist ?

- Low efficacy
- Moderate rate of association and dissociation
- Initial stimulation followed by block

Mention 3 examples

- Nicotine
- Succinylcholine
- Pindolol



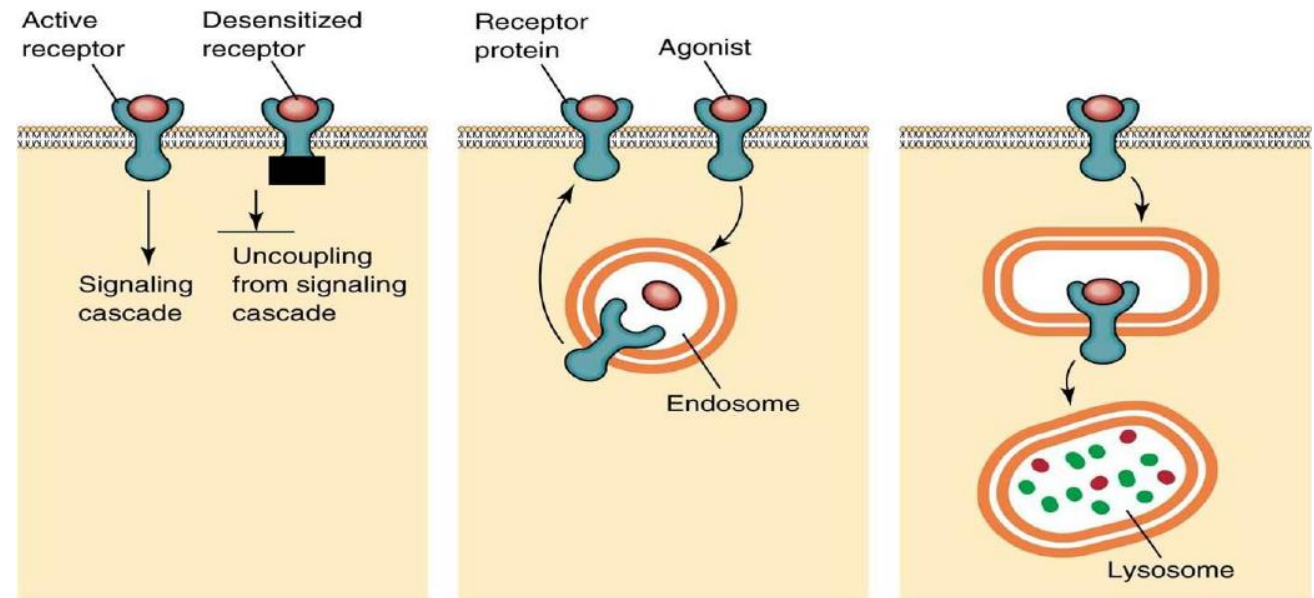
This image denote changes to the receptor.

What are these changes ? And Why?

- Down regulation of receptor due to long use of agonist

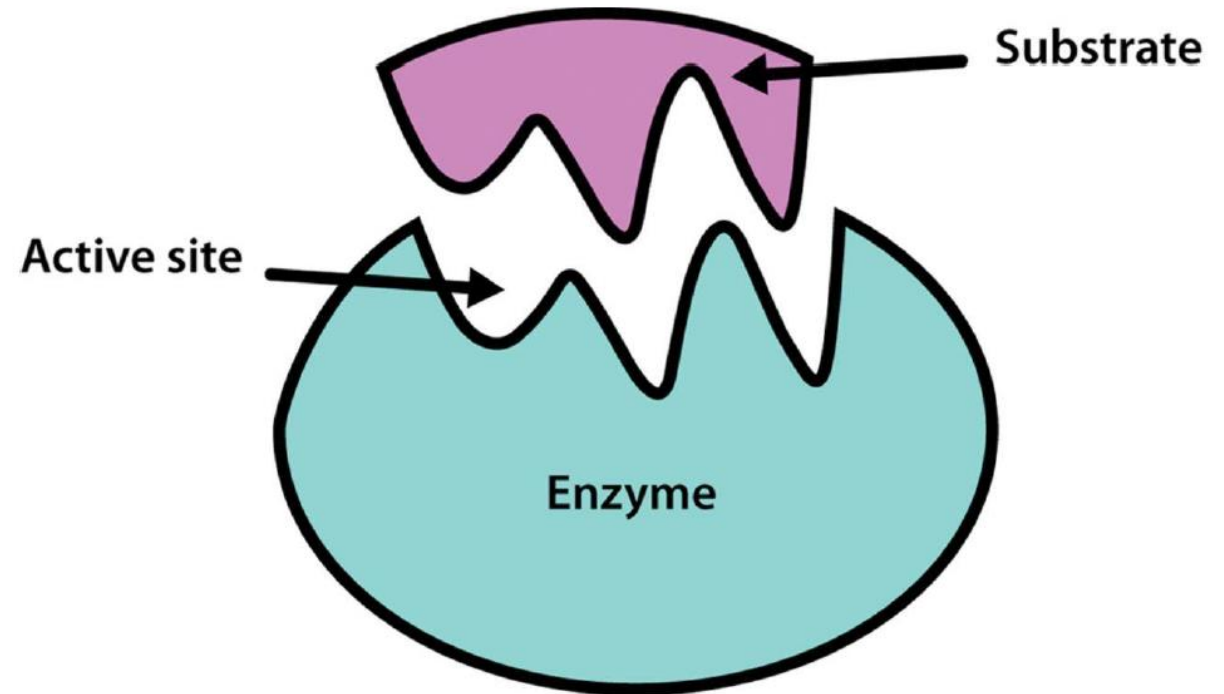
When the reverse occurs ?

- When antagonist is used for long periods proliferation of receptors occurs



Mention 3 drug examples which their mechanism of action is enzyme inhibition

- Aspirin on COX
- Captopril on ACE
- Physostigmine on Cholinesterase

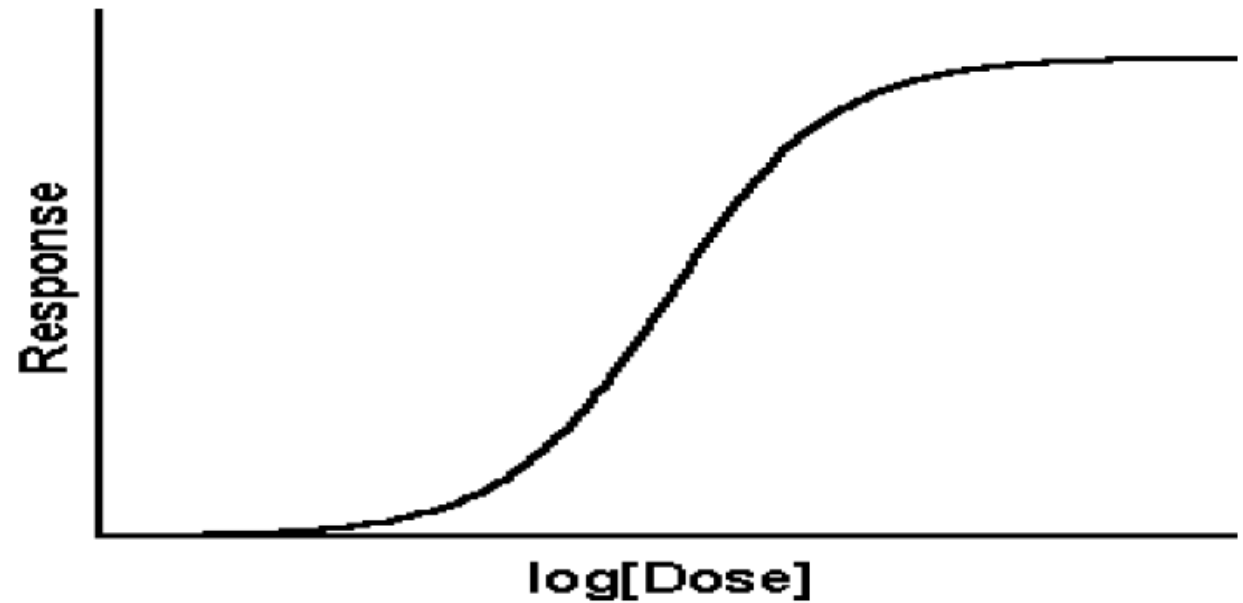


What is the name of this curve ?

- Dose response curve

What is the significance ?

- Useful in efficacy and potency determination and comparing of drugs , also determine type of blocker



What does EC50 mean ?

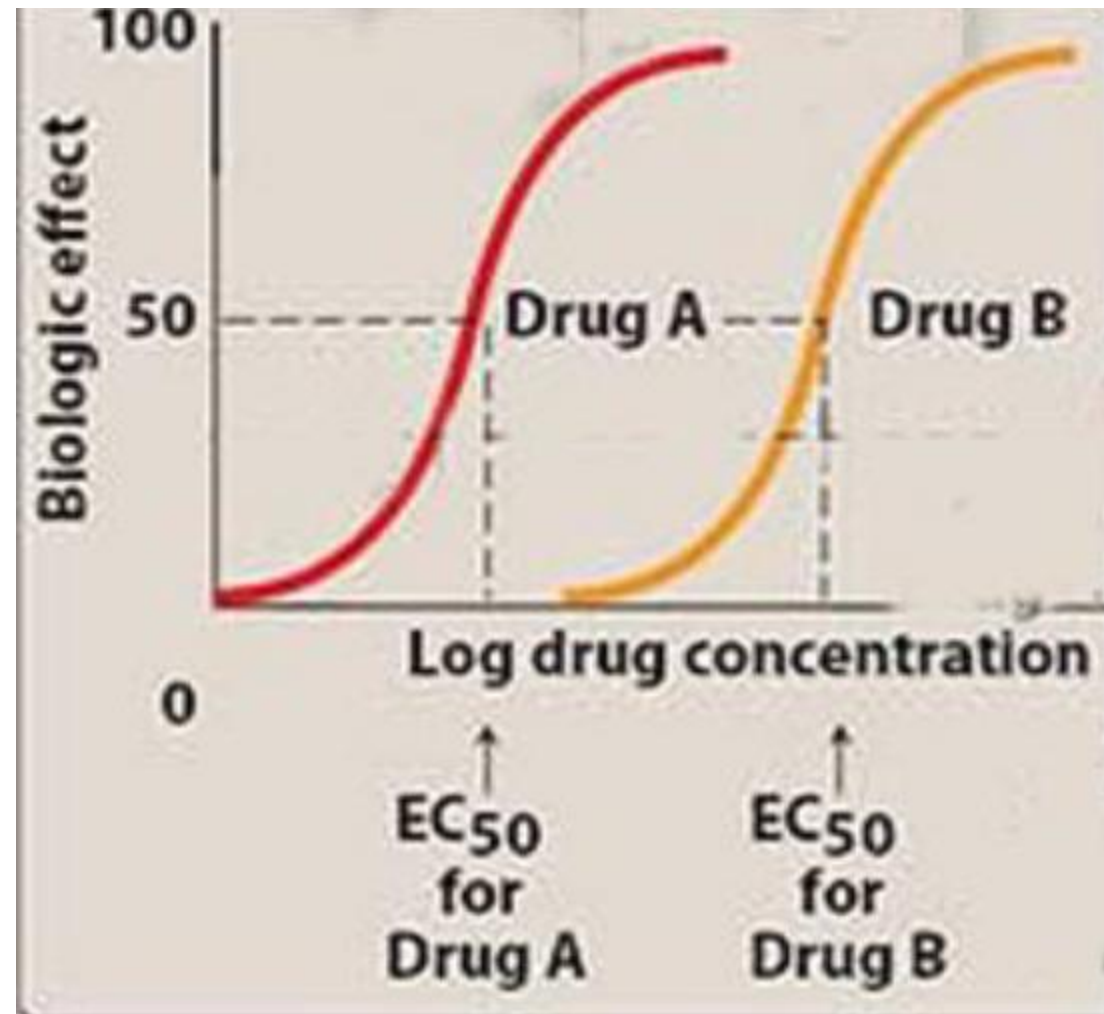
- Concentration producing 50 % of the effect

Which is more potent A or B ?

- Drug A

What is meant by potency ?

- The lower dose producing the same sub-maximal effect

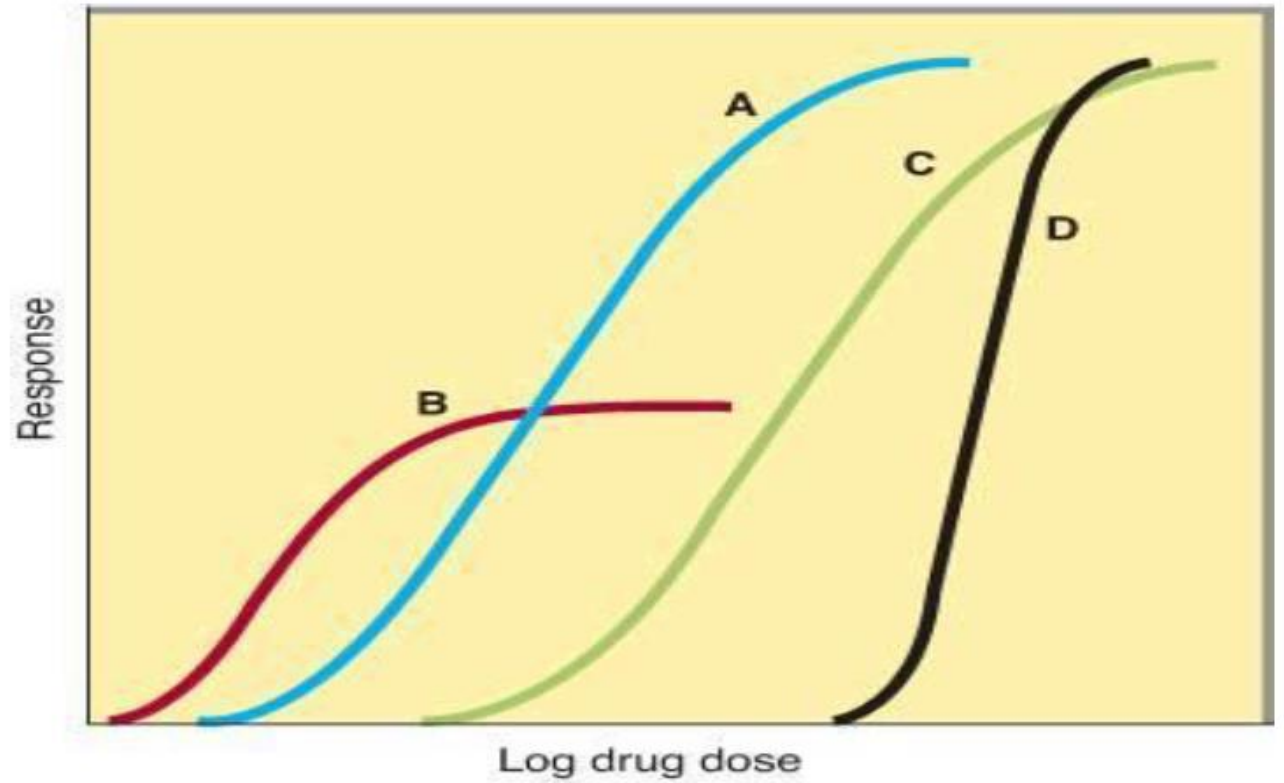


Which drug has the lowest efficacy ?

- B

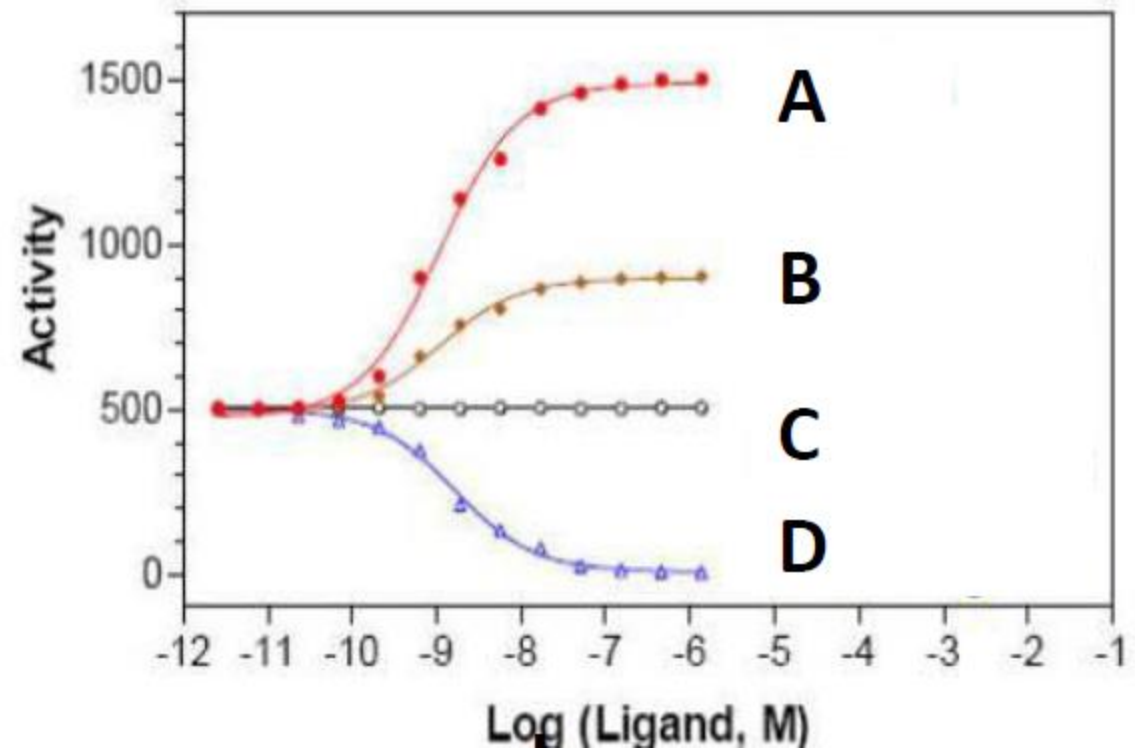
Which drug has the lowest potency ?

- D



From this dose
response curve :

- A. Agonist
- B. Partial Agonist
- C. Antagonist
- D. Inverse agonist

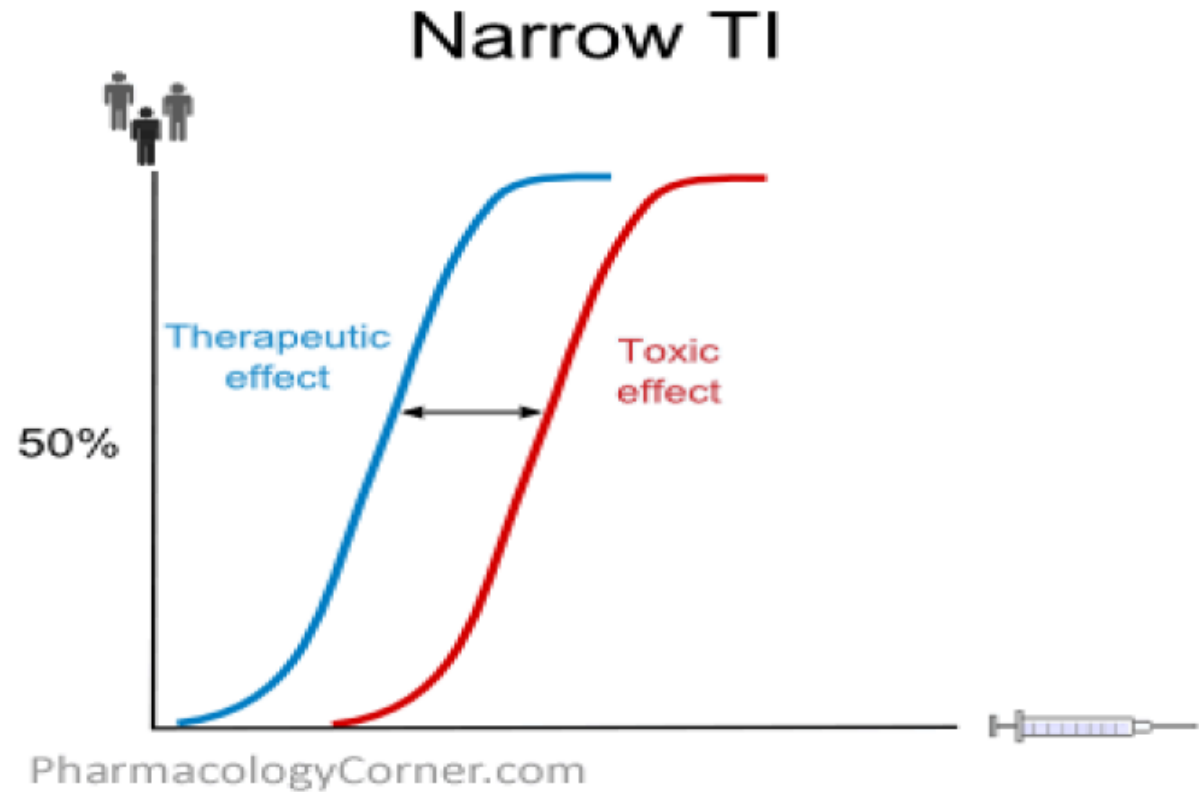


What is TI and its usefulness ?

- TI : therapeutic index
- Compare safety of drugs

How to calculate ?

- Calculated from ratio of lethal dose in 50% of animals to effective dose in 50% of animals



Which kind of blockers is B considered ?

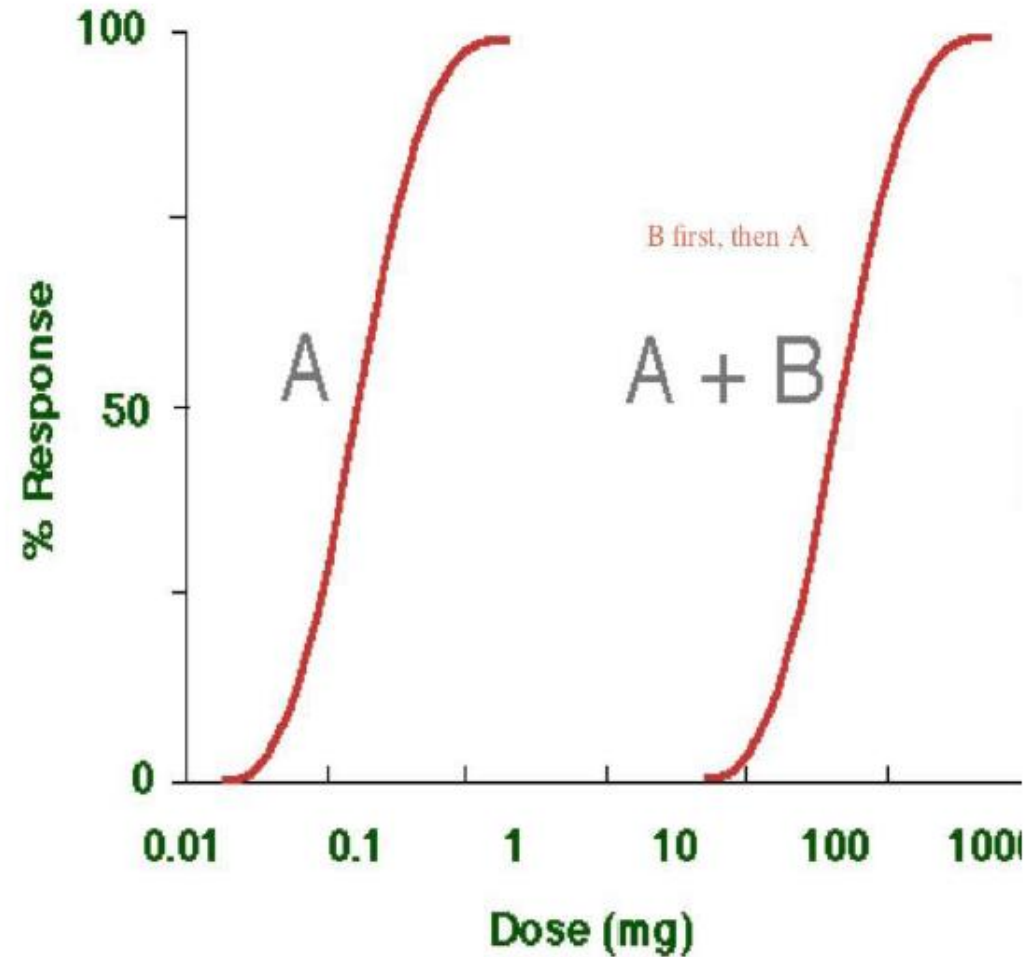
- Competitive

What are the criteria of this type of blocker?

- Reversible
- Displaced by excess agonist
- Decreased potency
- Same efficacy
- Parallel shift to right of dose response curve

Mention 3 examples

- Atropine
- Propranolol
- Naloxone



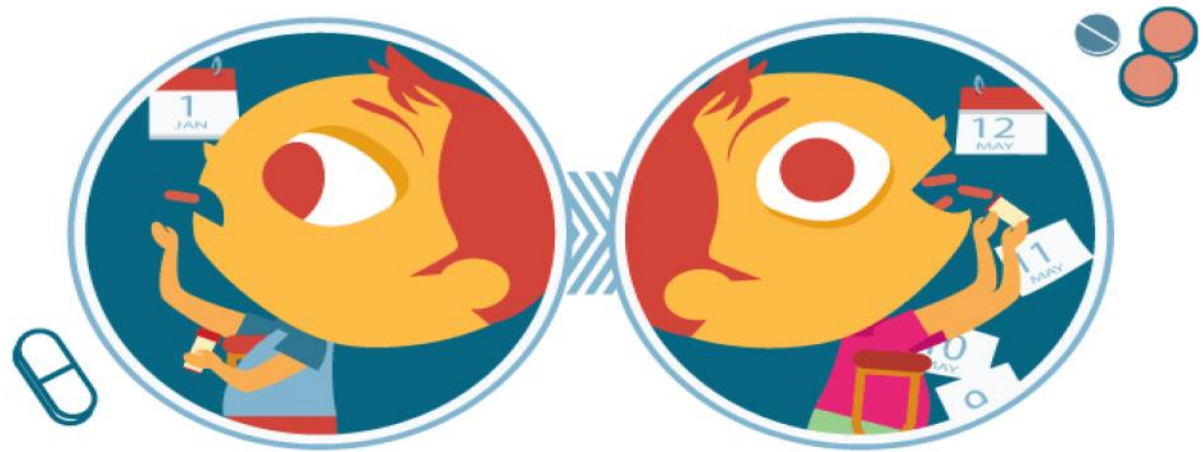
This patient increased dose to obtain the same effect

What is this phenomenon called ?

- Tolerance

What is the mechanism?

- Pharmacokinetic (decreased absorption , enhanced metabolism and excretion)
- Pharmacodynamic (down regulation of receptors , antibodies , adaptation of targets)



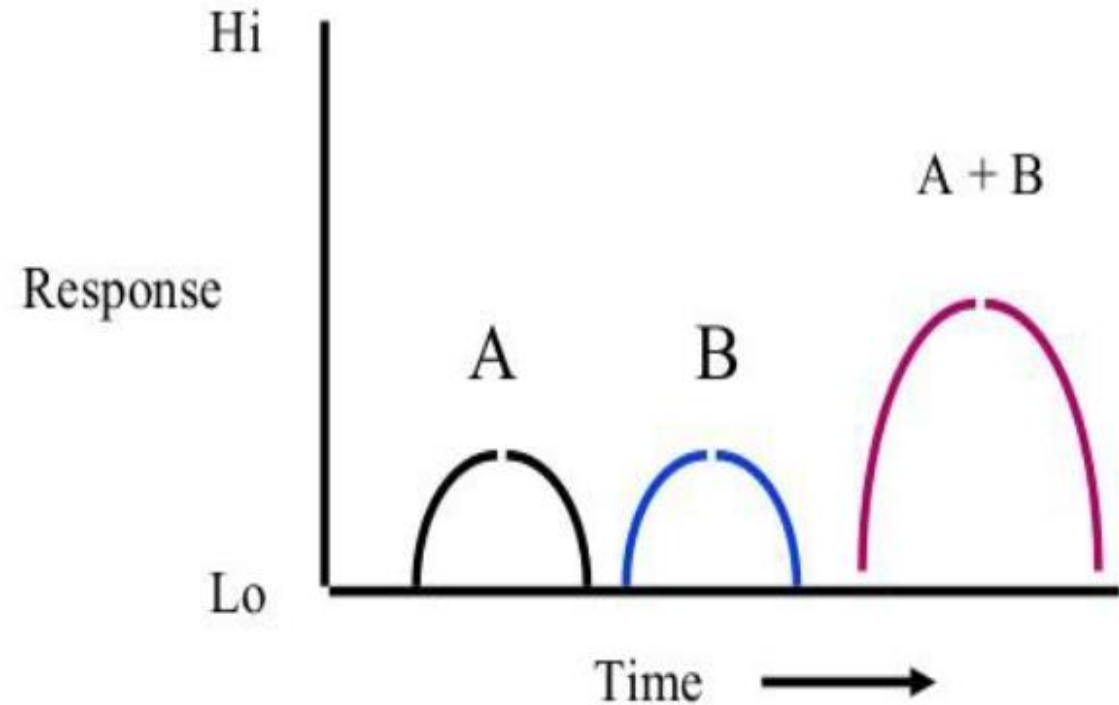
The effect of two drugs together equal to the sum of the two drugs

What is this phenomenon called ?

- Addition

Mention example

- Aspirin + Paracetamol



Is this image true or false ?

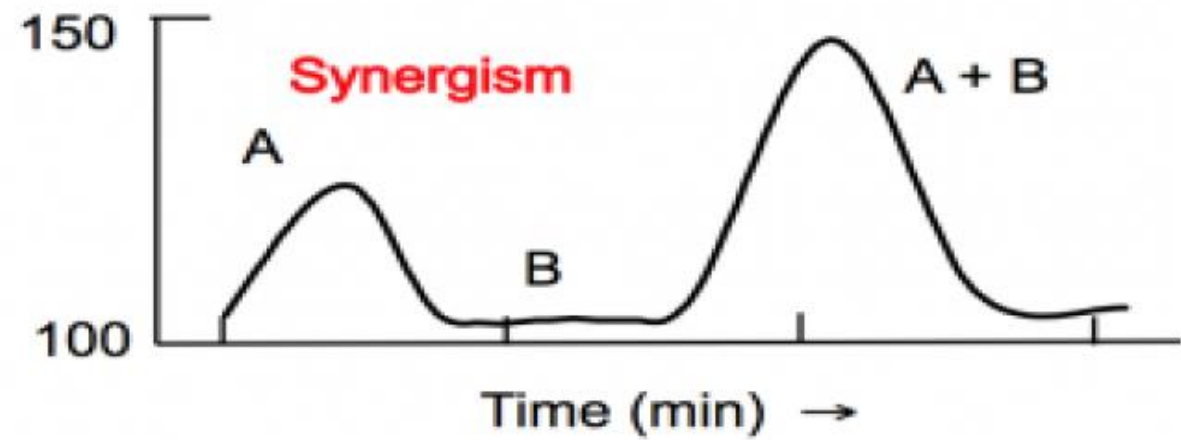
- False

Mention the correct if false

- Potentiation

Mention example

- A.ch + Physostigmine



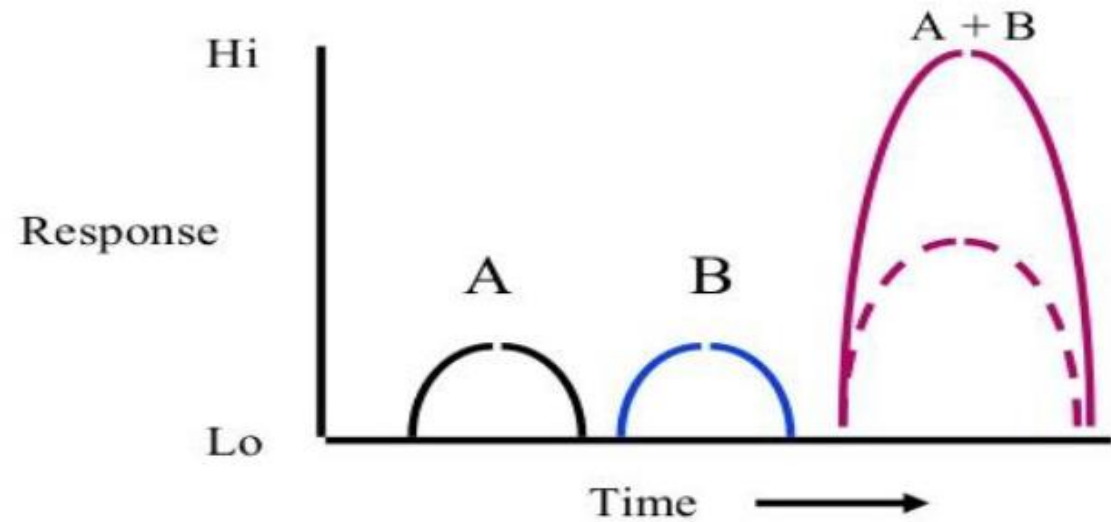
The effect of 2 drugs together is greater than the sum of the two drugs

What is this phenomenon called ?

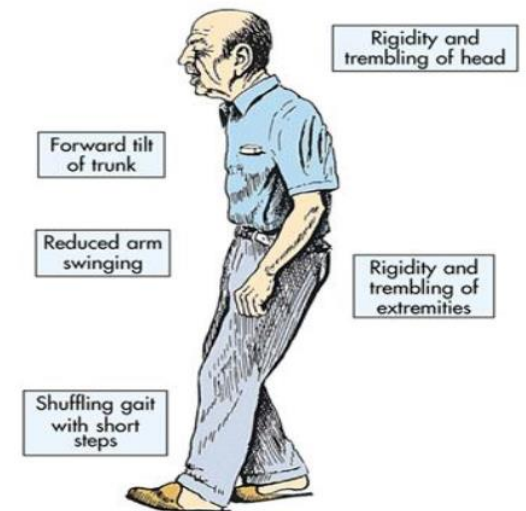
- Synergism

Mention example

- Alcohol + Barbiturates



- When chlorpromazine intake for schizophrenia induce Parkinsonism , this is called iatrogenic effect



This side effect is termed

- Hypersensitivity

Mention its types and example for each type

- Type I (immediate or anaphylactic):
 - Penicillin
- Type II (Cytotoxic):
 - a methyl dopa : hepatotoxicity
- Type III(Arthus reaction):
 - B-lactams : serum sickness
- Type IV(Delayed or cell mediated):
 - Sulfa and B-lactams antibiotics : Contact dermatitis



Itching



Skin rash



Urticaria



Angioedema

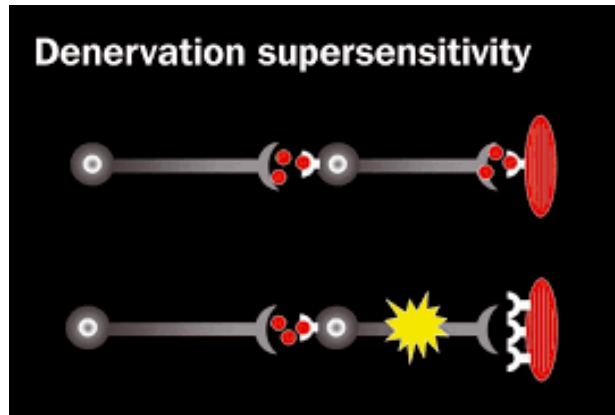
Those are two side effects.

What is the difference ?

- Super sensitivity : appearance of toxic effects of a drug at normal therapeutic dose
- Hypersensitivity : unpredictable abnormal response to a drug due to Ag/Ab reaction

Mention ONE example for each

- Super sensitivity :super sensitivity to adrenaline in thyrotoxicosis
- Hypersensitivity : anaphylaxis due to penicillin





What happens in this case ?

- Hemolysis after taking some drugs as Aspirin (hemolytic anemia)

What is this called ?

- Idiosyncrasy



Mention 3 examples of food drug interactions

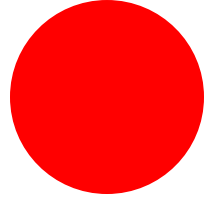
- Amino acids ↓ absorption of Levodopa
- Milk ↓ absorption of tetracycline
- Tea ↓ absorption of iron



- Drug A has molecular weight of 20 Dalton 0% bound to plasma protein and 100% ionized in maternal plasma
- Drug B has molecular weight of 250 Dalton 99% bound to plasma protein and 50% ionized in maternal plasma
- Which one crosses placenta at faster rate?
- Drug A as it's small and not bound to plasma proteins but it passes through water pores as it's ionized

- Calculate the dose of **Paracetamol** for a child of 2 years if you know that **adult** dose is **500 mg/6h**
- Child dose(>2 years) = adult dose * (age in years /20) = $500 * (2/20)$
=50mg/6h

- A 5 years old child has dysentery and you prescribed Trimethoprim/Sulfamethoxazole, if you know that adult dose is 160/800 mg every 12h
- Calculate the child dose
- Trimethoprim dose = Adult dose \times (age/20) = $160 \times (5/20) = 40$ mg / 12 h
- Sulfamethoxazole dose = Adult dose \times (age/20) = $800 \times (5/20) = 200$ mg / 12h
- child dose = 40/200 mg /12 h

- 
- What is the dose of amoxicillin in infant weighing 9kg if the adult dose is 500mg/8h
 - 1kg=2.2 pounds
 - Infant dose = adult dose * (weight in pounds / 150) = 500 * (20/150) = 66mg / 8h

- Drug A has (AUC oral) of 200 mg h/L and (AUC IV) of 2000 mg h / L
- Drug B has (AUC oral) of 100 mg h/L and (AUC IV) of 120 mg h/L

Which drug has the higher oral bioavailability?

Bioavailability = (AUC oral / AUC IV) *100%

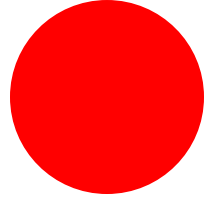
Bioavailability of Drug B = $100/120 = 83.3 \%$

Bioavailability of drug A = $200/2000 = 10\%$

So drug B has a higher bioavailability

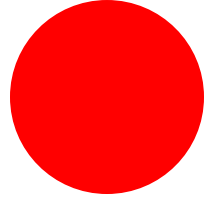
- If you know that a drug has volume of distribution (V_d) of 200L and its initial concentration in plasma was 2 mg/L
- What was dose given to the patient
- Dose = Volume of distribution * concentration = $200 * 2 = 400$ mg
- Is dialysis suitable for clearing this drug from blood? Explain why?
- No because high V_d indicates high binding to tissue proteins and low plasma level

- If certain drug has **volume of distribution (V_d)** of 3L, So the main site of distribution is plasma

- 
- If you know that pKa of weak basic drug is 7 and urine pH is 6
 - Determine the fraction of ionized vs. non-ionized portions of the drug
 - $pK_a = pH + \log (\text{ionized}/\text{unionized})$
 - $\log(\text{ionized}/\text{unionized}) = 7 - 6 = 1$
 - $\text{Ionized}/\text{Unionized} = \log^{-1}(1) = 10/1$
 - What is the significance of that?
 - To determine degree of ionization and the tendency of the drug to be reabsorbed or excreted

- If you know that certain drug follows zero order kinetics, the plasma concentration of the drug was 9mg/L after 3 hours of IV administration, and 1 hour later it became 8mg/L
- What was the initial concentration immediately after drug administration?
- It decreases by 1mg/h so the initial concentration was $9 + 3 = 12$ mg/L

- A drug with first order kinetics was injected IV with a dose of 4mg. This drug has V_d of 10L after 8 hours the plasma concentration was $100 \mu\text{g/L}$
- Calculate half-life of the drug.
- initial concentration = dose / $V_d = 4/10 = .4\text{mg} = 400\text{microgram}$
- 400 microgram decreased to 200 then 100 in 8 hours so $t_{1/2} = 4$ hours

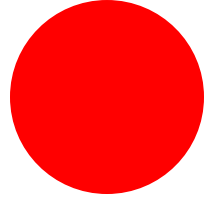
- 
- A drug with first order kinetics has V_d of 10L and clearance value of 10 ml/min
 - Calculate half-life of the drug.
 - Clearance = $10 \times 60 / 1000 = .6 \text{ L/h}$
 - $T_{1/2} = 0.7 \times (V_d / \text{clearance}) = .7 \times (10 / .6) = 11.66 \text{ hours}$

- A drug with first order kinetics was injected IV a loading dose to achieve a target plasma concentration of 50 µg/ml to control an emergency case
- This drug has Vd of 5L
- Calculate the loading dose of this drug.
- Loading dose = $V_d \times \text{concentration} = 5 \times 50 \left(\frac{1000}{1000} \right) = 250\text{mg}$

- A drug with first order kinetics was administered in a loading dose orally to achieve its concentration (C_{ss}) of 120 $\mu\text{g/ml}$ to control an emergency case
- This drug has V_d of 5L and its bioavailability is 0.8.

Calculate the loading dose of this drug.

$$\text{Loading dose} = V_d * \text{Concentration} / \text{bioavailability} = 5 * 120 (* 1000 / 1000) / 0.8 = 750 \text{mg}$$

- 
- A drug with first order kinetics was administered orally t.d.s to achieve a target plasma concentration of 5 µg/ml to treat a chronic case
 - The clearance value of this drug is 10 ml/min and its bioavailability is 0.9

Calculate the maintenance dose of this drug

Maintenance dose = $C_{ss} \times \text{clearance} \times \text{dosage interval} / \text{bioavailability}$ =
 $5(*1000/1000) * 10 * (60/1000) * 8 / 0.9 = 26.27 \text{ mg}$

- If you know that 100mg for drug A and 50mg for drug B is the effective dose in 50% of people
- And toxic dose was 200mg for drug A and 60 mg for drug B in 50% of people

Calculate the therapeutic index

TI (A)=toxic dose in 50% /effective dose in 50%=200/100=2

TI (B)=toxic dose in 50% /effective dose in 50%=60/50=1.2

Which drug is more toxic and not safe?

Drug B

Locally Acting drugs

Is this agent antiseptic or disinfectant agent ?

- Disinfectant

In Which concentration will it be effective ?

- 70 %



Classify this locally acting drug and mention its uses ?

- Counter irritant agent
- Used over skin causing feeling of hotness and burning so that they mask the pain
- Relieves pain in muscles and joints



This is a locally acting agent, mention its uses

- Fungal infections
- Warts and Corns
- Eczema and certain forms of acne
- Psoriasis



This is a Chelator agent

Mention its uses

- It's an effective chelator of copper
- It's used in hepato-lenticular degeneration "Wilson's disease"
- Mercury cobalt and lead poisoning
- Rheumatoid arthritis





This is a **chelating** agent used in which heavy metal toxicity ?

- Acute iron poisoning
- It's also used for treatment of haemolytic anemia

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deferoxamine mesylate for injection USP

2 g per vial

4 vials

Each vial contains deferoxamine mesylate USP, 2 g in lyophilized form.
For subcutaneous intramuscular or intravenous administration.

Rx only

 **NOVARTIS**

This locally acting drug belongs to which group ?

- Astringents

Mention mechanism of action

- Drugs that precipitate surface proteins of abraded skin and mucous membranes forming a protective layer against noxious stimuli



What is this drug ?

- A derivative of Vitamin A used in treatment of moderate to severe acne

Mention 2 cautions to be taken during therapy by this drug ?

- Avoid prolonged exposure to sunlight
- Avoid exposure to eyes and mucous membranes , can cause severe irritation
- Contraindicated in pregnancy or lactation



This is a case of acne

Enumerate drugs used locally for treatment of acne

- Sulfur
- Salicylic acid
- Isotretinoin
- Benzoyl peroxide





What is this drug ?

- Activated charcoal

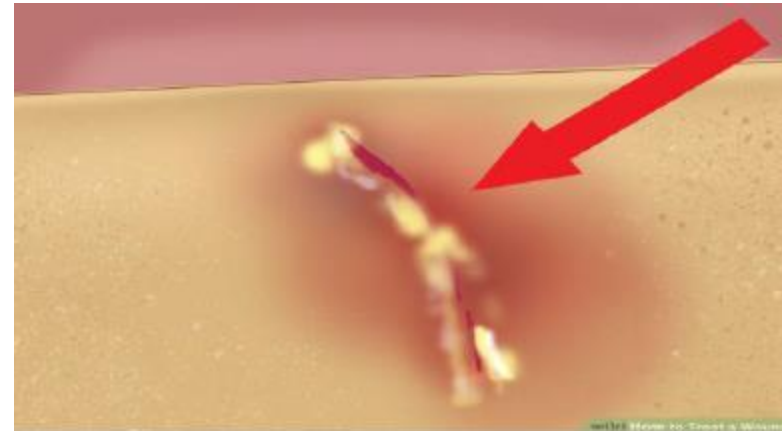
Mention its uses ?

- Treatment of dyspepsia, flatulence, diarrhea and dysentery
- Oral drug poisoning
- Mechanical protection of skin

Local Anesthesia

Lidocaine would be less potent when applied to such inflamed wound , why ?

- It would be less potent when applied to purulent (suppurative) inflammation as inflamed tissues with pus are of acidic pH and acidity decreases penetration of the drug and decreases its potency



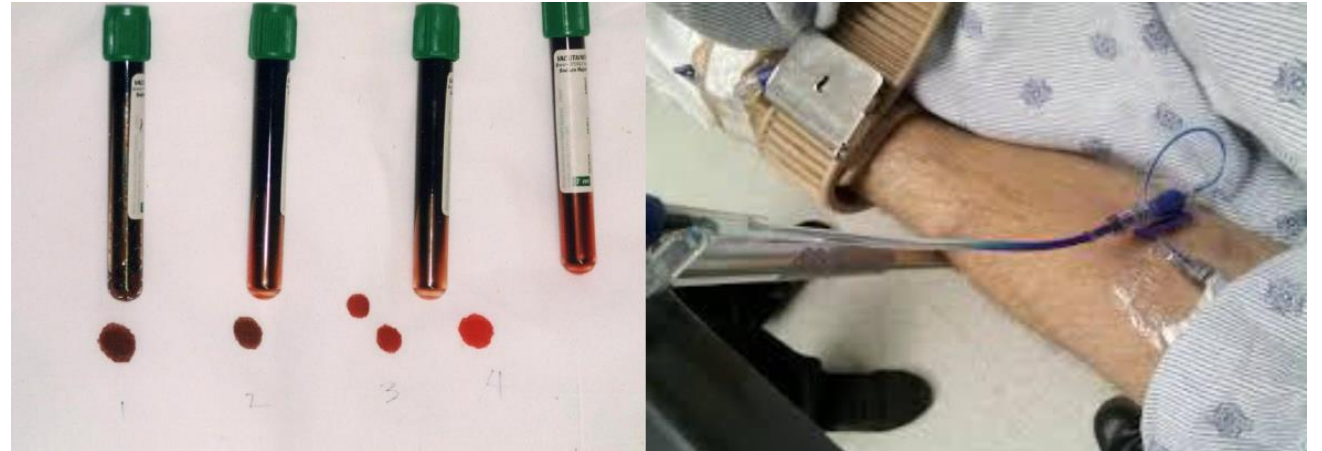
Addition of adrenaline would be contraindicated in this site . Why ?

- For fear of ischemia and gangrene as they are supplied by end arteries



**Identify the local anesthetic drug that's known to cause methemoglobinemia ?
How?**

- Prilocaine
- Due to formation of O-toluidine that converts HB to meth HB

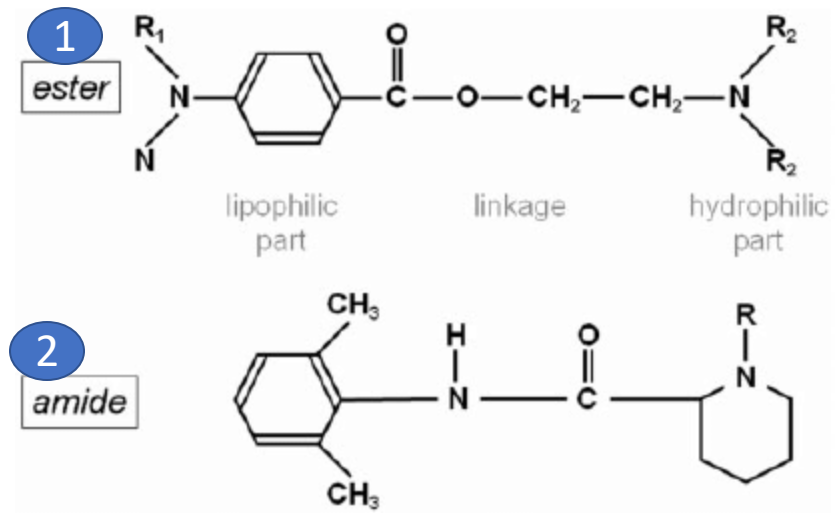


Which bond (1or2) does lidocaine have ?

- Amide (2)

It has long duration . Why?

- Because it's metabolized in liver to active metabolites and not by nonspecific esterase in plasma

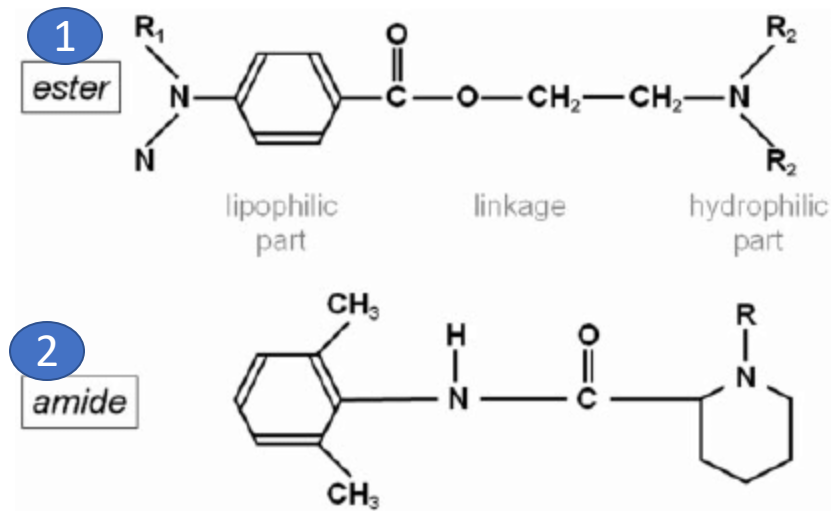


Which bond (1 or 2) does benzocaine have?

- (1) ester

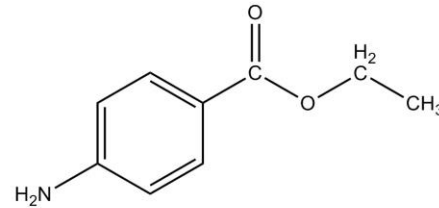
In has short duration .Why ?

- Because it's metabolized in plasma and liver by nonspecific esterase

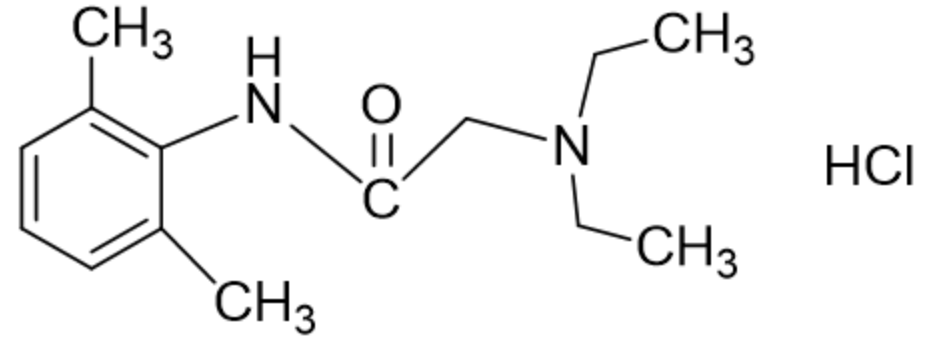


Benzocaine is of **low** solubility so used for surface anesthesia powders and ointments for wounds and ulcers

Lidocaine is of **high** solubility , so used for injection and surface anesthesia



Benzocaine
[Benzoic acid, 4-amino-, ethyl ester]



**Adrenaline is added to local anesthetics .
Why ?**

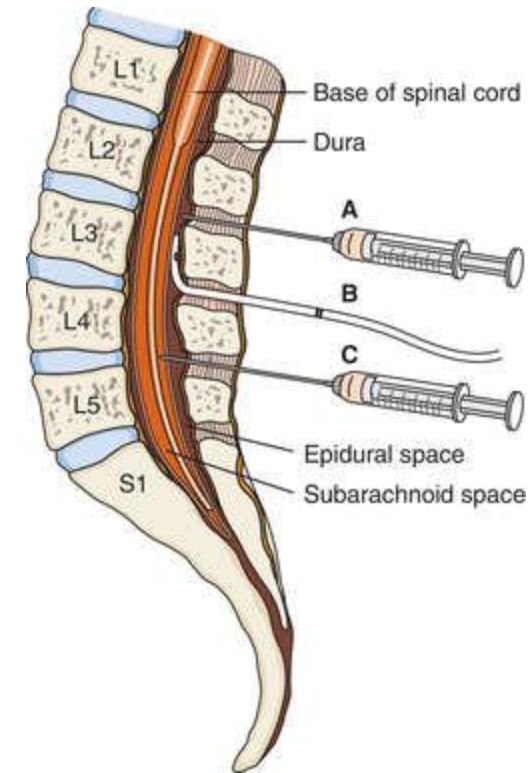
- Causes VC so decrease absorption of LA and decrease its spread & systemic absorption leading to increase duration and decrease toxicity



Mention side effects of spinal anesthesia on CVS ?

How could this be treated ?

- Hypotension and bradycardia
 - Treated by :
 - Elevation of legs to increase VR
 - IV fluids to fill dilated vascular bed and increase VR
 - Sympathomimetic e.g. IV epinephrine or norepinephrine



The drug X penetrates nerve fiber and blocks sodium channel from inside

Could you suggest to which class of drugs does this drug belong ?

- Local anesthesia

Structurally , the **amino** group is responsible for its action (efficacy)

