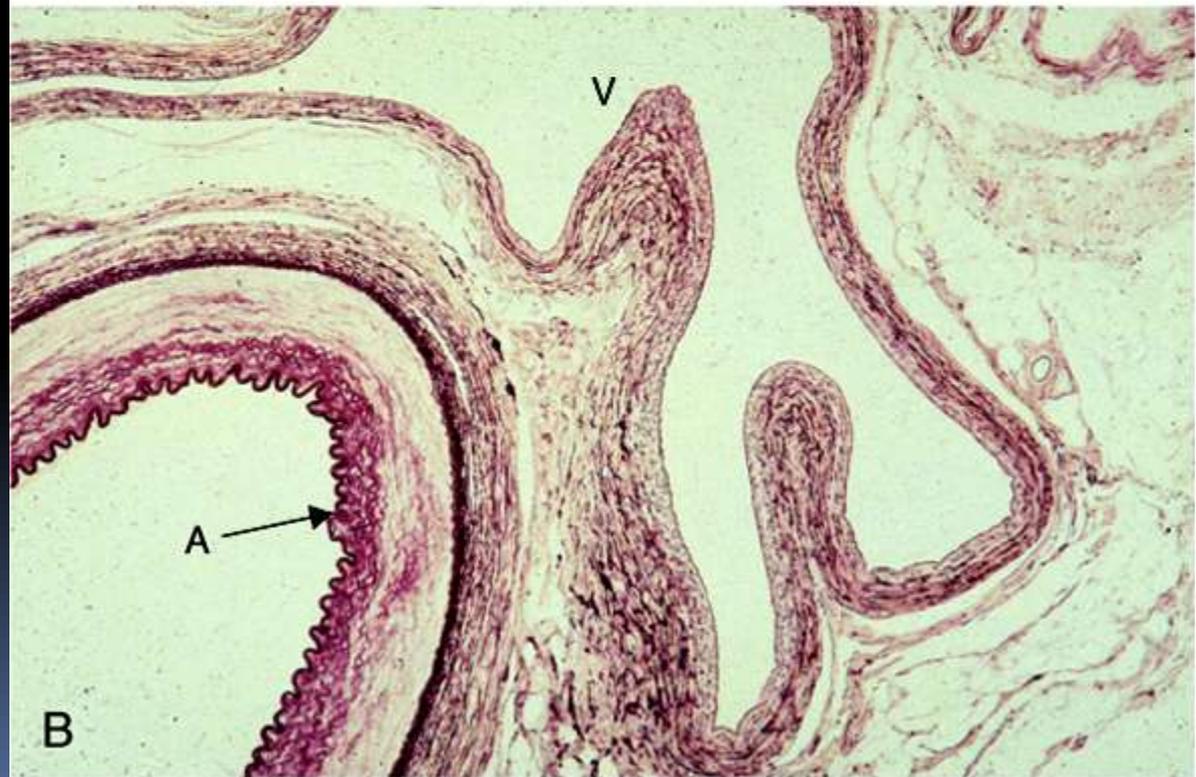
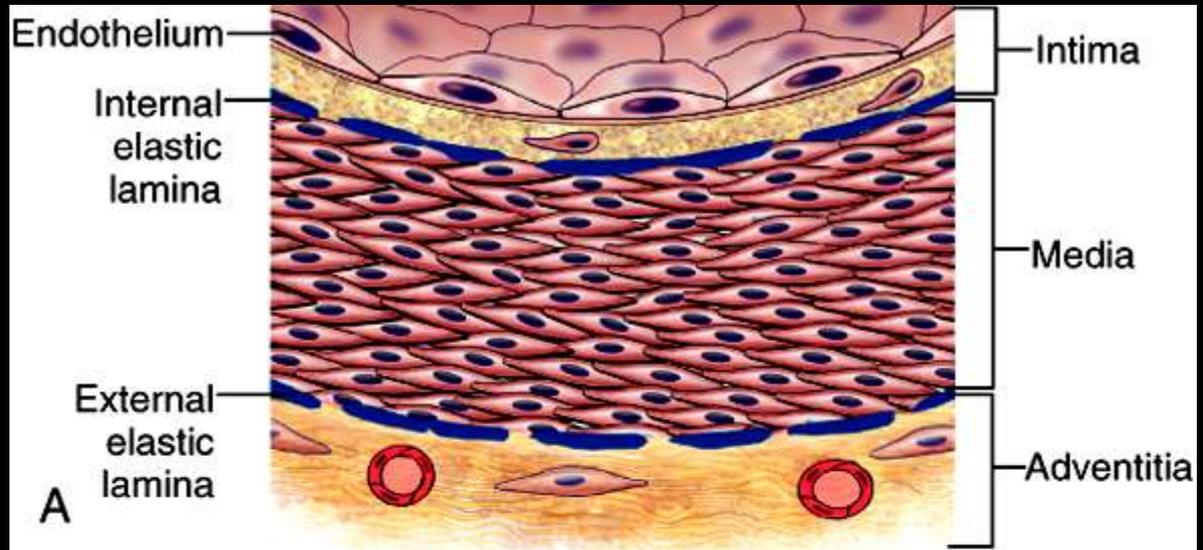


Normal blood vessels

A = artery

V = vein



ARTERIOSCLEROSIS

- ***Arteriosclerosis literally means "hardening of the arteries"***
- It reflects arterial wall thickening and loss of elasticity.
- Three patterns are recognized, with different clinical and pathologic consequences:

1-Arteriolo sclerosis

- affects small arteries and arterioles.
- is most often associated with hypertension and/or diabetes mellitus

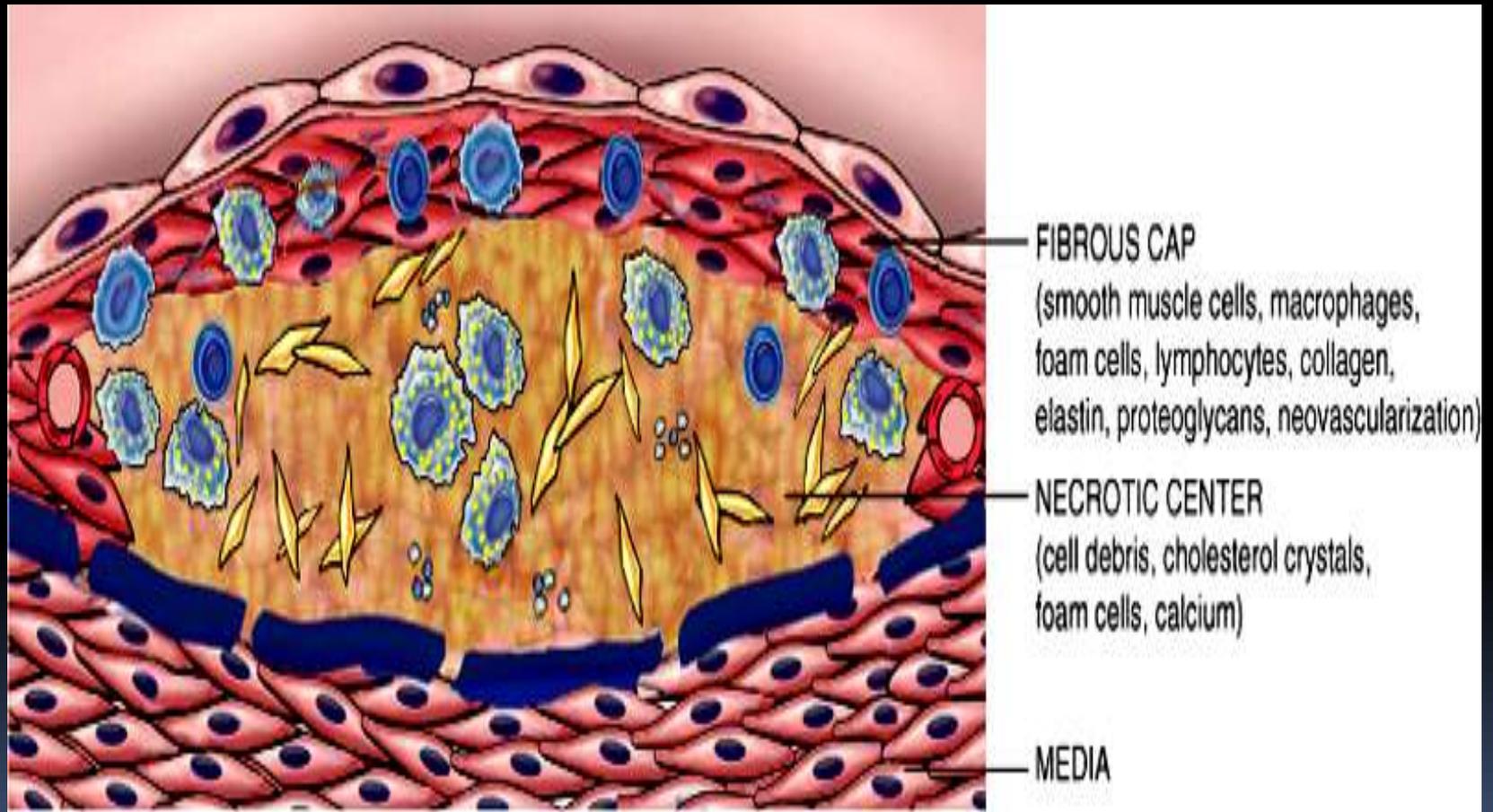
2-Mönckeberg medial calcific sclerosis

- is characterized by calcific deposits in muscular arteries
- typically in persons older than age 50.
- radiographically visible
- often palpable calcifications
- do **not** encroach on the vessel lumen and are usually not clinically significant

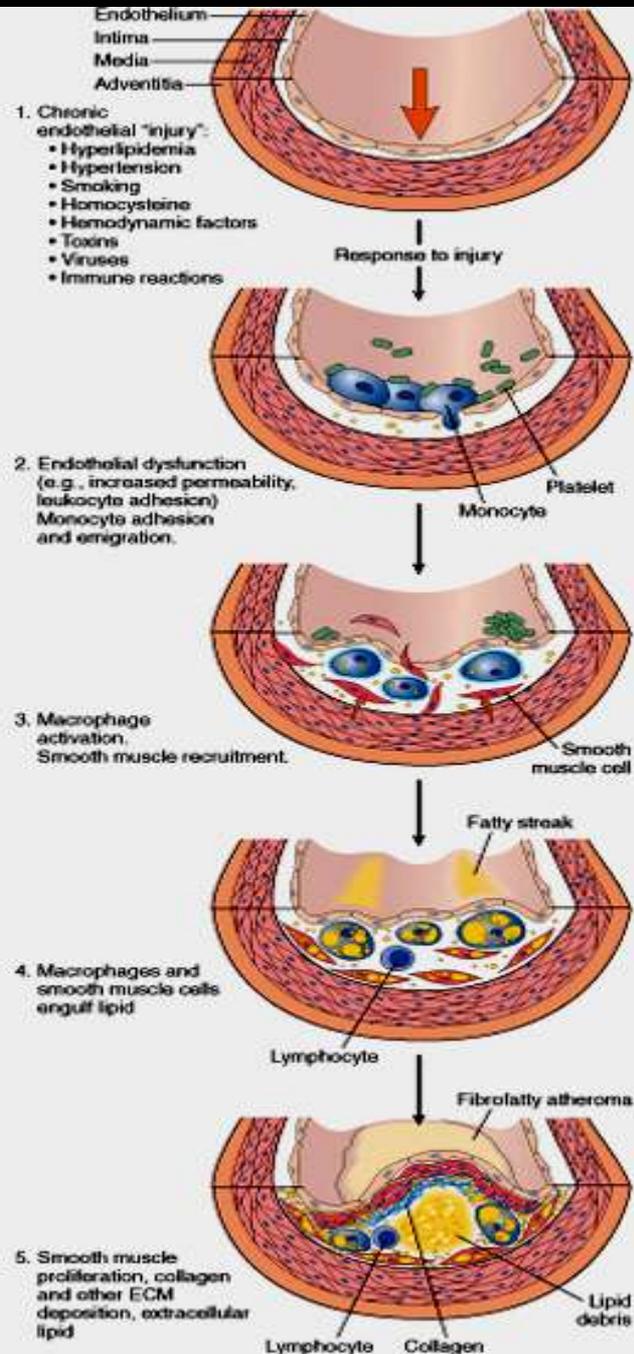
3-Atherosclerosis

- from Greek root words for "gruel" and "hardening,"
- is the most frequent and clinically important pattern
- characterized by intimal lesions called *atheromas* (also called *atherosclerotic plaques*), that protrude into vascular lumina.
- 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

The major components of a well-developed intimal atheromatous plaque overlying an intact media



Formation of atheromatous plaque



Epidemiology

- atherosclerosis is much less prevalent in Central and South America, Africa, and Asia.
- The mortality rate for IHD in the United States is among the highest in the world and is approximately five times higher than that in Japan.
- Nevertheless, IHD has been increasing in Japan and is now the second leading cause of death there. Moreover, Japanese who immigrate to the United States and adopt American lifestyles and dietary customs acquire the same predisposition to atherosclerosis as the homegrown population.
- *Multiple risk factors have a multiplicative effect:* 2 risk factors increase the risk 4X.
- 3 risk factors are present (e.g., hyperlipidemia, hypertension, and smoking), the rate of myocardial infarction is increased 7X.

Risk Factors for Atherosclerosis

Major Risks	Lesser, Uncertain, or Non-quantitated Risks
Nonmodifiable	Obesity
Increasing age	Physical inactivity
Male gender	Stress ("type A personality)
Family history	Postmenopausal estrogen deficiency
Genetic abnormalities	High carbohydrate intake
	Lipoprotein(a)
Potentially Controllable	Hardened (trans)unsaturated fat intake
Hyperlipidemia	
Hypertension	Chlamydia pneumoniae infection
Cigarette smoking	
Diabetes	
C-reactive protein	

Major Constitutional Risk Factors for atherosclerosis

- Major Risks (*Nonmodifiable*):

- *Increasing age

- *Male gender

- *Family history

- *Genetic abnormalities

- *Potentially Controllable*

- Hyperlipidemia

- Hypertension

- Cigarette smoking

- Diabetes

■ 1-age

- Between ages 40 and 60, the incidence of myocardial infarction in men increases 5 times.
- Death rates from IHD rise with each decade even into advanced age.

■ **2-Gender**

- **Premenopausal** women are relatively protected against atherosclerosis compared with age-matched men.
- MI and other complications of atherosclerosis are uncommon in premenopausal women unless they are otherwise predisposed by diabetes, hyperlipidemia, or severe hypertension.
- **After menopause**, the incidence of atherosclerosis-related diseases increases and with greater age eventually exceeds that of men

3-Genetics

- well-established familial predisposition to atherosclerosis and IHD is multifactorial.
- In some instances it relates to familial clustering of other risk factors, such as hypertension or diabetes, whereas in others it involves well-defined genetic derangements in lipoprotein metabolism,
- E.g familial hypercholesterolemia that result in excessively high blood lipid levels.

Additional Risk Factors for atherosclerosis

- 20% of all cardiovascular events occur in the absence of any major risk factor

1-Inflammation as marked by C-reactive protein

2-Hyperhomocystinemia

3-Lipoprotein a

4-Factors Affecting Hemostasis

- **Other Risk Factors**

1-lack of exercise

2-competitive, stressful lifestyle ("type A" personality)

3-obesity

4-Postmenopausal estrogen deficiency

5-High carbohydrate intake