LECTURE 6

ECG

BLOOD VESSELS

Blood Pressure wave

① Respiratory wave (Traube-Hering wave)

② mayer wave - (Tambe-mayer wave)

* Respiratory wave-

During Respiration, 4-6 mmHg rise & Fall in Arterial Pressure

Respiration

Inspiration

↓

Lungs vol. ↑

↓

Size ↑

↓

↳ Ventricle size ↓

↓

↳ Blood in ↳ ventricle

↓

S.V. ↓ = to maintain C.O. → H.R ↑sc

↓

4-6 mm Hg arterial pressure ↓

Expiration

→ Lungs recoil

↓

↳ v. Normal size

↓

↳ v. volume ↑

↓

S.V ↑ → to maintain C.O.

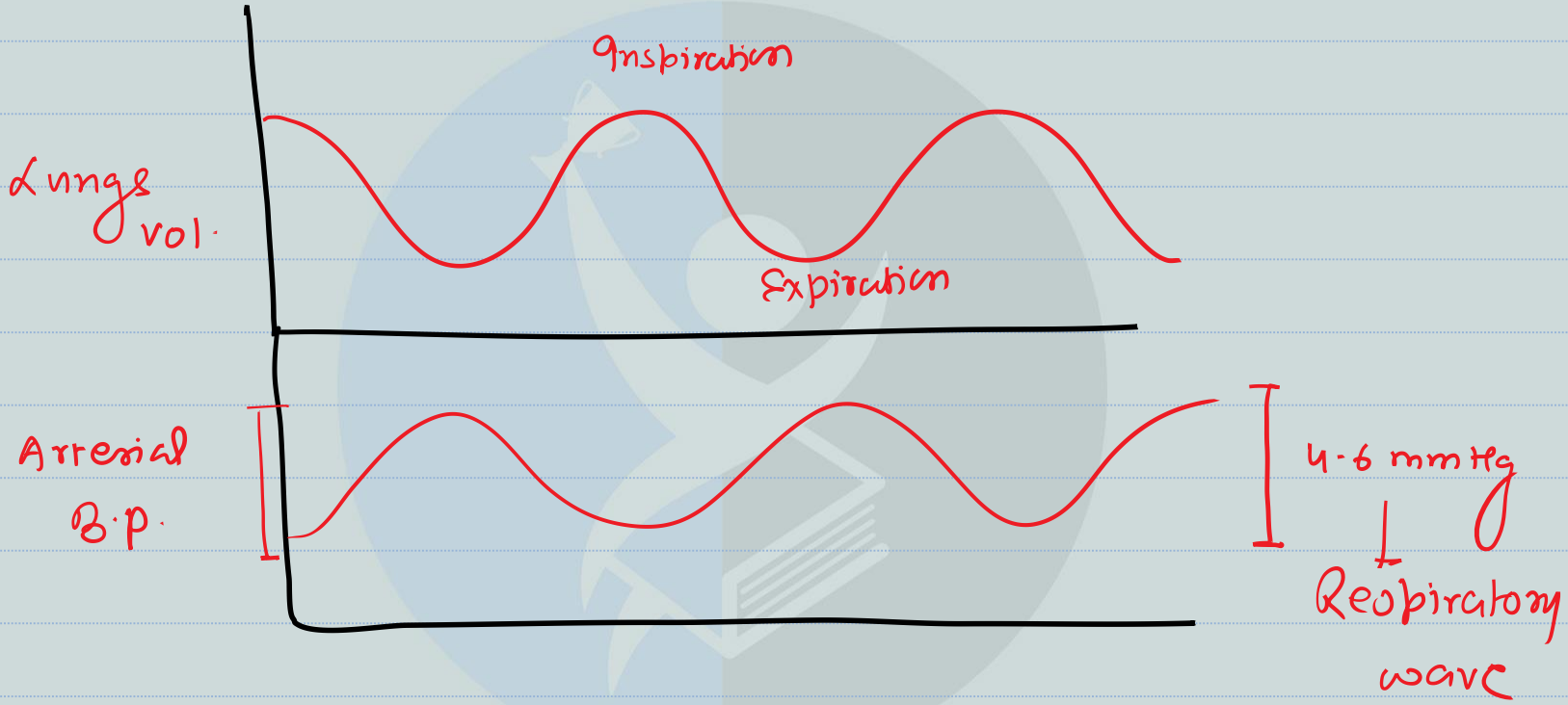
↓

4-6 mm Hg arterial pressure ↑

C.O.

↓

H.R ↓


Inspiration
Lungs vol.
Expiration
Arterial B.P.
4-6 mm Hg
Respiratory wave

(2) mayer wave

→ Appears due to Reflex occillation of CNS

↓

Chemoreceptor & Baroreceptor



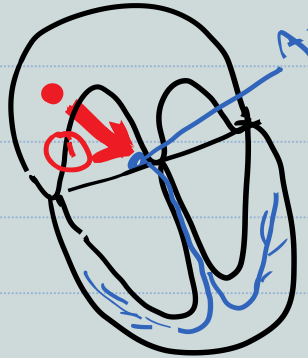
* Frequency of mayer wave is less than respiratory wave but amplitude is very high (25-30 mmHg)

* Electrocardiogram [ECG]



- measured the electrical activity of heart
- not a direct record of action potential in a cell

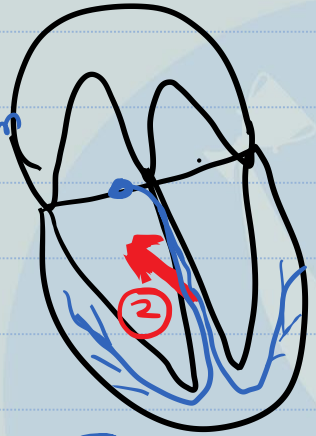
⇒ Depolarization waves



① Atrium depolarization

↓

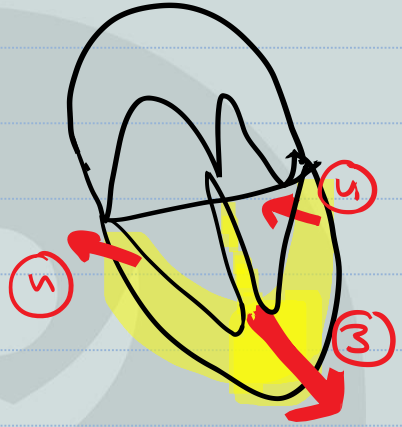
P wave



② Ventricular septum depolarization

↓

Q wave

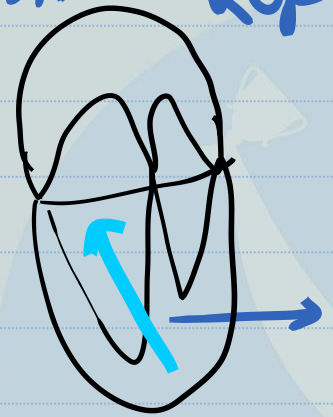


③ major V. Depolarization → R wave

↓

④ Basal V. Depolarization → S wave

Ventricular Repolarization wave (T-wave)

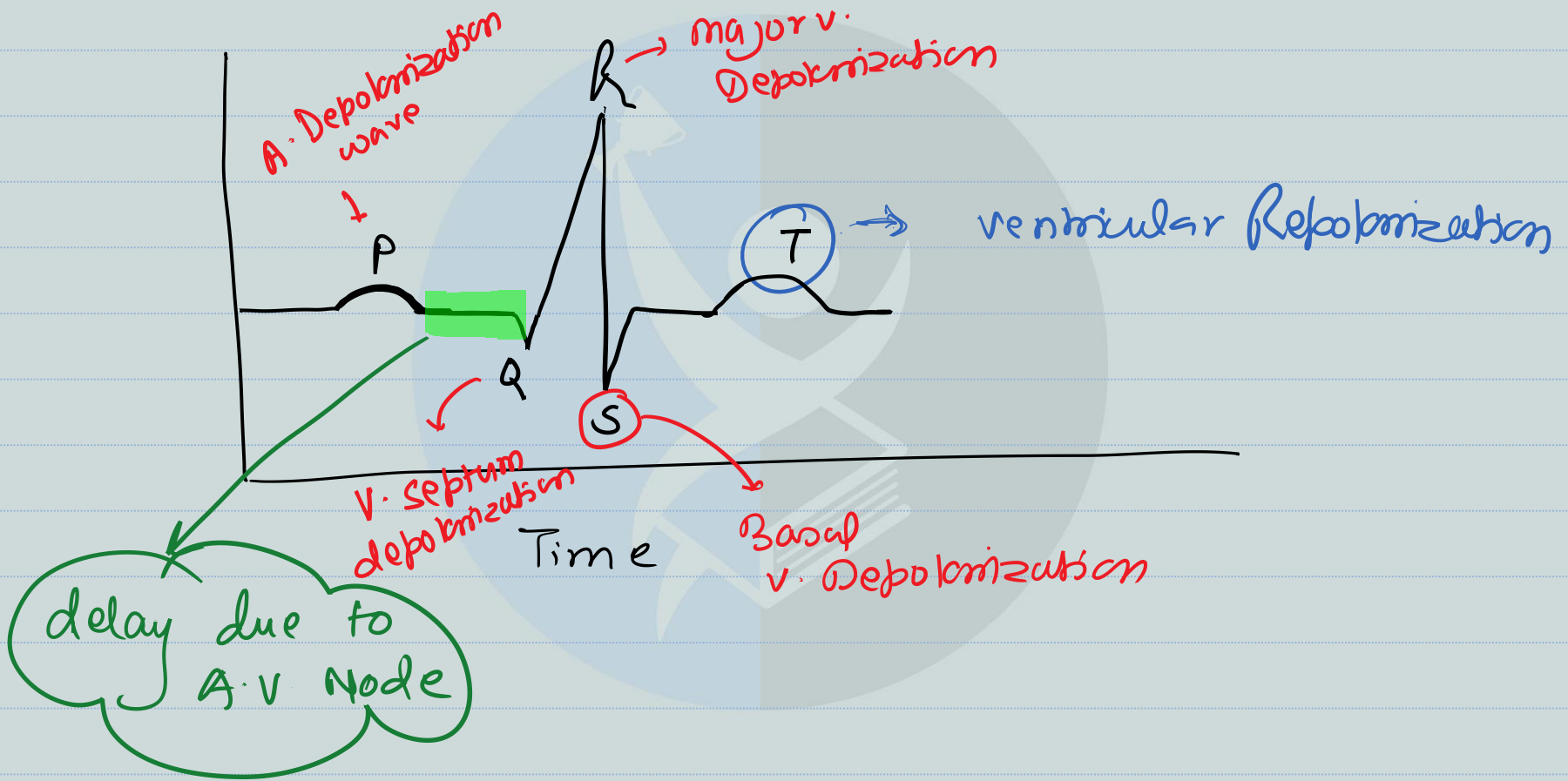


Repolarization

- Repolarization wave

↓

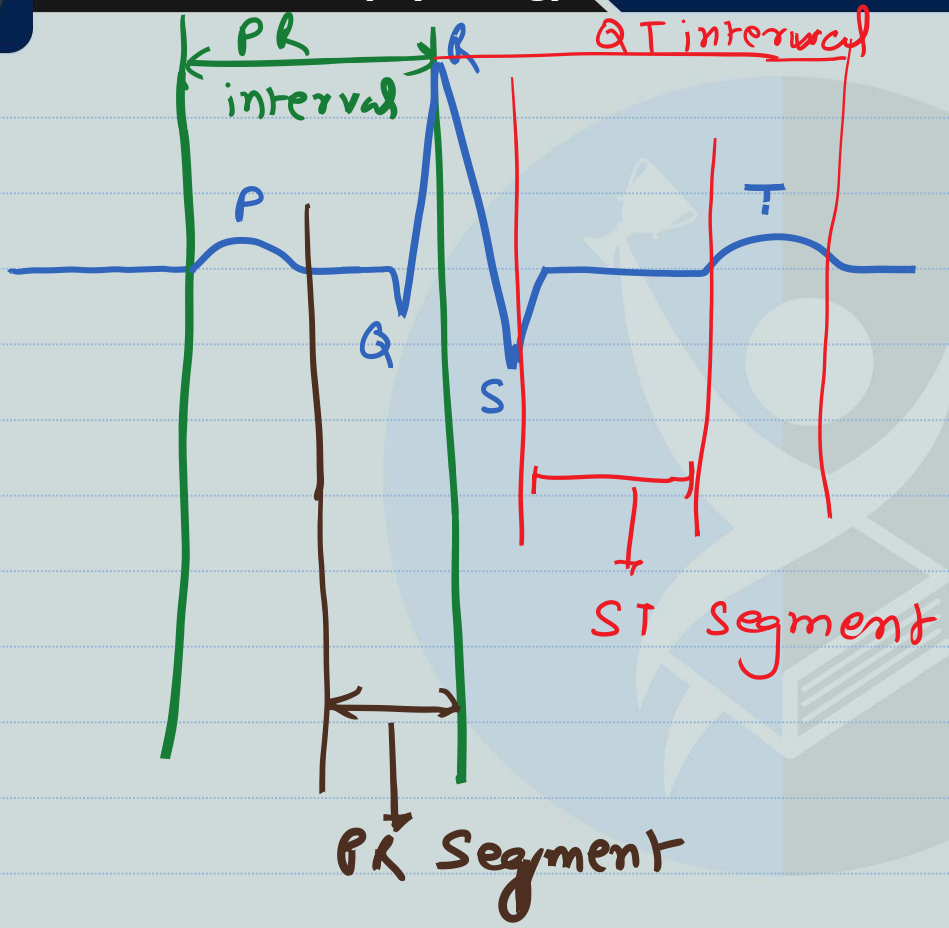
T wave


A. Depolarization wave
P
R
major V. Depolarization
T
ventricular Repolarization
Q
S
V. septum depolarization
Time
Basal V. Depolarization
delay due to A.V Node

P-wave - Atrium Depolarization

Q
R
S] complex - ventricular Depolarization

T wave - V. Repolarization



PR interval = Atrioventricular Conduction

QRS duration = V. Depolarization Duration

QT- interval = V. Action Potential

ST- Segment = Plateau Phase of V. A Potential

* ECG can detect Alteration in Electrical activity of Heart.

* if Block b/w SA Node & A.V Node (1st degree Block)
↓
distance b/w P wave & QRS Complex

implant Artificial Pacemaker

* if Compleat Block b/w SA Node & AV Node (3rd degree)
↓
2 Consequtive P wave followed by 1 QRS complex

↓
A·V Node itself starts its Pacemaking activity

↓
H·R ↓ (40 bpm)

* if there is block b/w AV Node & Bundle of His

↓
Bundle of His start its Pacemaking Activity

↓
H·R = 20 or less beats/min

Circulatory System

1. Blood
2. Heart
3. Blood vessels

(3) Blood vessels

(1) Artery (2) Capillary (3) Veins

(1) Artery

→ Carry Blood away from Heart
→ Diameter = ↓
→ Resistance ↑

Arteries kla Resistance vessels

→ Blood flow with ↑ Pressure

→ multilayered
→ Deeply situated in Skin

(3) Vein

→ Carry Blood toward the Heart
→ Diameter ↑
→ Resistance ↓
→ Blood flow with ↓ Pressure

- kla Capacitance vessels

Store >60·1 of total Bloody

• less No of layer tnt

Capillary

Fenistrated

→ most common

→ Gap ↑nt in b/w Endothelial cells

↓

K/a fenestration

Continuous

- Restricted to the Brain
- Form Blood Brain Barrear
- Tight junction ↑nt in b/w Endothelial cell

Sinusoidal

- ↑ Gap b/w Endothelial cell

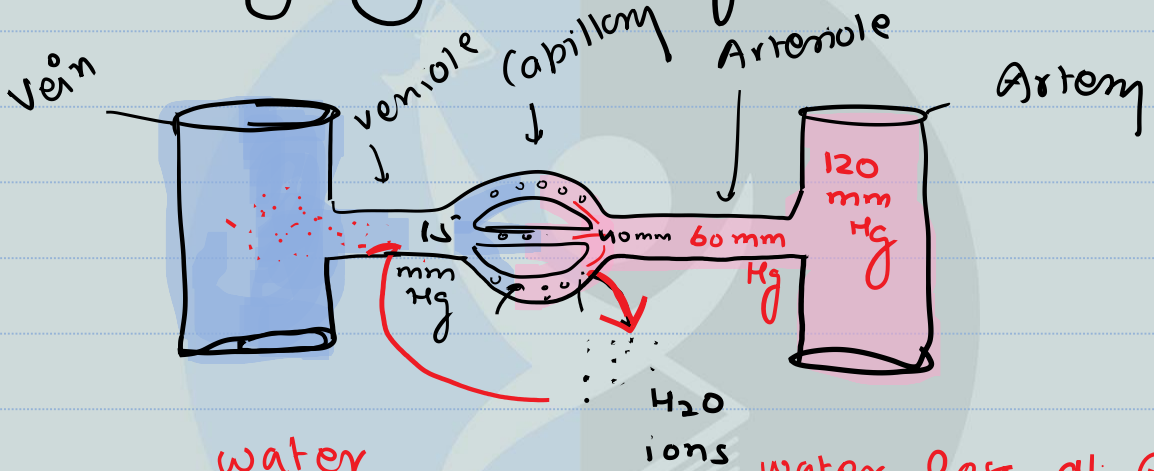
↓

↑nt in Bone marrow

↓

Cells can pass through Gaps

Starling Hypothesis of Blood volume



water Reabsorb at veniole End.

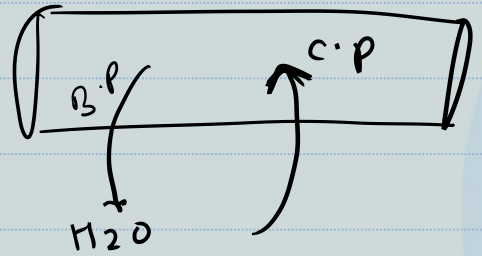
water loss at Arteriole End

Starling forces

1. Blood pressure (B.P) → water loss
2. Colloidal Osmotic pressure = water Reabsorb

↓

due to the of osmolites (proteins & ions)



Arteriole End

B.P = 40 mmHg

C.O.P = −25 mmHg

15 mmHg → water loss

Veniole End

B.P = 15 mmHg

C.P = −25 mmHg

−10 mmHg

Water Reabsorb

Rest of water and other substances Bring Back to the circulation via lymphatic System

Lymphatic System

- 2° Circulatory System
- Brings 4 lit water / day into circulation

if there is infection in lymphatic system

ex. bronchofteae → Elephantiasis

Venous Return -

→ Depends upon Contractility of Skeletal muscle

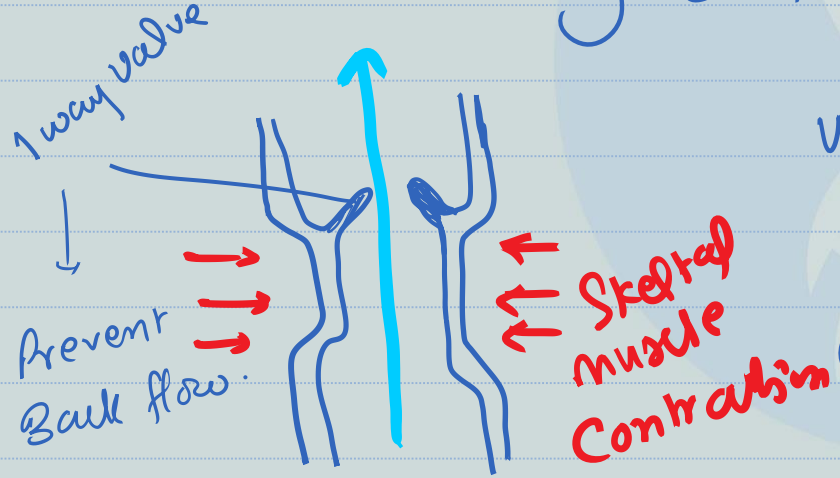
→ most of Blood flow in veins is against gravity

↓

veins has Some Adaptation

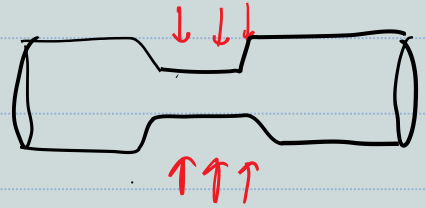
① 1 way valve tnt

② Blood Propells due to Skeltal muscle contraction



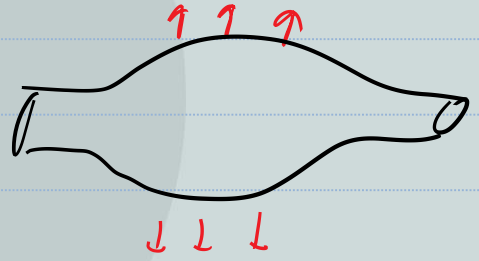
Factor That Affect Arterial Blood Flow

Vasoconstricter



- Vascular Smooth muscle Contraction

Vasodialator



Relaxation of Vascular Smooth muscle

Local factor

Vasoconstrictor

- Temp ↓

Vasodialator

- Local Temp ↑
- CO_2 ↑, O_2 ↓
- Adenosine ↑
- Lactate
- pH ↓

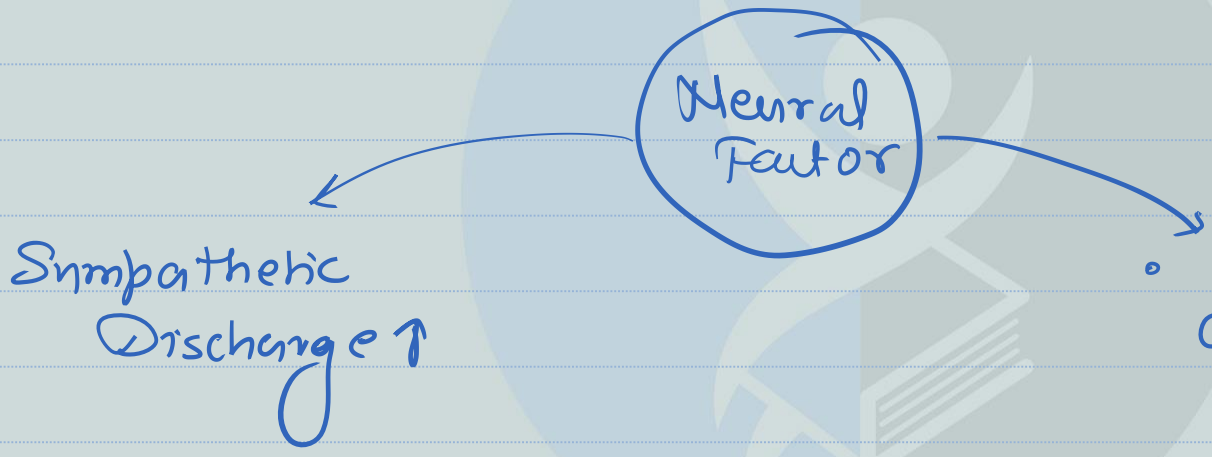
Circulating Neurohormone

- Epinephrin [except in skeltal muscle & liver]
- nor epinephrin
- vasopressin

- Epinephrin in liver & skeltal muscle
- Calcitonin Related Protein

- Angiotensin II
- Neuropeptide Y

- Substance P
- Histamine
- Atrial Natri-uratic peptide



No is potent vasodialator

Cardiovascular Disease

→ Athero-sclerosis (Hardening of Artery)

↳ Can leads to Heart Attack

Damage in Blood vessels

Cause - Hypertension
Stress
Fat diet

B.P. ↑



Cholesterol (LDL)

↓

oxLDL + Ca^{++} + collagen = K/A Plaque

If Blood Pressure ↑ → Vessels Damage

↓

Clotting Start

Plaque + Clot = K/A Thrombus

If occ. in coronary artery → K/A Coronary Thrombosis

if Thrumbus breaks into circulation

↓

K/a Embolous

↓

Can Block narrow artery

of Brain or Heart

↓ ↓

Brain Stroke | Heart attack

By Pass



* Treatment

- Angiography - detect clot
→ Angioplasty → Remove Blockage

HAPPY LEARNING

THANKS

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