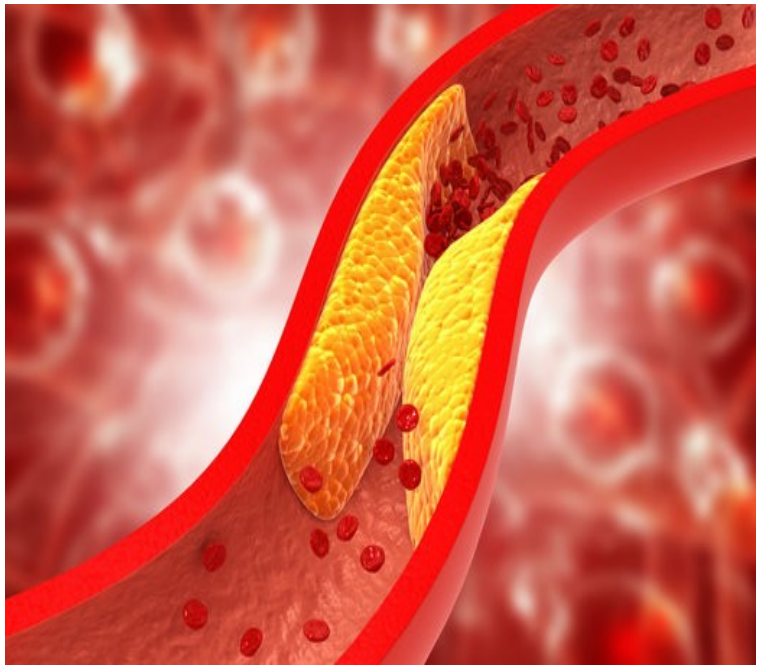
ATHEROSCLEROSIS



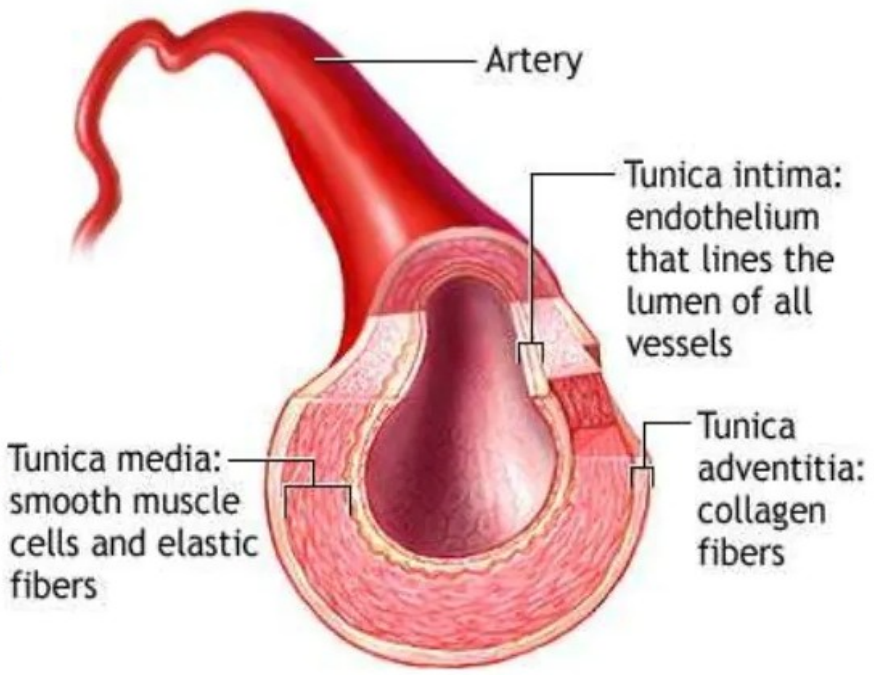
PRESENTED BY

DR. H.S. PALIWAL

Atherosclerosis

Normal Blood Vessel Wall

- Vessel walls are organized into three concentric layers: **intima, media, and adventitia**
- These are present to some extent in all vessels but are **most apparent in larger arteries and veins.**



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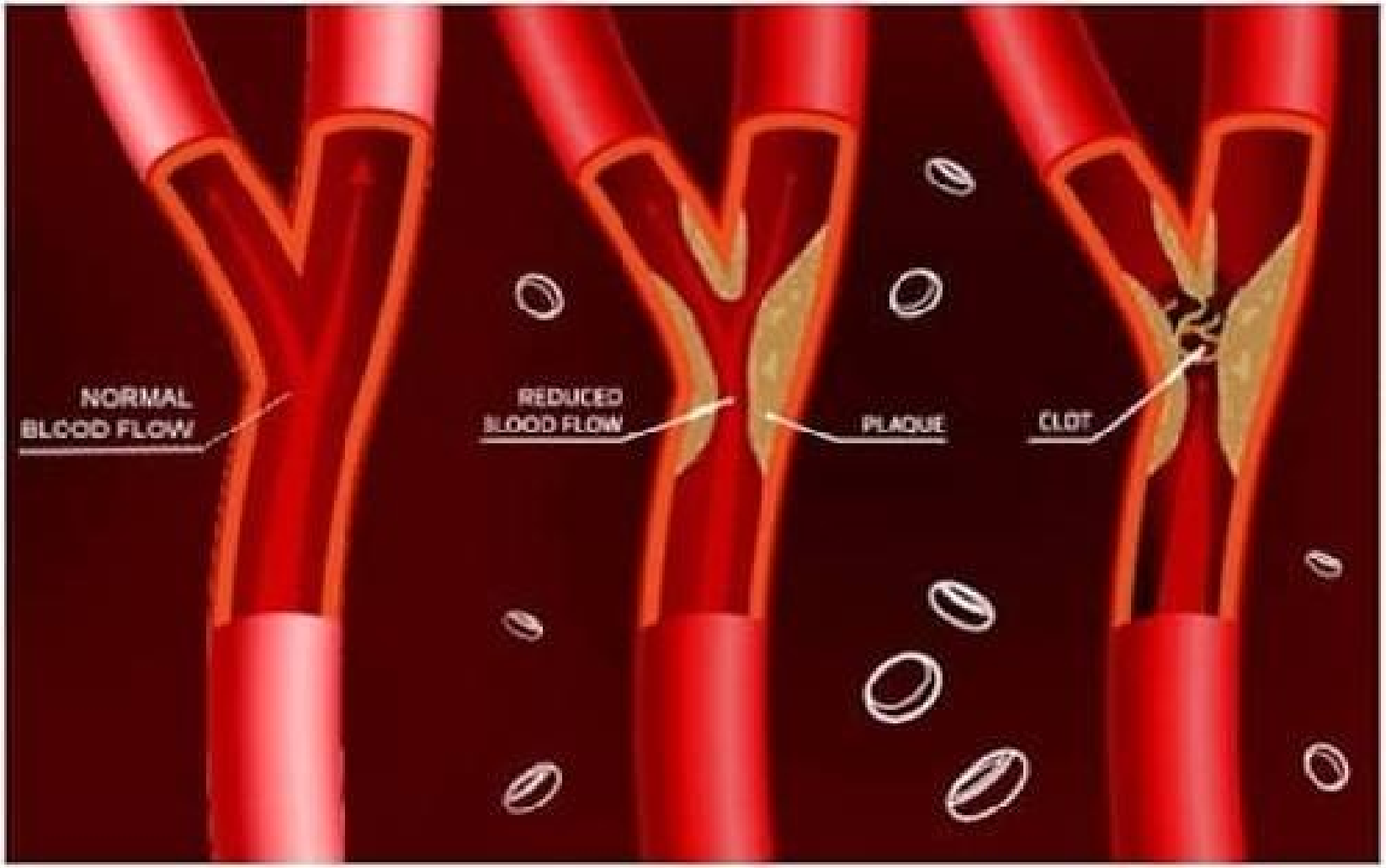


Normal Blood Vessel Wall

Blood vessel walls

1. The three tunics:

a) Tunica intima

(1) Endothelium

(2) Subendothelial layer

b) Tunica media

(1) Smooth muscle

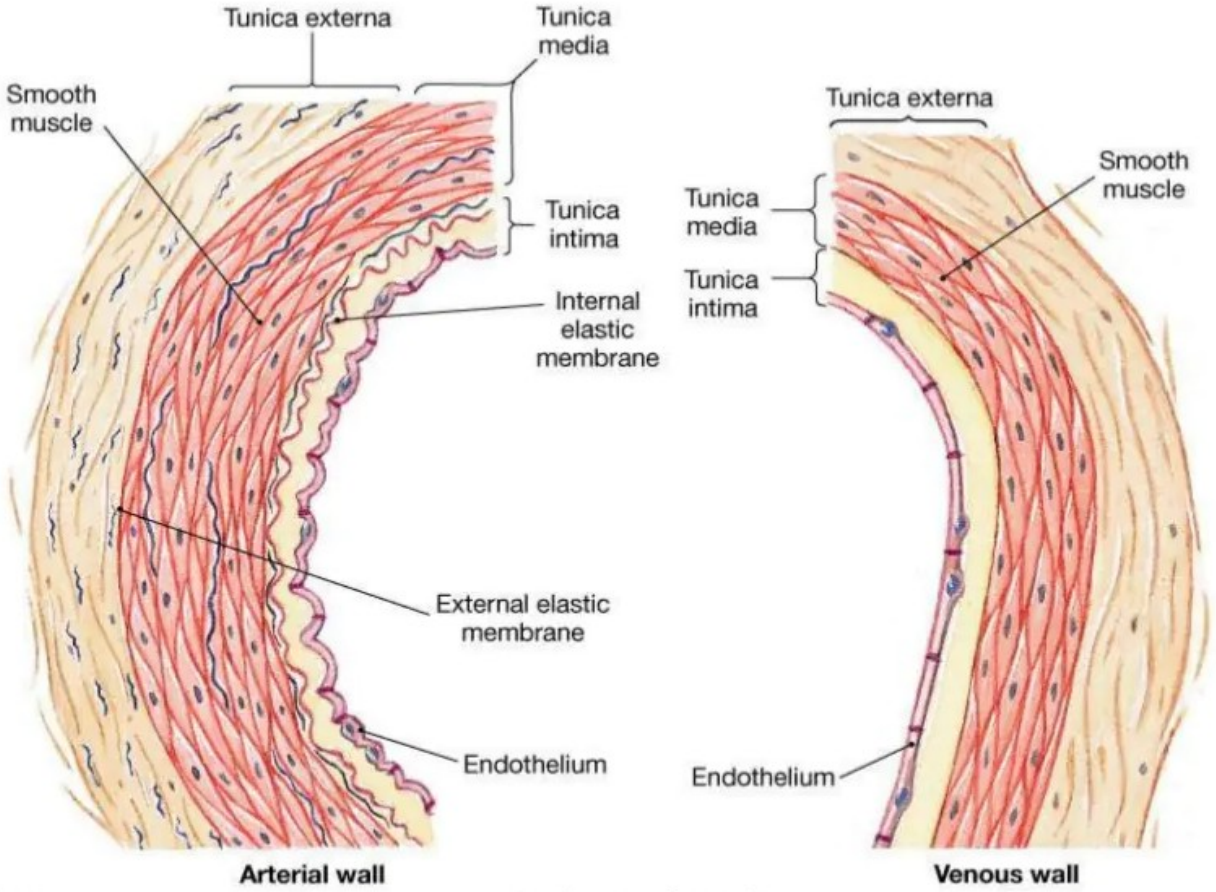
(2) Elastin

c) Tunica adventitia (externa)

(1) CT(Connective tissue) surrounding TM(Tunica Media)

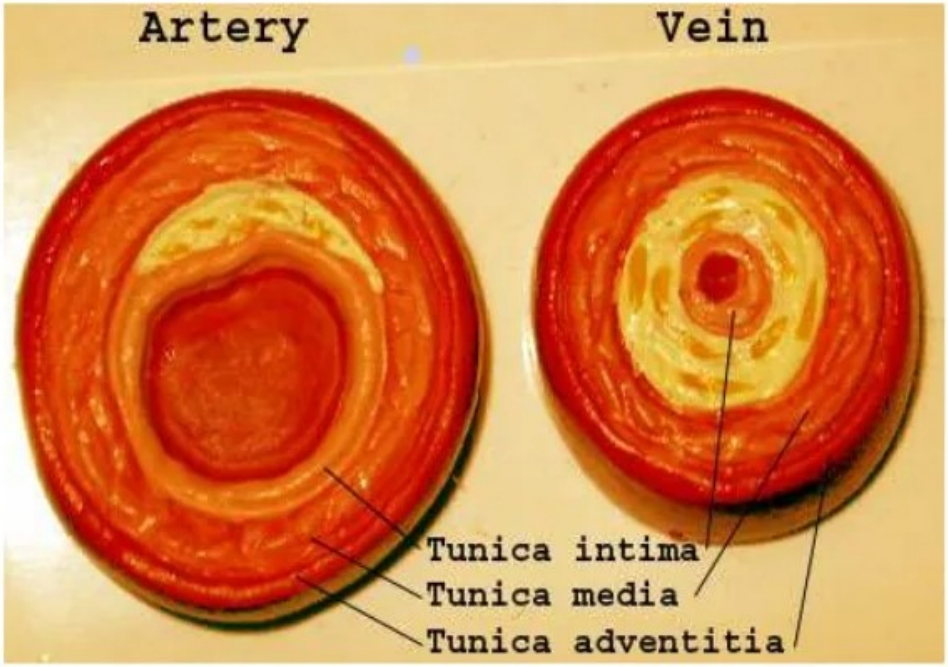
(2) Arterioles in larger vessels

Normal Blood Vessel Wall



Normal Blood Vessel Wall

- Arterial walls are thicker than corresponding veins at the same level of branching to accommodate pulsatile flow and higher blood pressure.



Classes of Arteries

Arteries

a) **Elastic arteries** – large arteries near heart

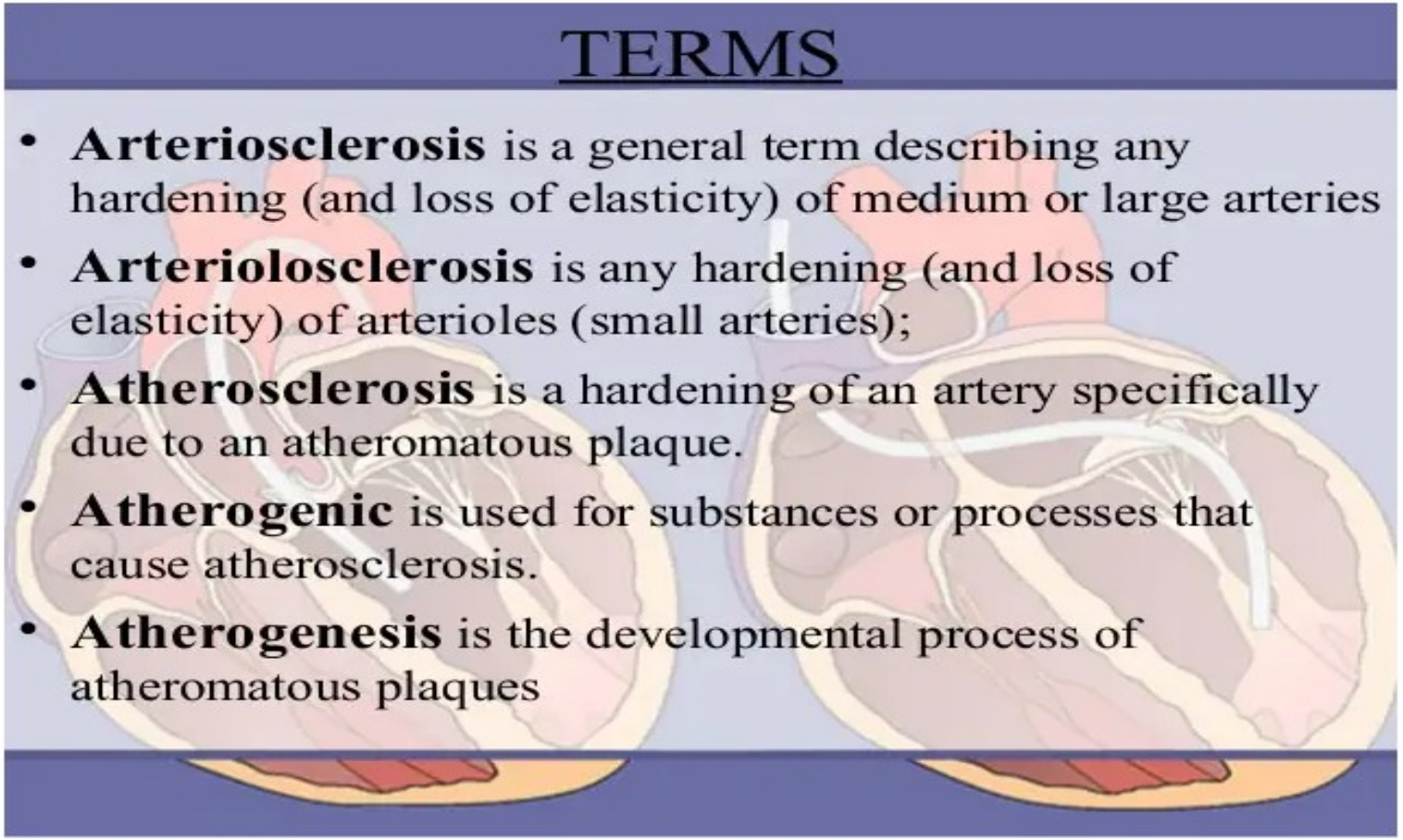
b) **Muscular (distributing) arteries** – thick tunica media

c) **Arterioles-** Diameter regulated by vasoconstriction/dilation

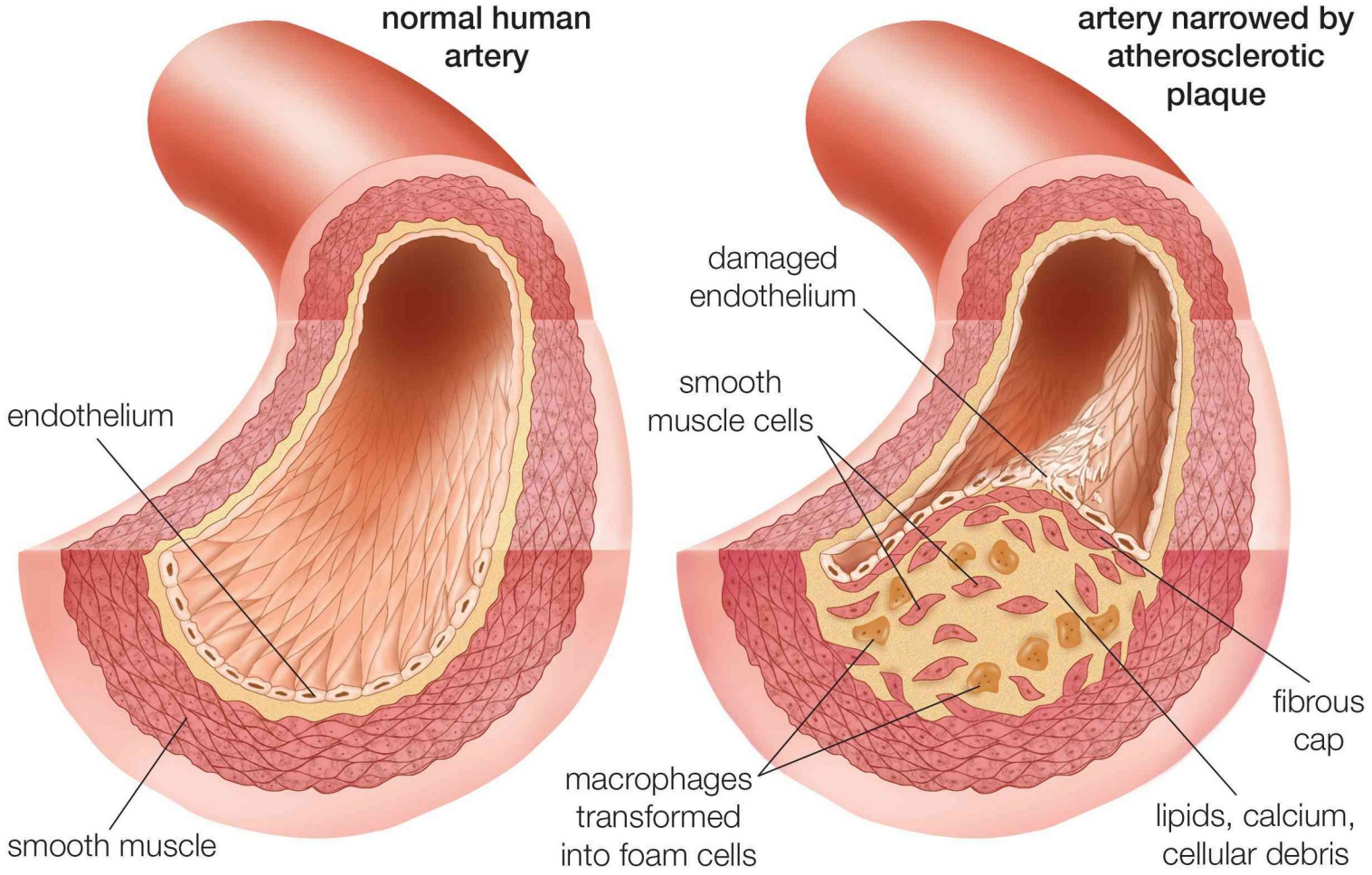
Atherosclerosis affects mainly elastic and muscular arteries and hypertension affects small muscular arteries and arterioles.

Atherosclerosis

- Atherosclerosis = hardening of the arteries.



Atherosclerosis



Arteriosclerosis

Thickening and loss of elasticity of arterial walls.

Hardening of the arteries.

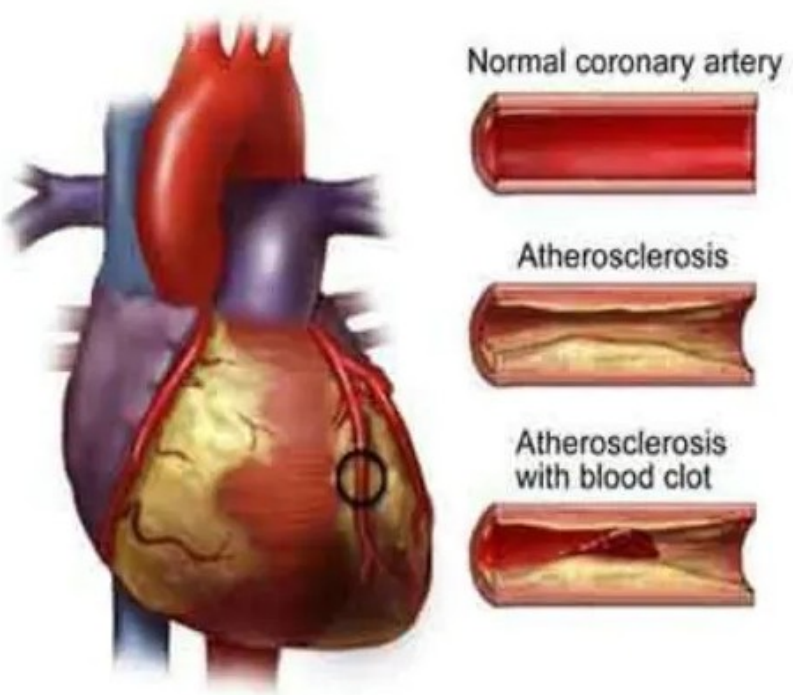
Greatest morbidity and mortality of all human diseases via narrowing, weakening.

ATHEROSCLEROSIS

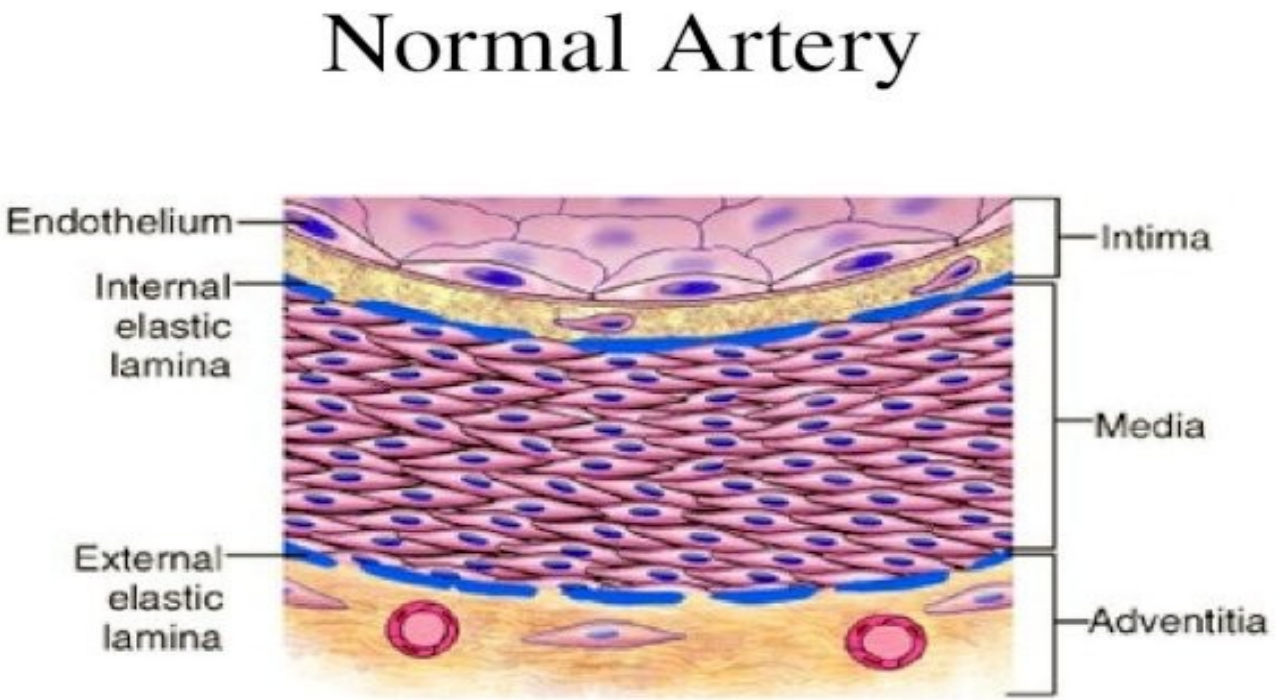
- Atherosclerosis can affect any artery in the body.
- When it occurs in the heart, it may cause angina, MI and sudden death; in the brain, stroke and transient ischaemic attack; and in the limbs, claudication and critical limb ischaemia.

Atherosclerosis

It is characterized by intimal lesions called atheromas (also called Atheromatous or atherosclerotic plaques), that protrude into vascular lumina.



PATHOPHYSIOLOGY

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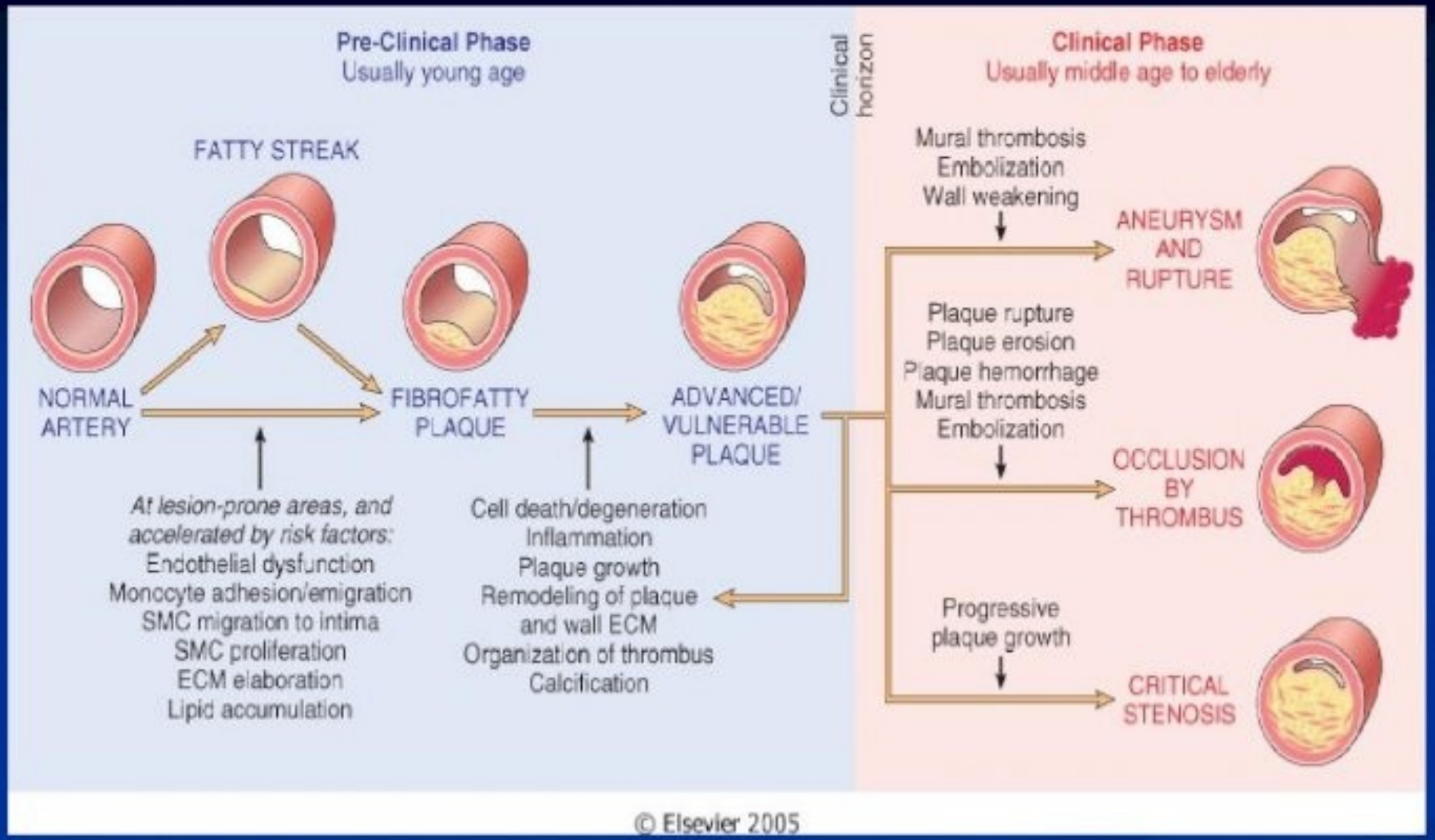


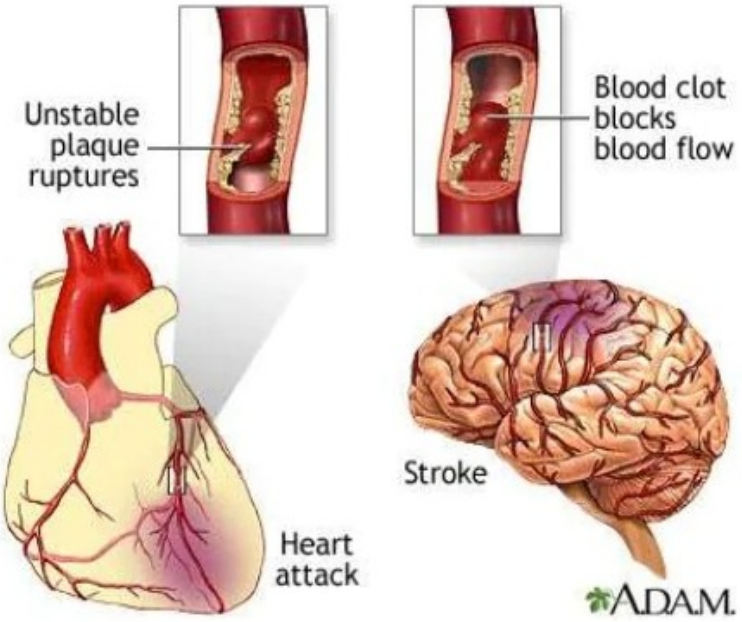
Atheromatous plaque

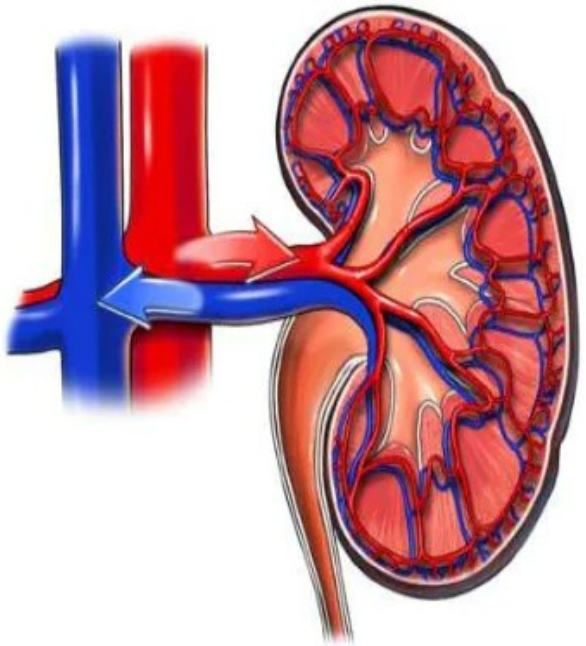
- An Atheromatous plaque consists of a raised lesion with a soft, yellow, grumous core of lipid (mainly cholesterol and cholesterol esters) covered by a firm, white fibrous cap.
- Besides obstructing blood flow, atherosclerotic plaques weaken the underlying media and can themselves rupture, causing acute thrombosis.

Atherosclerosis

- Atherosclerosis primarily affects elastic arteries (e.g., aorta, carotid, and iliac arteries)
- Large and medium-sized muscular arteries (e.g., coronary and popliteal arteries).
- In small arteries, atheromas can gradually occlude lumina, compromising blood flow to distal organs and cause ischemic injury.

Atherosclerosis





- Atherosclerosis also takes a toll through other consequences of acutely or chronically diminished arterial perfusion, *such as mesenteric occlusion, sudden cardiac death, chronic IHD, and ischemic encephalopathy.*

Risk factors for Atherosclerosis

Major risk factors (non modified)

- Increase age
- Male gender
- Family history
- Genetic abnormalities

Risk factors for Atherosclerosis

Lesser, uncertain, risks factrors

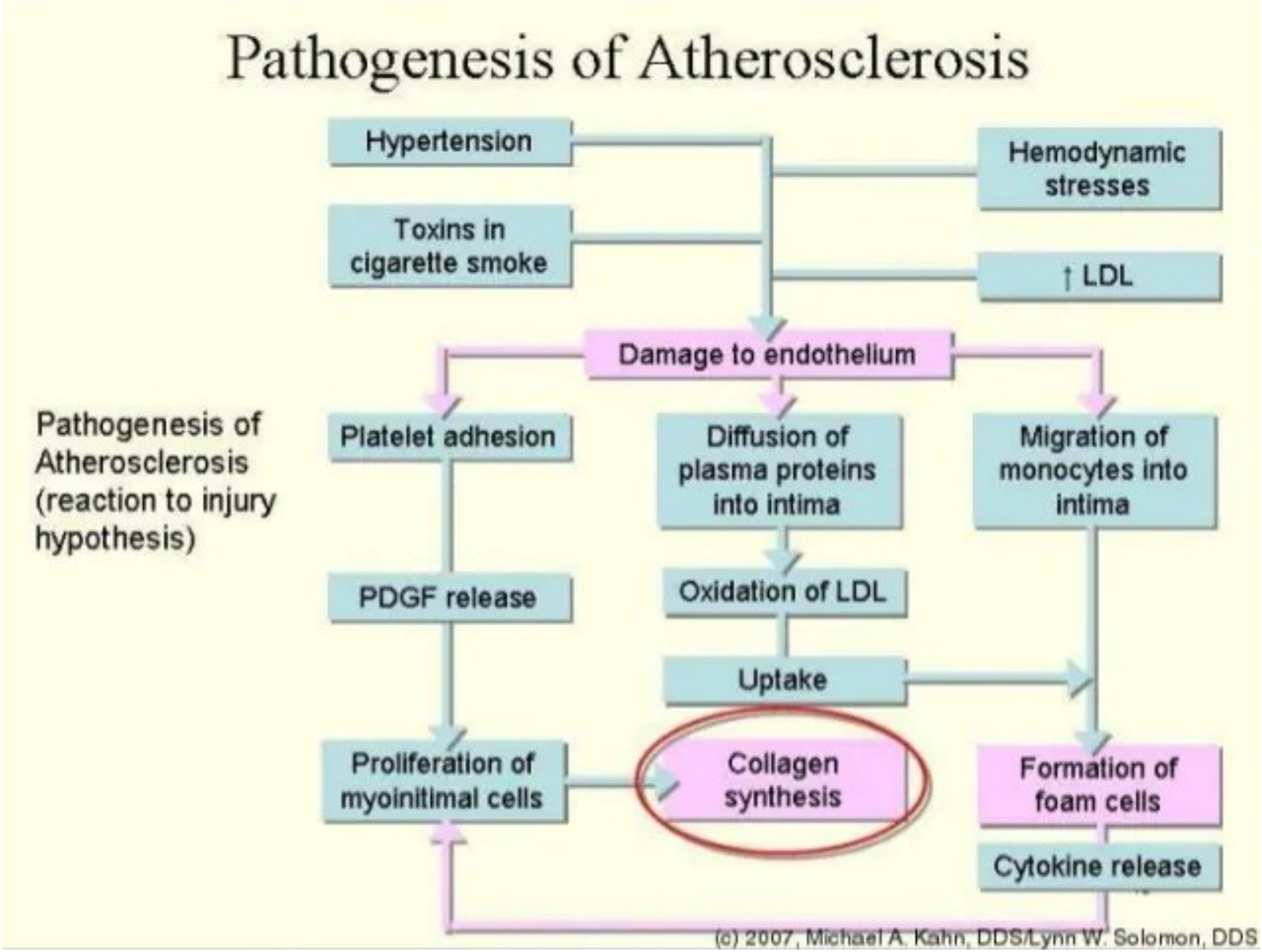
- Obesity
- Physical inactivity
- Postmenopausal estrogen deficiency
- High carbohydrate intake
- Lipoprotein
- Unsaturated fat intake

Risk factors for Atherosclerosis

Potentially controllable

- Hyperlipidemia
- Hypertension
- Cigarette smoking
- Diabetes
- C-reactive protein

Pathogenesis of Atherosclerosis



Symptoms

- Atherosclerosis develops gradually, typically begins in early adolescence, and is usually found in most major arteries. There are usually no atherosclerosis symptoms until an artery is so narrowed or clogged that it can't supply adequate blood to your organs and tissues. Sometimes a blood clot completely obstructs blood flow, or even breaks apart and causes blood clots that can trigger a heart attack or stroke.

Symptoms

Atherosclerosis symptoms depend on which arteries are affected. For example:

- **Atherosclerosis in heart arteries,** have symptoms similar to those of a heart attack, such as chest pain (angina).
- **Atherosclerosis in the arteries leading to brain,** have symptoms such as sudden numbness or weakness in your arms or legs, difficulty speaking or slurred speech, or drooping muscles in your face.
- **Atherosclerosis in the arteries in arms and legs,** produces decreased blood flow is called peripheral artery occlusive disease (PAOD).have symptoms such as leg pain when walking
- Sometimes atherosclerosis causes erectile dysfunction in men.

Complications

The complications of atherosclerosis depend on the location of the blocked arteries. For example:

- **Coronary artery disease.** When atherosclerosis narrows the arteries close to your heart, you may develop coronary artery disease, which can cause chest pain (angina) or a heart attack.
- **Carotid artery disease.** When atherosclerosis narrows the arteries close to your brain, you may develop carotid artery disease, which can cause a transient ischemic attack (TIA) or stroke.

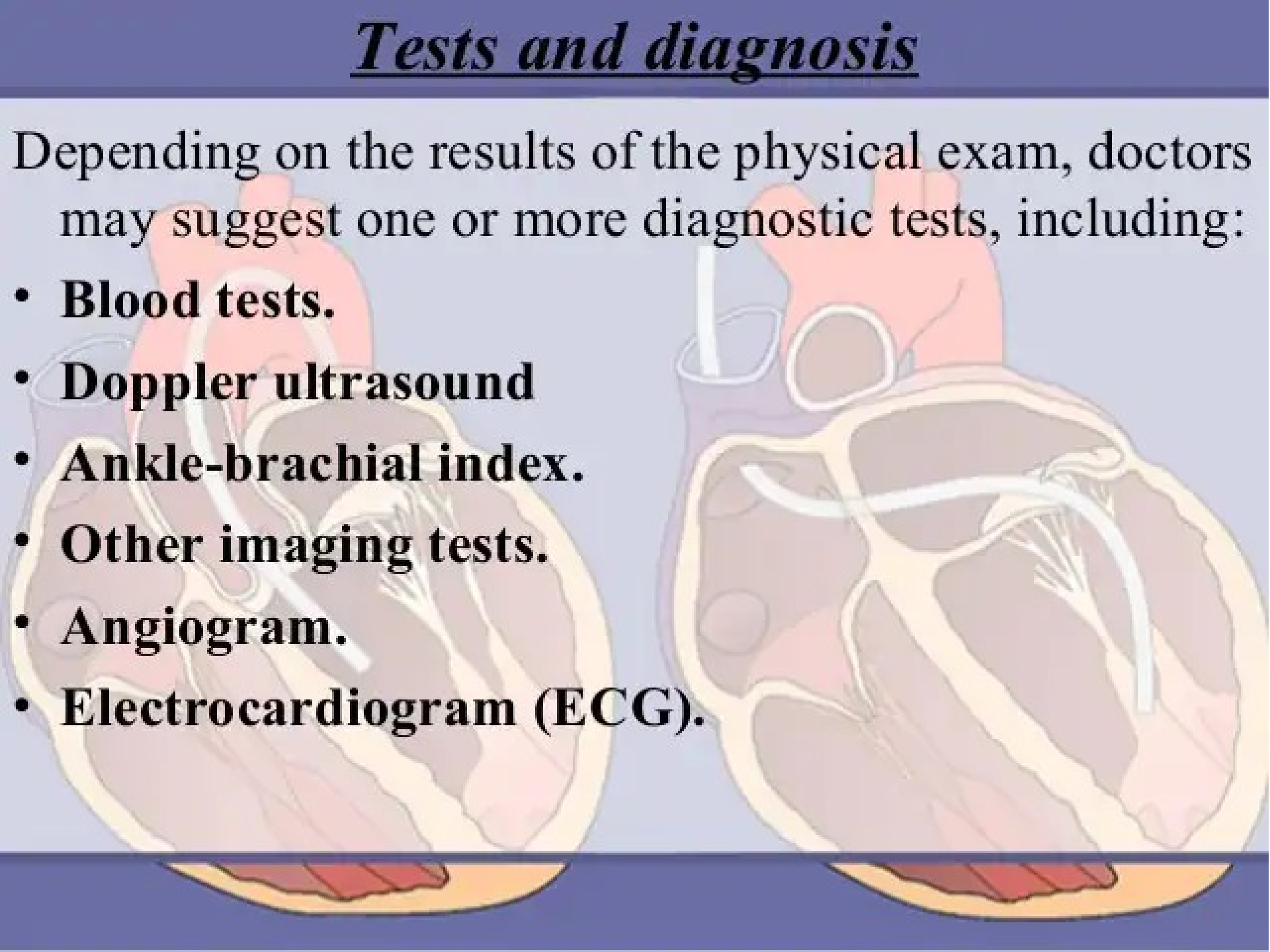
Complications

- **Peripheral artery disease.** When atherosclerosis narrows the arteries in your arms or legs, you may develop circulation problems in your arms and legs called peripheral arterial disease. This can make you less sensitive to heat and cold, increasing your risk of burns or frostbite. In rare cases, poor circulation in your arms or legs can cause tissue death (gangrene).
- **Aneurysms.** Atherosclerosis can also cause aneurysms, a serious complication that can occur anywhere in your body. An aneurysm is a bulge in the wall of your artery. Pain and throbbing in the area of an aneurysm is a common symptom. If an aneurysm bursts, you may face life-threatening internal bleeding. Although this is usually a sudden, catastrophic event, a slow leak is possible. If a blood clot within an aneurysm dislodges, it may obstruct an artery at some distant point.

Tests and diagnosis

Depending on the results of the physical exam, doctors may suggest one or more diagnostic tests, including:

- **Blood tests.**
- **Doppler ultrasound**
- **Ankle-brachial index.**
- **Other imaging tests.**
- **Angiogram.**
- **Electrocardiogram (ECG).**



Tests and diagnosis

- **Blood tests.** Lab tests can detect increased levels of cholesterol and blood sugar that may increase the risk of atherosclerosis.
- **Doppler ultrasound.** Uses a special ultrasound device (Doppler ultrasound) to measure blood pressure at various points along arm or leg. These measurements can help doctor gauge the degree of any blockages, as well as the speed of blood flow in the arteries.
- **Ankle-brachial index.** This test can tell if one have atherosclerosis in the arteries in your legs and feet. Doctor may compare the blood pressure in ankle with the blood pressure in the arm. This is known as the ankle-brachial index. An abnormal difference may indicate peripheral vascular disease, which is usually caused by atherosclerosis.

Treatments and drugs

Lifestyle changes, such as eating a healthy diet and exercising, are often the first line of defense in treating atherosclerosis. But sometimes, medication or surgical procedures may be recommended as well.

Various drugs can slow — or sometimes even reverse — the effects of atherosclerosis. Here are some common choices:

- **Cholesterol medications.** Aggressively lowering low-density lipoprotein (LDL) cholesterol, the "bad" cholesterol, can slow, stop or even reverse the buildup of fatty deposits in arteries. Boosting your high-density lipoprotein (HDL) cholesterol, the "good" cholesterol, may help, too. cholesterol medications includes drugs known as statins and fibrates.
- .

Treatments and drugs

- **Anti-platelet medications.** Doctors may prescribe anti-platelet medications, such as aspirin, to reduce the likelihood that platelets will clump in narrowed arteries, form a blood clot and cause further blockage.
- **Anticoagulants.** An anticoagulant, such as heparin or warfarin (Coumadin), can help thin blood to prevent clots from forming.
- **Blood pressure medications.** Medications to control blood pressure — such as beta blockers, angiotensin-converting enzyme (ACE) inhibitors and calcium channel blockers — can help slow the progression of atherosclerosis

Treatments and drugs

- **Angioplasty.** In this procedure, your doctor inserts a long, thin tube (catheter) into the blocked or narrowed part of your artery. A wire with a deflated balloon is passed through the catheter to the narrowed area. The balloon is then inflated, compressing the deposits against your artery walls. A mesh tube (stent) is usually left in the artery to help keep the artery open. Angioplasty may also be done with laser technology.
- **Endarterectomy.** In some cases, fatty deposits must be surgically removed from the walls of a narrowed artery. When the procedure is done on arteries in the neck (the carotid arteries), it's known as carotid endarterectomy.


Thank
You!!!