SEM 3
PHARACOLOGY
REVISION

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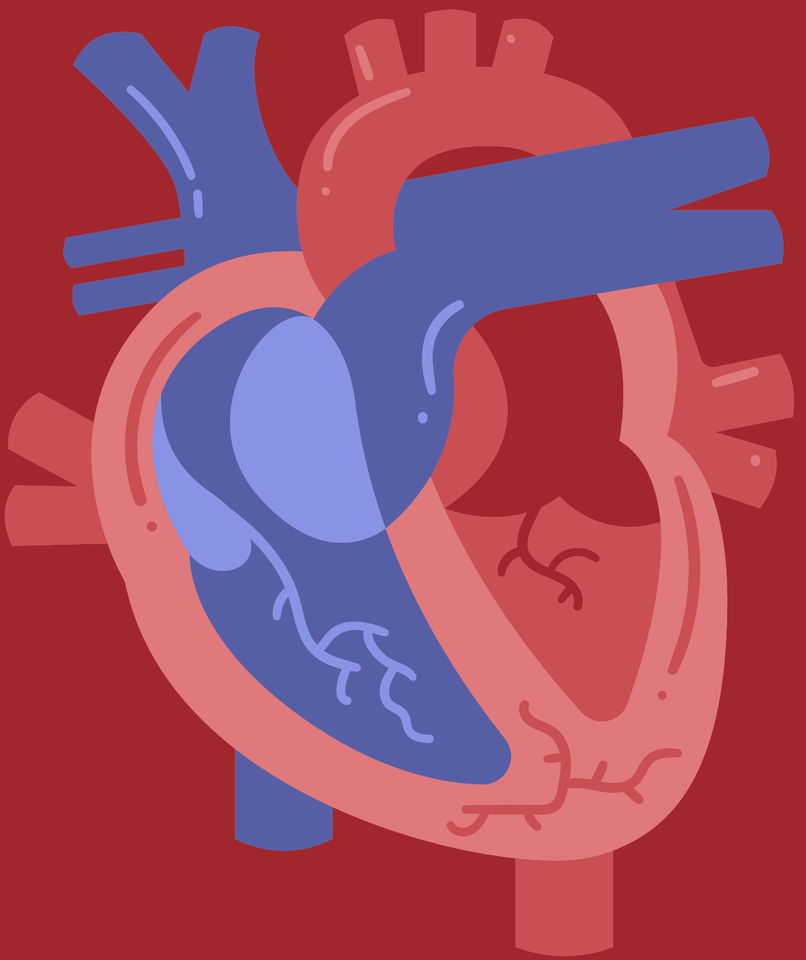
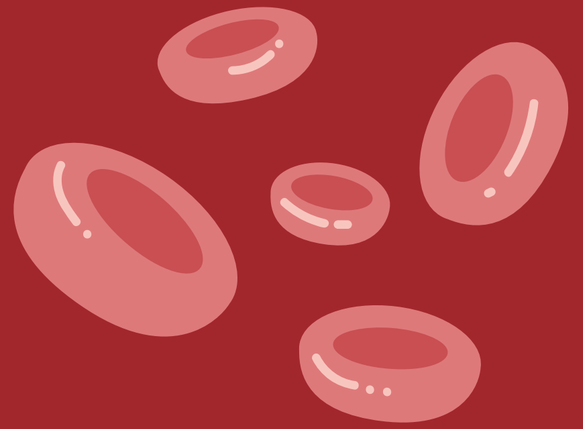
CVS Pharmacology



Antihypertensive drugs



Pharmacologic therapy

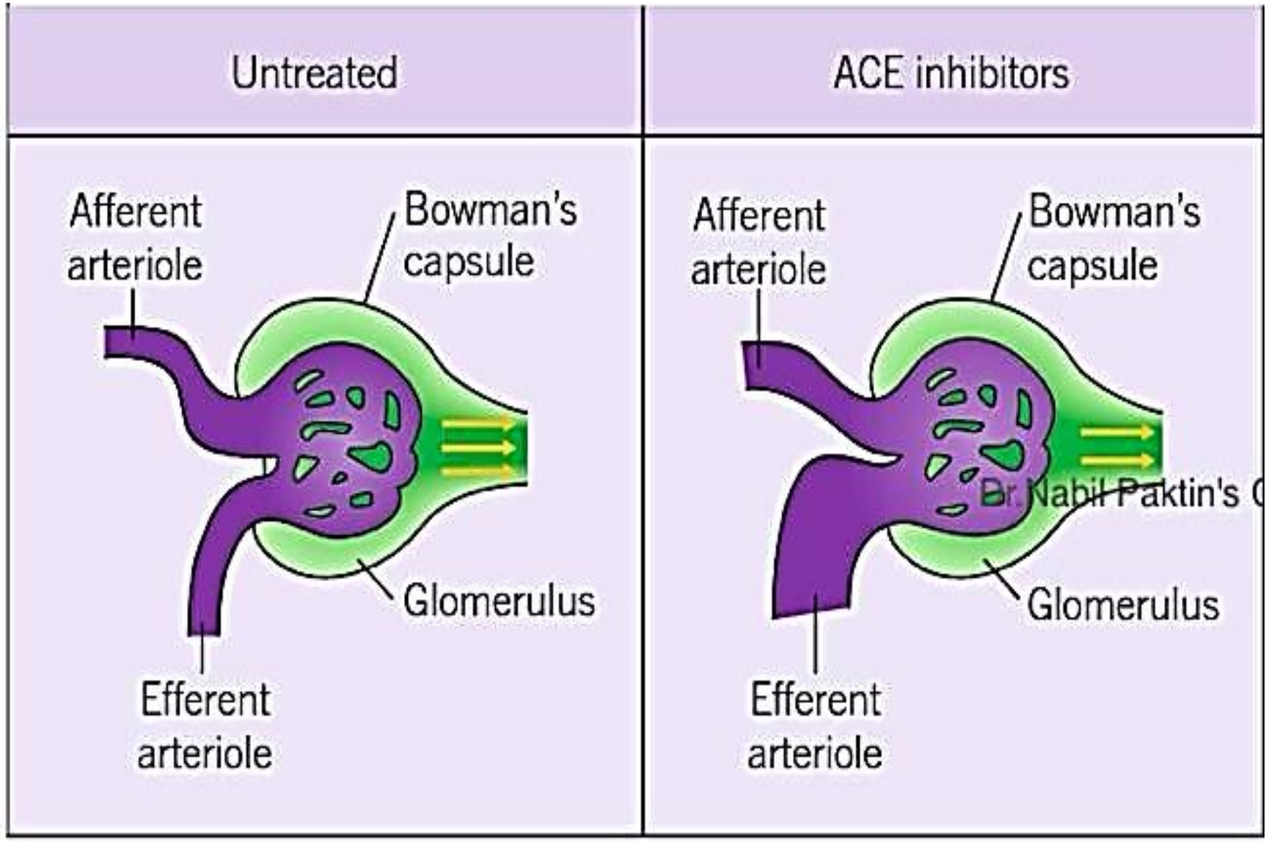
1st line drugs (commonly used)	2nd line drugs
✓ Renin-angiotensin-aldosterone system blockers • Angiotensin converting enzyme inhibitors (ACEIs) • Angiotensin receptor lockers (ARBs)	. α_1- blockers: prazosin and doxasosin. . Combined α and β-blockers: labetalol. . Adrenergic neuron blockers: α-methyldopa and reserpine. . Vasodilators: e.g. hydralazine. . Central α_2 stimulants: clonidine. . Endothelin blockers: Bosentan. . Dopamine agonists: fenoldopam.
✓ Calcium channel blockers (CCBs)	
✓ Thiazide diuretics	
β-blockers	

1. Explain in case of Renal impairment (creatinine > 2.8 mg/dl), the use of ACEIs is dangerous ?

2. Mention two side effects of Nifidipine.

3. Mention 2 antihypertensive drugs that can be used during pregnancy.

4. Explain vasodilator drugs should be combined with diuretics\ B B.



Which antihypertensive medication can cause the rare side effect of angioedema?

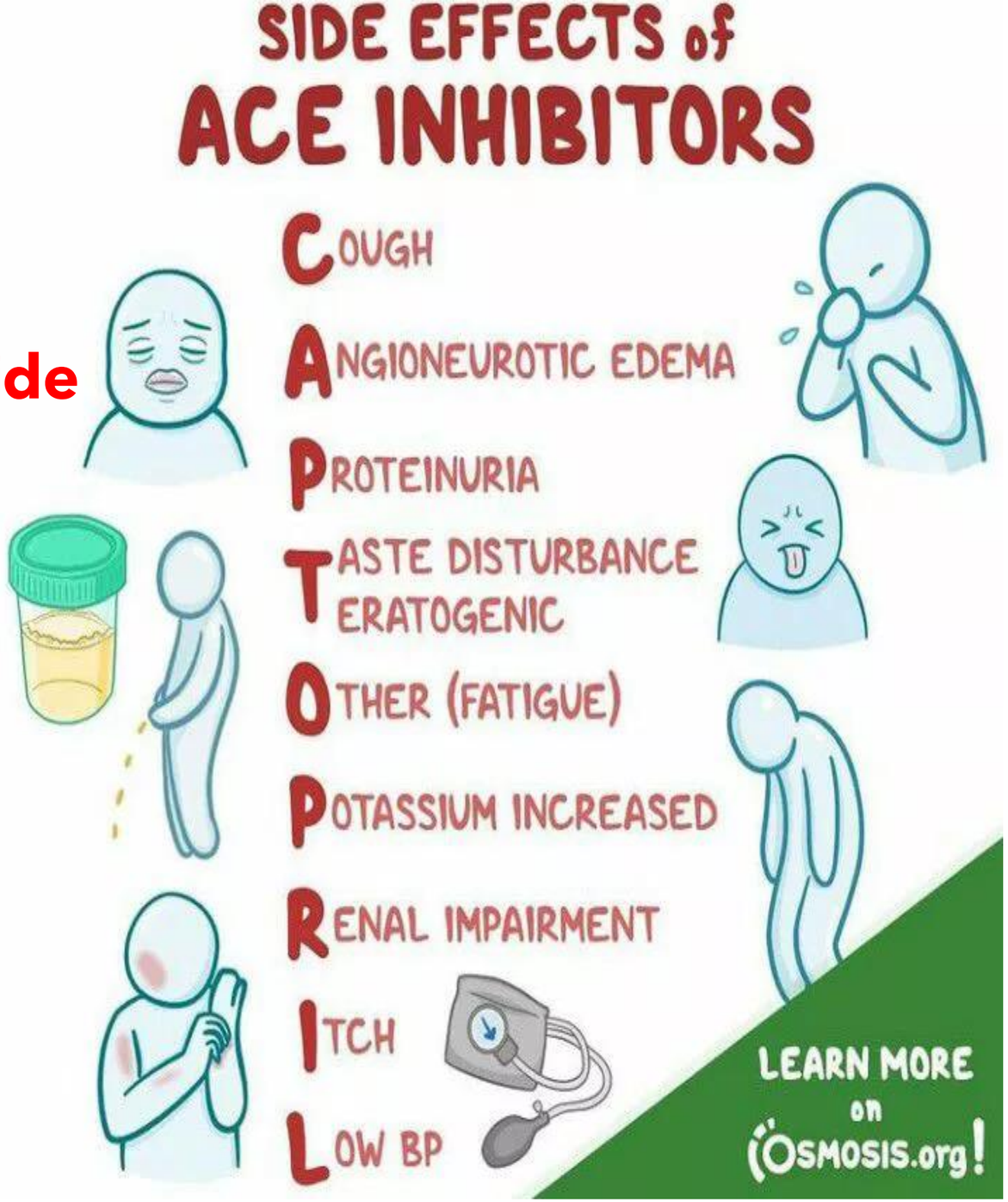
a. Amlodipine

b. Captopril

c. Prazosin

d. Propranolol

e. Verapamil



Which one of the following antihypertensive drugs may cause ankle edema?

a. Atenolol.

b. Hydrochlorothiazide.

c. Nifedipine.

d. Prazosin

e. Propranolol

Which one of the following antihypertensive drugs may cause hyperlipidaemia & hyperglycaemia?

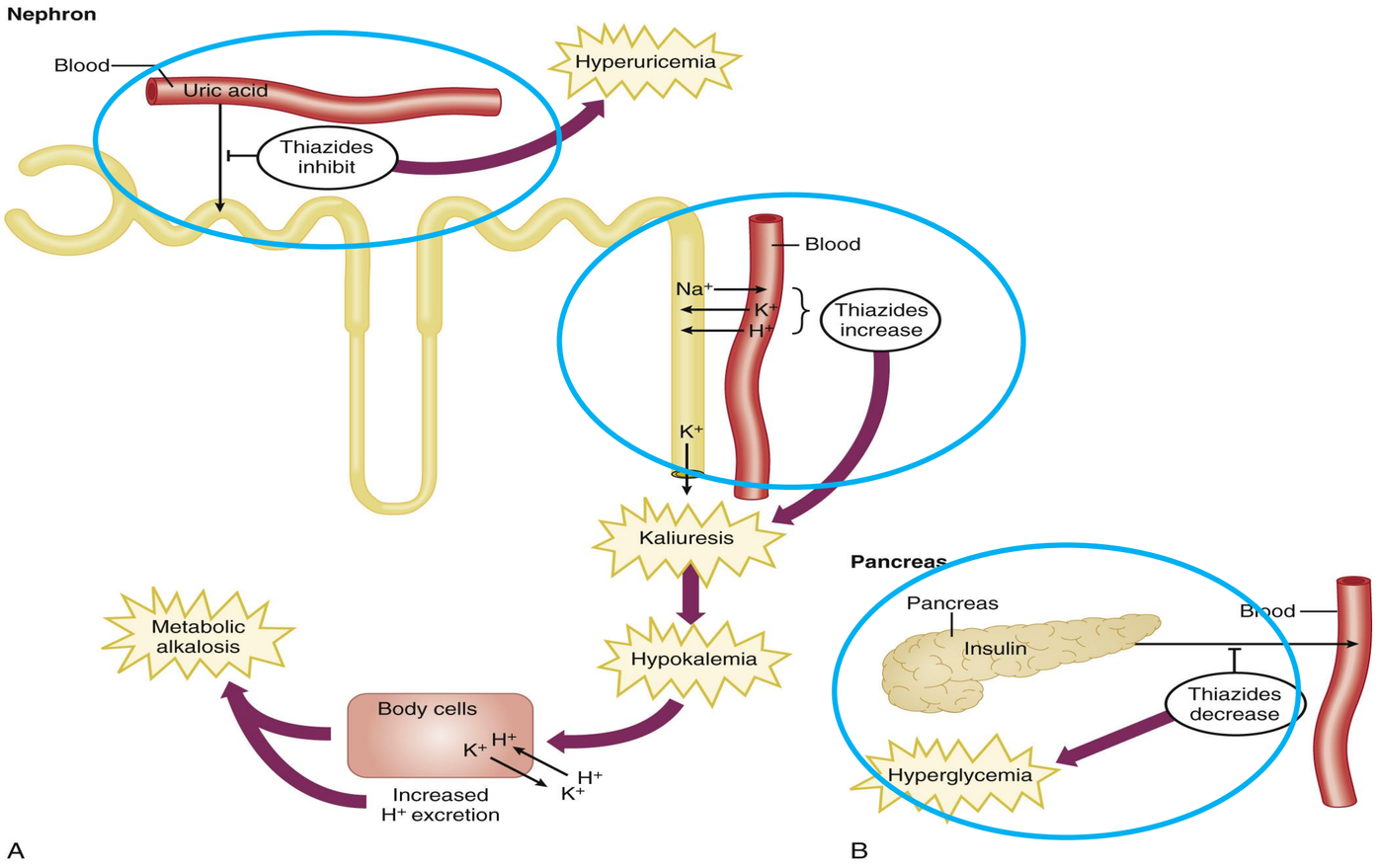
a. Atenolol

b. Hydrochlorothiazide.

c. Nifedipine.

d. Losartan

e. Verapamil



Significant relaxation of arteriolar and venular smooth muscles can be produced by which of the following drugs?

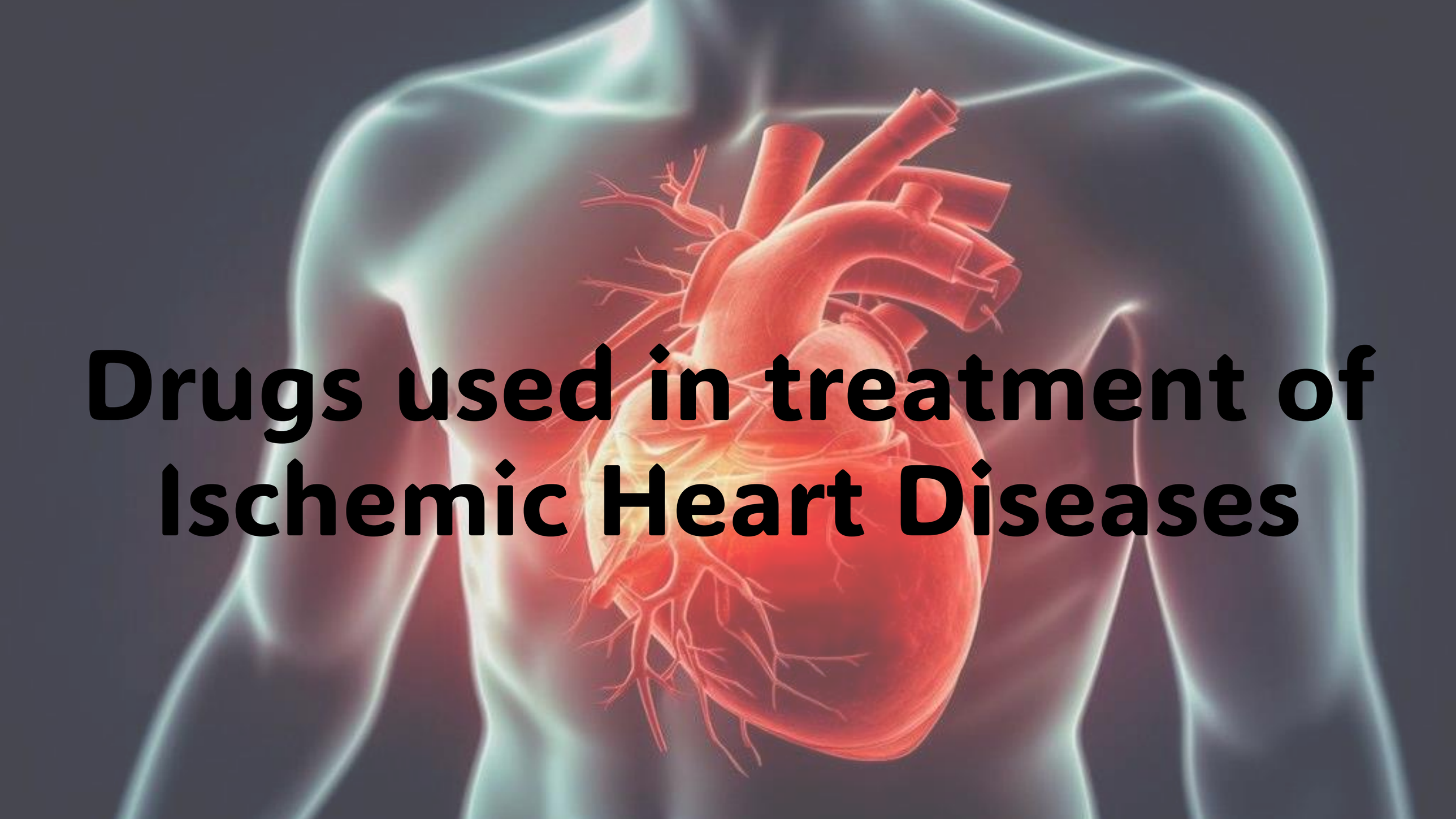
a. Hydralazine

b. Minoxidil

c. Sodium nitroprusside

d. Nifedipine

e. Atenolol



Drugs used in treatment of Ischemic Heart Diseases

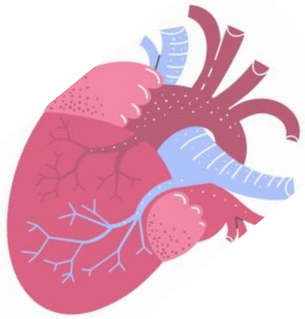
Therapeutic strategies

- **Decrease Oxygen requirement by:**
  - ↓ heart rate
  - ↓ Preload
  - ↓ Afterload
  - ↓ Contractility

Myocardial depressants
- β-Blockers
- CCB

- **Increase Oxygen delivery:**
  - ↑ Coronary blood flow
  - ↑ Diastolic filling time

Vasodilators
- Nitrates
- CCB



1. Mention two side effects of Nitrates.

2. Mention mechanism of action of Ivabradine in treatment of stable angina.

3. Explain ACEIs can be used as an additional therapy in stable angina.

** Which drug combination is most likely to have an *adverse* effect on cardiac function in a person with angina?

A. GTN with atenolol.

B. Verapamil with atenolol.

C. Amlodipine with atenolol.

D. GTN with nicorandil.

E. GTN with low-dose aspirin.

** Which agent prevents myocardial cell calcium overload and thereby decreases ventricular wall tension?

(A) ranolazine

(B) nitroglycerin

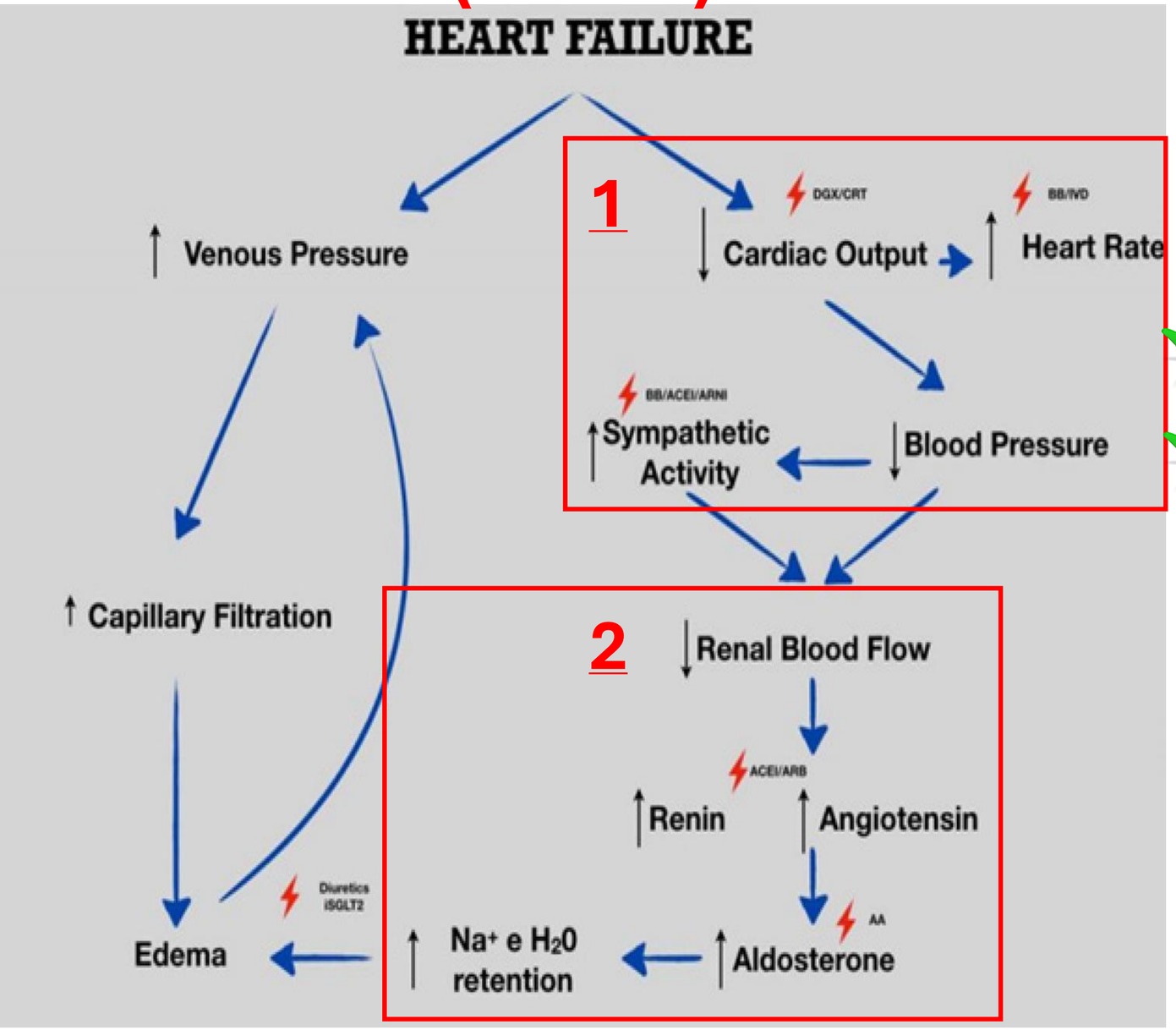
(C) amlodipine

(D) ivabradine

(E) trimetazidine

Drugs for heart failure

Guideline-Directed Medical Therapy (GDMT)



I. Inhibitors of the RAAS system

- ACEIs/ARBs
- ✓ MRAs
- ✓ Angiotensin receptor-neprilysin inhibitor (ARNI)

✓ II. β-Blockers

✓ III. Sodium glucose cotransporter 2 (SGLT2) inhibitors

IV. Diuretics (loop diuretics)

V. Sinus node inhibitor ➔ Ivabradine

VI. +ve Inotropic drugs ➔ Digoxin

VII. Hydralazine and Isosorbide Dinitrate Combination (H-ISDN)

1. Mention mechanism of action of SGLT-2 inhibitors in treatment of heart failure.
2. Mention two side effects of Digoxin.
3. Mention two side effects of Sacubitril/valsartan

SGLT-2 inhibitors

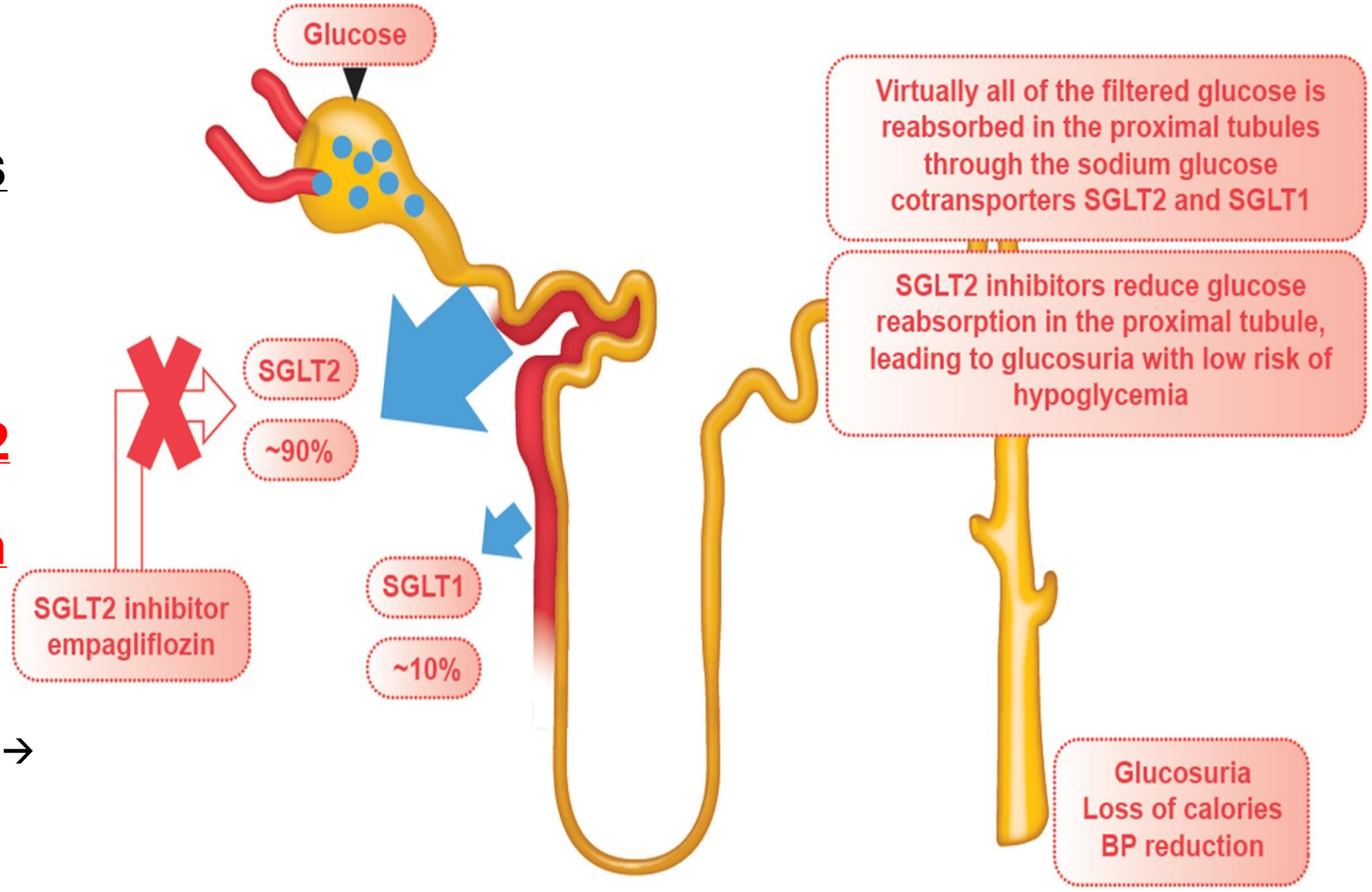
Dapagliflozin or empagliflozin

- SGLT2 inhibitors are primarily used in treatment of **diabetes**
- **MOA ➔**

  SGLT2 inhibitors ➔ **inhibit SGLT2**

  ➔ ↓ **renal glucose reabsorption**

  ➔ ↑ **urinary glucose excretion (glucosuria)** ➔ osmotic diuresis → ↑ urine volume → ↓ **BP and blood glucose**

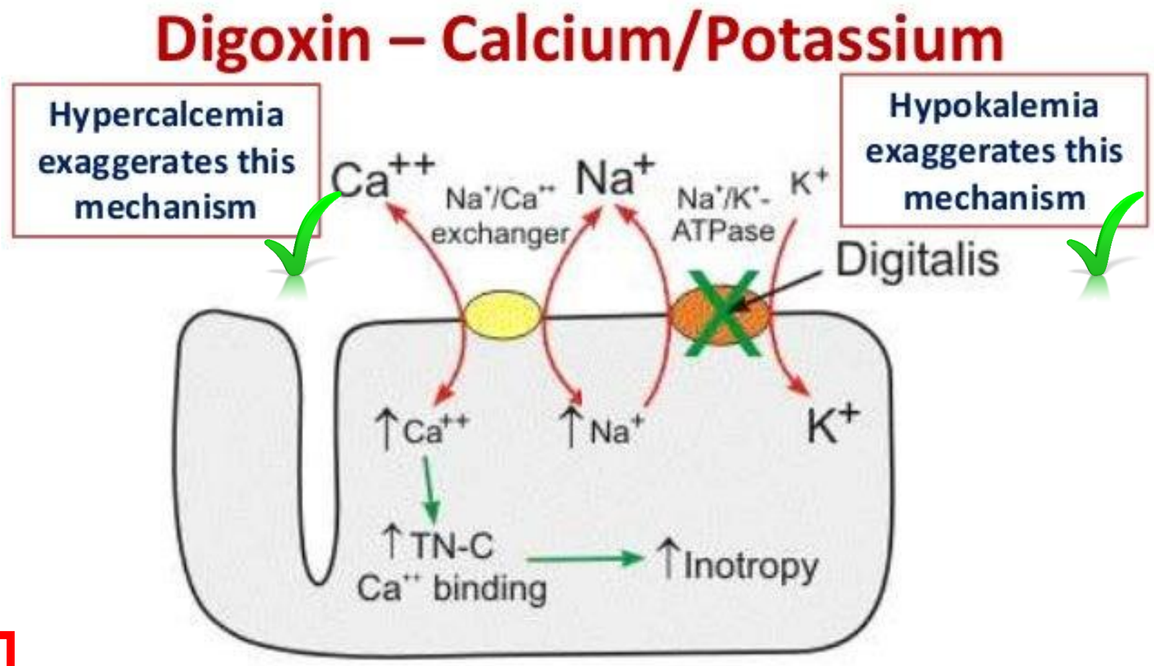


Digoxin
side effects

1. **Eye → blurred vision, or *yellowish vision*** (initial signs of toxicity).
2. **GIT → Anorexia, nausea, vomiting**
3. **Heart → ↑ the risk of arrhythmias ➔ any type of arrhythmia (*AV block*, *extrasystoles* & *ventricular arrhythmias*)**

   ➔ most serious

- **↓ serum K+ (hypokalemia) worsens digoxin toxicity ➔ because digoxin normally competes with K+ for the same binding site on the Na+/K+ ATPase pump.**



Loop diuretics

Angiotensin receptor-neprilysin inhibitor (ARNI)

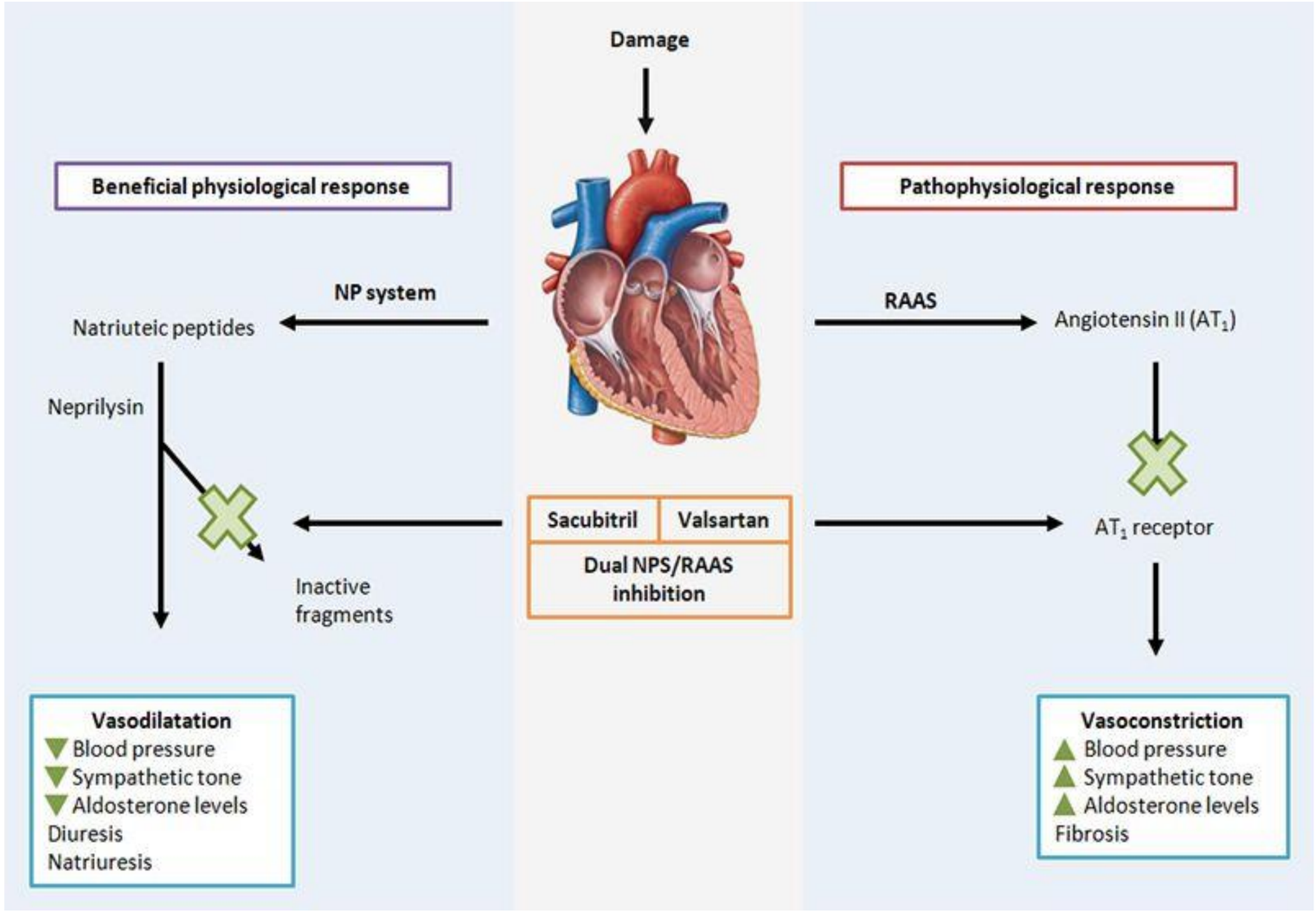
Sacubitril/valsartan

Adverse effects ➔

Like ACEIs/ARBs➔

- **Hypotension**
- **Angioedema**
- **Hyperkalemia ➔ less than ACEIs**
- **Renal failure** in **susceptible** patients

Patients transitioned from an ACEI to an ANRI ➔ should **take ARNI after 36 h** of ACEI stoppage to avoid drug interactions ➔ ↑ risk of angioedema



Which one of the following drugs is associated with clinically useful important positive inotropic effect?

A. Captopril
B. Digoxin
C. Enalapril
D. Losartan
E. Nesiritide

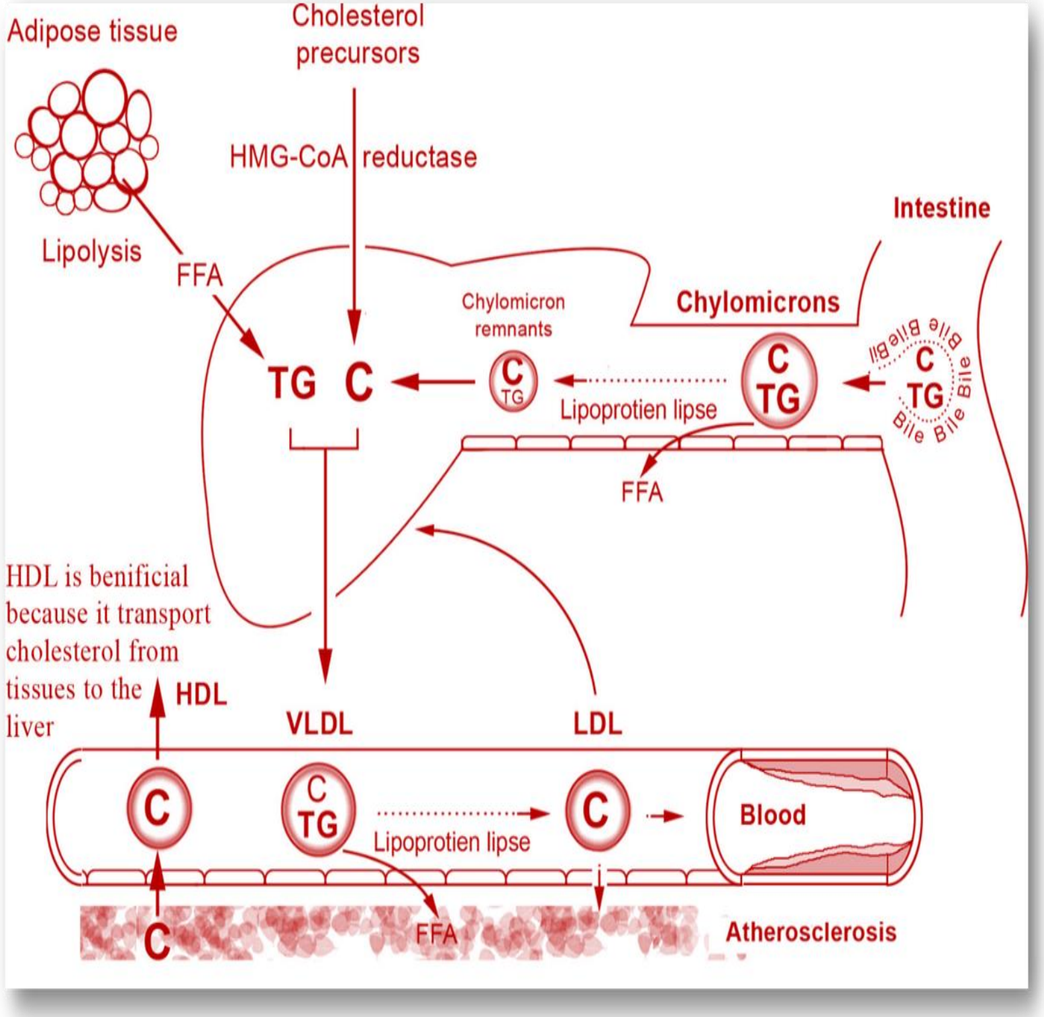
Which of the following is important to monitor in patients taking digoxin?

A. Chloride
B. Potassium
C. Sodium
D. Zinc
E. Calcium

Hyperlipidemia & Drug lowering lipids

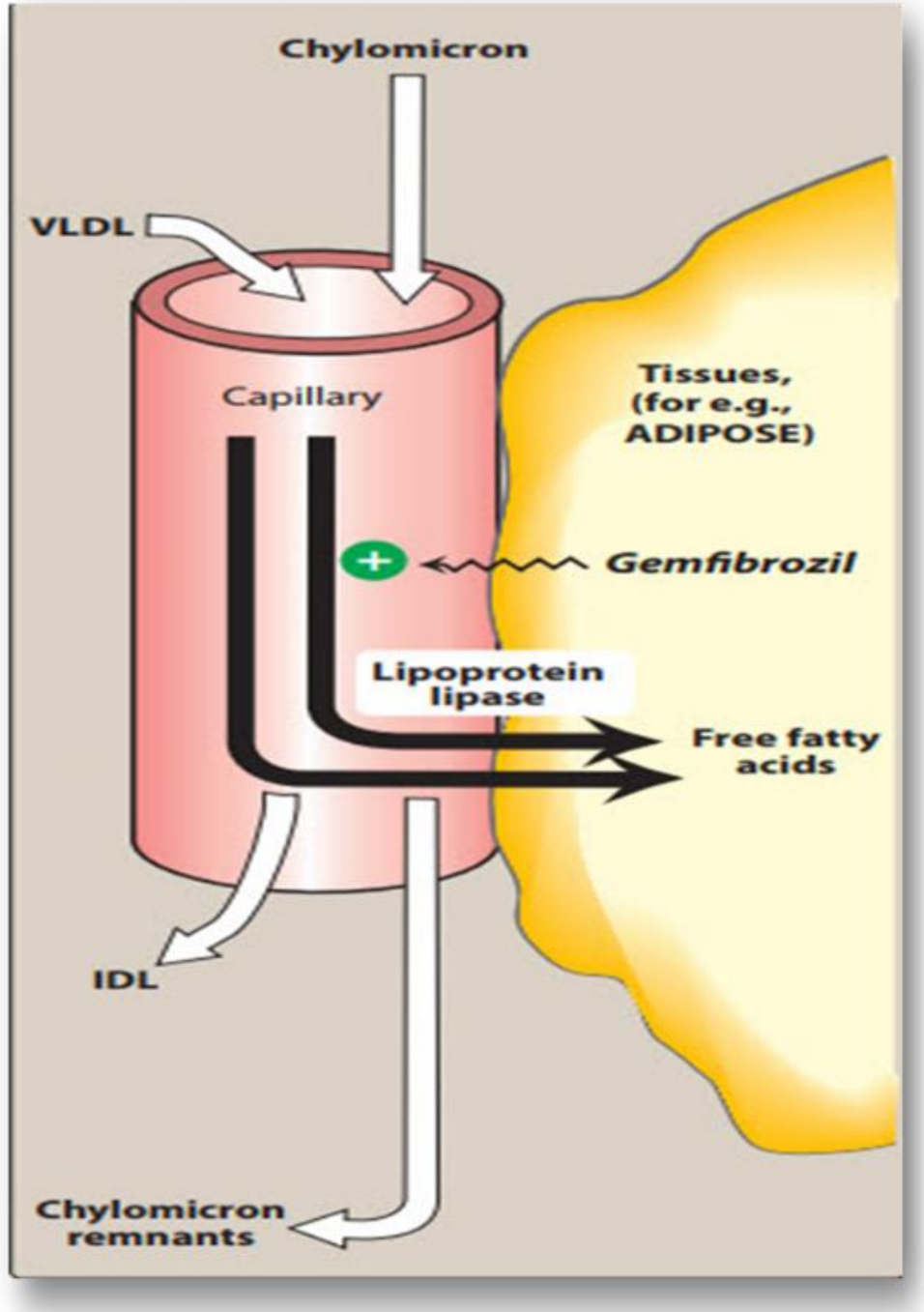
❑Classification of lipid lowering drugs

- HMG-CoA reductase inhibitors: statins.
- Inhibitors of intestinal cholesterol absorption: ezetimibe
- PCSK9 inhibitors: Evolocumab, Alirocumab
- Bile acid binding resins: cholestyramine, colestipol
- Activators of plasma lipoprotein lipase: fibric acid derivatives
- Inhibitors of lipolysis in adipose tissue: nicotinic acid



1. Mention two adverse effects of atorvastatin

2. Mention mechanism of action of fenofibrate



The lowering of plasma lipids by statins occurs because it:

A. Inhibits HMG coenzyme A (CoA) reductase

B. Binds bile acids

C. It inhibits VLDL secretion

D. Increases the activity of lipoprotein lipase

Which of the following statements is true concerning cholestyramine?

A. It inhibits free fatty-acid release from adipose tissue

B. It releases lipoprotein lipase

C. It is an anion-exchange resin that binds bile acid in the intestinal lumen

D. It blocks the final step in the formation of cholesterol in the body

RES Pharmacology


Asthma

Lines of treatment of bronchial asthma

1- Bronchodilators→ relieve of bronchial spasm

a-β_2 agonists b-Anti-muscarinic drugs. c-Methyl-xanthines.

2-Anti-inflammatory drugs→ Reduction of edema and congestion

Corticosteroid

3-Adjuvant therapy:

Leukotriene receptor antagonist

4-Biological therapy:

According to the results of phenotyping

5-Others:

a- Avoid drugs precipitating the attack.

b-Desensitization or avoidance of antigen if it is known.

c- Treatment of respiratory infection.

d- O2 therapy

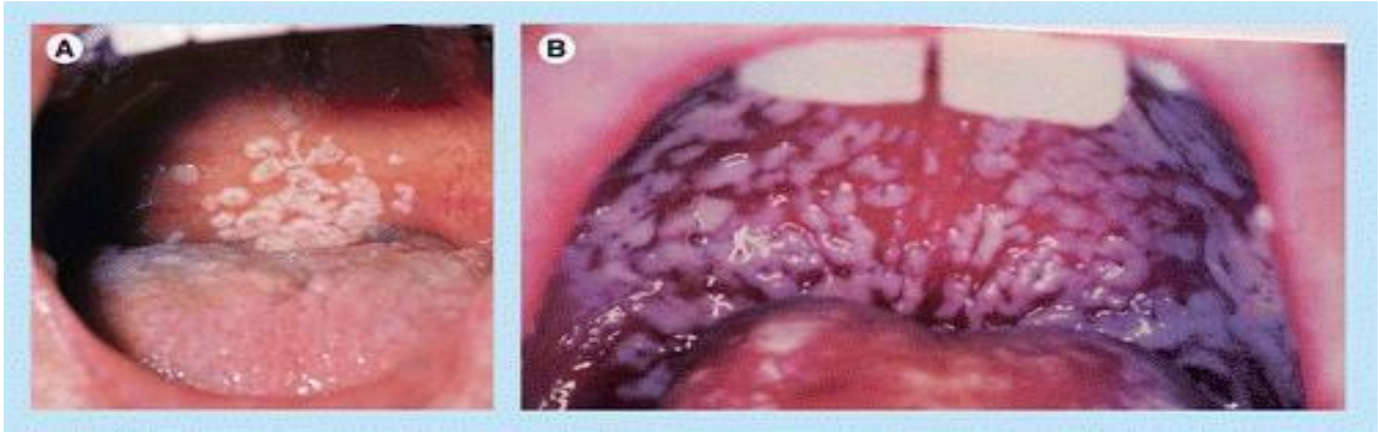
e-Expectorants and mucolytic.

f- Psychic support

Q Enumerate bronchodilator drugs used in treatment of bronchial asthma.

Q Mention 2 adverse effects of inhaled corticosteroids

Q Mention 2 adverse effects of salbutamol



Which of the following is one of the most important contraindication to the use of methylxanthines in treatment of bronchial asthma?

A. Acute pulmonary edema.

B.CNS depression.

C. Arrhythmia

D. Apnea of premature newborn

E.Migraine

Which of the following drugs can decrease the concentration of leukotriene in the inflamed tissue?

A.Zileuten.

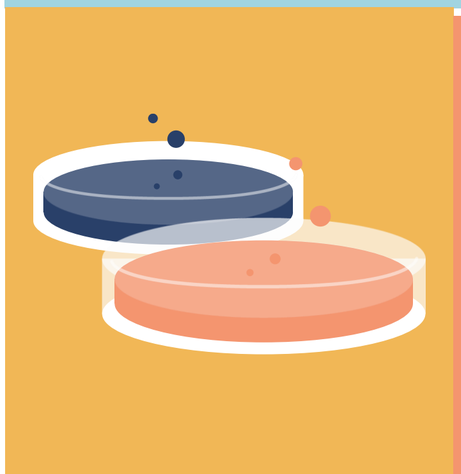
B.Montelukast

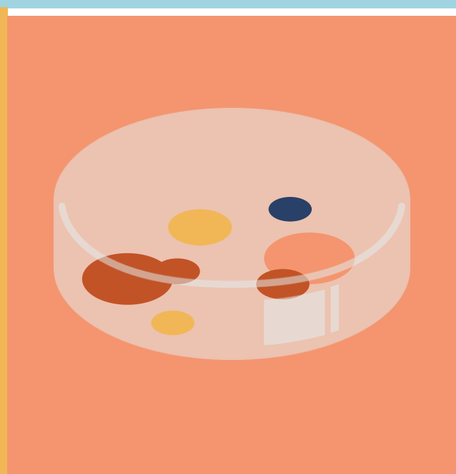
C.Theophylline

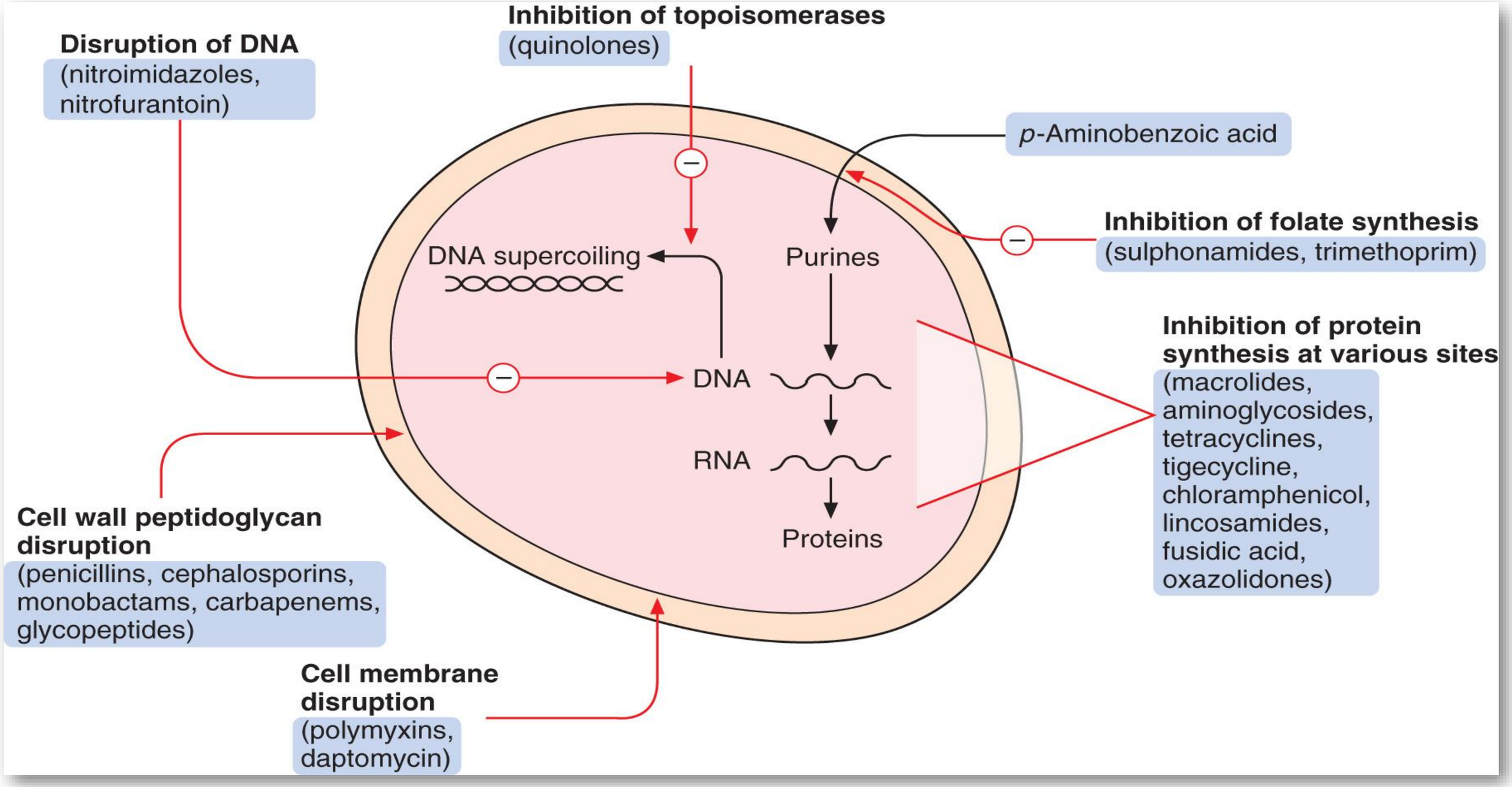
D.Loratadine

E.Cromoglycate

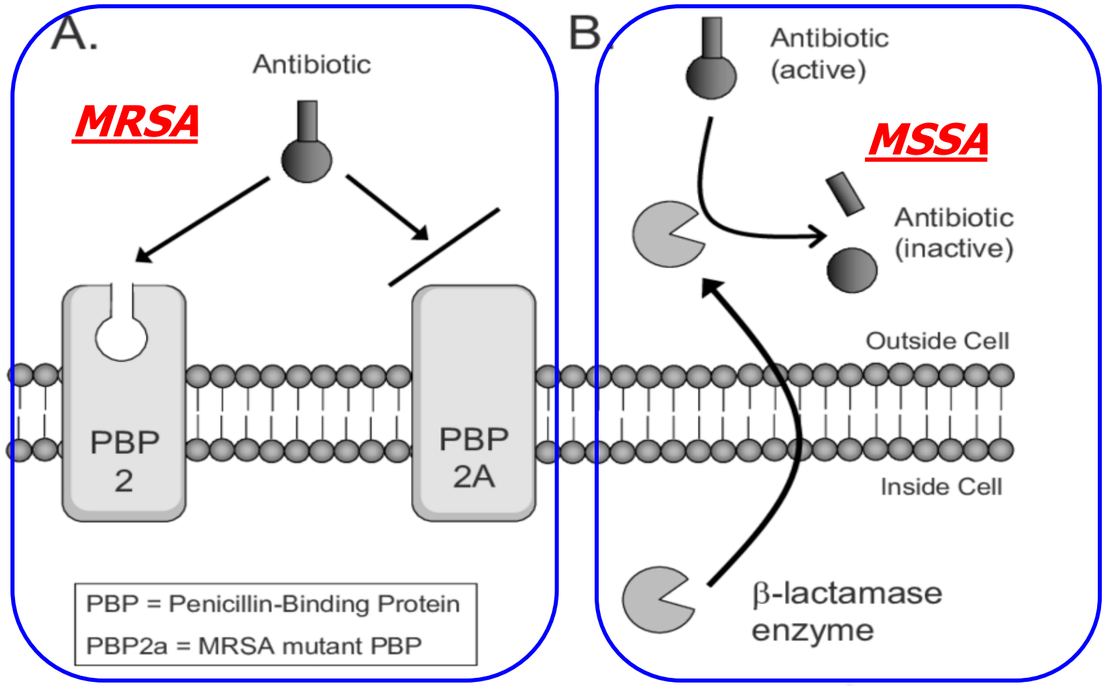
Antibacterial drugs

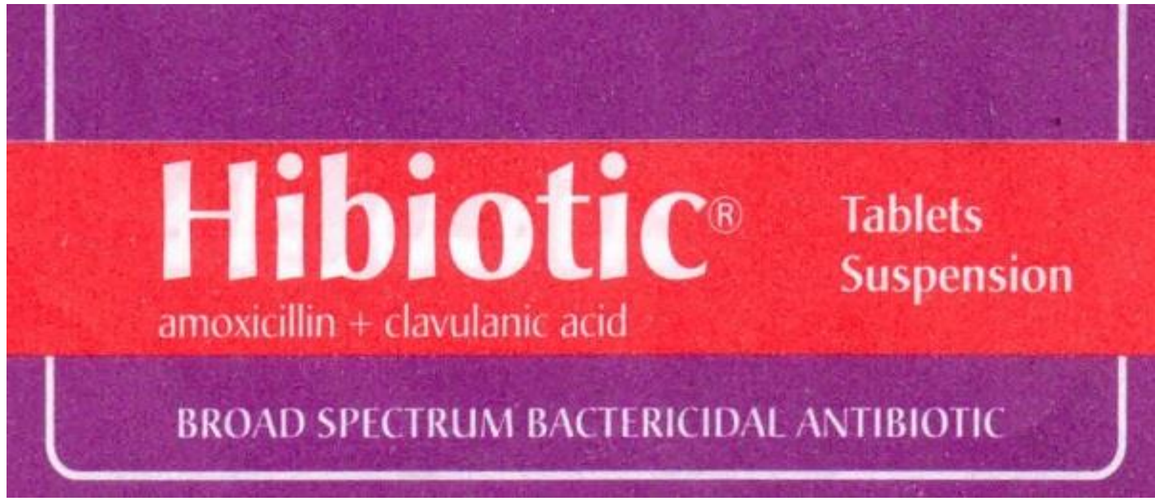





Inhibition of topoisomerases
(quinolones)
Disruption of DNA
(nitroimidazoles, nitrofurantoin)
p-Aminobenzoic acid
Inhibition of folate synthesis
(sulphonamides, trimethoprim)
DNA supercoiling
Purines
DNA
RNA
Proteins
Inhibition of protein synthesis at various sites
(macrolides, aminoglycosides, tetracyclines, tigecycline, chloramphenicol, lincosamides, fusidic acid, oxazolidones)
Cell wall peptidoglycan disruption
(penicillins, cephalosporins, monobactams, carbapenems, glycopeptides)
Cell membrane disruption
(polymyxins, daptomycin)

1. Mention 2 major adverse effects of Ciprofloxacin
2. Menton 2 mechanisms of Bacterial resistance to β-Lactams
3. Explain clavulanate is combined to Amoxicillin.





Quinolones

➢ Adverse effects:

- Nausea, vomiting, abdominal pain, diarrhea
- CNS effects: dizziness, headache, tremor, seizures
- Pain and inflammation in tendons (particularly the Achilles tendon), occasionally with tendon rupture. The risk of this is increased in older people (over 60 years) and those with renal impairment.
- Moxifloxacin prolongs the **Q–T** interval on the electrocardiogram (ECG)

Q.Which of the following antibiotic agents should not be given to children less than 8 years of age due to its deposition in bone and teeth?

A. Azithromycin

B. Doxycycline

C. Linezolid

D. Clindamycin

E. Quinolones

Q. A 21-year-old marathon runner reports to the clinic with acute Achilles tendon rupture. The nurse noted that the patient recently took an antibiotic for pneumonia. Which antibiotic may have contributed to tendon rupture?

A. Amoxicillin/clavulanate

B. Azithromycin

C. Levofloxacin

D. Minocycline

E. Linezolid

Anti-tuberculosis treatment

Drugs for M. tuberculosis

- 1st-line anti-TB drugs → used initially to treat most patients with TB → isoniazid, ethambutol, and pyrazinamide (which are synthetic drugs), and rifampin/rifampicin which is an antibiotic.
- 2nd-line drugs → are reserved to treat patients infected with organisms that are resistant to 1st-line drugs → rifabutin and rifapentine, fluoroquinolones, capreomycin, ethionamide, amikacin, kanamycin, and others.

1.Mention 2 adverse effects of Isoniazide.

2.Mention 4 indications of corticosteroids in T.B.

3.Mention mechanism of action of Rifampicin.

Why is vitamin B6 usually prescribed with isoniazid (INH)?

a. It acts a cofactor for INH.

b. It prevents hepatotoxicity of INH .

c. Like INH, it has tuberculostatic activity.

d. It prevents metabolism of INH

e. It prevents neurotoxicity of INH

One of the drugs commonly used to treat TB induces microsomal cytochrome P450 enzymes in the liver:

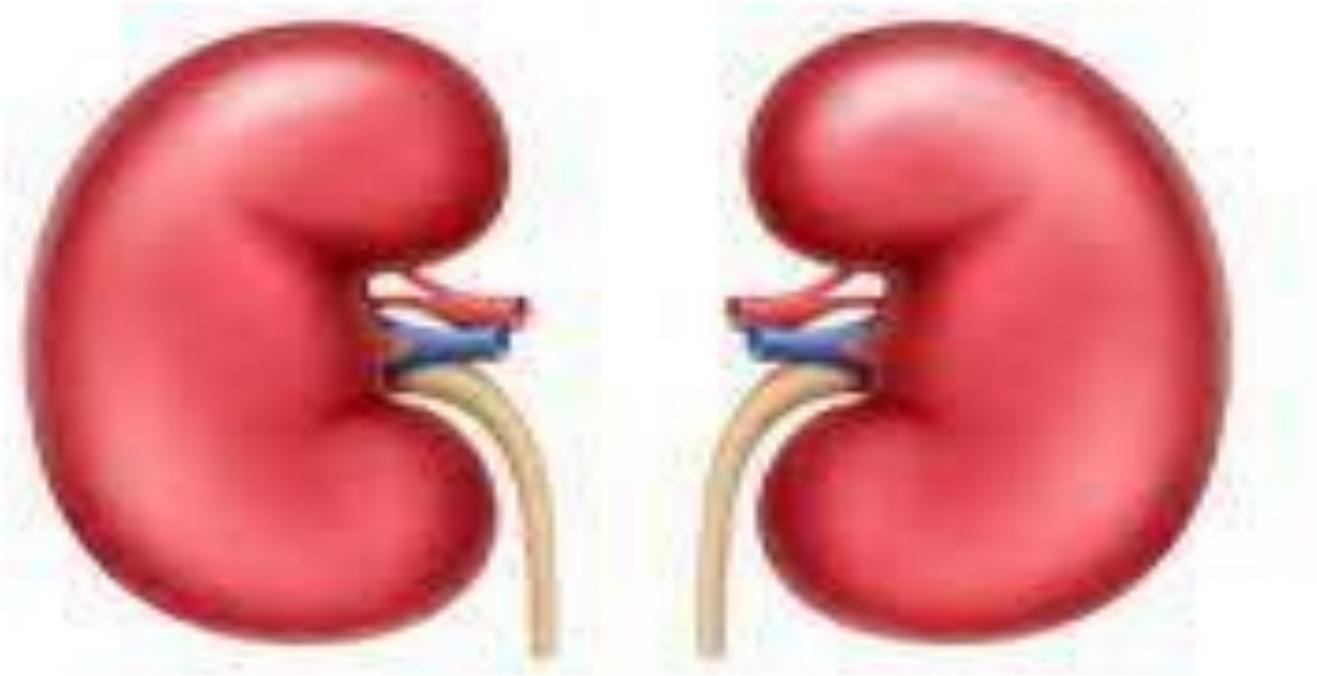
a. Isoniazid.

b. Rifampicin.

c. Pyrazinamide.

d. Ethambutol.

Diuretics

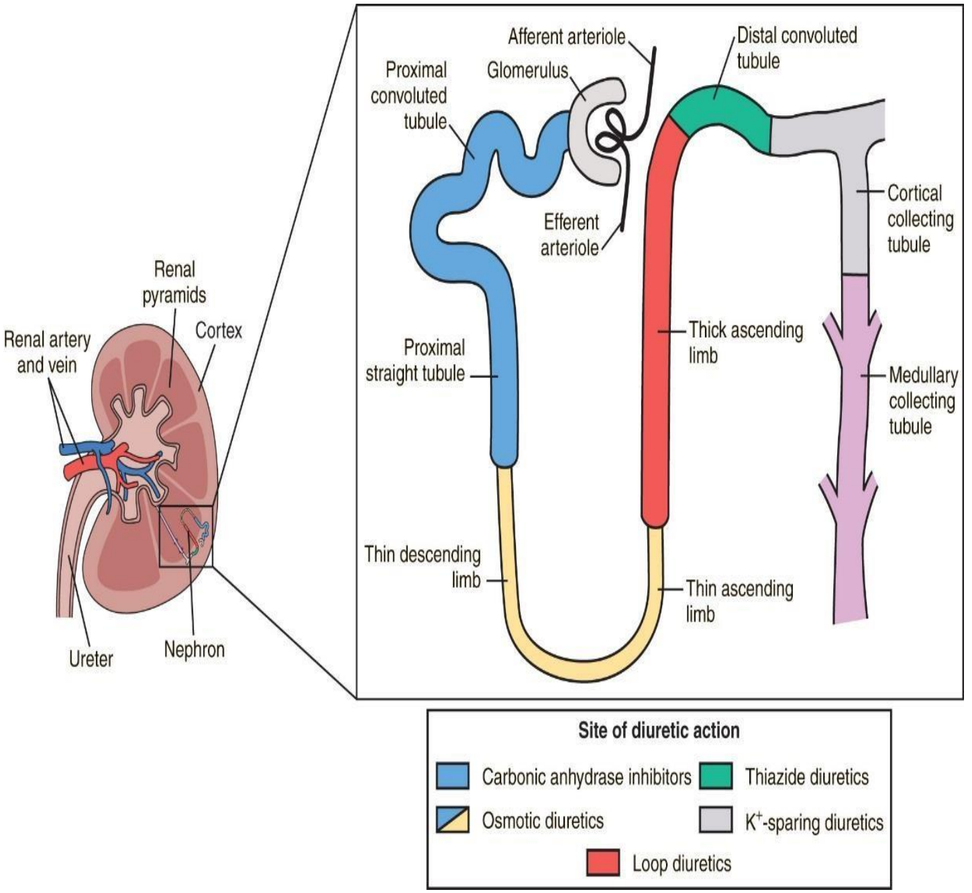


Diuretics

Def: Drugs that increase urine volume secondary to inhibition of Na+ reabsorption (increased excretion) in the kidney.

Five different classes:

- Carbonic anhydrase inhibitors (PCT)
- Loop diuretics (Thick ascending part of LOH)
- Thiazide diuretics (DCT)
- K+ sparing diuretics (Collecting duct)
- Osmotic diuretics (PCT &LOH)



1. **Mention 2 adverse effects of Spironolactone.**
2. **Mention 2 therapeutic uses of thiazide diuretics.**
3. **Explain ethacrynic acid should not given with aminoglycosides.**
4. **Mention 2 therapeutic uses of acetazolamide.**

The ascending part of the loop of Henle is the principal site of action of the following diuretics?

A. Hydrochlorothiazide

B. Triamterene

C. Amiloride

D. Bumetanide

E. Spironolactone

Acute congestive glaucoma is best treated by i.v. administration of :

A. Bumetanide

B. Furosemide

C. Mannitol

D. Amiloride

E. Metalozone


Thank
you