



# **Circulatory System**

# Parts and Organs

# Blood vessels

transport blood throughout the body

# Arteries

**blood vessels** that carry blood  
**AWAY** from the heart

# Pulmonary arteries

carry the **deoxygenated blood** from  
**heart** to **lungs**

**left** and **right** **pulmonary arteries** go to  
the **left lung** and **right lung**

# Coronary Arteries

**Two** valves that originate  
**in the aorta** that  
**supply blood**

**TO THE MUSCULAR TISSUE OF THE  
HEART**

# Aorta

The **largest artery** in the body.

The aorta arises from the **left ventricle** of the heart, goes up a little ways, bends over, then goes down **through the chest** and **through the abdomen** to where ends by dividing into two arteries called common iliac arteries that go to the legs.

# Veins

larger **blood vessels** that carry  
blood

**TOWARD** the heart



# Pulmonary Veins

Carries **blood** from **lungs** to **heart**  
(left atrium)

Only veins that **carry oxygenated blood**

# Venules

small **blood vessels** that allows  
**deoxygenated** blood

**TO RETURN FROM THE CAPILLARY  
BEDS**

**TO THE VEINS**

# MAJOR valves

Openings that allow the blood to flow

# The tricuspid valve

between the  
right atrium and right ventricle.

# The pulmonary or pulmonic valve

between the  
right ventricle and the pulmonary  
artery

# The mitral valve

between the  
**left atrium and left ventricle**

# The aortic valve

**between the left ventricle and the  
aorta**

# Right Atrium

- one of four chambers in the human heart
- It receives **deoxygenated** blood from the **superior and inferior vena cava** and pumps it into the **right ventricle** through the **tricuspid valve**



# Left Atrium

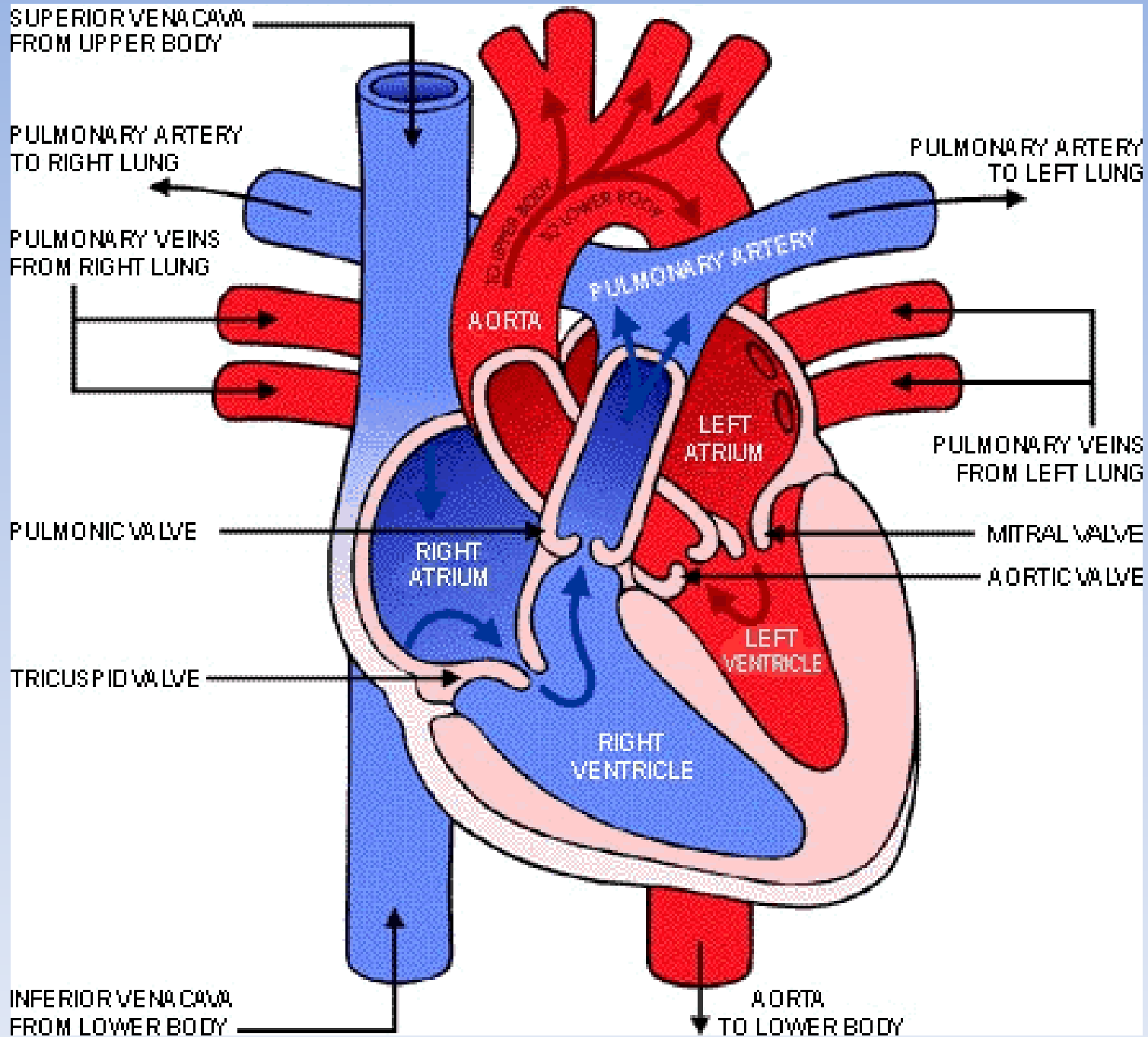
- one of the four chambers in the human heart
- It receives **oxygenated** blood from the **pulmonary veins**, and pumps it into the **left ventricle**, via the **bicuspid valve**.

# Right Ventricle

- one of four chambers in the human heart.
- It receives **deoxygenated** blood from the **right atrium** via the **tricuspid valve**, and pumps it into the **pulmonary artery** via the **pulmonary valve**

# Left Ventricle

- one of four chambers in the human heart
- It receives oxygenated blood from the left atrium via the mitral valve, and pumps it into the aorta via the aortic valve.



# BLOOD

carries **nutrients**, **water**, **oxygen**, and **waste products** **to** and **from** your body's **cells** and **defends** against infections and other foreign materials

# RBC (Red blood Cell)

- Performs the MOST IMPORTANT **BLOOD DUTY**
- A single drop of **blood** contains millions of red blood cells
- RBC's are **constantly traveling** through your body **delivering oxygen** and removing waste  
(if they weren't you would slowly die)

# WBC (White Blood Cell)

- When a **germ or infection enters** the body the WBC's "snap" to attention and **race toward** the "scene of the crime"
- WBC's are constantly on the lookout for signs of disease
- Ways to "attack" a germ: produce

**PROTECTIVE ANTIBODIES**

or they

**SURROUND AND DEVOUR THE BACTERIA**

# Platelets

- Irregularly shaped, colorless bodies that are **present in blood**
- Their sticky surface lets them, along with other substances, **form clots to STOP bleeding**



# Plasma

- Straw-colored, clear liquid that is 90% water
- Contains **NO CELLS**
- The blood cells use this as **SUSPENSE**
- Half your **blood** is made of plasma
- Plasma is made in the **liver**

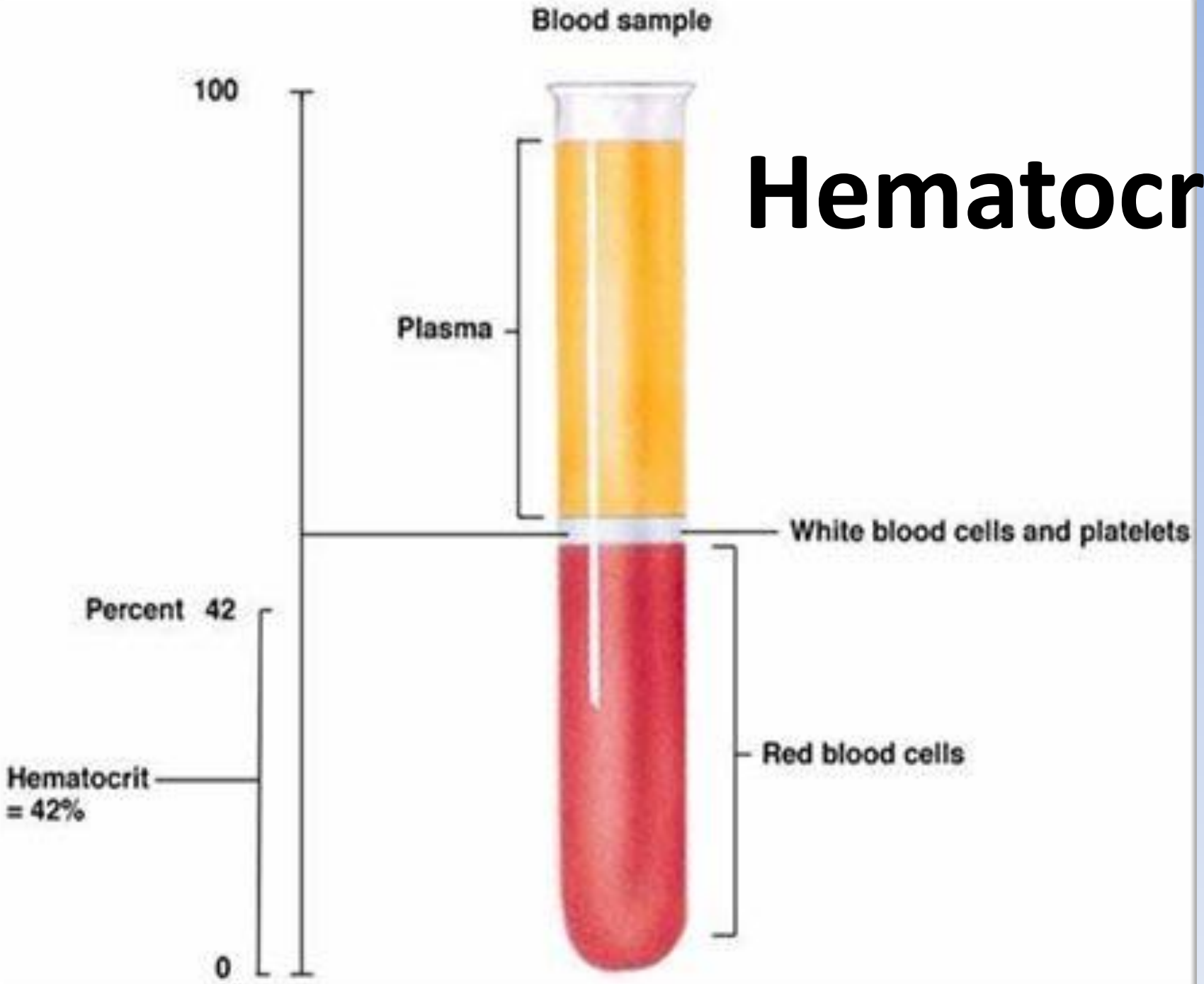
Hemoglobin in the **blood**

Serves as the **oxygen** carrier in the  
**blood**

# Hematocrit

- Also known as **packed cell volume** is the **proportion** of blood volume that is occupied by **red blood cells**
- Shows:
  - complete blood count
  - hemoglobin concentration
  - white blood cell count
  - platelet count

# Hematocrit



Oxygenated Blood

The **air** you breath travels  
down your air way **to** your  
lungs and into your **bronchial**  
**tubes**

At the end of each bronchial tube are groups of tiny air sacks known as **alveoli**

These **air sacs** have thin walls **that** small blood vessels called **capillaries run through**



# Oxygen

passes through the **alveoli**  
and into the **capillaries**,  
at the same time

**carbon dioxide** is transferred  
from the **blood** into the **air sacs**

After the **blood** is **oxygenated** it is taken to the **upper left chamber** (left atrium)

It is then **pumped** into the **lower left chamber** (left ventricle) and then into an **artery**

After traveling the **arteries** and **oxygenating** the **cells**, the **blood** then returns to the **heart** via a vein to the **upper right chamber** of the heart (right atrium)

It is then **squeezed** into the **right lower chamber** (right ventricle)

The blood is squeezed out of the **ventricle** and taken by an **artery** back to the lungs

The cycle repeats

# Vena Cava

veins that return deoxygenated blood from the body to the heart (both empty into the right atrium)



# Inferior Vena Cava

A large **vein** that allows the **deoxygenated blood**

**from the lower half** of the body  
to go to the **heart**

\*largest vein in the body

# Superior Vena Cava

large short **vein** that carries **deoxygenated** blood

**from the upper part** of the body  
to the right atrium

# Lungs

Oxygenate **blood**- critical for every cell to function properly

**Heart**

- The **heart** is a **key organ** in the circulatory system
- It is a hollow **muscular pump**
- Main function is to **propel blood** throughout the **body**
- Beats about 60 to 100 times per minute but can go much faster if necessary
- Beats 100,000 times a day, 30 million times a year, and 2.5 billion times in a 70-year lifetime

# What is a **heart attack**?

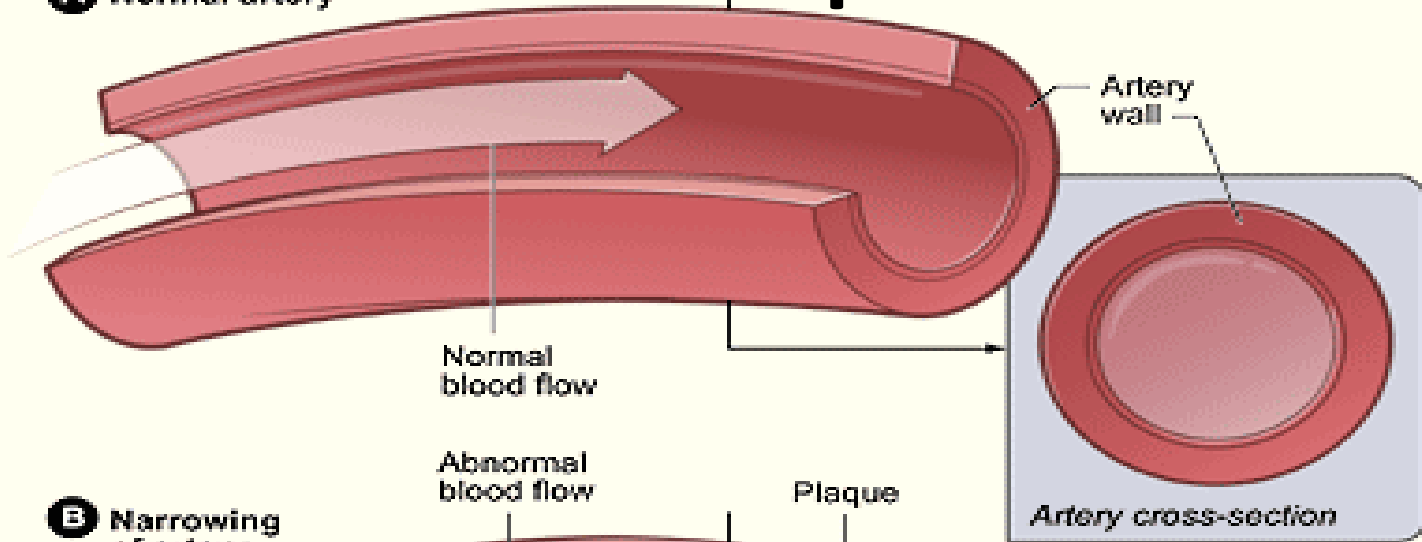
A heart attack occurs when the heart's major **blood vessels** become **blocked** so the **oxygen** is not delivered to the heart muscle. The lack of oxygen causes the heart muscle to die, producing pain and other symptoms.

# What causes **heart attacks**?

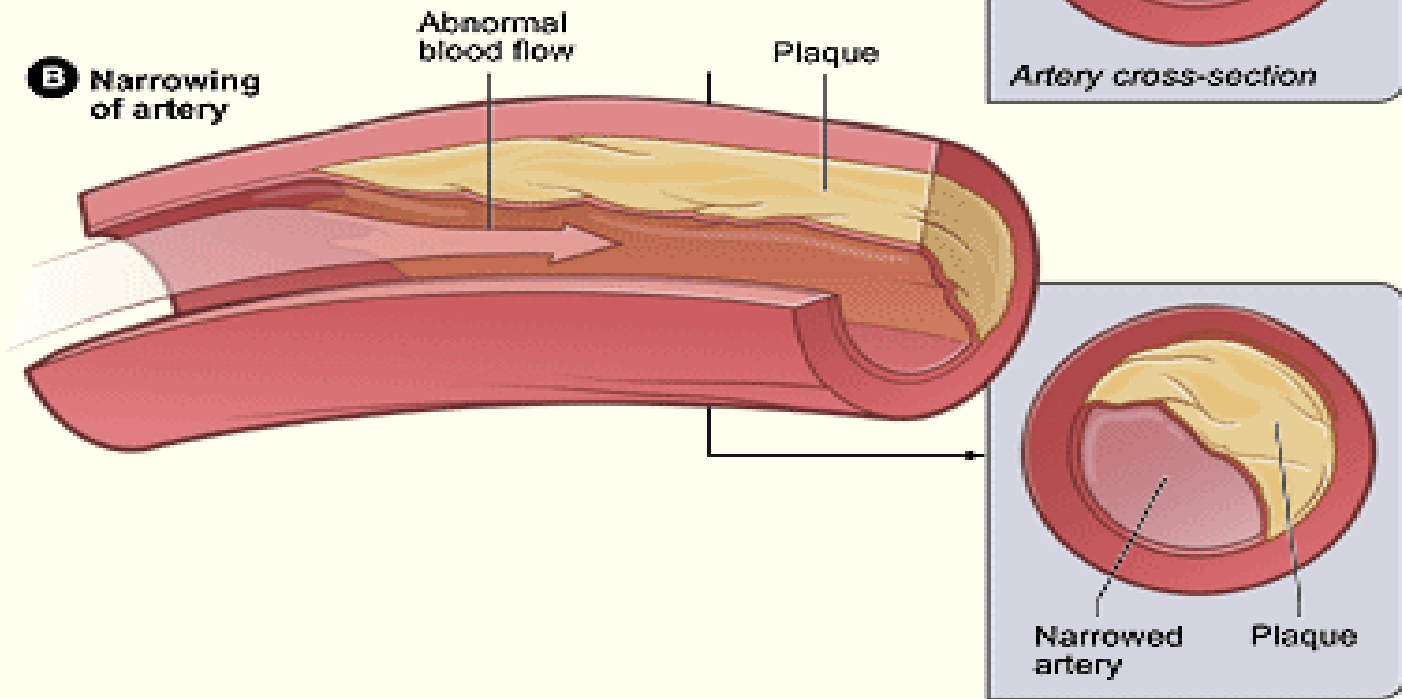
- High blood cholesterol
- High blood pressure
- Physical inactivity
- Obesity
- Stress
- Too much alcohol
- Heredity
- Increasing age

# Example

**A** Normal artery



**B** Narrowing of artery

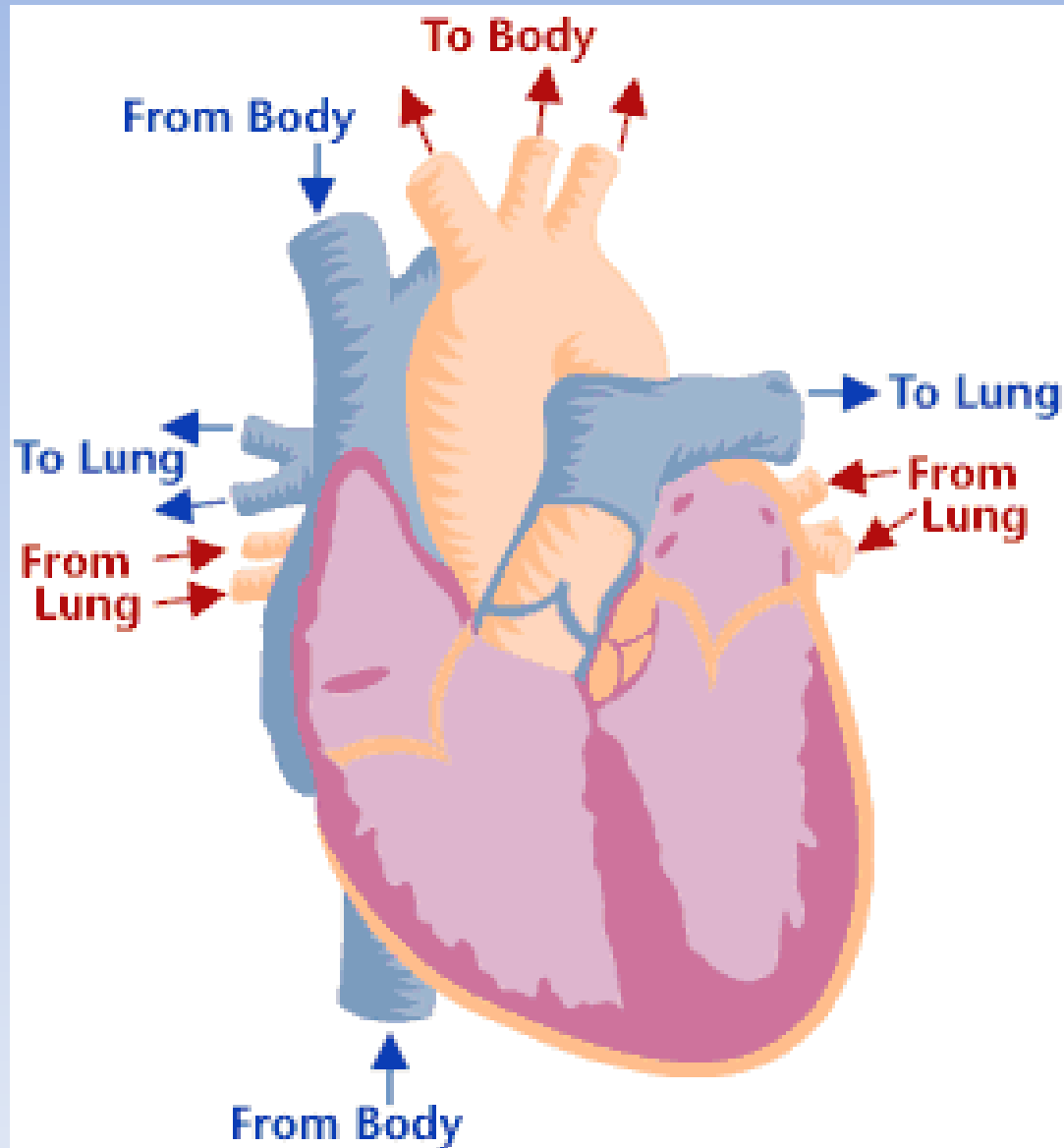




# PRESSURES OF THE HEART

- **Systolic Pressure-** when the **blood pressure** is at its **maximum** when the heart is **beating**
- **Diastolic Pressure-**when the **blood pressure** decreases the heart is **relaxing**

# Path of the blood



# Useful Websites

- <http://www.bostonscientific.com/templatedata/imports/HTML/lifebeatonline/winter2007/learning.shtml>
- This shows an excellent diagram of the flow of the blood through the heart step by step (this helped us map out our pathway for the activity in class)

- [www.wikipedia.com](http://www.wikipedia.com)
- We used this for all of the parts of the heart because it explains clearly each part

- [http://www.nhlbi.nih.gov/health/dci/Diseases/HeartAttack/HeartAttack\\_WhatIs.html](http://www.nhlbi.nih.gov/health/dci/Diseases/HeartAttack/HeartAttack_WhatIs.html)
- This shows exactly what a heart attack is and what causes it

- [http://kidshealth.org/parent/general/body\\_basics/blood.html](http://kidshealth.org/parent/general/body_basics/blood.html)
- Fully explains blood and all the types

# Need more help with the path of the blood?

- Look at the other PowerPoint that was used during the simulation during class
- Look at the PowerPoint with a test of how well you know the heart