

Chapter 3 Circulation

Section 1 The Body's Transport System

The Cardiovascular System

Three Functions of the Cardiovascular System

Delivering Needed Materials

Oxygen, Sugar, Proteins, Fats, etc...

Removing Waste Products

Carbon dioxide

Fighting Disease

White blood cells

The Heart

Each time the heart beats, it pushes blood through the blood vessels of the cardiovascular system.

Made of Cardiac Muscle:

Smooth: Involuntary

Striated: Contract repeatedly

The Heart

Heart Structures

Atrium: Two upper chambers of the heart.
Receives blood.

Ventricle: Two lower chambers of the heart.
Pumps blood from the heart.

Valve: Flap of tissue that prevents blood
from flowing backwards.

The Heart

Heart Structures Continued...

Septum: Dividing wall in the heart that keeps oxygen poor and oxygen rich blood from mixing.

When heart relaxes chambers of fill with blood.

When heart contracts it squeezes blood out.

The Heart

Regulation of Heartbeat

Pacemaker:

Sends out signals that regulate the heart beat.

Located in right atrium of the heart.

Adjusts rate of heart according to body activities.

Two Loops

Three kinds of Blood Vessels

Arteries: Carry blood away from the heart.

Capillaries: where substances are exchanged between the blood and body cells.

Veins: Brings blood back to the heart, has valves.

Two Loops

Pattern of Blood Flow Loop One

Oxygen poor blood goes from the right ventricle to the lungs through arteries. The blood then picks up oxygen from the lungs and returns back to the left atrium of the heart through veins.

Two Loops

Pattern of Blood Flow Loop Two

Oxygen rich blood goes from the left ventricle to the body through arteries. The blood then gives up its oxygen in exchange for carbon dioxide from the body cells and returns back to the right atrium of the heart through veins.

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Section 2

A Closer Look at Blood Vessels

Arteries

Artery Structure

The walls of arteries are generally very thick, and consist of three layers.

Arteries

The Three Layers

Innermost layer

Epithelial Cells: smooth surface enables blood to flow freely.

The Middle Layer

Smooth Muscle Tissue: For strength and support.

The Outer Wall

Flexible Connective Tissue: Allows the artery to flex under great pressure.

Arteries

Pulse

Caused by alternating expansion and relaxation of the artery wall, a heart beat.

Arteries

Regulating Blood Flow

The smooth muscle in the artery allow it to expand and contract to allow different amounts of blood into an area of the body at a time. This allows the control of blood flow to different parts of the body and its organs.

Capillaries

In the capillaries, materials are exchanged between the blood and the body's cells. Capillary walls are only one cell thick.

Diffusion: moving molecules from high concentration to low concentration.

Most everything the body needs to survive get into cells this way.

Veins

After blood moves through capillaries, it enters larger blood vessels called veins, which carry blood back to the heart. The walls of veins, like those of arteries, have three layers, with muscle in the middle layer.

Veins

Three factors that help move blood through veins:

Skeletal muscle helps push blood along through a vein.

Larger veins have valves, that prevent blood from flowing backwards.

Breathing movements help squeeze blood back to the heart.

Blood Pressure

What causes blood pressure?

Blood pressure is caused by the force with which the ventricles contract.

As the blood moves away from the heart the force gets lower.

Blood Pressure

Measuring Blood Pressure

Sphygmomanometer (sfig moh muh NAHM uh tur)

Measured in Millimeters of mercury

First number measured when ventricles contract,
big number.

Second number measured when ventricles relax,
lower number.