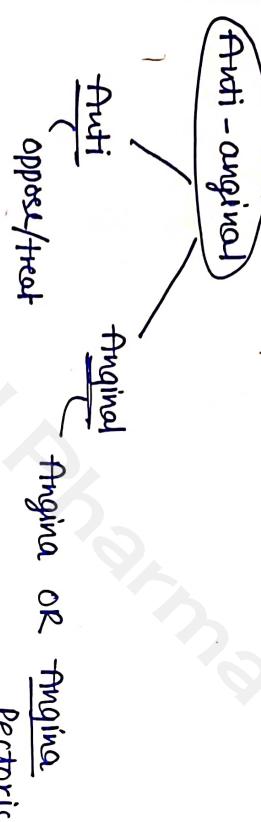


Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

ANTI-ANGINAL DRUGS

These are those drugs which used in the treatment of angina pectoris.



Angina Pectoris [OR] Angina

Also called as ischemic chest pain.

- Angina is severe chest pain due to ischemia (lack of O₂ to the heart muscles).
- This pain occurs in chest and left side of body spread to neck, jaw, back and arms.

Causes →

- When our heart muscles (myocardium) does not get enough blood and Oxygen supply
- Less O₂ supply ↑ in heart
- More O₂ demand

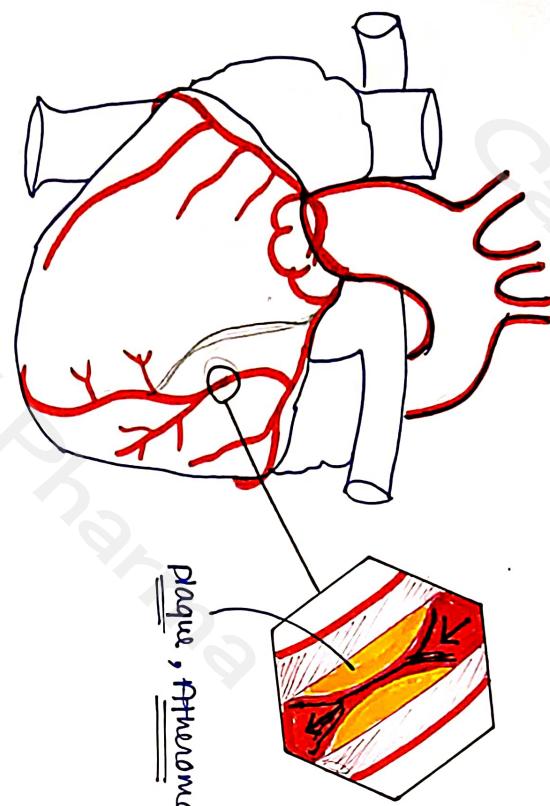
Reason :

- Coronary artery disease (CAD)
- Vasoconstriction of coronary arteries.
 - Due to this, heart does not get enough blood, without blood tissue loses O₂ and die

↓ O₂ supply ≠ ↑ O₂ demand

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise



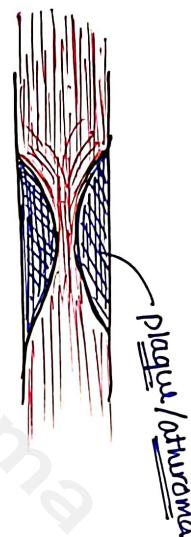
- Coronary artery disease — Due to formation of these atheroma, heart muscle does not get enough blood and oxygen (O_2).
- Coronary artery disease
 - Vasoconstriction
 - Heart work load ↑
- Heart work load ↑
 - Or supply ↓
 - Or demand ↑

- Ischaemic
- Heart failure — Mortality ↑
- Myocardial infarction — cause Death
- Risk factors —
- Hyperlipidemia (\uparrow Lipids)
 - Hypertension (\uparrow heart work load — \downarrow demand)
 - Diabetes
 - Smoking
 - weak lifestyle
 - family history (of heart disease).
- Types :
- three types
 - i) stable angina
 - ii) variant angina
 - iii) unstable angina
- 1) stable Angina —
- Also known as classical angina.
- It is most common type of angina.
 - these attacks are predictable and caused by exercise, emotion and work load.

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

Main reason behind classical angina is severe atherosclerotic in coronary artery which supply blood to the deeper tissue of heart.



- this results in decrease ↓ coronary

artery perfusion

Blood to organ/tissue.

ii) Variant Angina -

Also known as vassospastic and

Prinzmetal angina

- uncommon and unpredictable

- Attacks occurs at rest

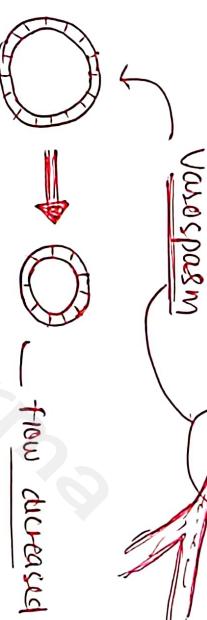
- Caused by coronary vasoconstriction.

↓ Blood supply ↙

• No atherosclerosis.

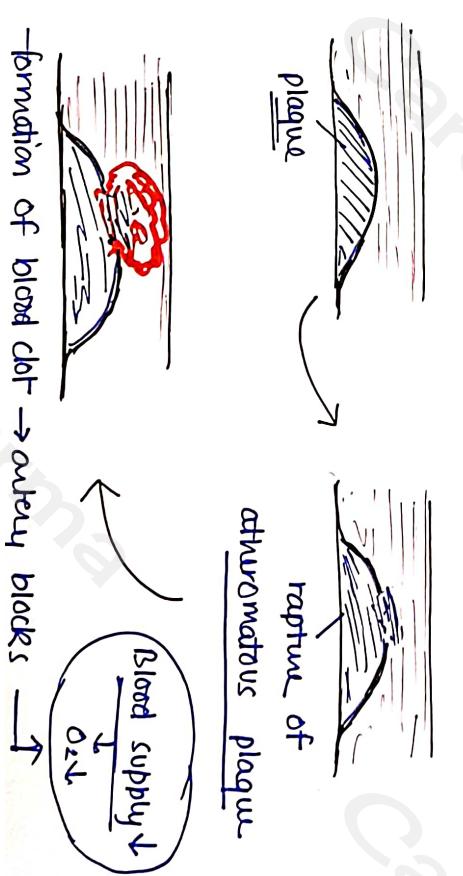
- In this, Drugs used to relieving

Vasospasm



iii) Unstable Angina -

* Rapid increase in duration and severity of attacks which occurs during rest.



Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

In this atheromatous plaque rupture

- which further attract platelet deposition -
- occlusion of the coronary artery -
- coronary vasospasm.

- High risk of Myocardial Infarction (MI).

- it comes as surprise
- longer lasting than stable

Treatment of medical procedure

+ therapies.

Self care

- Physical exercise ↑
- weight loss ↓
- ⊗ smoking

surgery

coronary artery bypass

surgery

Drugs

- Anti-Anginal → Vasodilators, calcium channel blockers, Beta blockers etc -

Anti-Anginal

Vasodilators

Calcium Channel blockers

- Amyl Nitrite
- Nitroglycerin*

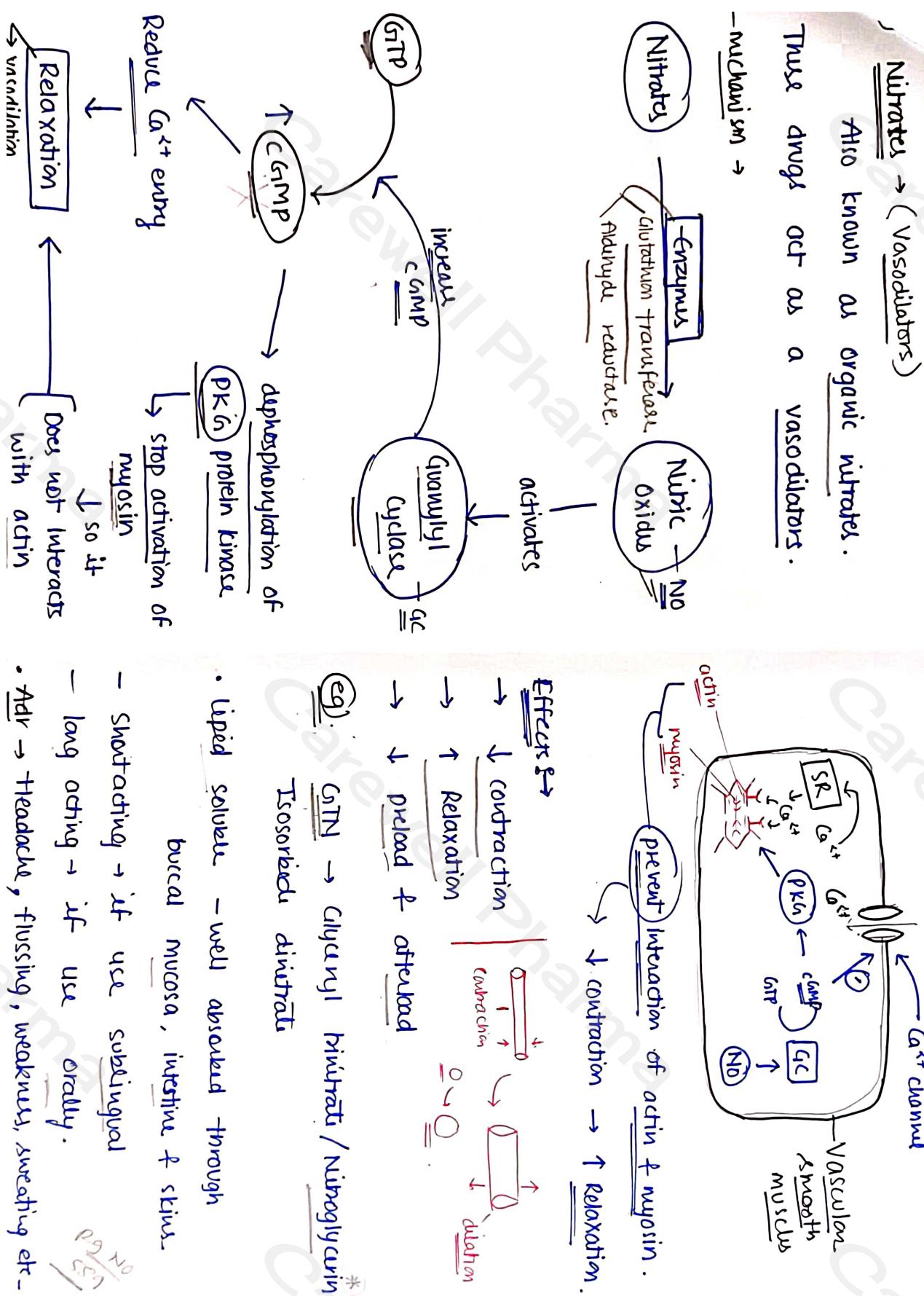
- Bepridil hydrochloride
- Diltiazem HCl

- Isosorbide dinitrate*
- Dipyridamole

- Verapamil
- Nifedipine
- Amlodipine
- Felodipine
- Nicardipine
- Nimodipine

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise



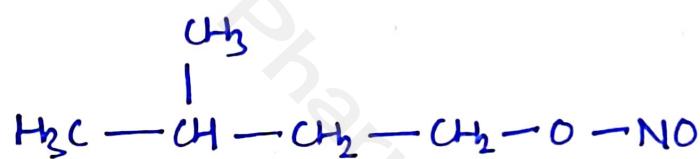
Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

① Vasodilators :-

Also known as Nitrates

1) Anetyl Nitrate :-



- MOA →

- It produces Nitric oxide which results in the reduction of systemic and pulmonary arterial pressure and decrease cardiac output by peripheral vasodilation.

- Uses →

 used to treat Angina and other heart disease

- Sometimes used as an antidote for cyanide poisoning

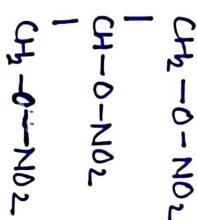
- In industry, it used as cleaning agent and as a solvent.

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

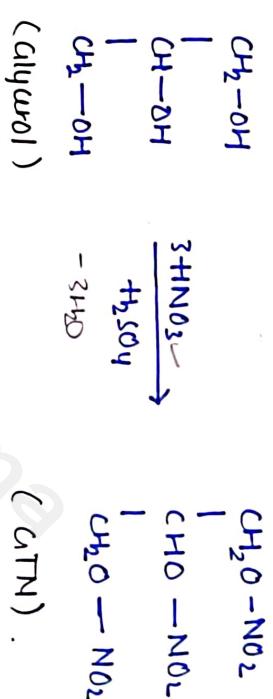
② Nitroglycerin :-

Also known as Glyceryl Trinitrate (GTN).

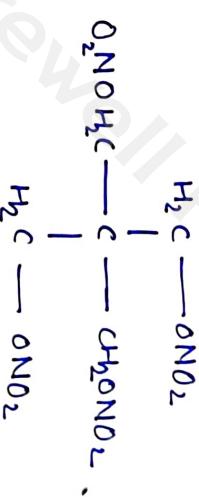


(GTN).

acid give Nitroglycerine [Nitration].



③ Pentaerythritol Tetranitrate :-



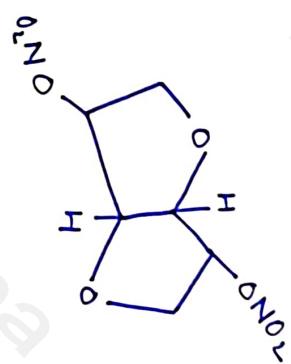
(PTTN).

- MOA -
 - It produce Nitric oxide (NO)
 - then same ...
- Uses -
 - Used in the treatment of Angina and other heart disease
 - used in the form of sublingual tablet for fast acting
 - Similar as GTN but duration of action is more than GTN.
- Synthesis -
 - used in the treatment of Angina. When Glycerol is treat with Nitric acid in the presence of sulphuric

Carewell Pharma - A Family of Learning

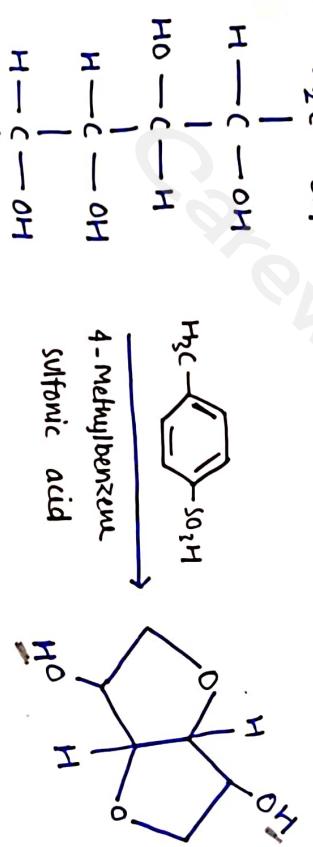
search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

④ Isosorbide dinitrite :-



- M.O.A -
 - Similar as GTN (Nitro glycerine).

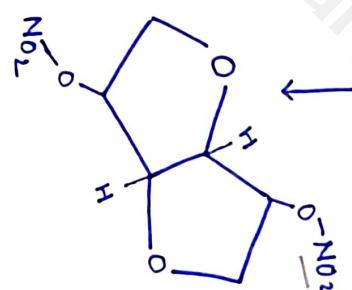
- Synthesis -



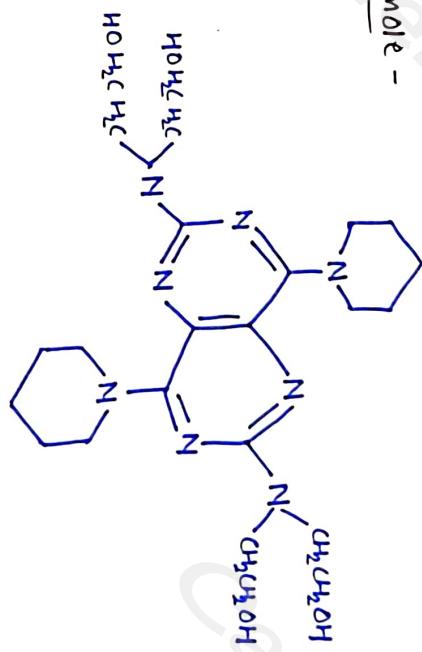
D- Sorbitol

$\begin{cases} \text{HNO}_3 \\ \text{H}_2\text{SO}_4 \end{cases}$

⑤ Dipyridamole -



- Uses -
 - used in the treatment of acute angina in the form of sublingual or chewable tablets.



- M.O.A -

- It inhibit the phosphodiesterase enzyme that normally breakdown cAMP and cGMP.

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

- It inhibit the cellular receptors of adenosine into platelets - increase cAMP.

- Uses -

- used as antiplatelet drugs.
- used to dilate the blood vessels.
- used as vasodilator to treat angina and other heart diseases.

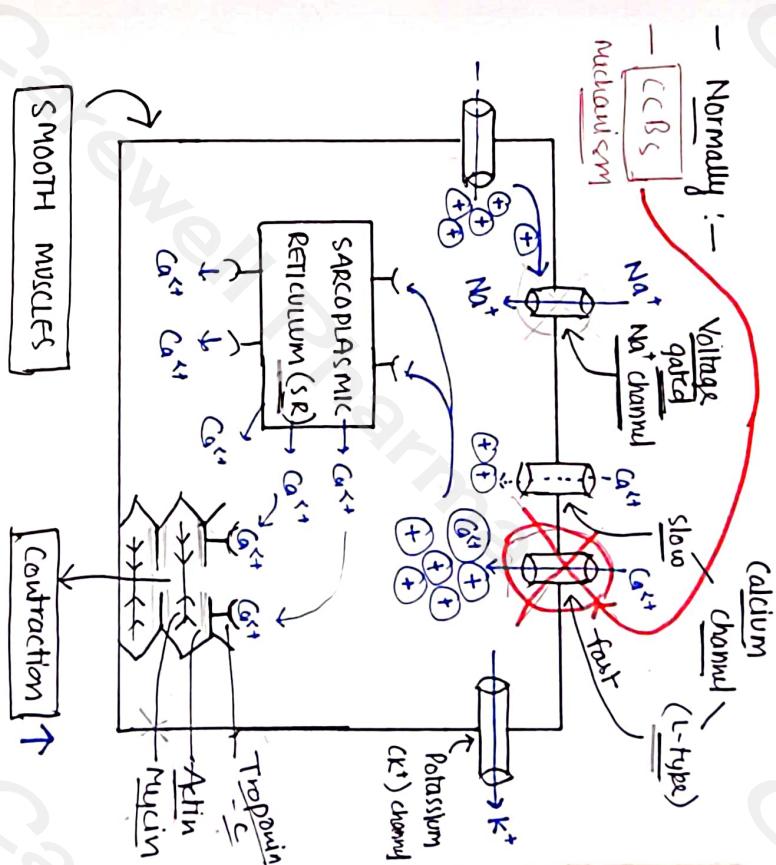
ii) Calcium channel blockers

- Those drugs which are used in the treatment of Angina pectoris, hypertension and many other heart problems.

- These drugs give their action by

blocking calcium channel which inhibit the influx of Ca^{2+} which is responsible for excitation, contraction and secretion.

• Mechanism of Action :-

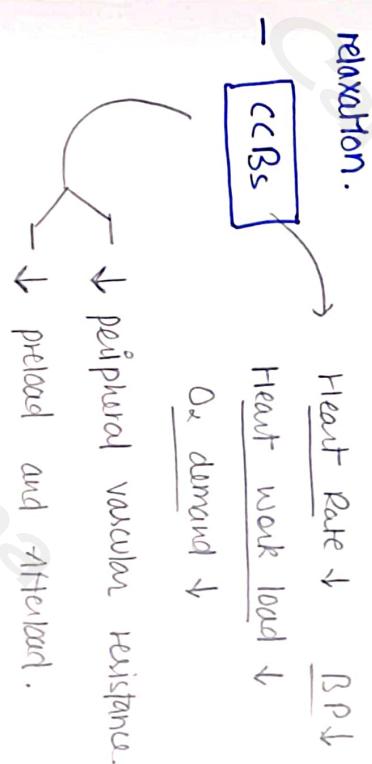


- Calcium channel responsible for influx of Ca^{2+} ion.
- Now, voltage gated L-type calcium channel are more sensitive and more sensitive and most of the Ca^{2+} ion comes through it.

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

- Now, these Ca^{++} ion activate sarcoplasmic reticulum which further produce more Ca^{++} ion.
- Now, these Ca^{++} ion bind with Tropomycin receptor and cause interaction of Actin and myosin.
- Which further cause **contraction**.
- Angina (chest pain) \Leftarrow
 - \downarrow Heart Rate \uparrow
 - \downarrow Heart work load \uparrow
 - \downarrow O₂ demand \uparrow
- Now, calcium channel blockers (CCBs) introduced into the body.
- These drugs blocks L-type voltage gated calcium channel.
- Which further inhibit the Ca^{++} ion influx
- which decrease the contraction & cause

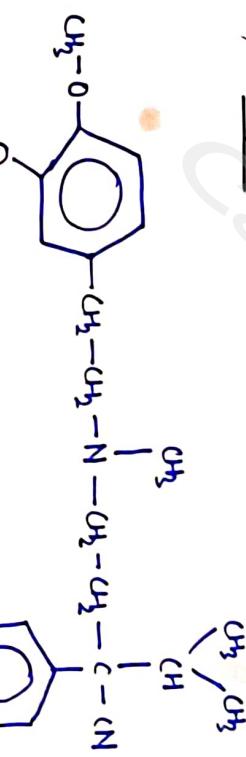


- Drugs :-
 - 1) Phenylalkylamines
 - Verapamil
 - Bepridil hydrochloride.
 - 2) Benzothiazepines
 - Diltiazem hydrochloride
 - 3) Dihydropyridines
 - Nifedipine
 - Amlodipine
 - Felodipine
 - Nicardipine
 - Nimodipine

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

i) Verapamil :-



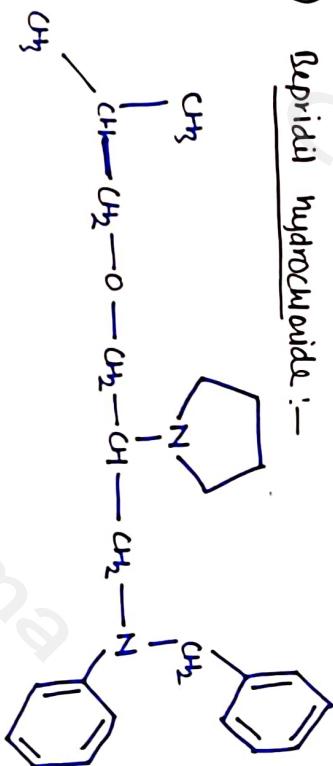
• MOA -

- It give their action by inhibiting both calcium as well as sodium channel.

• Uses -

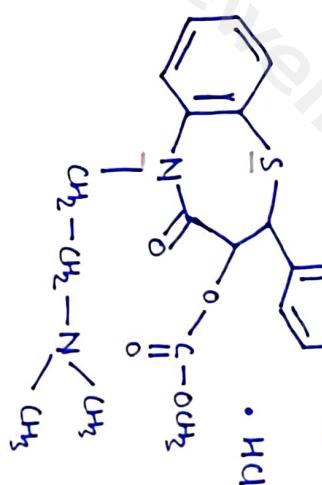
- used to treat Angina, hypertension and other heart conditions

ii) Rerpidil hydrochloride :-



iii) Diltiazem :-

Belong to Benzothiazepines



• MOA -

- used in the treatment of angina, hypertension and other heart diseases.

• Uses -

- used to control heart rate.

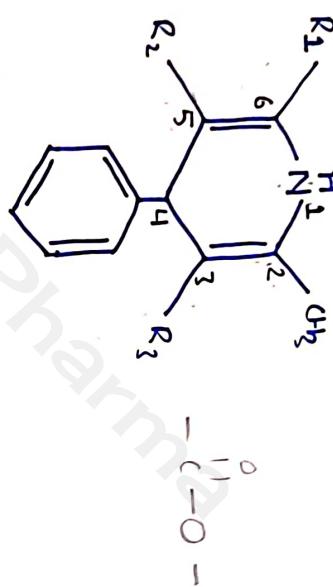
- MOA -
- same as other
- Uses -
 - used in the treatment of angina, hypertension and other heart diseases.

Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

- Dihydropyridine (DHP)

- SAR (Structure Activity Relationship)

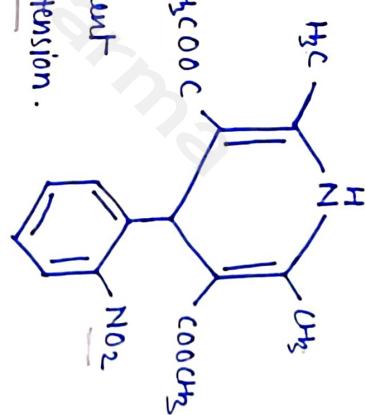


- Substituted phenyl ring at 4th position is essential for activity.
- Now, substitute in this phenyl ring by (X) - Cl, NO₂ increases the activity.
- 1,4-dihydropyridine ring is essential for activity.
- Substituted at 1st position decrease activity.
- Methyl group at position 2nd + 6th increases activity + essential. (except amlodipine).

- Presence of ester group at position 3rd + 5th increases the activity.

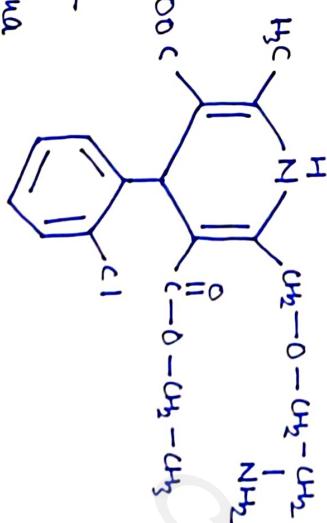
iv) Nifedipine -

- MOA -
- same as other.
- Uses -
- Used in the treatment of Angina, Hypertension.
- Used in Raynaud's phenomenon.



v) Amlodipine -

- MOA -
- same as other.
- Uses -
- Used in the treatment of stable angina and hypertension.



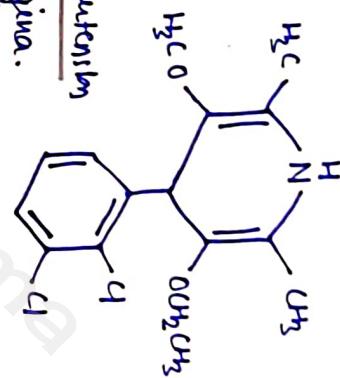
Carewell Pharma - A Family of Learning

search CAREWELL PHARMA on YouTube & Watch Videos Syllabus wise

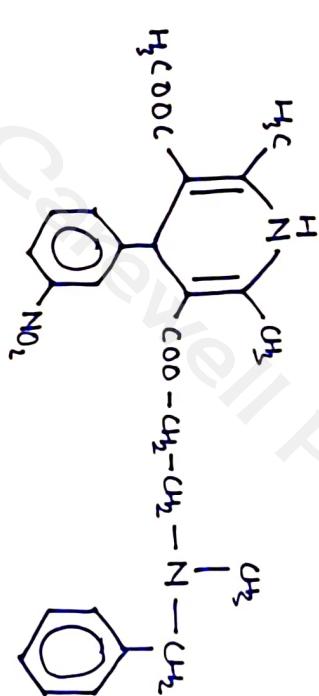
vi) Felodipine :-

- MOA -
- same as other.

- Uses -
- used in the treatment of hypertension and stable angina.



vii) Nicardipine :-



viii) Nimodipine :-

- MOA -
- same as other.

- Uses -
- used in the treatment of Angina.
- dilates cerebral blood vessels.

