DRUGS USED IN ATHEROSCLEROSIS

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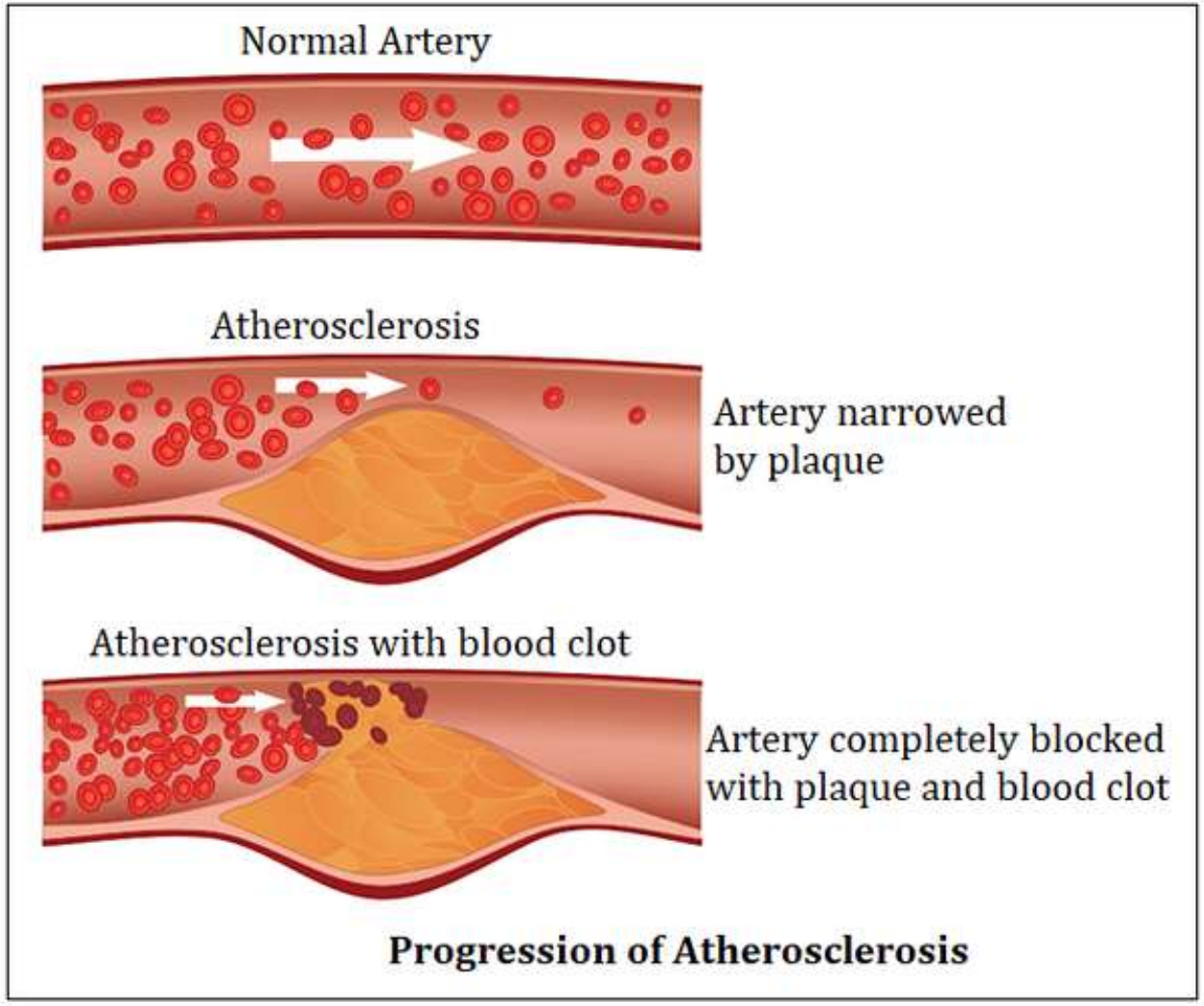
ATHEROSCLEROSIS

- Atherosclerosis-**Atheroma**(fatty deposits in arteries)+**Sclerosis**(hardening)

- **Atherosclerosis** is a hardening and narrowing of arteries due to plaque formation. It causes obstruction of blood flow.

- Atherosclerosis often has no symptoms until a plaque ruptures or the build-up is severe enough to block blood flow.

Atherosclerosis…….



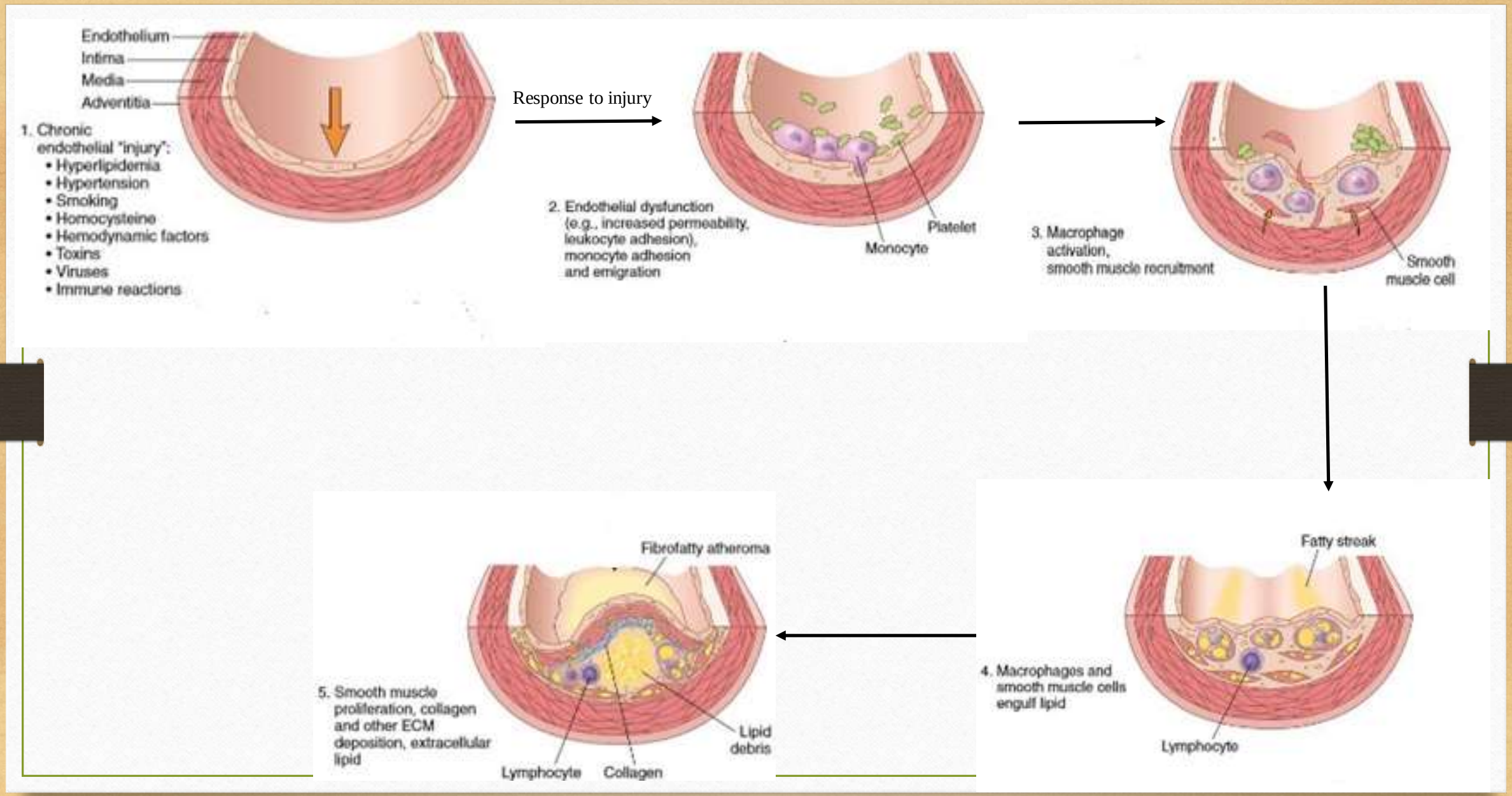
Etiology

- Obesity
- Hypertension
- Diabetes mellitus
- Smoking
- Alcohol consumption
- Sedentary life style
- Use of oral contraceptives by woman
- Deficiency of oestrogen

Pathophysiology

Pathogenesis of Atherosclerosis involves following mechanisms:

- ✓ Endothelial injury
- ✓ Endothelial dysfunction
- ✓ Macrophage activation
- ✓ Macrophage engulf lipids
- ✓ Smooth muscle proliferation, collagen and other ECM deposition


Endothelium
Intima
Media
Adventitia
1. Chronic endothelial "injury":
• Hyperlipidemia
• Hypertension
• Smoking
• Homocysteine
• Hemodynamic factors
• Toxins
• Viruses
• Immune reactions
Response to injury
2. Endothelial dysfunction (e.g., increased permeability, leukocyte adhesion), monocyte adhesion and emigration
Platelet
Monocyte
3. Macrophage activation, smooth muscle recruitment
Smooth muscle cell
4. Macrophages and smooth muscle cells engulf lipid
Fatty streak
Lymphocyte
5. Smooth muscle proliferation, collagen and other ECM deposition, extracellular lipid
Fibrofatty atheroma
Lipid debris
Lymphocyte
Collagen

Symptoms

- Atherosclerosis in Heart arteries---causes **Chest pain(Angina)**
- Atherosclerosis in the arteries supplying brain leads to **Stroke**
- Atherosclerosis in the arteries in arms and legs produces decreased blood flow is called as **peripheral artery occlusive disease (PAOD)** have symptoms such as leg pain when walking.
- Atherosclerosis causes erectile dysfunction in men.

Diagnosis

- Electrocardiogram
- Echocardiogram
- Chest X-ray
- Ankle/brachial index
- Angiography
- Blood test: Lipid profile

Treatment

Non-Pharmacological treatment

- Quit smoking. ...
- Eat a balanced diet that is high in fiber and low in cholesterol, fat and sodium. ...
- Exercise. ...
- Manage other related health problems, such as high blood pressure, diabetes, or high cholesterol.

Pharmacological treatment

Anti-Atherogenic drugs

Surgery

- Angioplasty
- Endarterectomy
- Bypass surgery

Anti-Atherogenic Drugs

- These are drugs which are used in the treatment of Atherosclerosis.
- These are also known as Hypolipidemic drugs.
- These are drugs which the lower the levels of Lipids and lipoproteins in blood.

Classification of Anti-Atherogenic drugs

I. HMG CoA reductase inhibitors
II. Bile acid sequestrants
III. Fibrates
IV. Cholesterol absorption inhibitor
V. Miscellaneous

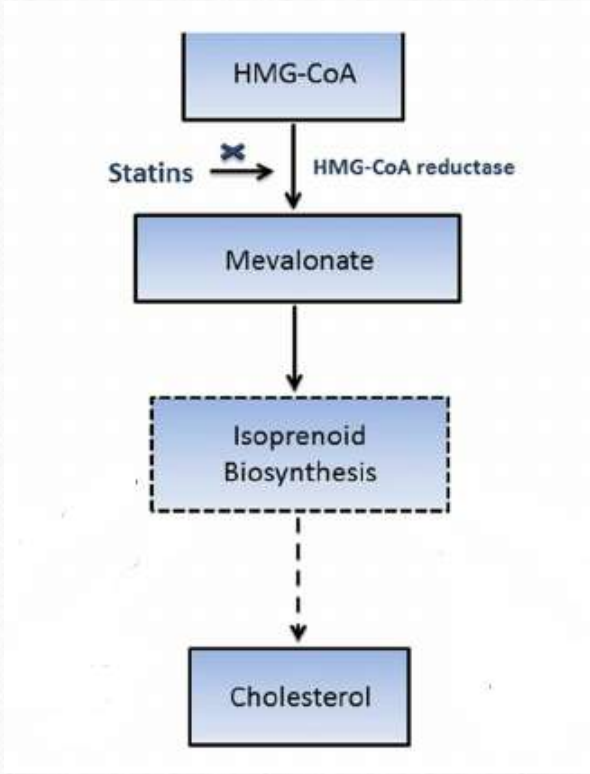
1.) HMG CoA reductase inhibitors

- Atorvastatin
- Lovastatin
- Simvastatin
- Pravastatin
- Rosuvastatin

1.) HMG CoA reductase inhibitors

- They are the most effective agents for treating hyperlipidemias.
- They inhibit enzyme HMG CoA reductase(3-Hydroxy-3-methyl glutaryl coenzyme A) and decreases cholesterol synthesis in the liver.
- They decrease cholesterol, triglycerides, LDL and VLDL and increase HDL cholesterol levels in plasma.
- They are usually given once, daily, in the evening because cholesterol biosynthesis occurs mainly at night.

1.) HMG CoA reductase inhibitors



1.) HMG CoA reductase inhibitors

Adverse effects:

- Hepatotoxicity
- Headache
- Sleep disturbances
- Myopathy
- Anorexia, nausea, vomiting and diarrhoea

Statins are contraindicated in Pregnancy because of teratogenic effect.

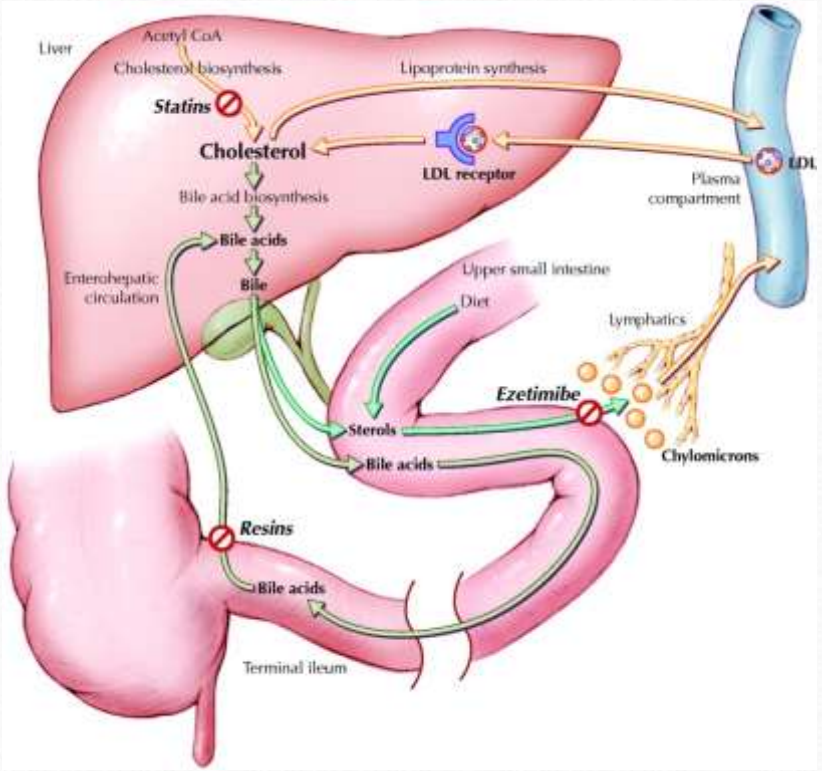
II.) Bile acid sequestrants

- Cholestyramine
- Colestipol

II.) Bile acid sequestrants

- Bile acid sequestrants are polymeric compounds that serve as ion-exchange resins. It exchange anions such as chloride ions for bile acids. By doing so, they bind bile acids and sequester them from the enterohepatic circulation. The liver then produces more bile acids to replace those that have been lost. Because the body uses cholesterol to make bile acids, this reduces the level of LDL cholesterol circulating in the blood.

II.) Bile acid sequestrants



II.) Bile acid sequestrants

- They are taken orally in divided doses before meals.

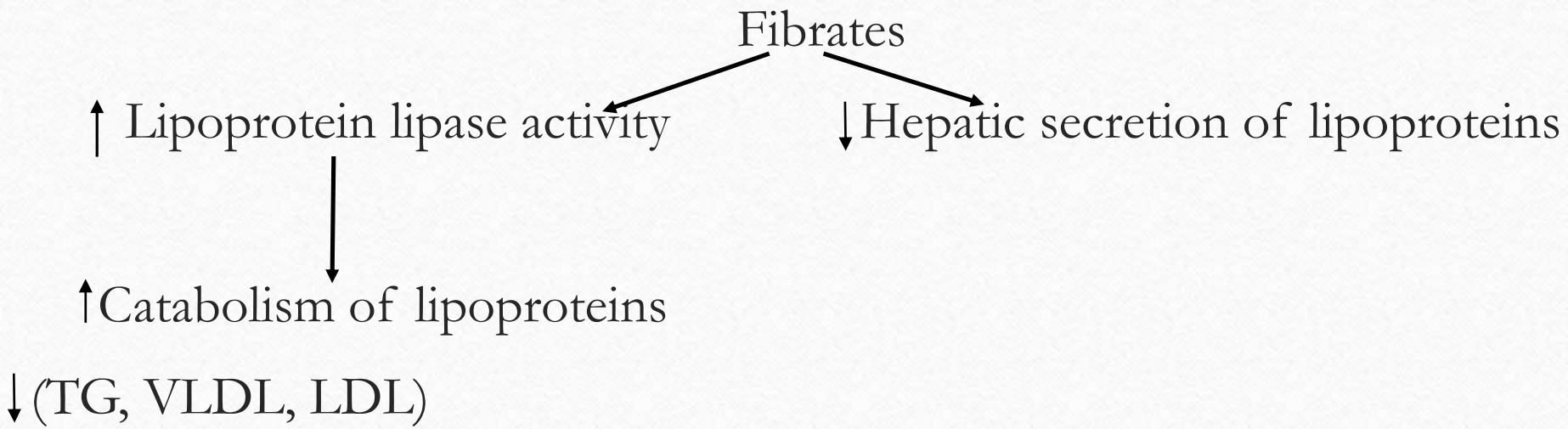
Adverse effects:

Unpalatability, Bloating, nausea, flatulence and constipation

III.) Fibrates

- Clofibrate,
- Gemfibrozil
- Bezafibrate
- Fenofibrate

III.) Fibrates



III.) Fibrates

Adverse effects:

- Dyspepsia
- Nausea, vomiting
- Muscle pain
- Headache

IV.)Cholesterol absorption inhibitor

Ezetimibe is an example of Cholesterol absorption inhibitor

- It inhibits the absorption of cholesterol in the intestine.
- It is generally used with a statin.
- It is taken orally any time of the day.
- Rarely, it can cause allergic reactions.

IV.)Cholesterol absorption inhibitor

Ezetimibe inhibits sterol transporter in intestine

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Absorption of Cholesterol decreases

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Decreased delivery of cholesterol to liver

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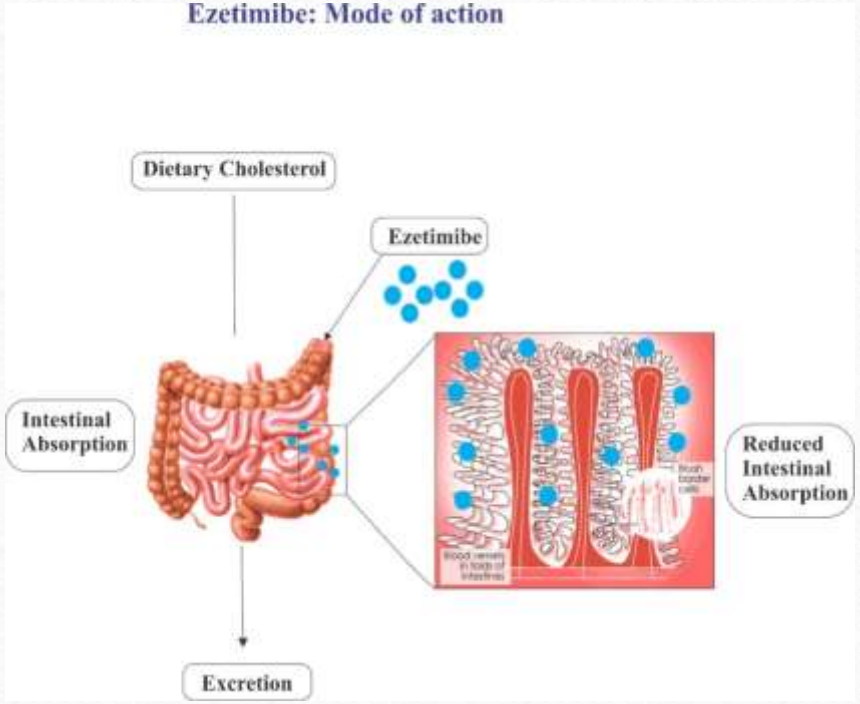
Reduced hepatic cholesterol stores



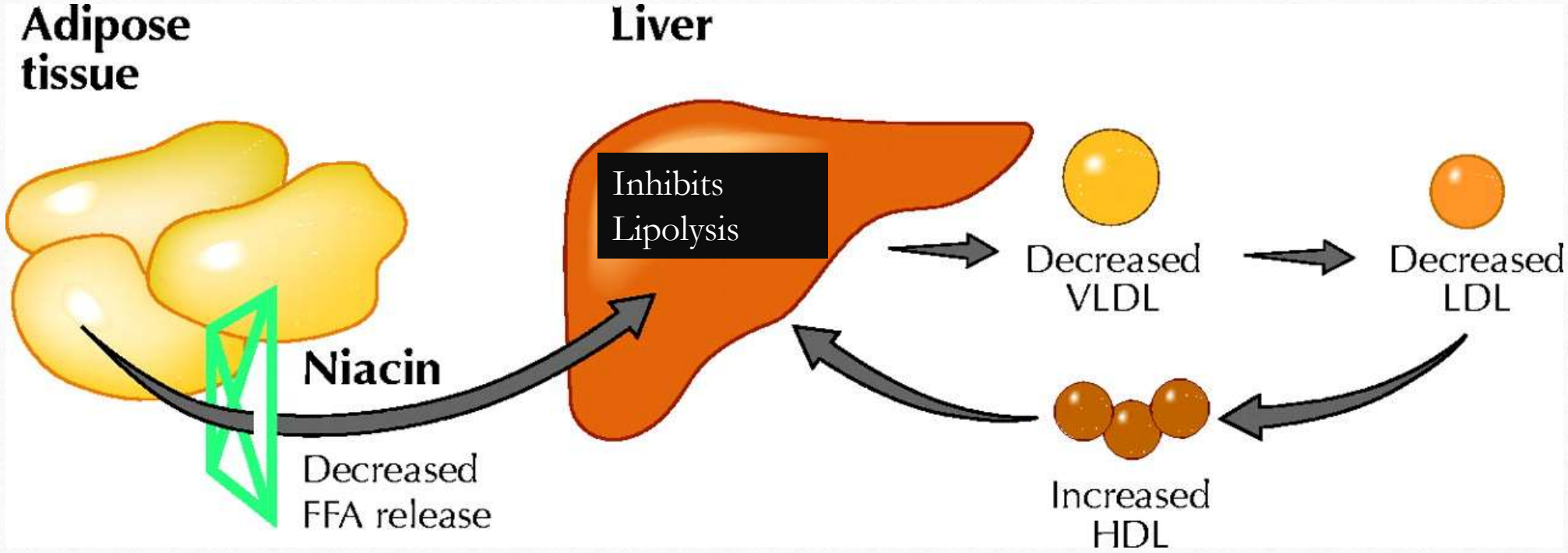
V.) Miscellaneous

- Niacin
- Gugulipid

V.) Miscellaneous

- Niacin(Nicotinic acid) is a B-complex vitamin
- Niacin reduces plasma TGs, LDL cholesterol and raises HDL level.
- It inhibits lipolysis in adipose tissue and thus reduces hepatic VLDL production.
- It should be started at low dose & can be taken with meals to delay absorption.
- The main adverse effects are flushing and dyspepsia.
- Flushing can be reduced by combining niacin with aspirin.
- The other side effects are itching, headache, hyperpigmentation, peptic ulcer, hyperuricemia, hepatotoxicity, hyperglycemia.

V.) Miscellaneous



V.) Miscellaneous

Gugulipid is a mixture of sterones obtained from gum Guggul which has been used in Ayurveda

- ✓ It lowers plasma cholesterol and triglycerides level.
- ✓ Diarrhoea is the main side effect of Gugulipid.


THANK
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