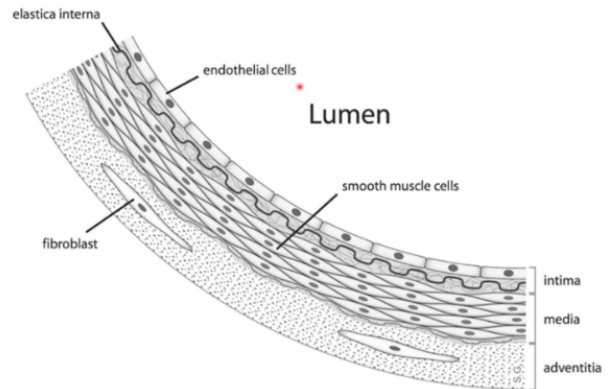


Blood vessel walls have three layers:

1. Adventitia: The outermost layer of arterial wall
2. Media: The muscular layer of the arterial wall
3. Intima: The innermost lining of the arterial wall



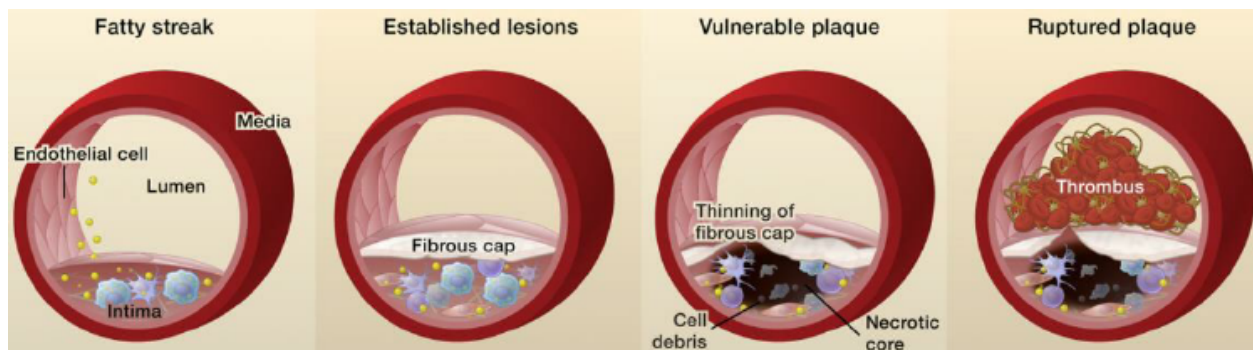
The most interior aspect of the intima is a thin layer of endothelial cells, known collectively as the endothelium. **The endothelium lines the inner surface of blood vessels, including coronary vessels that supply the heart.** The endothelium releases substances that control vascular relaxation (vasodilation) and contraction (vasoconstriction) as well as enzymes that control blood clotting, immune response, and platelet (a colourless component of blood) adhesion. The endothelial cells also act as gatekeepers of the blood vessel walls, controlling what enters and exits the blood vessel.

Atherosclerosis & the Endothelium

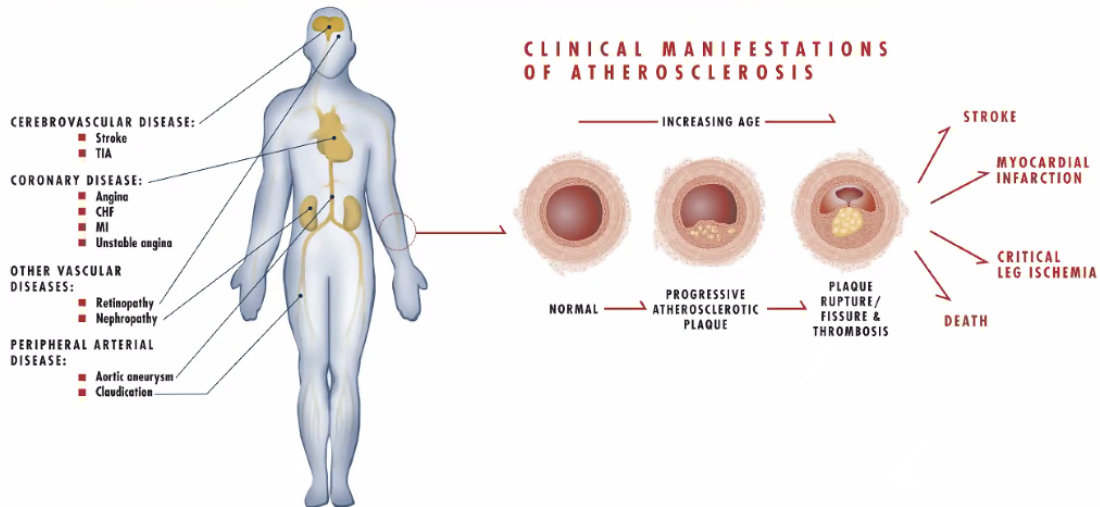
Atherosclerosis refers to the buildup of soft plaques (ex. fats, cholesterol and other substances) within the luminal space of blood vessels. This plaque causes the diameter of the arteries to narrow, blocking blood flow while also thinning the intima (inner cell layer) of the arterial walls.

A common misconception is that the plaque buildup is what blocks the arteries, causing all cardiac events (Ex. heart attacks) to occur. However, this is only the cause of a small percentage of cardiac events.

What makes the buildup of soft plaques within the cell walls so dangerous is when the soft plaques begin to breakdown. As they breakdown, plaque particles seep through cracks in the thinned blood vessel wall and enter into the blood stream. This is known as plaque rupture. The body's immune system detects this rupture and misidentifies the situation as a bleed within the body. Clotting factors are sent to the region of interest, and it is the formation of a thrombus by these clotting factors which ultimately block the artery causing the onset of a cardiac event.



It is important to remember that there are various manifestations (symptoms) of atherosclerotic plaque development. See the infographic below for details.



Cardiovascular Disease: A Systemic Disease

Cardiovascular disease is a systemic disease, meaning that it affects many systems within the body, and therefore many tissues (not just tissues directly adjacent to plaque buildup). For an arterial blockage to affect the downstream tissues, the blockage must occlude ~70% of the blood vessel. If <70% of a blood vessel is occluded, it is unlikely that downstream tissues will be significantly affected.

However, it is important to remember that most cardiac events happen due to soft plaque rupturing through the cell wall which the immune response detects and forms a thrombus (a blood clot), blocking the artery. Therefore, if plaque rupture occurs, a blood vessel does not need to be 70% blocked by atherosclerotic plaques to cause significant tissue damage downstream. The body's immune response will detect the plaque rupture and develop a thrombus that can occlude a large portion of the vessel (causing >70% of the blood vessel occlusion).

What can I do to prevent, stabilize, and reverse atherosclerotic plaque buildup? The Heart Disease Reversal Program!

- There are four primary components: 1) Diet, 2) Exercise, 3) Stress Management and 4) Group Support.
- Regarding exercise, remember to implement the FITT protocol (see below).

Frequency	5-7x/week
Intensity	Low- Moderate Intensity (11-14 RPE; Conversation Pace)
Time	20-40mins of steady state exercise (this is in addition to 3-5mins of warmup exercise and 3-5mins of cool down exercise)
Type	Steady state cardiovascular exercise Ex. walking, rowing, cycling, swimming, etc.

For individuals who are prescribed pharmacological therapy, exercise should always be prescribed as adjunctive therapy