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## CARDIOVASCULAR SYSTEM

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# Introduction

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This closed system of tubes carries blood around the body, supplying cells with oxygen and nutrients and removing wastes. The system's main components are the heart, arteries, capillaries, veins, and blood. The lymphatic system is a related system.

**Heart** This muscular pump lies in a sac (the pericardium) between the lungs. It has four chambers: an (upper) auricle or atrium and a (lower) ventricle on each side of the muscular septum that divides the heart lengthwise. Auricles (atria) receive blood from veins; ventricles pump blood into arteries. Valves control blood flow in and out of the heart.

**Arteries** These branching blood vessels take blood from heart to body tissues. The main artery is the aorta. Arterioles are tiny arteries regulating blood supply to capillaries.

**Veins** These are blood vessels transporting blood to the heart; valves permit only one-way flow. The largest veins are the vena cava inferior and superior. The smallest are venules taking blood from capillaries. In portal systems veins take blood between two capillary networks. Venous sinuses (channels) drain blood from the brain.

**Capillaries** These minute tubes link arterioles with venules. Capillaries exchange substances with nearby tissues via capillary cell walls.

**Blood** This is a complex fluid; its major components are plasma, erythrocytes (red cells), leukocytes (white cells), and platelets. Blood may contain two major agglutinins: A and B. The presence of one, both, or neither agglutinins determines an individual's blood group.

**Bone marrow** This is a tissue in bone, and produces erythrocytes and the leukocytes called granulocytes and monocytes.

**Spleen** A large organ below the diaphragm, this stores and releases erythrocytes, eliminates damaged erythrocytes, and produces lymphocytes.

**Lymphatic system** This system of blind-ended tubes contains lymph, a colorless fluid itself largely derived from blood. Some lymphatic vessels contain enlargements called lymph nodes, producing bactericidal lymphocytes.