

Cardiovascular system

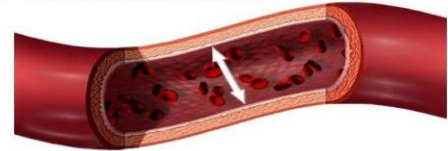
- Hypertension
- Angina
- Myocardial infarction
- Heart failure
-

Hypertension

➤ Blood pressure (BP) control :-

- **BP** → Pressure generated when the heart Contract against the resistance of the blood vessels.
- **Cardiac output (CO):**
- $CO = \text{Stroke volume (SV)} \times \text{Heart rate (HR)}$

Blood pressure is the measurement of force applied to artery walls



$$BP = \text{Cardiac output (CO)} \times \text{Peripheral vascular resistance (PVR)}$$

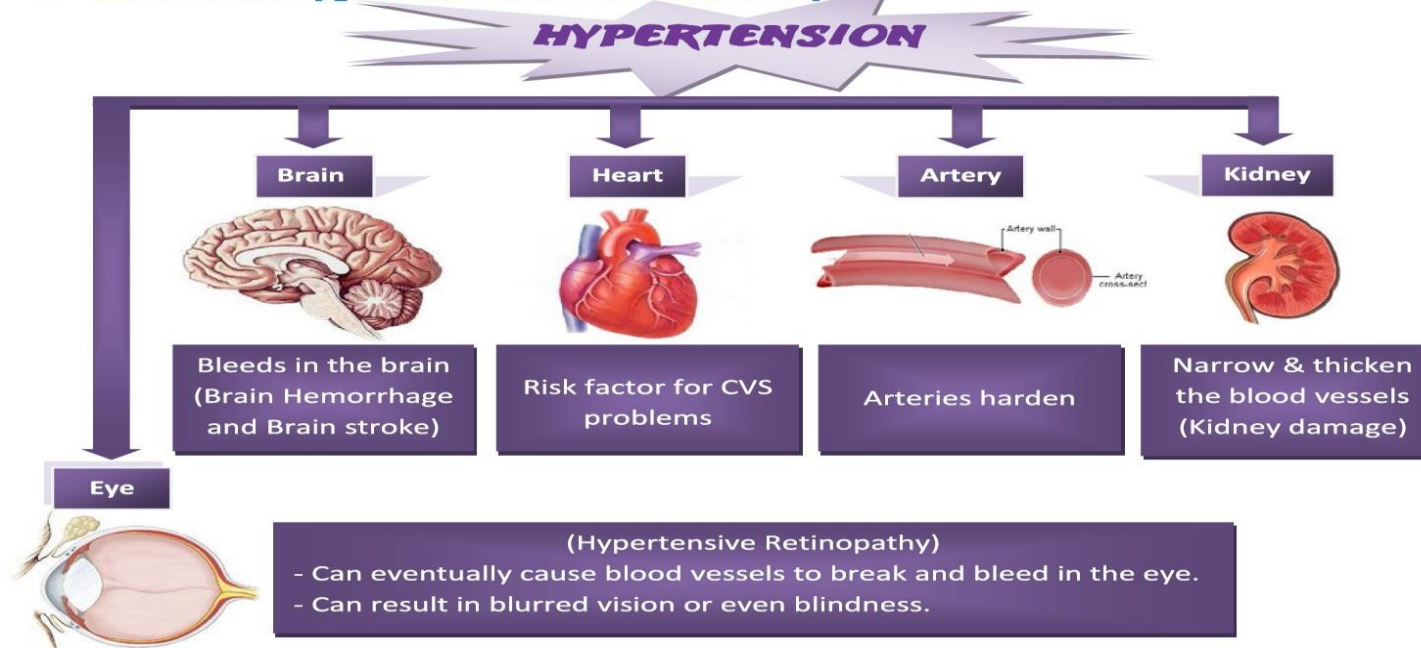
- Increase CO → Increase BP.
- Increase PVR → Increase BP.
- Increase CO and PVR → Increase BP.
- **Drugs decrease BP :**
 - Drug decrease CO, PVR or decrease both.



➤ Definition of hypertension :-

- It is a condition in which both systolic and diastolic blood pressure rise above normal levels.

➤ How does hypertension affect the body?



Therapy used to control of hypertension

a- Diuretics : It increase the urinary output of water and sodium “ prevention or correction of edema” through one of the following mechanisms:

1- Increasing the glomerular filtration rate .

2- Decreasing the rate at which sodium is reabsorbed from the glomerular filtrate by the renal tubules, therefore water is excreted along with sodium

B- angiotensin converting enzyme inhibitors

The ACE inhibitors, such as enalapril [e-NAL-ah-pril] and lisinopril [lyeSIN-oh-pril], are recommended as first-line treatment of hypertension in patients with a variety of compelling indications, including high coronary disease risk or history of diabetes, stroke, heart failure, myocardial infarction, or chronic kidney disease

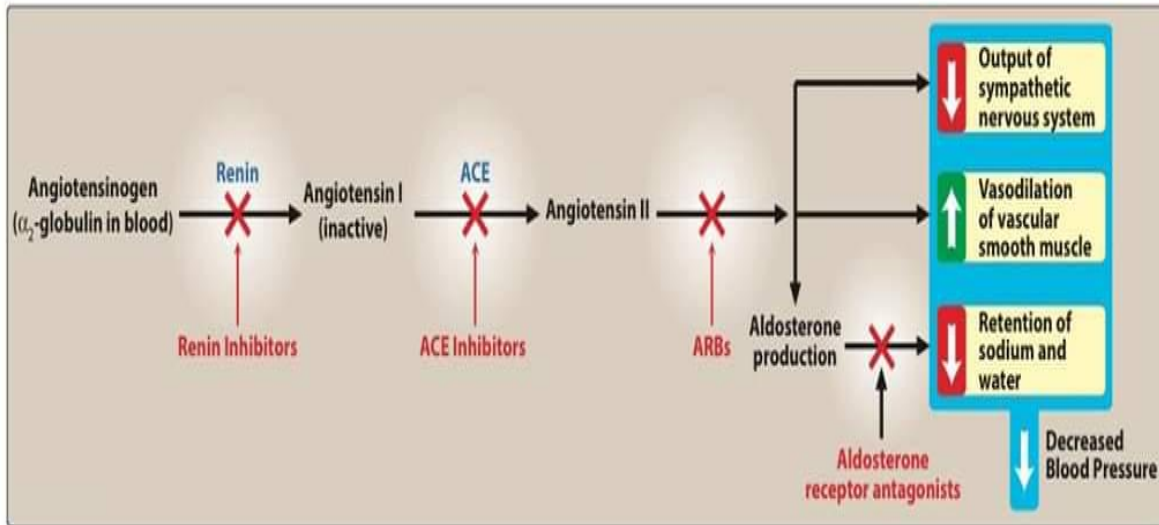


Figure 17.10

Effects of various drug classes on the renin–angiotensin–aldosterone system. Blue = drug target enzymes; red = drug class.

BETA BLOCKERS

DRUG	Mechanism	Uses	Side
Propranolol (indral)	Non selective beta blocker	Hypertension , angnina , migraine , MI,	NOT RECOMMENDED IN ASTHMA , copd, diabetes and hypotension
Metaprolol	Selective	Hypertension , angina , Congestive heart failure , MI,	Bradycardia, sexual dysfunction
Carvedilol	Alpha and beta blocker	Hypertension and CHF	BRADYCARDIA, hypotension

D-ANGIOTENSIN II RECEPTOR BLOCKERS

The ARBs, such as losartan [LOW-sar-tan] and irbesartan [ir-be-SARtan], are alternatives to the ACE inhibitors. These drugs block the AT1 receptors, decreasing the activation of AT1 receptors by angiotensin II.

E- Calcium channel blockers

Verapamil [ver-AP-a-mil]

Diltiazem

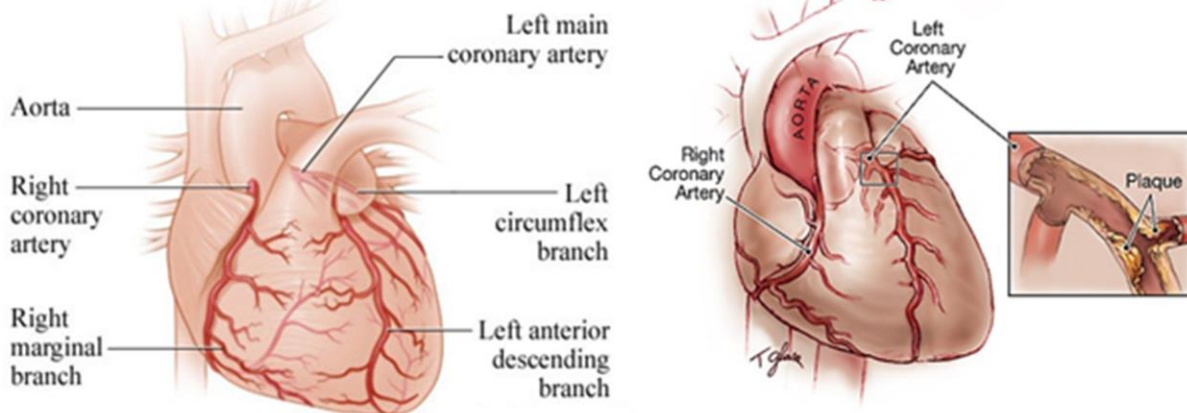
F- Vasodilator

direct-acting smooth muscle relaxants, such as hydralazine [hyeDRAL-a-zeen] and minoxidil [min-OX-i-dill],

Angina Pectoris

➤ Introduction:-

Coronary Arteries

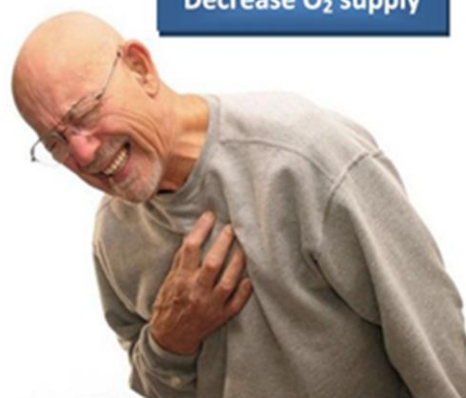


- Heart pump blood (which carry oxygen and nutrients) to the all body tissues.
 - Heart need energy (Oxygen and nutrients) to pump the blood.
 - Blood which carry oxygen and nutrients (Energy) pumped from the heart to the heart through coronary arteries.
 - Increase heart rate due exercise → Heart need more blood through coronary arteries to able to pump the blood to the tissues.
 - Coronary artery narrowing → Small amount of blood reached to the heart → decrease heart work → Angina pain.
- **Def.** → **Chest pain** caused by transient myocardial ischemia due to an imbalance between myocardial oxygen supply and oxygen demand.
- **Pain:** Sudden, severe, pricking chest pain radiating to the neck, jaw, back and arms.

Increase O₂ demand



Decrease O₂ supply



Therapy :

β-BLOCKERS Atenolol , Propranolol INDERAL

CALCIUM CHANNEL (Amlodipine ,) Diltiazem CARDIZEM Verapamil

ORGANIC NITRATES

