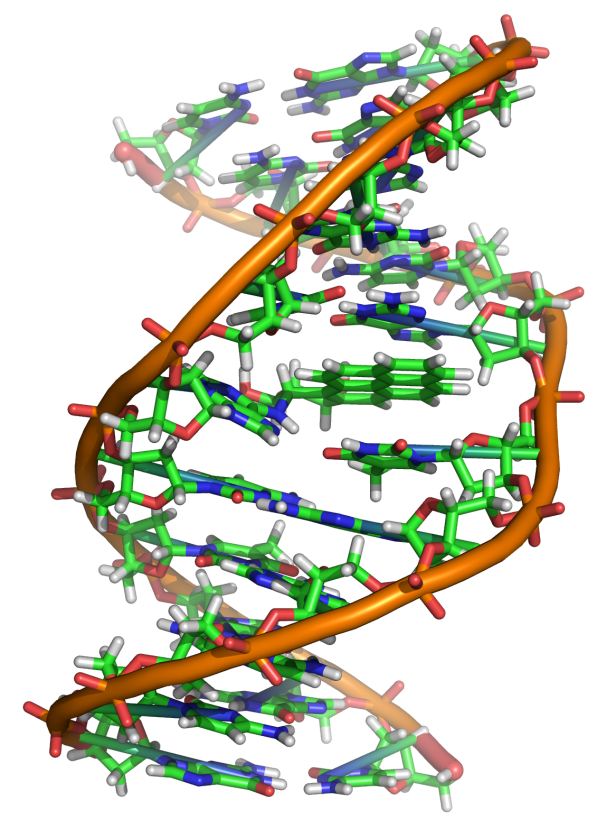
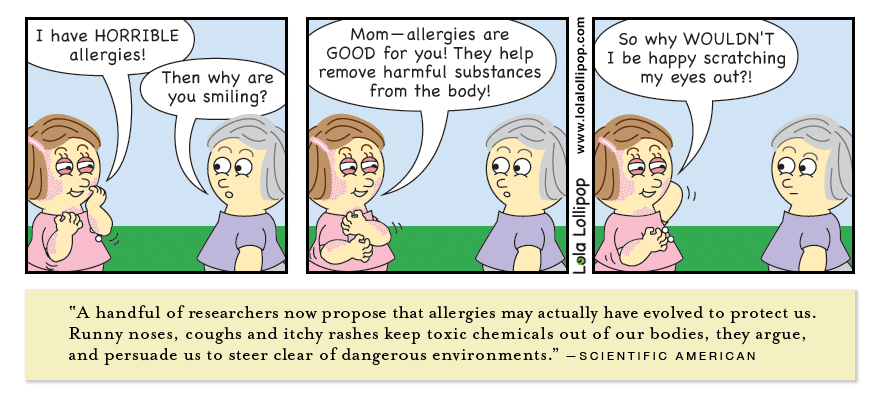
Unit A: Maintaining Health

**Science 30**

**Chapters 1 (Pages 4-75)**





**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Chapter 1 – Circulation and Immunity**



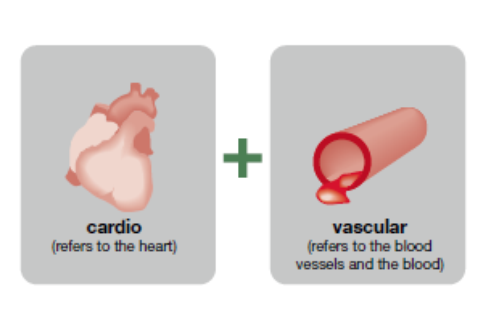
Comparison – City vs. Body

The human body is made up of trillions of cells closely packed together. These cells are similar to the closely packed houses that make up a city. Each house’s inhabitants generate wastes that must be regularly removed, and each house requires a constant supply of water and energy (natural gas and electricity). The houses are often far from the source of the needed supply or the waste disposal site. Like houses, cells generate wastes and require constant supplies. An efficient network for transporting materials is required to keep both cells and house functioning properly. Blood vessels in the human body function very much like highways, roads and pipes that serve cities and towns. Notice that no home in the photo is far from a road. In your body, no cell is more than two or three cells away from a blood vessel. Like roadways, there are one-way blood vessels, major and minor blood highways, and even the occasional traffic jam as blood vessels break or clog.

**Topic 1.1 – The Heart**

**The Circulatory System**

* Large organisms have an “internal transport system” known as the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**



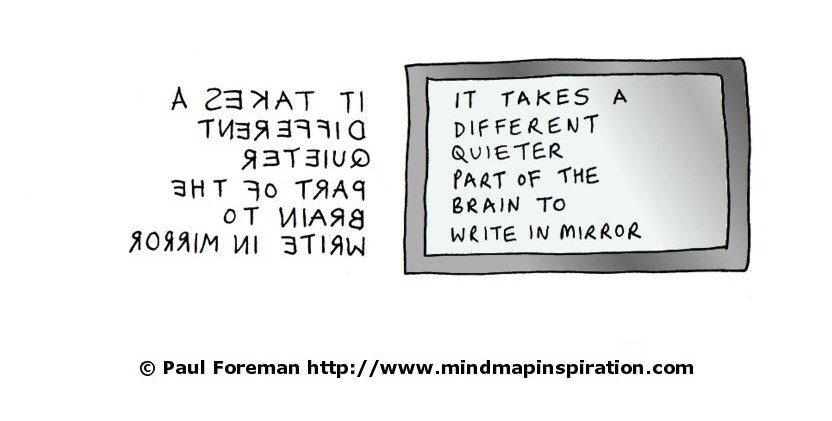
**The main roles of the circulatory system:**

1. Transport and delivery of **\_\_\_\_\_\_\_** and nutrients and removal of **\_\_\_\_\_\_\_\_\_** and waste from body cells.

2. Transport and delivery of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (like Hormones) throughout the body.

3. Distributes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

4. Defends against **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.  
  
**Some CRAZY ideas about the heart**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** believed a person's emotions, wisdom and personality was in the heart, not the brain. When someone died they believed the heart was weighed to determine a person's fate after death.
  + “Speaking from the heart”
* In 2nd century Greece, physician's like **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** believed the heart had two chambers and that food was turned into blood by the liver and then used up in the body. They also believed that the heart sucked blood from the veins and used it up. These ideas lasted for 1500 years (until it became more acceptable to perform human dissections)
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ was one of the first to dissect human cadavers and made many discoveries, but had to keep them secret because experiments on humans was not 'allowed.' To keep his work secret he used a type of mirror image writing.

**More Recent Ideas About the Heart**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** discovered:
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** existed in both heart and veins to control blood flow
  + Heart **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the same blood over and over again
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (the volume of blood pumped by the heart in one minute which is equal to the product of stroke volume and heart rate).

**Cardiac Output**

* Volume (IN **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**) of blood pumped through the heart in ONE **\_\_\_\_\_\_\_\_\_\_\_\_\_**!
  + Adult male pumps out 70 mL of blood per beat (**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**) and the average resting heart rate is 72 beats/minute
  + Adult female pumps out 60 mL of blood per beat (**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**) and the average resting heart rate is 72 beats/minute.

|  |
| --- |
| **The CARDIAC OUTPUT Calculation**  Cardiac Output = Stroke Volume (L) x beats per minute |

|  |
| --- |
| **Example Problem: (Page 9)**  A typical human male has a stroke volume of 70 mL per beat and a resting heart rate of 72 beats per minute.  a) Calculate the cardiac output. Express your answer in **liters per minute**.  **Note: The final answer is rounded to two significant digits since the given values in the question are expressed to two significant digits.** |

Cardiac Output Information:   
  
  
MedicineNet.com

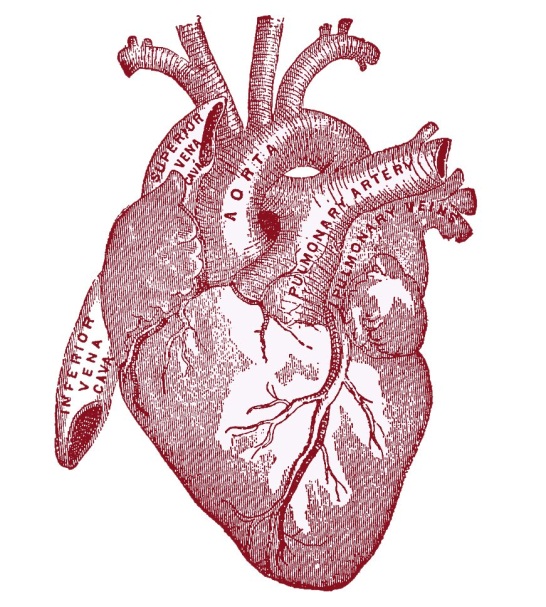


Cardiac Output Video:

Study.com

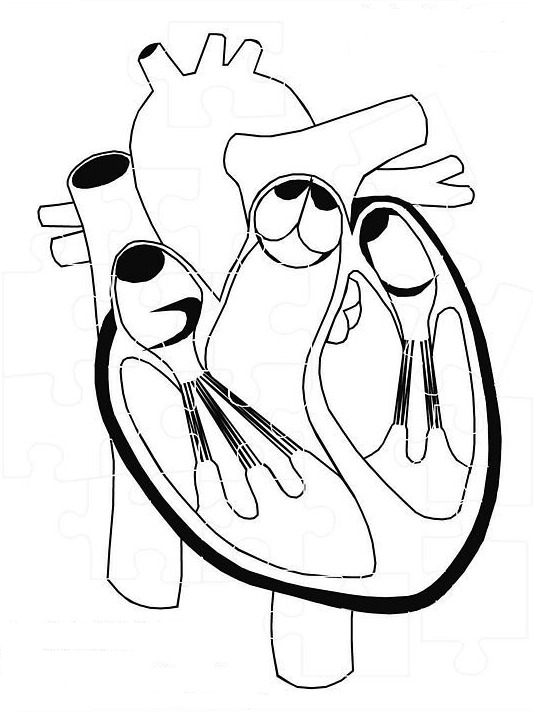


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| **Practice Problems – Page 9: Questions 1-5** |

**The Heart: An Amazing Pump**

* The size of your **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is about the size of your heart.
* Your heart beats over **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** per day and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in a lifetime.
* The heart is located almost in the center of the chest (not the left side)
  + Doctors listen to your heart on the left side of your chest because your heart is tilted slightly left – who knew?

**Heart Diagram**

Using **page 11** to help you, label the parts located in the word box. Take note of where the oxygenated blood (red) and deoxygenated blood (blue) come from and go to.

**Word Box**

Aorta

Superior Vena Cava

Inferior Vena Cava

Right Atrium

Right Ventricle

Left Atrium

Left Ventricle

Pulmonary vein

Pulmonary artery

Septum

Heart Valves

**Quick Vocab:**

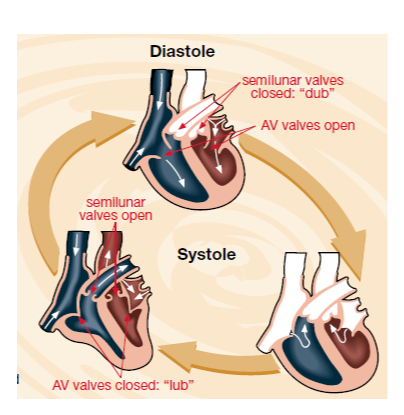
* **Septum**: a thick wall of muscle that divides the left and right sides of the heart
* **Atrium**: The smaller upper chamber that receives blood returning from the heart
* **Ventricle**: The larger v-shaped bottom chamber that pumps blood from the heart
* **Heart Valves**: thin flaps of tissue in the heart that open and close to ensure the proper direction of blood flow.

**Blood Flow through the Heart**

|  |  |
| --- | --- |
|  | **Stage 1:** |
|  | **Stage 2:** |
|  | **Stage 3:** |
|  | **Stage 4:** |
|  | **Stage 5:** |
|  | **Stage 6:** |

**The beating Heart**

* This looks like a step by step process. In reality, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**. When the right atrium relaxes, so does the left (so they both fill with blood). When both atria contract, both AV valves open, filling both ventricles together.

 **Two parts to the heart beat**

1) Diastole - **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (the valves are open and the relaxed heart chambers fill with blood)

2) Systole - **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (atria contract, push blood into ventricles, then ventricles contract and push blood out of heart)

The 'lub-dub' sound of your heart is from the closing of the valves during contraction.

**Factors Affecting Heart Rate:**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (eg. fear/excitement increases rate)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (eg. excess heat increases heart rate in an attempt to increase blood flow to dissipate heat)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** can actually increase stroke volume (heart muscle become more elastic, but not larger)
* The more **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** a person is, the lower their resting heart rate.

**Topic 1.1 Summary:**

Beliefs about the heart and the circulatory system have changed over time. William Harvey was the first person to prove that blood circulated around the body in a closed system of vessels. The pump that drives the circulatory system is the heart. The output of blood from the heart depends on how many times the heart contracts and how much blood it moved with each contraction. The atria contract simultaneously, followed by the simultaneous contraction of the two ventricles. This two-part contraction creates a “lub dub” sounds due to the functioning of the heart’s valves.

The heart rate is affected by emotion, temperature, exercise, fitness level, sleep, hormones, chemicals, drugs, and alcohol. By monitoring the heart rate during exercise programs, appropriate levels of exertion can be ensured. Heart rate is a key indicator of cardiovascular fitness.



Parts of the heart:

Innerbody.com



Blood Flow through the Heart:

Medical Institution.com

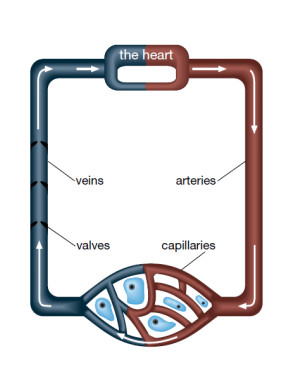


Blood Flow through the Heart

KhanAcademyMyMedicine.com



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| **Practice Problems: Page 19, 1-3** |

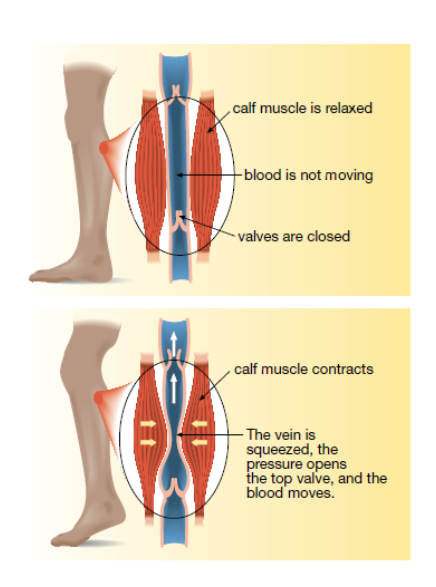
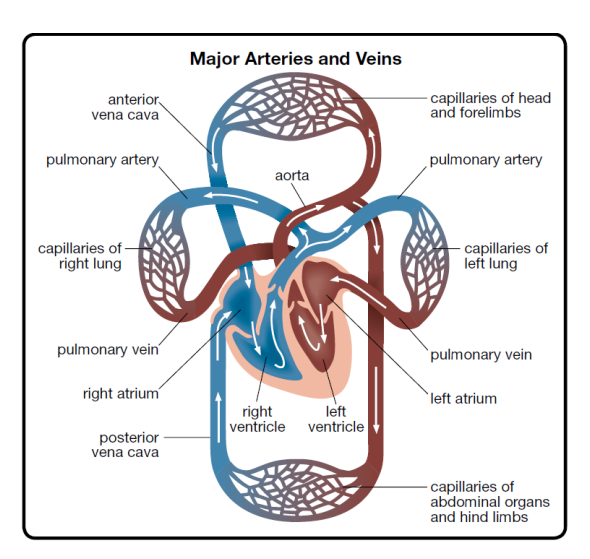
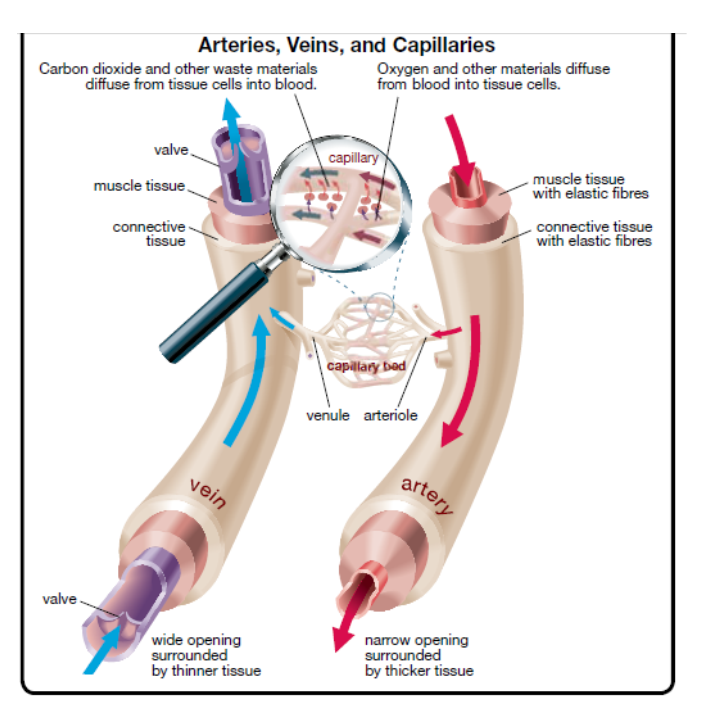
**Topic 1.2 – Blood Vessels**

**Three types of blood vessels:**

1. **Artery** – Carry blood **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** from the heart
2. **Vein** – Carry blood **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the heart
3. **Capillary** - **\_\_\_\_\_\_\_\_\_\_\_\_\_** blood vessels, connecting smallest part of artery to smallest part of vein. This is where **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** between blood and tissue occurs.

Using **page 22**, fill in the following table.

|  |  |
| --- | --- |
| **Type of blood vessel** | **Description** |
| **Artery** |  |
| **Vein** |  |
| **Capillary** |  |
| **Vena Cava (superior & inferior)** |  |
| **Pulmonary Artery** |  |
| **Pulmonary Vein** |  |
| **Aorta** |  |

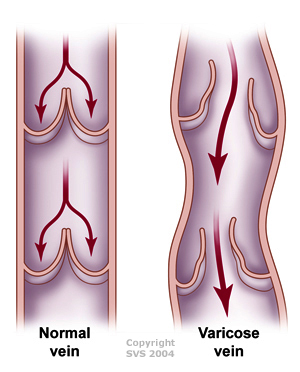
 

**ARTERIES:**

* Arteries have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to withstand the pressure of the pumping heart.
* Arteries all carry **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** blood except for the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Arteries get smaller and smaller as they head away from the heart
  + As they get smaller, the start to branch into **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** which are small enough to connect to capillaries.

**VEINS:**

* Blood leaves capillaries and flows into “baby” veins called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (connect to larger veins).
* There is not as much **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in the veins as in arteries so the walls do not need to be as thick.
* The blood in the veins must make its way back to the heart by using **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
  + This is done because veins have small **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in them so the blood does not go backwards.

**Varicose Veins**

* If veins become **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and the valves are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, blood in the veins pool.
* This causes the veins to become raised.
  + This is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Blood Flow through vessels:**

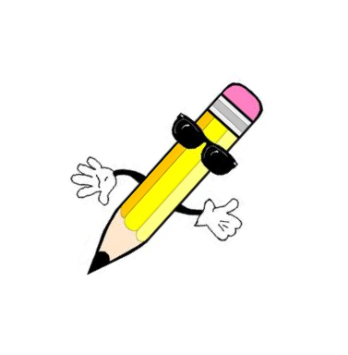
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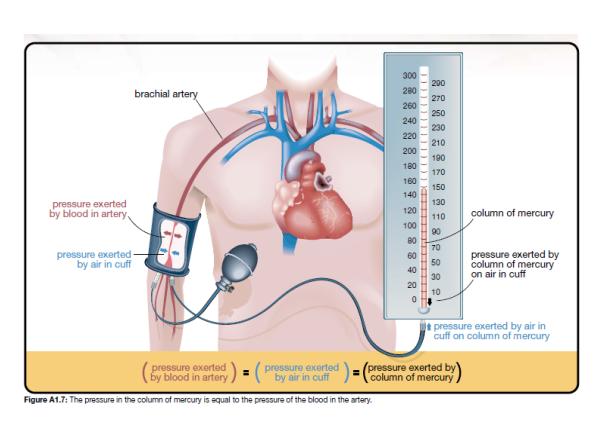


Varicose Veins Info:

WebMd.com

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| **Practice Problems: Page 23, Questions 11-14**  **: Page 24, Questions 15-19** |



**Blood Pressure:**

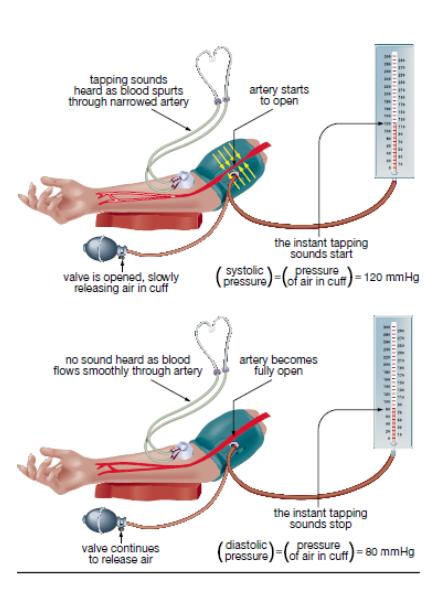
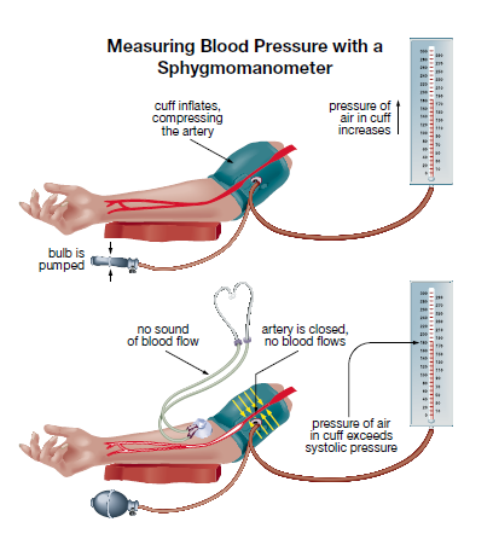
* Pressure exerted by blood against the walls of blood vessels (typically a major artery)
* Measured in **\_\_\_\_\_\_\_\_\_\_\_\_\_** (millimeters of mercury)
* Unit for measuring pressure in terms of the height of a column of mercury that can be supported by that pressure
* Your heart both **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** as it pumps blood so your blood pressure reading with have TWO numbers.

**The two numbers of blood pressure:**

* Systolic Pressure: the pressure in the arteries when the heart is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Normal range for adults between **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Diastolic Pressure: the pressure in the arteries when the heart is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Normal range for adults between **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |
| --- |
| **Blood Pressure is written as systolic pressure over diastolic pressure**.  Example: 100/60 |

* Hypertension: abnormally **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – values greater than 140/90
  + Caused by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, anxiety, exercise, excess blood in vessels, thicker than normal blood, kidney disease, caffeine (and other stimulants)...
  + Prolonged high blood pressure can cause blood vessels to burst (if happens in brain, causes a stroke)
* Low blood pressure: - not enough blood can get to all areas of body, causing **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and/or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Measuring Blood Pressure:**

**Topic 1.2 Summary:**

The circulatory system’s basic components are the heart, the blood vessels, and the blood. In this section you learned that vessels in the circulatory system are defined by their size and the direction in which they carry blood, relative to the heart. The vessels are specialized for their specific functions. Capillaries are uniquely designed for the exchange of nutrients between the body’s cells and the circulatory system. Because matter exchanged between capillaries occurs by diffusion, every cell in the body must be close to a capillary.

The pumping of the heart’s ventricles exerts pressure on blood, and this pressure is then transferred to the artery walls. Blood pressure has two readings. The systolic reading is the artery pressure when the heart’s ventricles are contracting. The diastolic reading is residual artery pressure when the heart’s ventricles are relaxed. When listed separately, the units of millimeters of mercury are included with each of these pressure valves. When communicated together, the units are usually omitted and the pressures are communicated as systolic pressure over diastolic pressure.



Blood Pressure Cuff How To Use:

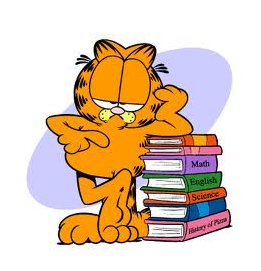
PolyFit.com



Blood Pressure – What can go wrong?

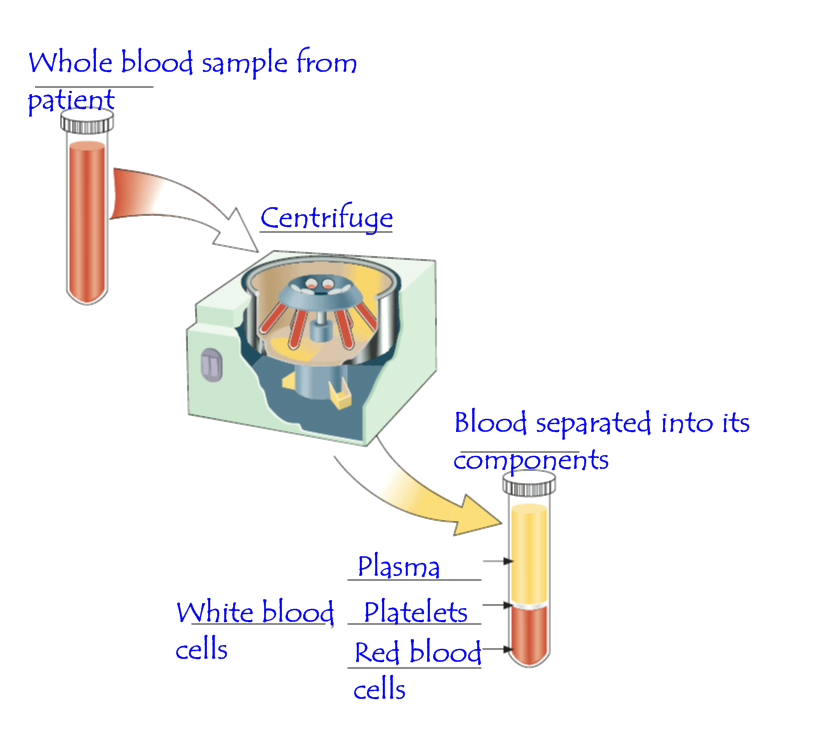
American Heart Association

|  |
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| **Practice Problems: Page 29, questions 20 and 21.**  **Extra Practice: Page 33, questions 1-6** |



**Topic 1.3 – Blood**

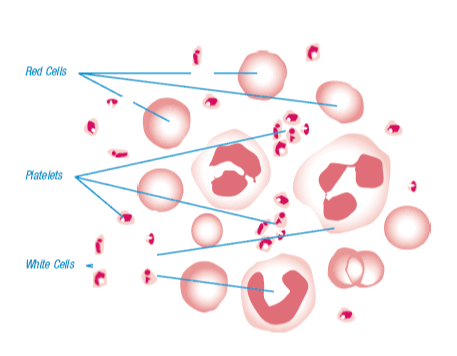
* Blood may look like a liquid with a uniform red color – IT IS NOT!!!!!!
* If you let a blood sample sit for a while or spin a blood sample in a machine called a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the blood separates into layers

**The parts of blood:**

1. **Plasma**

* the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** part of the blood
* about **\_\_\_\_\_\_\_\_**of blood volume
* it contains things like:
  + blood cells
  + carbon dioxide
  + urea
  + hormones
  + nutrients, vitamins and minerals
  + proteins

2. **Red Blood Cells** - erythrocytes

* about **\_\_\_\_\_\_\_\_\_\_** of the blood volume
* they live about **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* they are produced in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* they do not contain a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* they transport oxygen - they contain hemoglobin which carries oxygen. When hemoglobin is attached  to oxygen it is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* they have a biconcave shape - this make it easy for them to move through the blood vessels and it also gives them a lot of surface area to exchange gases

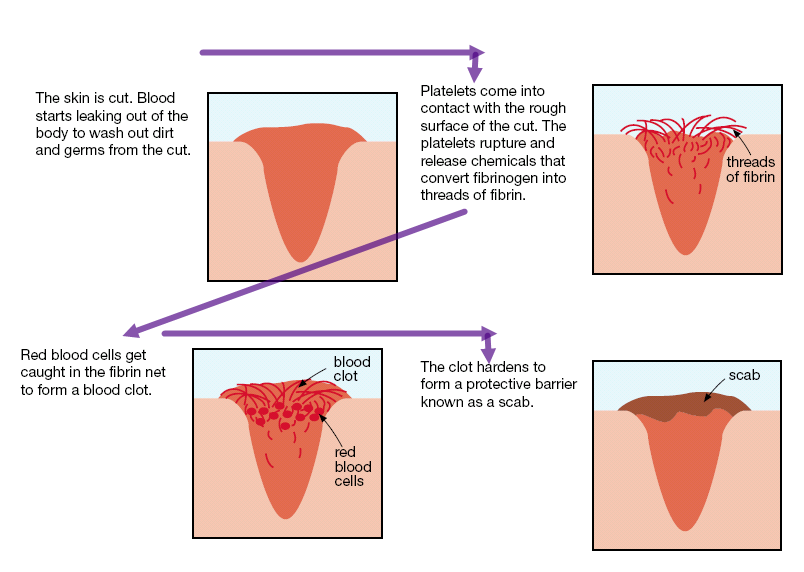
3. **White blood cells** - leukocytes

* less than **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of the blood volume
* live **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* produced in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* they have a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* too many of them may signal an infectio

4. **Platelets**

* When you get a cut, the bleeding usually stops after a short amount of time because proteins in your blood plug the damaged vessels.
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** – a protein present in blood that plugs damaged blood vessels.
* When a blood vessel is damaged, the fibrinogen creates a thread-like-protein called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**
  + The fibrin make a sort of web in your blood vessel that traps red blood cells
  + The fibrin creates a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (a jelly-like mass consisting mainly of red blood cells)

|  |
| --- |
| **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** a blood disorder involving the blood’s reduced ability to clot, which can lead to excessive bleeding |



**Topic 1.3 Summary:**

The typical human body contains about 5L of blood that transports materials around the body to help prevent disease. Blood is a mixture of living and non-living components: red blood cells, white blood cells, platelets, and plasma.

The disc-shaped red blood cells are full of a molecule called hemoglobin, which allows these blood cells to carry and transport oxygen to the body’s cells. While blood cells are designed to help protect the body from disease-causing organisms. Platelets are the blood parts that make blood self-sealing. When there is a cut, platelets form a clot to stop the loss of blood – people with hemophilia lack key factors in their blood that help form clots. Plasma is a yellowish liquid that the blood cells and platelets float in. Many substances are dissolved in plasma, including glucose, urea and hormones.

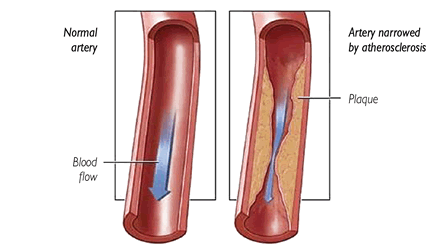
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| **Practice Problems: Page 41, #1-5** |

**Topic 1.4 – Cardiovascular Diseases and Disorders**

**What is cardiovascular Disease?**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is one of many disorders that affect the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and/or the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Heart disease, strokes and varicose veins

**Some terminology:**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: A waxy, fat-like substance present in the cell membrane of every body cell and in food from animal sources. Too much can be BAD!
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: a semi-hardened accumulation of substances originally suspended in a fluid.
  + As plaque accumulates, the artery starts to narrow
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** (LDL) a blood protein that carries cholesterol in the bloodstream from the liver to the rest of the body.
  + Too much LDL in the blood leads to deposits on the walls of arteries – THIS **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** (HDL) a blood protein that carries cholesterol in the bloodstream from the body cells to the liver
  + High levels of HDL in the blood means it is less likely that deposits will form on the walls of arteries – THIS IS **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |
| --- | --- | --- | --- |
| **Cardiovascular Disease** | **Description of disorder** | **Heart disease** | **Blood Vessel Disease** |
| **Atherosclerosis** | Hardening of arteries due to accumulation of fatty deposits |  | http://www.clker.com/cliparts/b/l/n/Q/E/5/check-mark-13x13-hi.png |
| **Coronary Heart Disease** | Restricted blood flow through coronary arteries resulting in chest pain and heart attack | http://www.clker.com/cliparts/b/l/n/Q/E/5/check-mark-13x13-hi.png |  |
| **Heart Attack** | Clot in a coronary artery cuts off blood supply to heart muscle and tissue dies | http://www.clker.com/cliparts/b/l/n/Q/E/5/check-mark-13x13-hi.png |  |
| **Stroke** | Sudden loss of brain function caused by an interruption in blood flow to the brain |  | http://www.clker.com/cliparts/b/l/n/Q/E/5/check-mark-13x13-hi.png |
| **Aneurysm** | Bulging or weakness in wall of artery or vein |  | http://www.clker.com/cliparts/b/l/n/Q/E/5/check-mark-13x13-hi.png |
| **Valvular heart disease** | Diseases of heart valves leading to narrowing, leaking, or improper closed in valves | http://www.clker.com/cliparts/b/l/n/Q/E/5/check-mark-13x13-hi.png |  |
| **Septal Heart Defects** | Opening within septum that allows blood to flow between left and right ventricles of heart | http://www.clker.com/cliparts/b/l/n/Q/E/5/check-mark-13x13-hi.png |  |

**\*\*\*\*NOTE:\*\*\*\*** The cramping pain a person feels caused by a narrowing of blood vessels that supply blood to the heart is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

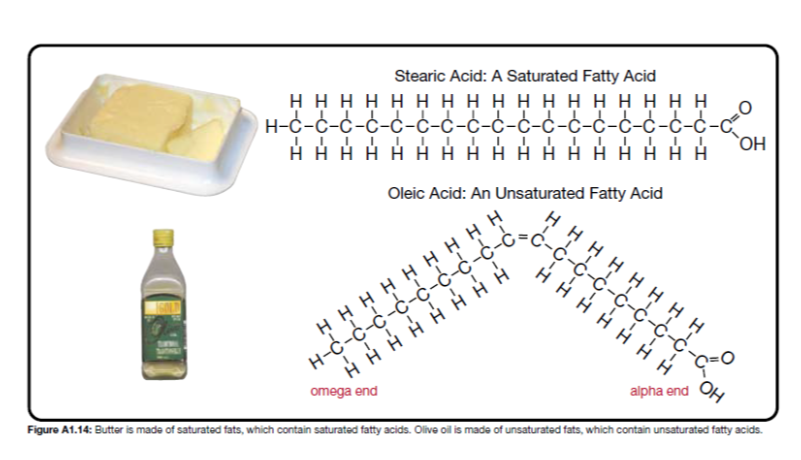
**How does a clot happen?**

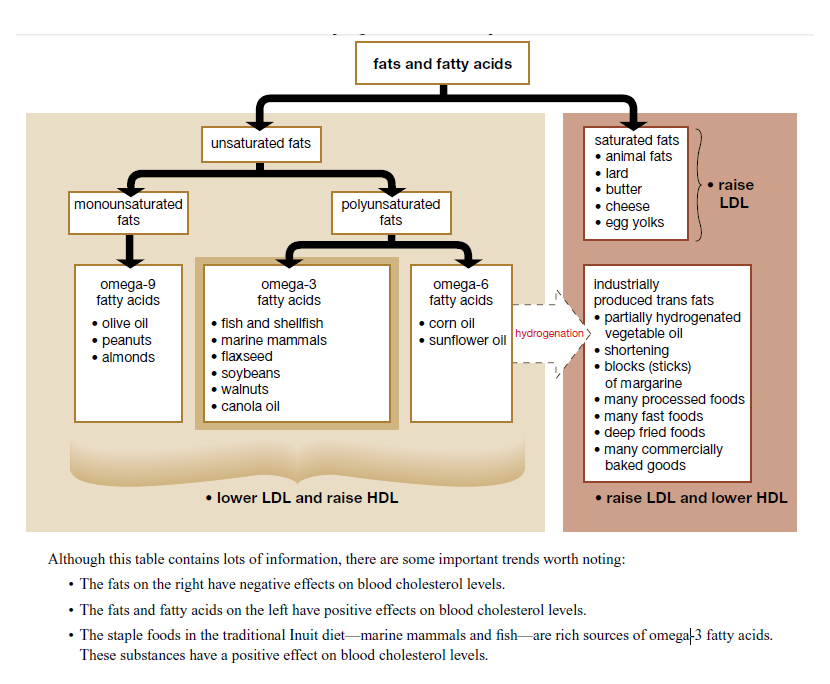
* When plague and build up in arteries becomes hard and jagged, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that are passing through can be ruptured which release the thread like **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** which starts the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Once the fibrin has formed its “web”, red blood cells can no longer get to where they need to go.
  + If the red blood cells are blocked from getting to the heart, the result is a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + If the red blood cells are blocked from getting to the brain, the result is a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

**Fats and Cholesterol in the Bloodstream:**

**INTERESTING NOTE:** Inuit people typically get 50% of their calories from fat...how is it possible that they have a very low occurrence of cardiovascular disease????

**Almost 75% of your cholesterol is actually manufactured in your liver....so its not so much about cutting out all cholesterol from your diet...its about the KIND of cholesterol you eat!**

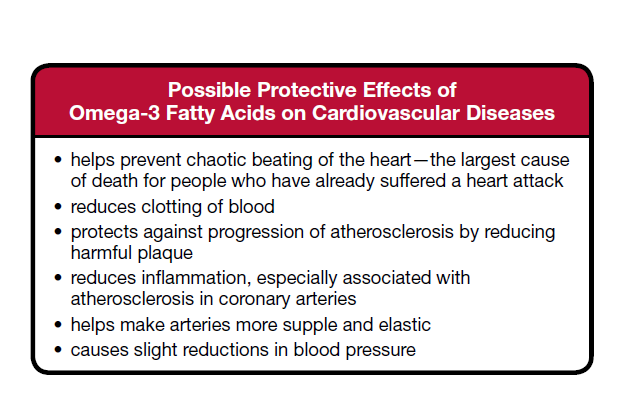
* The answer lies partly in the TYPE of fats that are eaten:
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** only single bonds between carbon atoms. Difficult to breakdown, lead to an increase in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:** contain one (or more) double or  triple bond between the carbon atoms. Easier to  break down, some may lead to an increase is **\_\_\_\_\_\_\_\_\_\_\_**.
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**: unsaturated fat goes through  hydrogenation (H atoms are added). Lead to an increase in **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.



**Essential Fatty Acids**

* Certain fats are essential for good health (they help form cell membranes, help with brain and nerve function and to help produce certain hormones).
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** are obtained only through the foods you eat - your body **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** manufacture them.

**Omega-3**

* certain types of omega-3 fatty acids come only  from **marine sources** (they actually help the fish and marine mammals survive in cold water)
* research indicates that these particular omega-3 fatty acids MAY provide the following protective effects to the cardiovascular system:

**Risk Factors of Heart Disease:**

* over 65 years old
* family history of cardiovascular disease
* diet high in cholesterol
* diet high in saturated fats
* overweight
* little physical activity
* high blood pressure
* smoker (or exposure to second hand smoke)
* stress
* excessive alcohol use

**Topic 1.4 Summary:**

Diseases or disorders of the heart and blood vessels that impair the functioning of the cardiovascular system are called cardiovascular diseases. Your risk for developing a cardiovascular disease may depend upon inherited genetic factors and lifestyle choices.

Atherosclerosis is a condition where a buildup of fatty substances, called plaque, coats the lining of arteries. This results in impaired circulation and heart pain (angina). Atherosclerosis can lead to the production of blood clots and even a vessel blockage. A blood clot in the coronary artery can cause a heart attack or, if it’s located in the arteries leading to the brain, can cause a stroke.

Cardiovascular Diseases: What can go wrong?

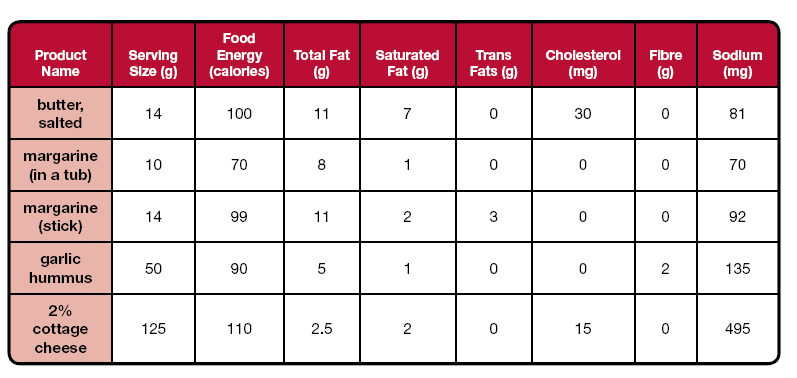
Science of Nutrition

|  |
| --- |
| **Practice Problems: Page 54, #1-6** |

**Try This Activity** - Analyzing Nutrition Fact Labels

p.50

Data Table



**Analysis**

**1.** Rank the products in amount of cholesterol per gram of product and amount of saturated fat per gram of product.

Identify which of the spreads would be best for someone trying to lower the blood cholesterol level.

**2.** A diet that includes lots of salty food causes sodium levels in the bloodstream to elevate. The body responds by adding more water to the bloodstream in an attempt to dilute the sodium concentration. Therefore, the volume of the blood increases.

**a.** Explain why a diet that contains many salty foods leads to higher blood pressure levels.

**b.** Identify which food items are best suited for someone diagnosed with high blood pressure.

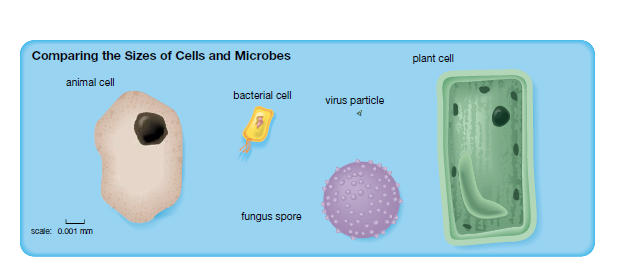
**3.** Bile, mostly made of cholesterol, is a substance that helps to digest fat. Soluble fibre is found in foods like apples, brown rice, and beans. When soluble fibre passes through the digestive tract, it can help trap bile in the intestine— this allows bile to be excreted along with other wastes.

**a.** Explain how soluble fibre helps to reduce blood cholesterol levels.

**b.** Identify what food items contain significant amounts of fibre.

**4.** Other than differences in dietary content, list some factors that may influence consumer choice in terms of buying one of these products.

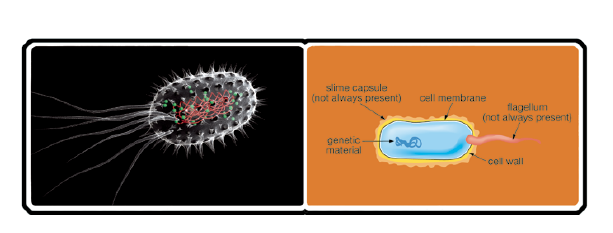
**Topic 1.5 – The Immune System**

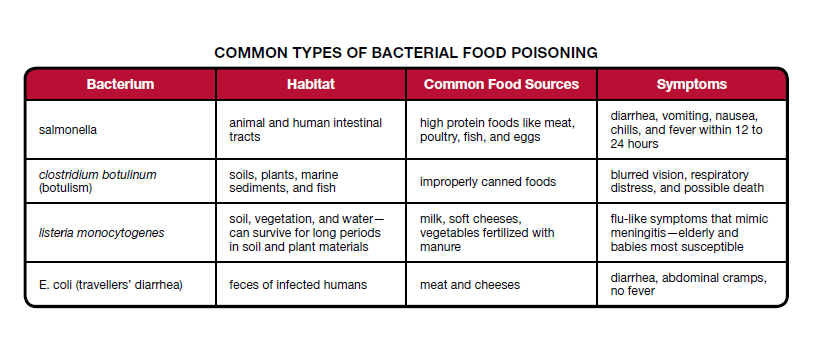


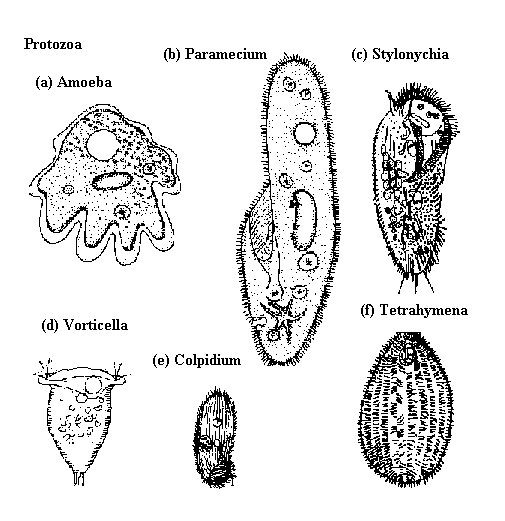
**Types of Pathogens**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - anything that causes disease
  + Examples: Viruses, protozoans, fungi, bacteria
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - organism that carries disease causing pathogens from one person to another

1. **Bacteria**

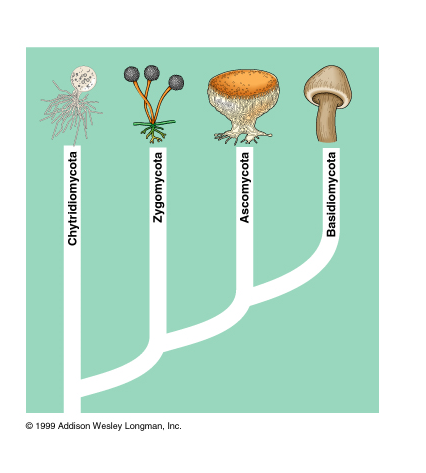
* Small, single celled organism with **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Genetic material is floating in cytoplasm (no nucleus)
* Reproduce rapidly by **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and can grow exponentially
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** can be used to kill bacteria



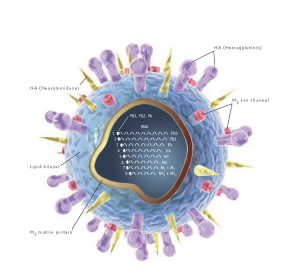
1. **Protozans**

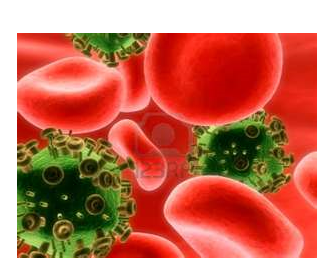
* Microscopic, single celled organisms that have a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Many can only divide (reproduce) when inside a **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (many live as parasites)
* Difficult to treat diseases without harming the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is caused by a protozoan

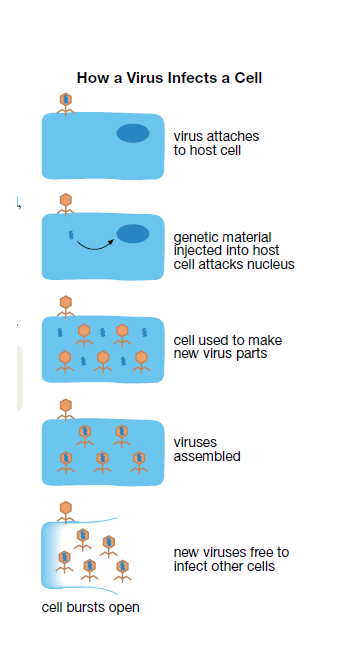
1. **Fungi**

* Organisms that absorb food in solution directly through their cell walls and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Typically live off remains of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** organisms, but some are parasitic
* Molds, mushrooms and yeast cells are examples of fungus
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is a fungal disease

1. **Viruses**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** consisting of a protein coat surrounding genetic material that divides (reproduces) only within the cells of a living organism.
* Extremely **\_\_\_\_\_\_\_\_** (1/100 the size of a bacteria)
* Antiviral drugs are used to try to stop the infection of cells by viruses (and to stop the development of new virus particles)
* Example - H1N1, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, HIV/AIDS





**The body’s first line of defense:**

* The Body’s First Line of Defense
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - Waterproof
    - acidic - sweat and oils
    - heals quickly - platelets
    - good bacteria
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - hairs and mucus
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - hairs and wax (modified sweat glands)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - tears (antiseptic)
* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - acids

**How do pathogens spread?**

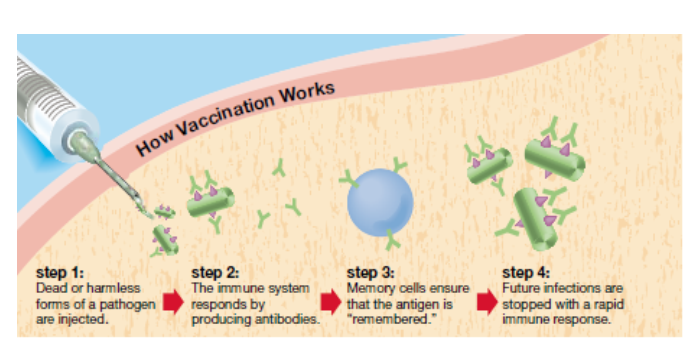
* Spreading Pathogens
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - sneezing/coughing sprays the particles  in the air
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - touching someone or something that has the pathogen in it
    - washing your hands is a great way to help prevent this type of transfer
  + bacteria in the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** we eat
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - viruses like HIV and hepatitis C can be spread through the blood stream
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - eg. malaria parasite - carried in mosquito saliva and transferred during a bite

**The Immune Response**

Use Page 64 and 65 to help you complete the chart below.

|  |  |  |
| --- | --- | --- |
| Sketch of Components | Name of Component(s) | Role(s) in the Immune System |
|  |  | Allow white blood cells to recognize foreign invaders |
|  | Macrophage |  |
|  |  | Identify antigens of foreign invaders and signal response of B-cells and killer T-cells |
|  | B-Cell |  |
|  |  | Attach to antigen of foreign material |
|  | Killer T-Cell |  |
|  | Memory B-Cell and Memory T-Cell |  |
|  |  | Signal for immune response to end |

**Vaccinations**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of an altered/weakened form of pathogen OR an inactivated toxin
* Antigens on surface of injected pathogen allows body to undergo immune response
* Some pathogens require **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** to ensure that memory cells stay present in blood stream.

**Inoculation**

* Similar to vaccination, but antigen is introduced into body through **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, while vaccinations are injected via needle under the skin

**Autoimmune Diseases:**

* Disorder in which the immune system produces antibodies **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + Examples:
    - **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (white blood cells attack bone  and cartilage cells)
    - **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (white blood cells attack parts of the nervous system)
    - **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (body manufactures antibodies directed against the pancreas)



Autoimmune Disease Info:

Healthline.com



Immune Response

Crashcourse.com

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| --- |
| **Chapter Review Questions: Page 71, #1-9** |