Understanding Cardiology

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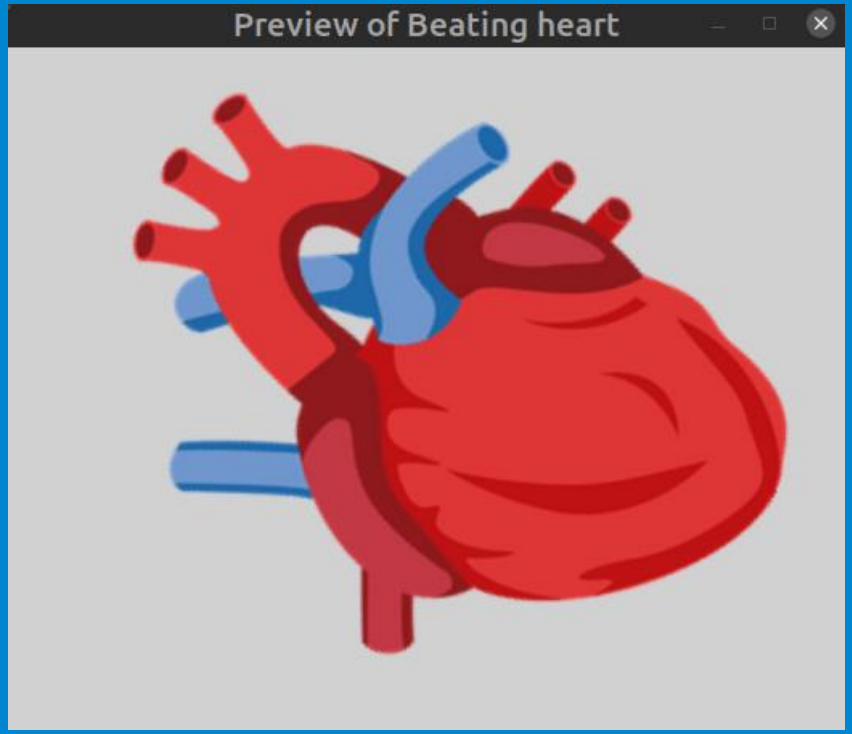
Objectives

I. Gain basic understanding of the heart and what it does
II. Gain basic understanding of diseases of the heart
III. Gain basic understanding of how heart disease is treated
IV. Learn how to protect the heart from developing disease

What does the heart do?

The heart is a muscle in the chest that pumps blood to every cell in the body, delivering oxygen needed to sustain life. It also receives used blood from the body to send to the lungs.



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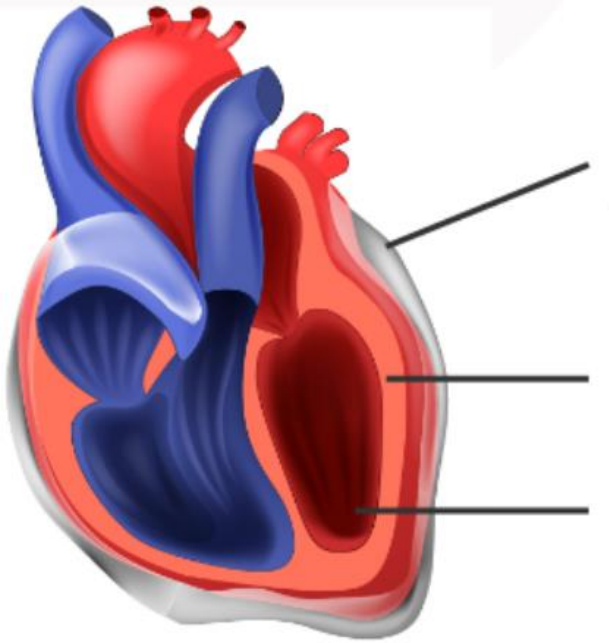
Heart Anatomy

Layers of the heart



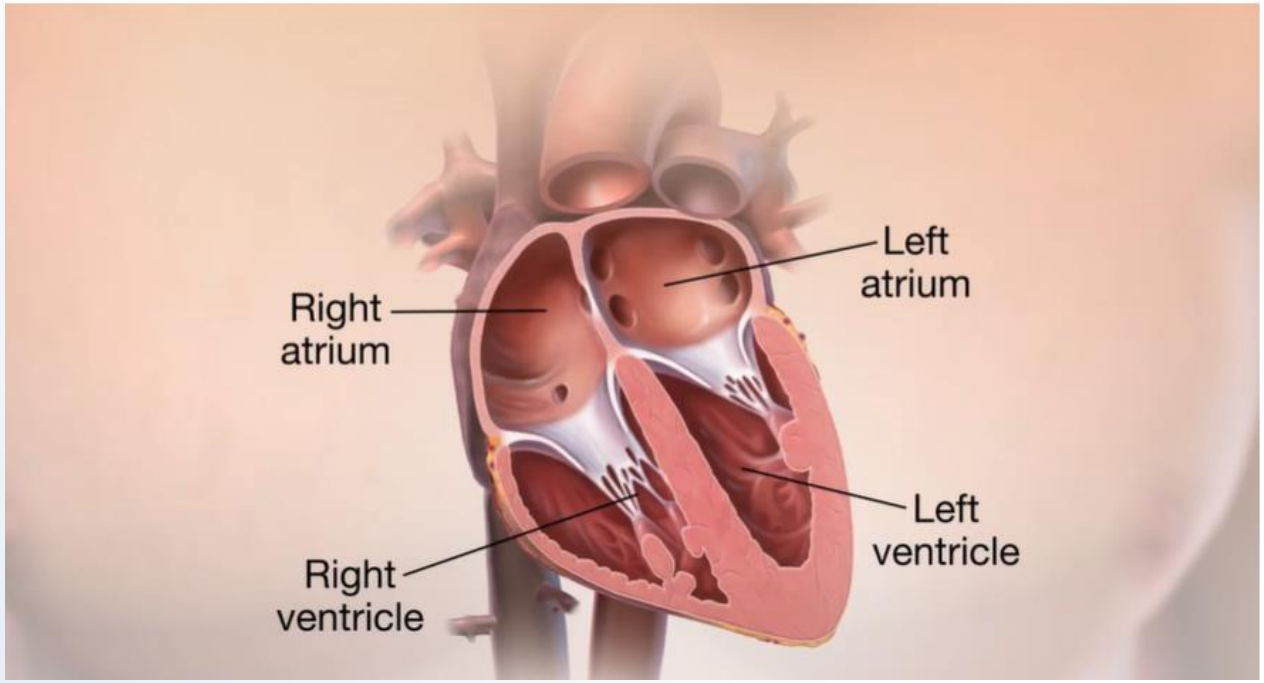
Pericardium - is the outermost layer. It consists of 2 thin, fibrous protective layer that contains fluid to protect them from friction

Myocardium - is the middle layer that contains the heart muscle

Endocardium - is the innermost layer that lines the heart

Heart Anatomy

The heart is divided into 4 chambers

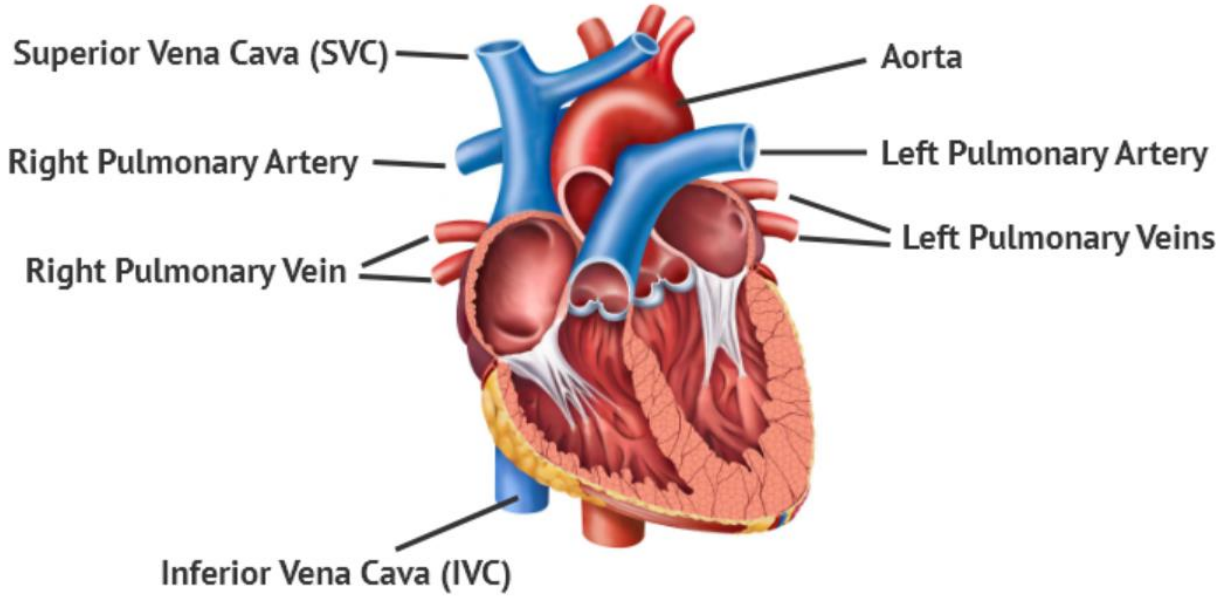


Heart Chambers

- Right atrium
- Right ventricle
- Left atrium
- Left ventricle

Heart Anatomy

Blood vessels connected to the heart

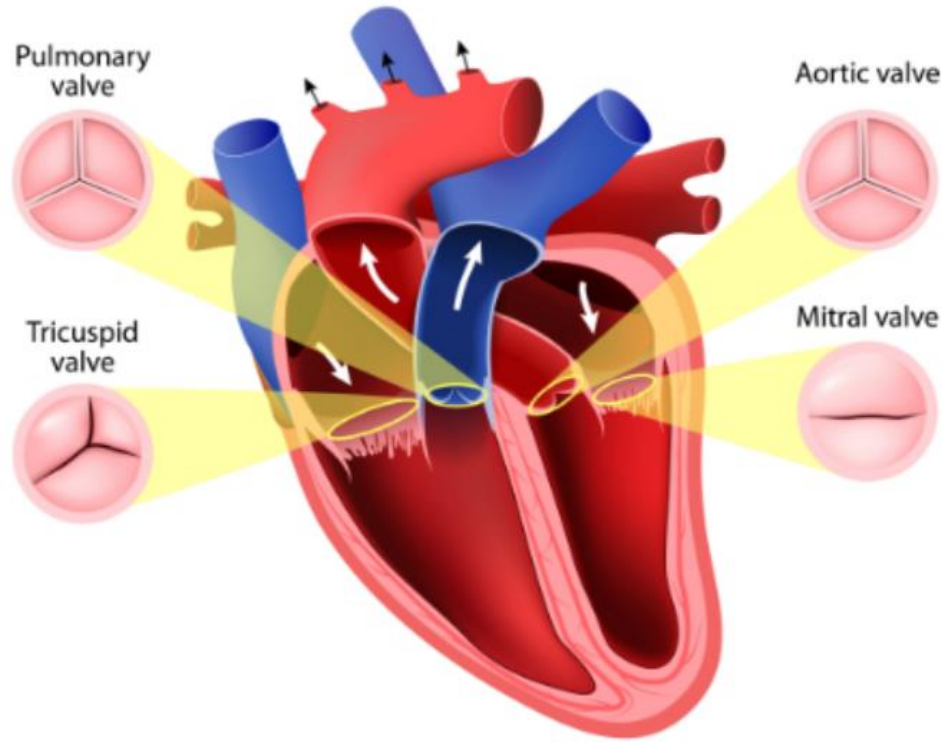


Major Blood Vessels to & from the heart

- Vena Cava- *vein that brings used blood back to the heart from body*
- Aorta- *artery that delivers fresh blood from the heart to the body*
- Pulmonary veins- *brings fresh blood to the heart from the lungs*
- Pulmonary arteries- *brings used blood from heart to lungs*

Heart Anatomy

4 valves separate each chamber of the heart

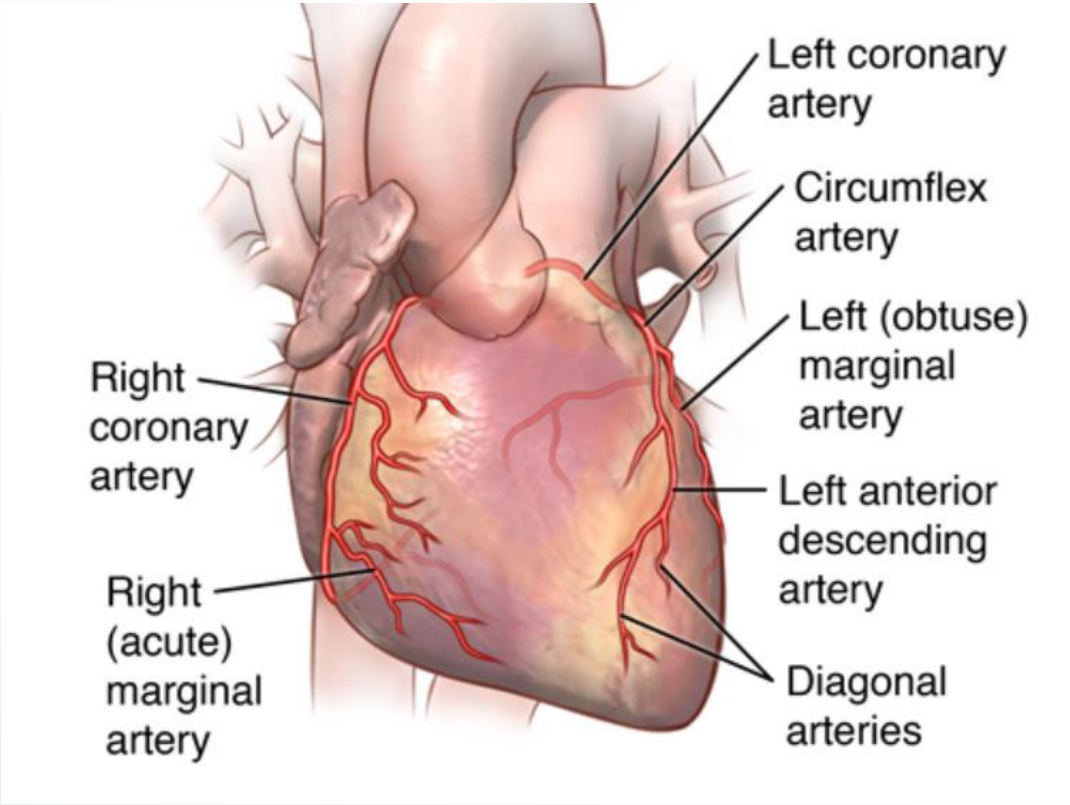


Valves of the Heart

- Aortic valve- *connects left ventricle to aorta*
- Mitral valve- *connects left atrium to left ventricle*
- Pulmonary valve- *connects right ventricle to pulmonary arteries*
- Tricsupid valve- *connects right atrium to right ventricle*

Heart Anatomy

Coronary Arteries

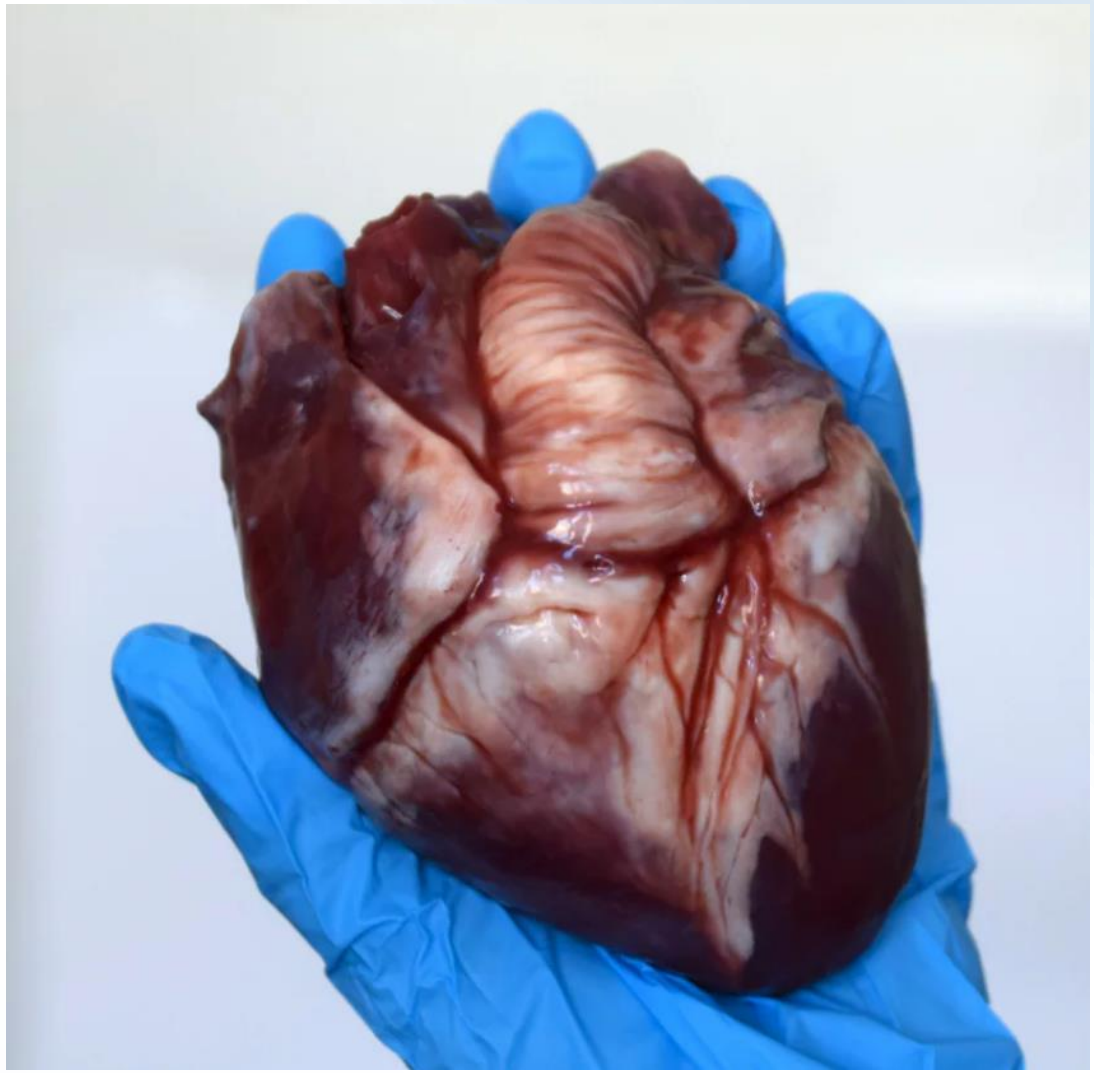


Coronary Arteries

- Deliver oxygen rich blood to the heart muscle
- Can become blocked over time
- Blockages can lead to heart attacks

Heart Anatomy

What does the heart look like?
How big is the heart?



Blood Flow Through the Heart

DISEASES OF THE HEART

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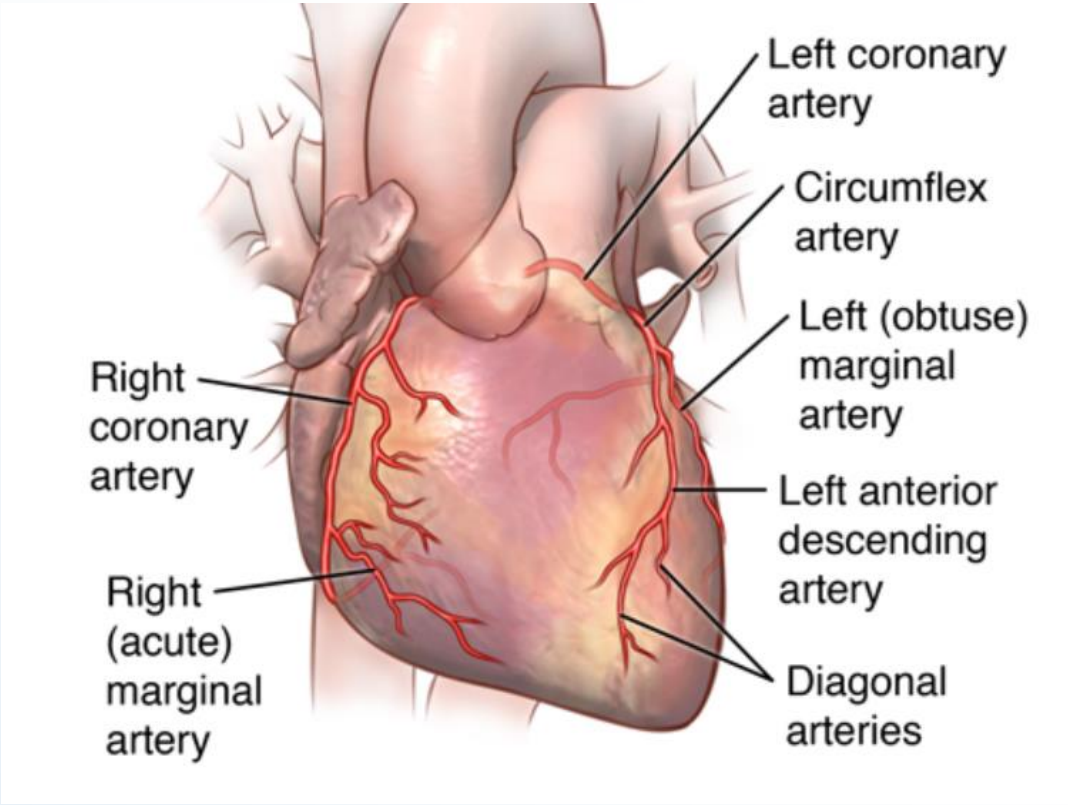
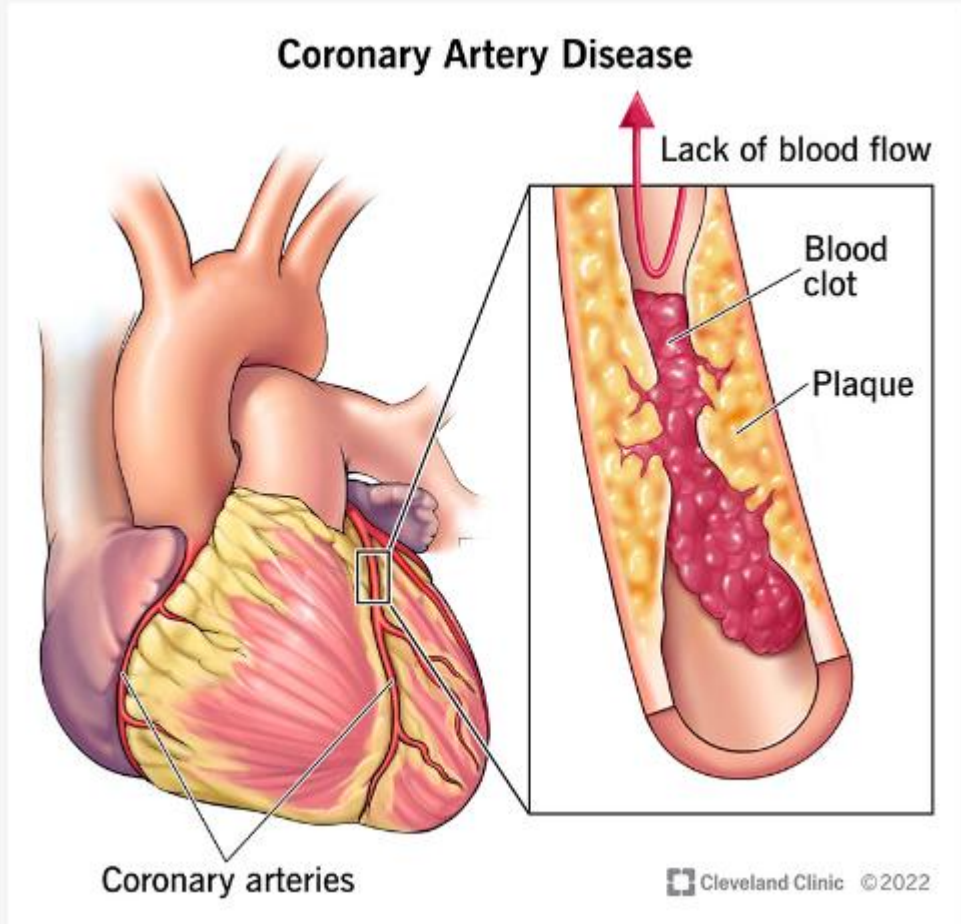
Coronary Artery Disease



Blockages

- Build up of plaques along walls of arteries
- Causes include high fat diet, diabetes, smoking, genes

Coronary Artery Disease



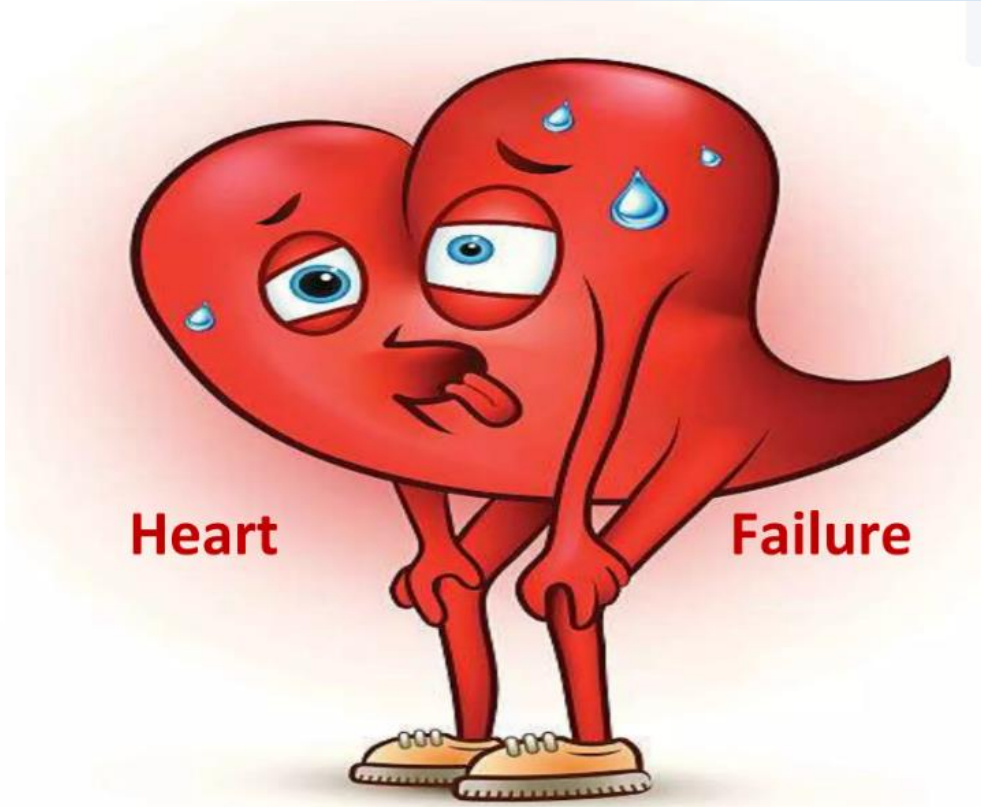
Blockages

- Can be a slow build up of plaque over many years that limits blood flow
- Piece of plaque can break off and clot forms causing complete blockage> heart attack

Treating Coronary Artery Disease

Heart Failure

- The heart does not squeeze strong enough, or is stiff and does not relax well enough
- This results in blood backing up into the lungs, causing shortness of breath and backs up into other areas of the body causing swelling



Heart Failure

Click for video

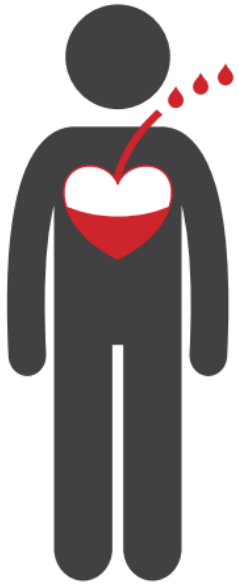
Heart Failure

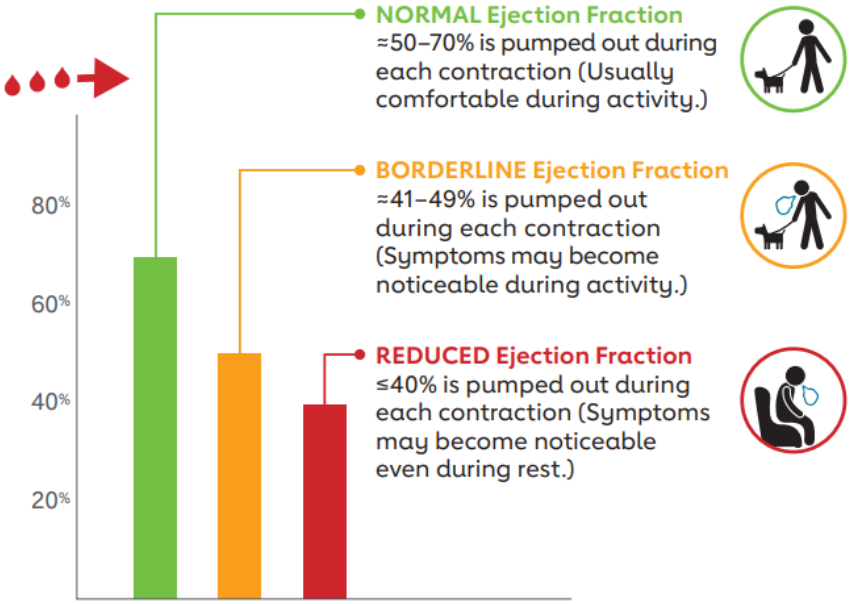
The **ejection fraction** compares the **amount of blood in the heart** to the **amount of blood pumped out.** The fraction or percentage helps describe how well the heart is pumping blood to the body.

EJECTION FRACTION =

amount of blood **pumped out** / amount of blood **in chamber**

How much blood is pumped out?





NORMAL Ejection Fraction
≈50–70% is pumped out during each contraction (Usually comfortable during activity.)

BORDERLINE Ejection Fraction
≈41–49% is pumped out during each contraction (Symptoms may become noticeable during activity.)

REDUCED Ejection Fraction
≤40% is pumped out during each contraction (Symptoms may become noticeable even during rest.)

It is also possible to have a diagnosis of heart failure with a seemingly normal (or preserved) ejection fraction of greater than or equal to 50%.

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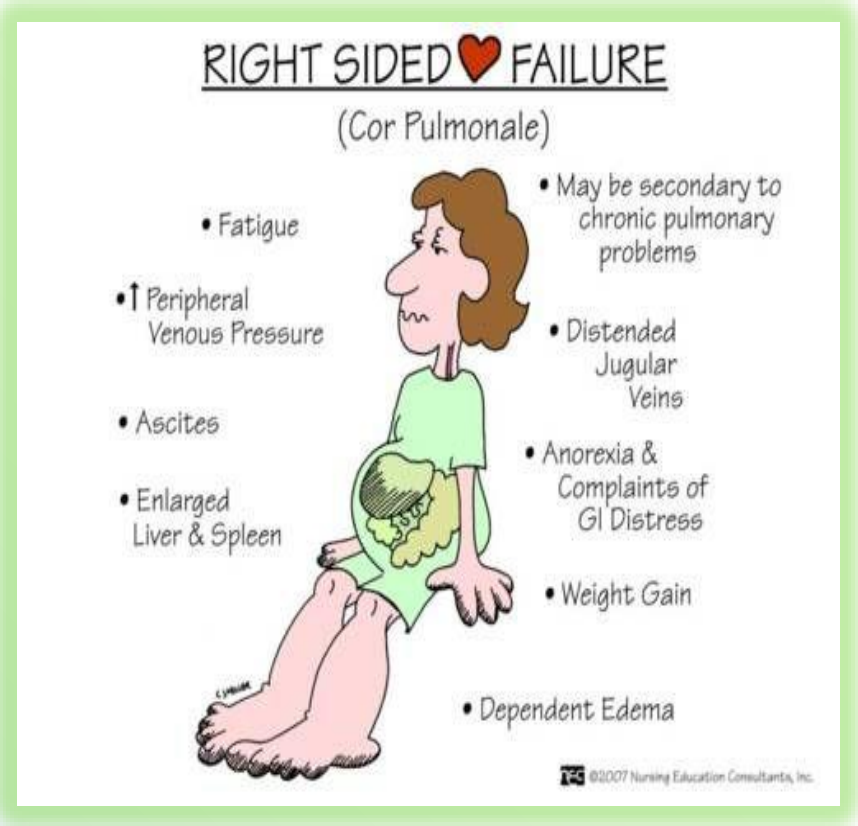
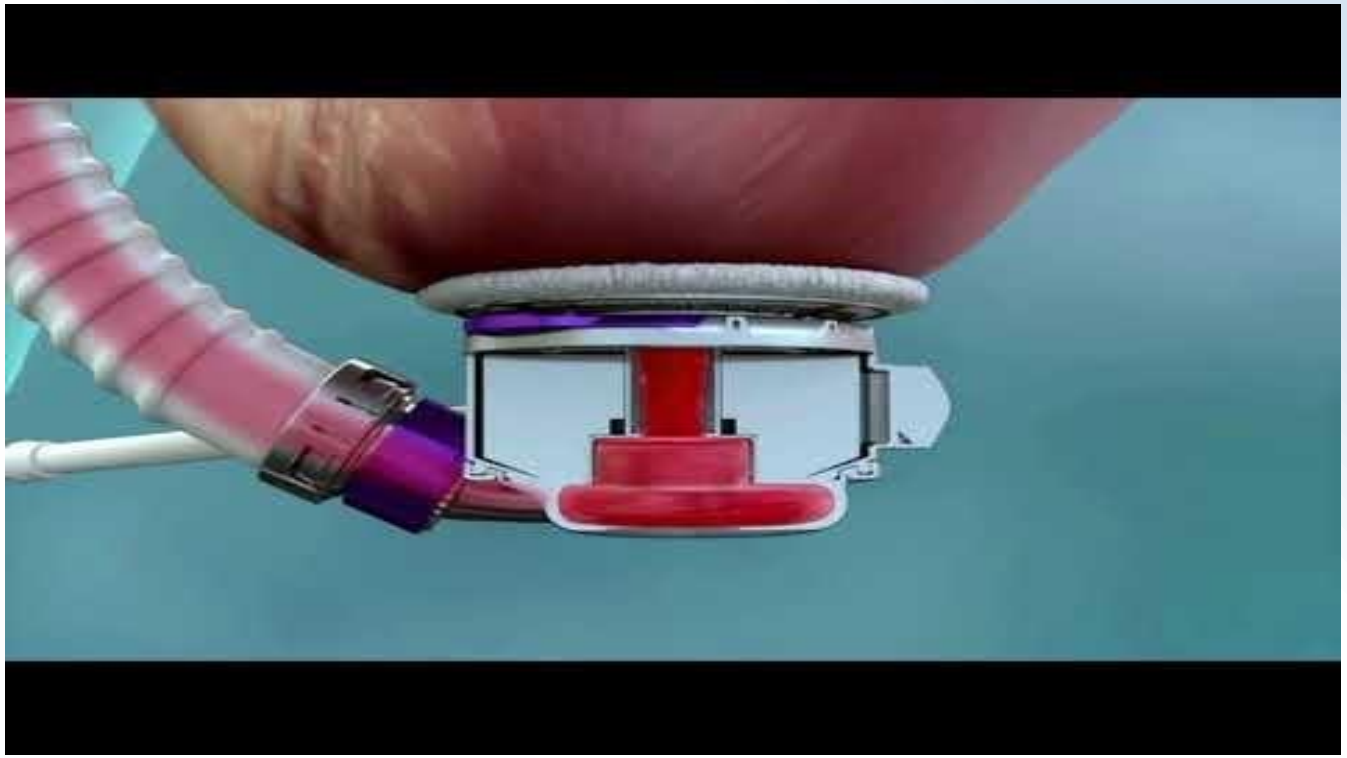
Heart Failure

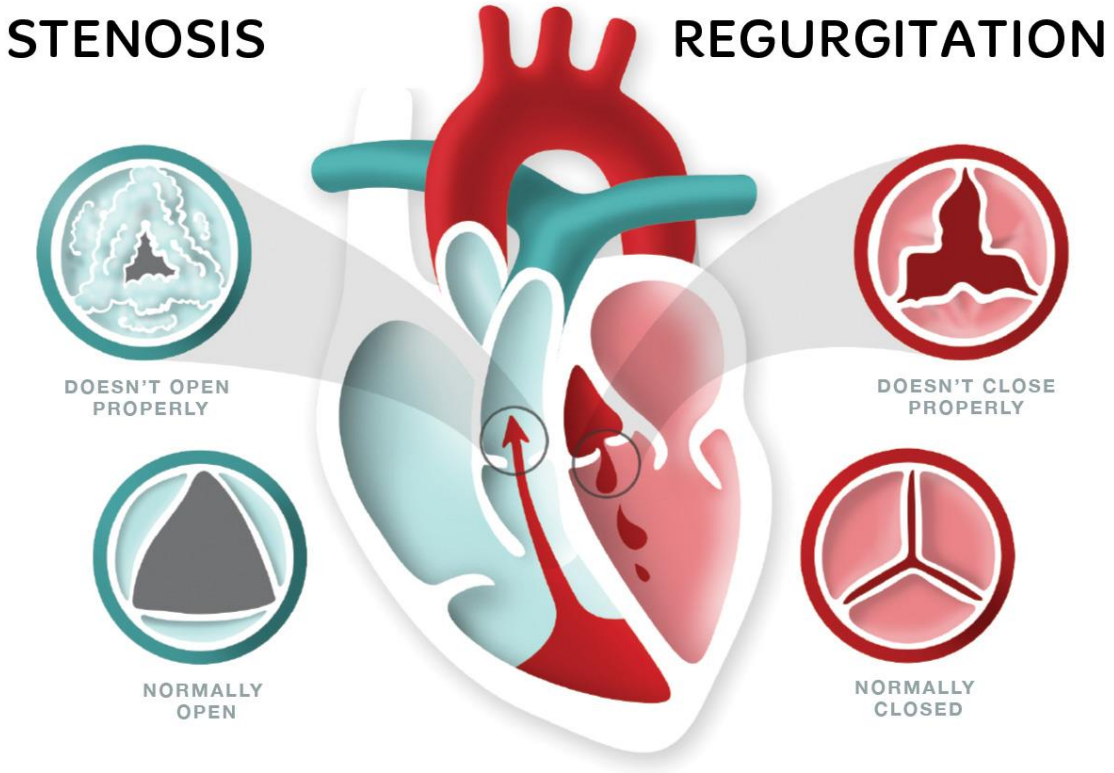


Heart Failure



Heart Failure

Valvular Disease



Stenosis & Regurgitation

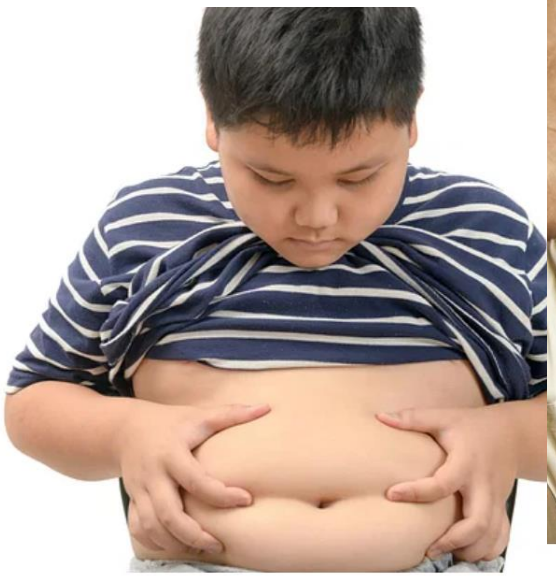
- Stenosis> valve does not open all the way
- Regurgitation> valve does not close all the way

Valvular Regurgitation

Valvular Stenosis

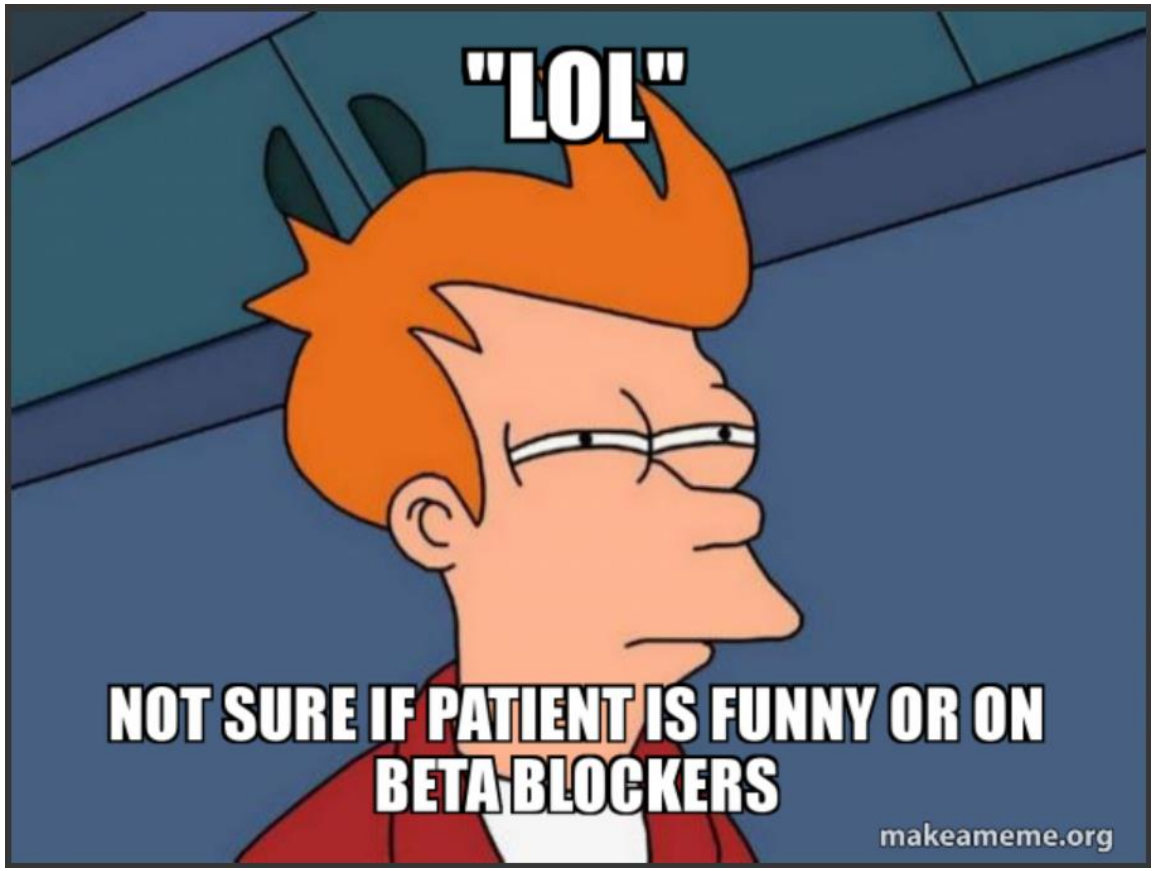
Fixing Valvular Stenosis

What Causes Heart Disease?



How to Prevent Heart Di

Medications for Heart Disease



Beta Blockers

- Block the release of stress hormones
- Slow down heart rate
- Lower blood pressure
- Decrease how hard heart has to work

Medications for Heart Disease

ACE Inhibitors

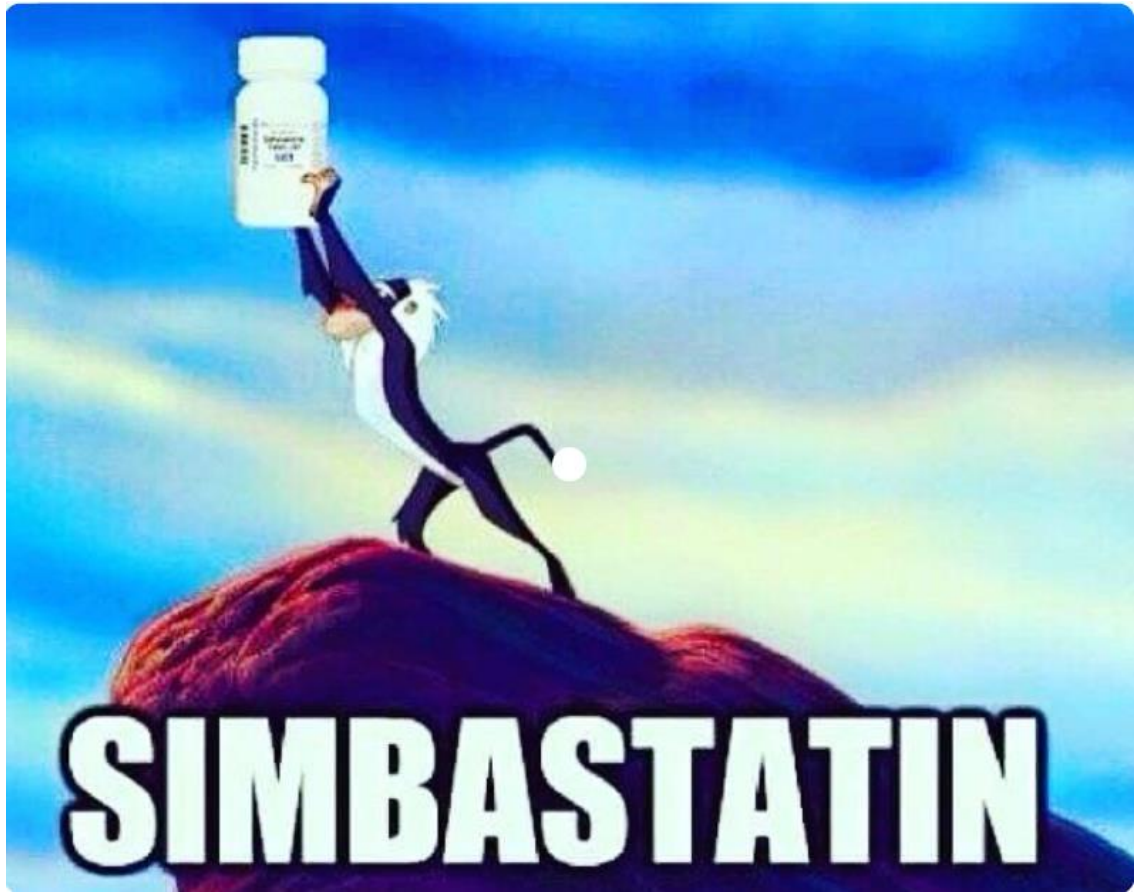
- Relax walls of blood vessels
- Block hormones that narrow blood vessels and hold onto salt

Medications for Heart Disease

ARB's

- Work much like ACE inhibitors

Medications for Heart Disease



Statins

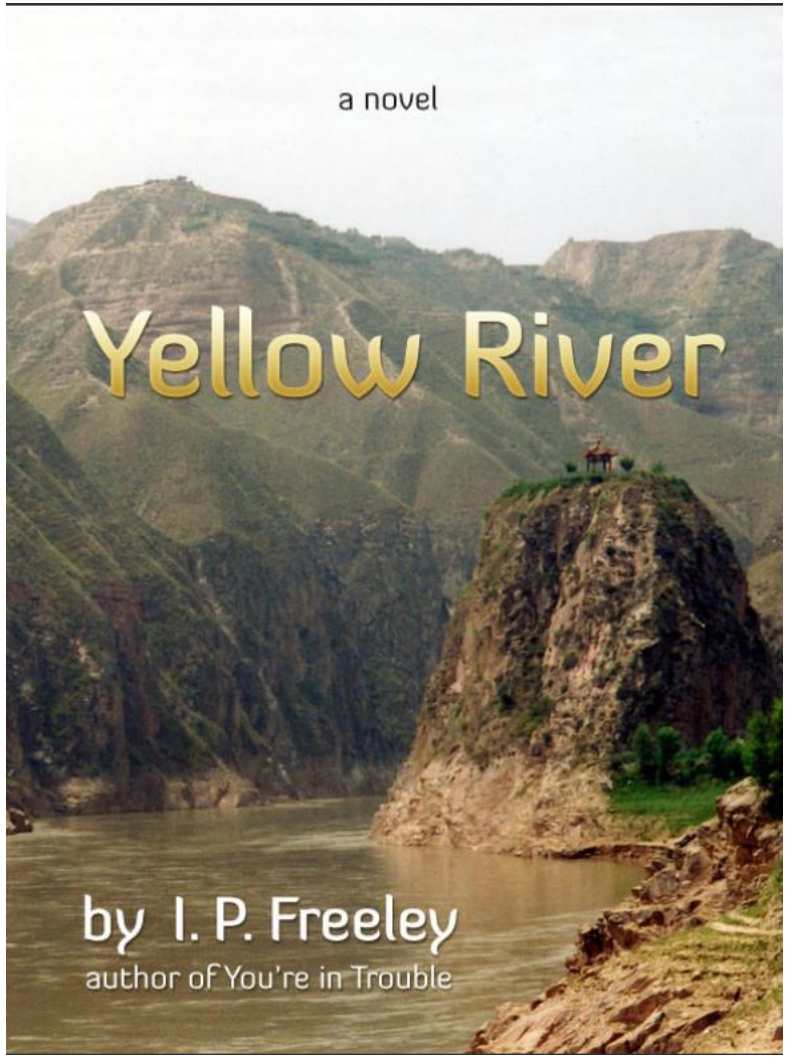
- Work to lower cholesterol

Medications for Heart Disease

Aspirin

- Reduces the clotting ability of blood

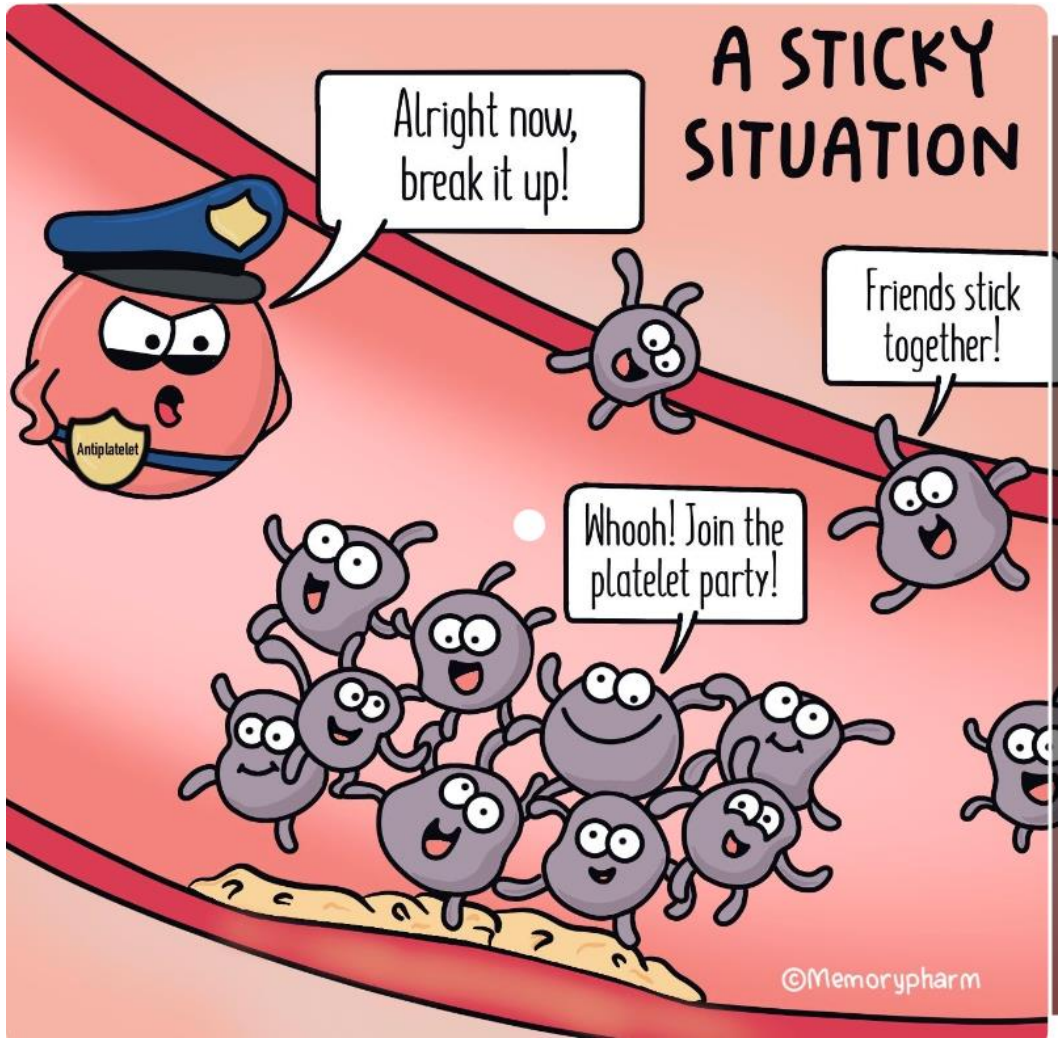
Medications for Heart Disease



Diuretics

- Work in the kidneys to help remove excess fluid

Medications for Heart Disease



Antiplatelet Agents

- Work in the blood to help clots from forming

Medications for Heart Disease

Anticoagulants

- Work in the blood to slow down the body from making clots

Questions/Comments