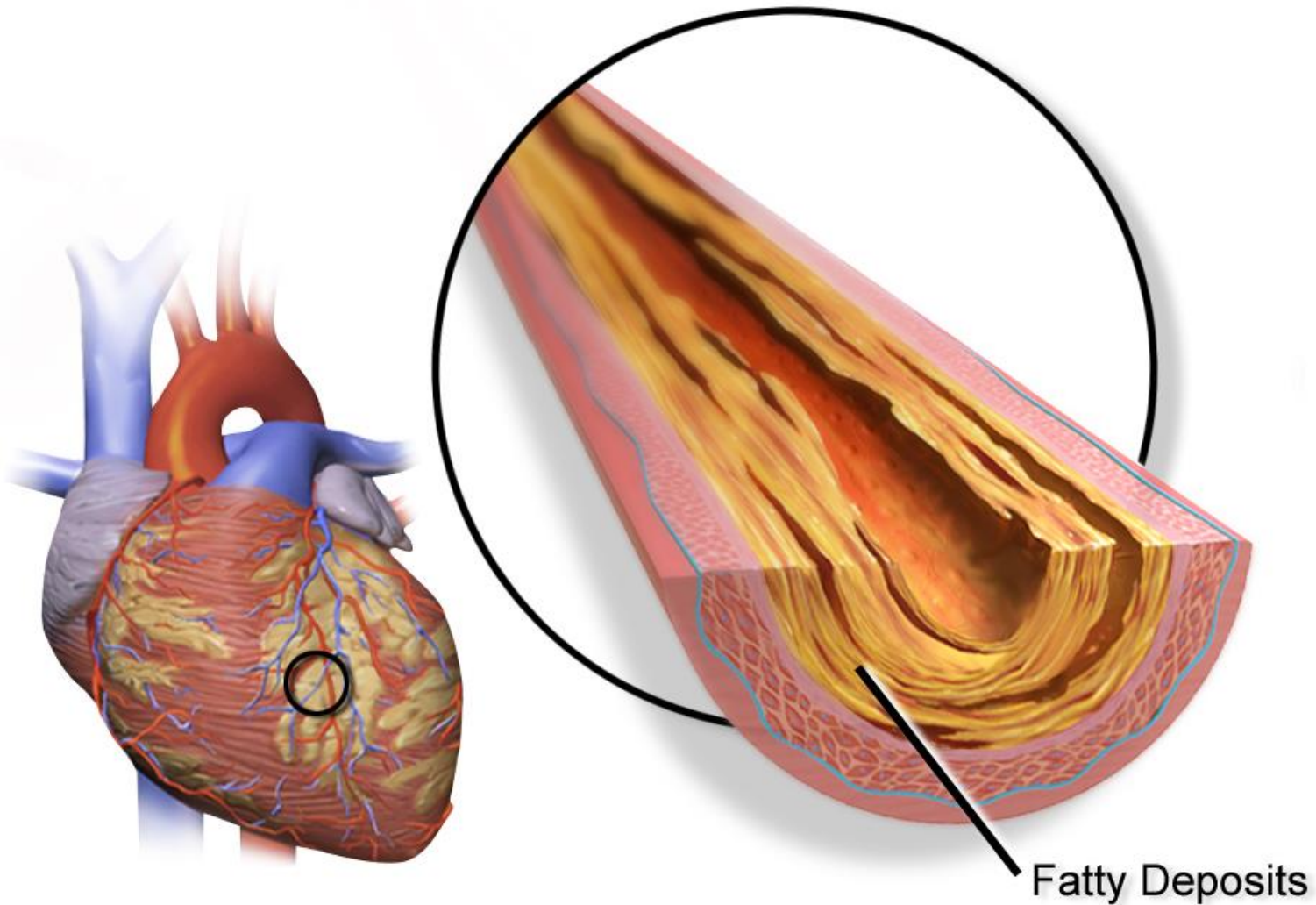
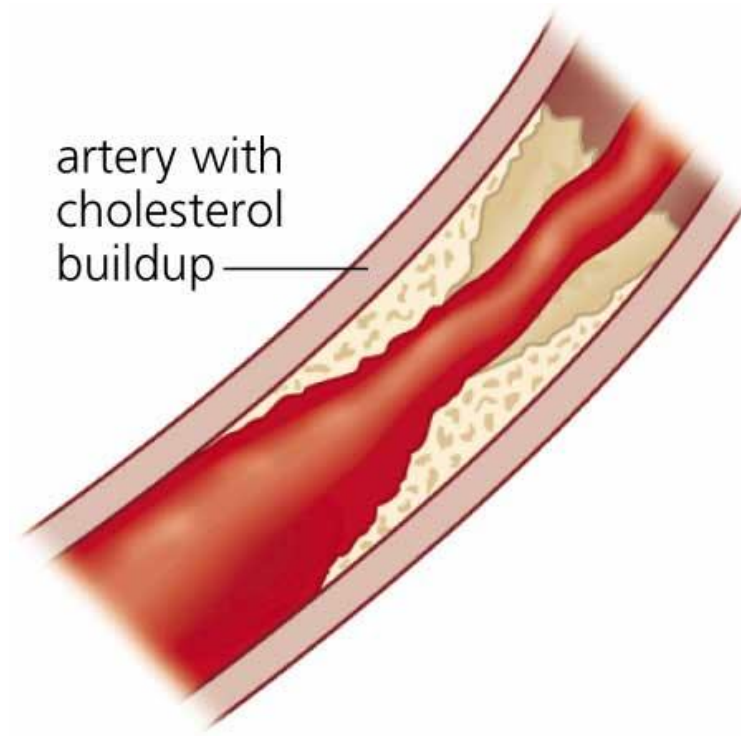


CHD - Coronary Heart Disease (damage to the coronary arteries)



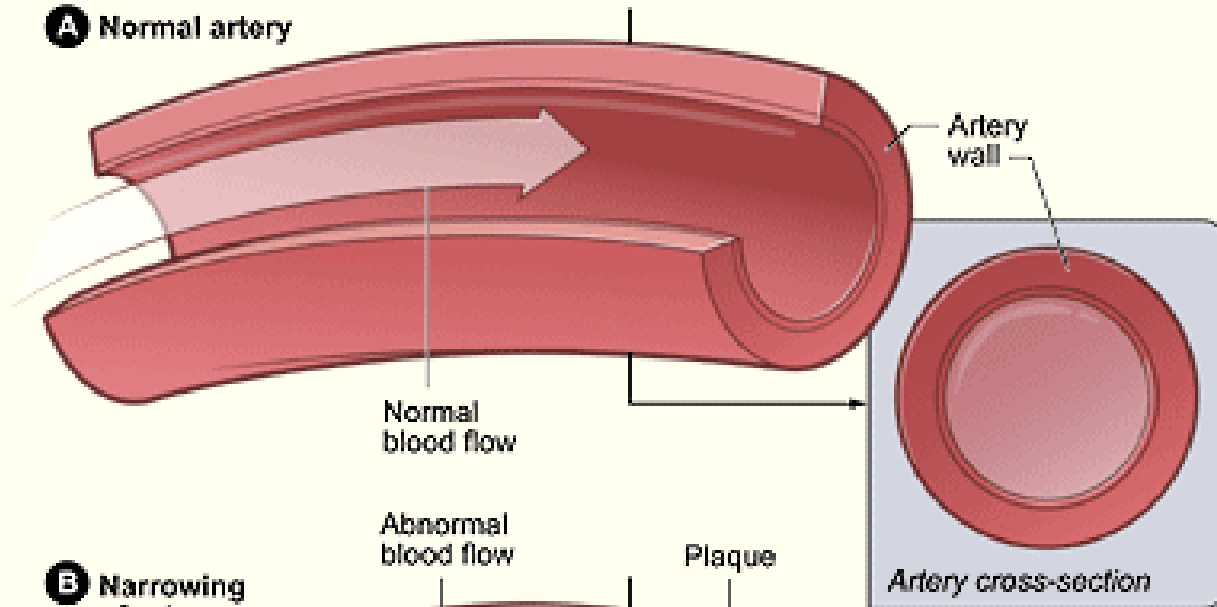
- **Atherosclerosis** is a disease in which an **artery wall thickens** THROUGH THE DEVELOPMENT OF ATHEROMAS OR FATTY PLAQUES
- Risk factors include: **smoking**, inactivity, stress, high **salt intake**, high blood cholesterol
- THE ARTERY WALL BECOMES LESS ELASTIC, THE LUMEN NARROWS AND BLOOD PRESSURE INCREASES



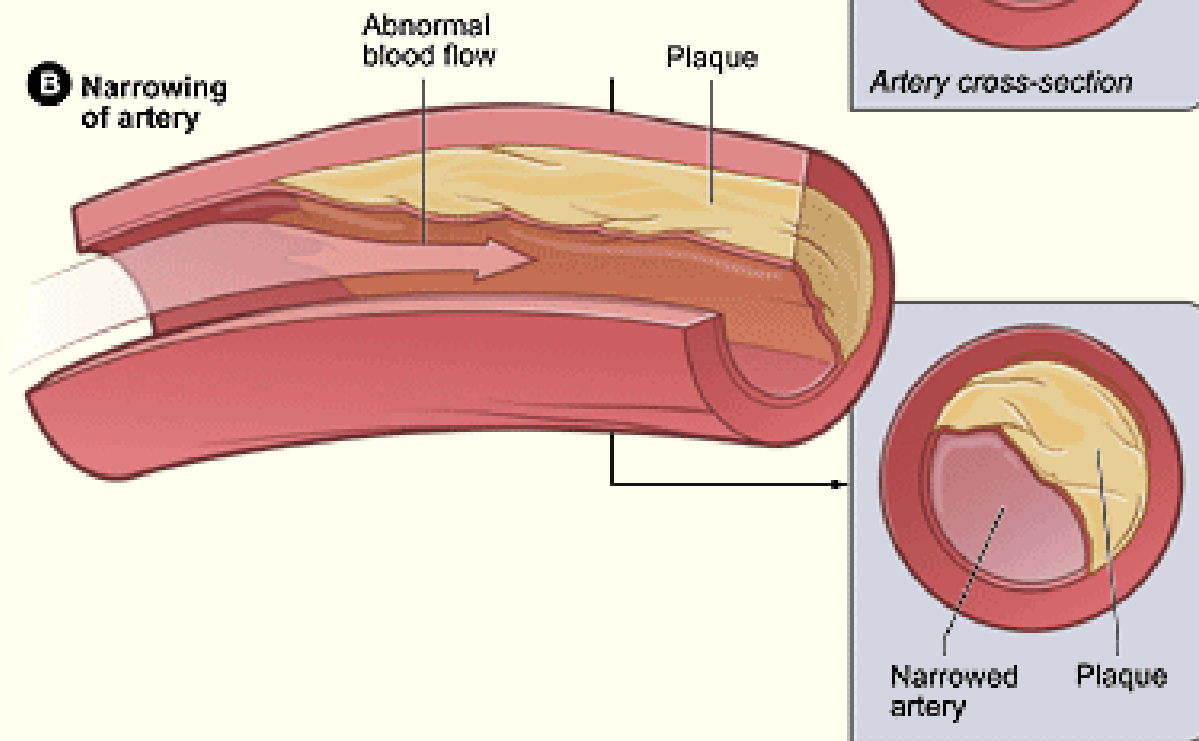
DID YOU KNOW?

Comes from the Greek words athero meaning gruel and sclerosis meaning hardness

A Normal artery



B Narrowing of artery



A cholesterol-filled atherosclerotic coronary artery from a human body

(Image Courtesy: University of Pennsylvania School of Medicine)



THE FORMATION OF AN ATEROMA USUALLY follows this sequence of events...

1. Damage to the **SQUAMOUS ENDOTHELIAL CELLS** (endothelium) lining the artery e.g. from high blood pressure which puts an extra strain on the layer of cells **OR** damage from the toxins from tobacco smoke in the blood stream

2. An inflammatory response occurs once the endothelium has been breached/damaged **AND THE ATHEROMA STARTS TO BUILD UP IN THE WALL OF THE ARTERY, BENEATH THE ENDOTHELIUM.**

Macrophages (white blood cells **DEVELOPED** from monocytes) leave the blood vessel and move into the artery wall. They accumulate chemicals from the blood, particularly **cholesterol BUT ALSO DEAD MUSCLE CELLS AND SALTS (e.g. CALCIUM).** **FIBROUS TISSUE WILL BUILD UP TOO AS THE ARTERY ATTEMPTS TO REPAIR DAMAGE. THIS DEPOSIT IS CALLED THE ATHEROMA, WHICH WILL BEGIN TO BUILD UP INTO HARDENED PLAQUES**

3. THE ATHEROMAS (PLAQUES) INCREASE IN SIZE AND TOUGHNESS AND BULGE INTO THE ARTERY LUMEN. THIS NARROWING RESTRICTS BLOOD FLOW AND INCREASES BLOOD PRESSURE AND WILL LIKELY LEAD TO FURTHER ATHEROMAS FORMING (ENDOTHELIAL DAMAGE)

IMPORTANTLY, THE HARDENING OF THE ARTERIES WITH FIBROUS MATERIAL CAUSES THE ARTERY TO BE LESS ELASTIC AND LESS ABLE TO REGULATE BLOOD FLOW THROUGH VASOCONSTRICTION AND VASODILATION.

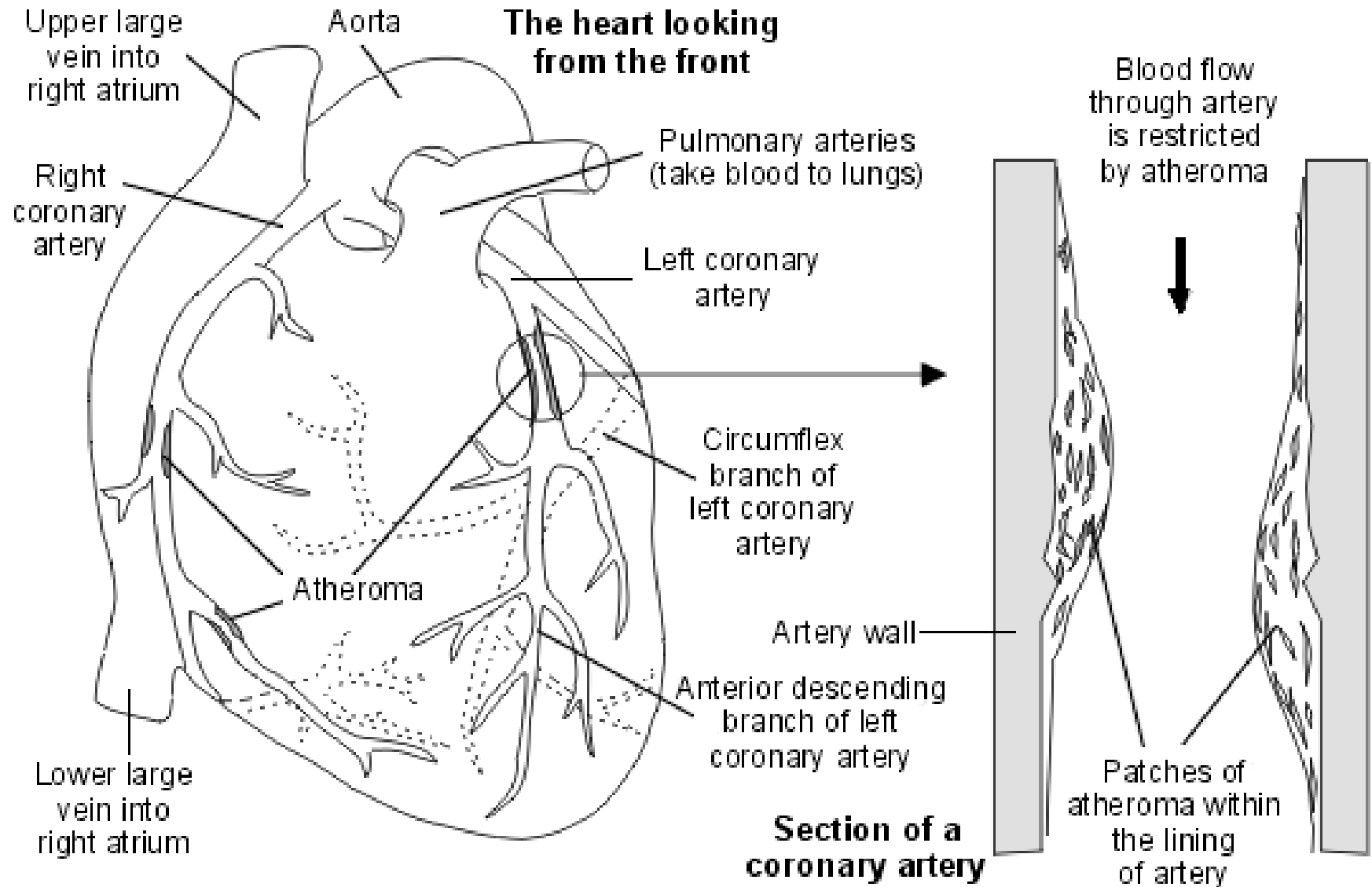
REMEMBER!

If the arteries become very narrow or blocked then they cannot supply enough blood to their tissues or organs and those cells will die **WHY?**

THROMBOSIS is the formation of blood clots **within a blood vessel**. They are a particular problem in narrow arteries e.g. coronary arteries or ones narrowed by heart disease (atherosclerosis) but they can occur anywhere.

A thrombosis in a coronary artery is called a **coronary thromobosis** and is more likely to happen if the artery wall has been damaged e.g. due to the presence of an atheroma. The affected area of the heart doesn't receive blood carrying glucose and oxygen and therefore those cells could die from **lack of respiration** if the blockage persists. If a large area of the heart is affected e.g. blockage near the start/origin of the artery rather than at the end, a heart attack results. This is called a **myocardial infarction**.

Angina caused by atherosclerosis in the coronary arteries:



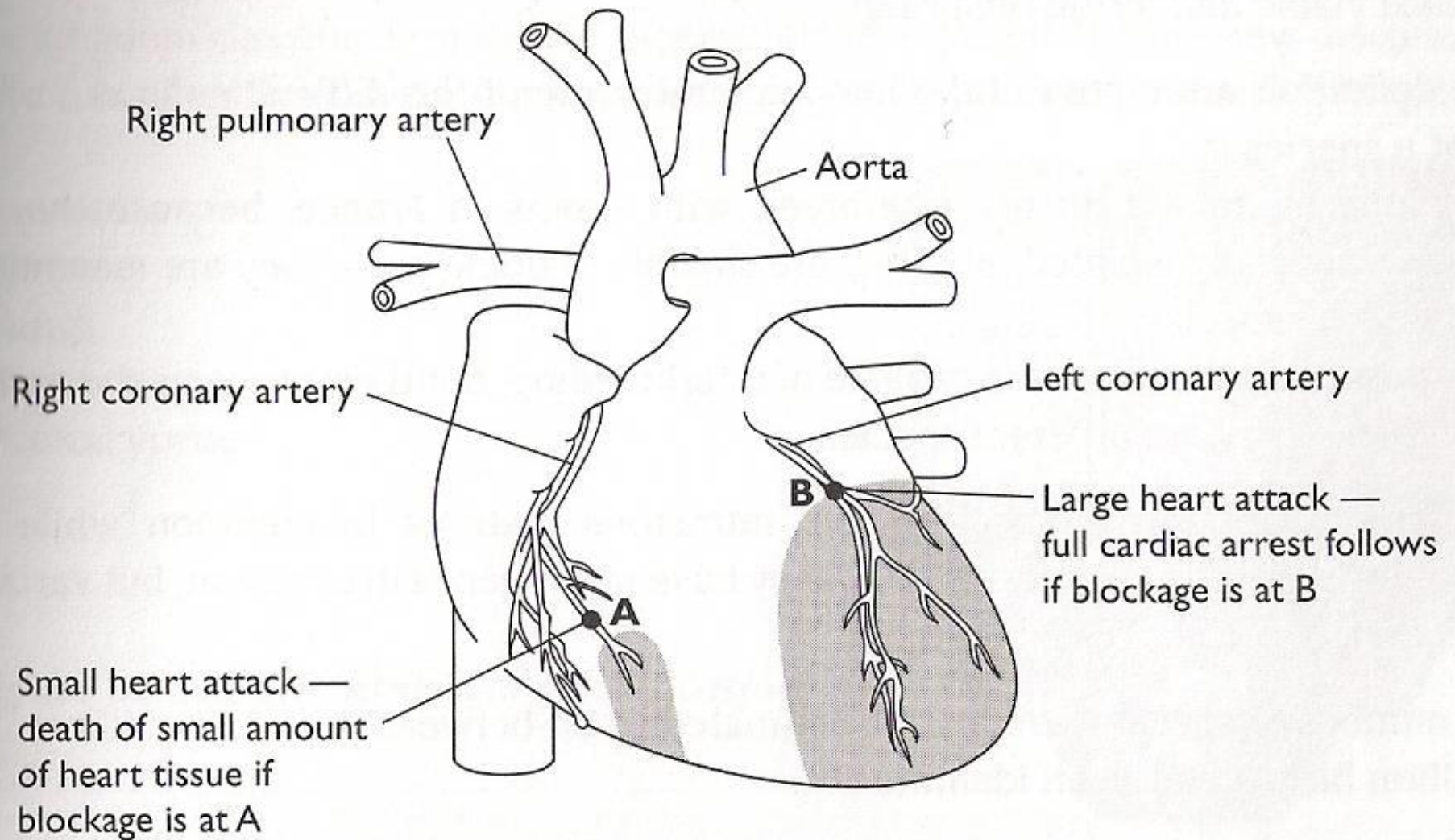


Figure 30 Different-sized heart attacks

(c) Distinguish between the terms “atheroma” and “atherosclerosis” and explain how they may lead to a coronary thrombosis (heart attack).

[5]

- (c) An atheroma is an accumulation (of macrophages/cholesterol)/ swelling in artery walls;
in atherosclerosis the artery wall loses its elasticity/artery lumen becomes narrower;

[2]

Any three from

- atherosclerosis leads to an increase in blood pressure
- surface of the atheroma/plaque to become damaged/ atheromatous plaque forms
- change in blood flow/damaged surface may trigger the production of a clot or thrombus
- clot/thrombus may block the coronary artery
- starving the cardiac muscle of oxygen (metabolites)/leading to death of the cardiac muscle tissue

[3]