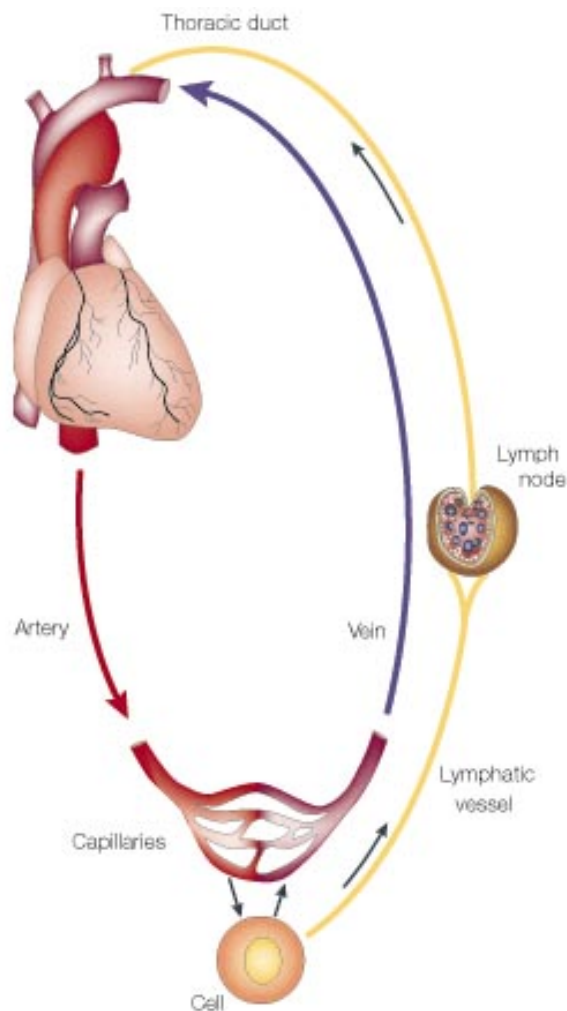




Blood and Lymph Diseases



The cardiovascular system consists of the heart as well as blood vessels (arteries, veins and capillaries) and lymphatic vessels. Arteries deliver oxygenated blood (red) to the capillaries where bidirectional exchange occurs between blood and tissues. Veins collect deoxygenated blood (blue) from the microvascular bed and carry it back to the heart. Lymphatic vessels (yellow) collect extravasated tissue fluid, filter it through lymph nodes and return it to the circulation through the thoracic and lymphaticovenous anastomoses (not shown). The lymphatic vascular system is not continuous like the blood vascular system. (Figure and legend reproduced from: Jones, N., et al. (2001) Tie receptors: new modulators of angiogenic and lymphangiogenic responses. *Nat. Rev. Mol. Cell Biol.* 2; 257-267, with permission.)

As most of the cells in the human body are not in direct contact with the external environment, the circulatory system acts as a transport system for these cells. Two distinct fluids move through the circulatory system: blood and lymph. Blood carries oxygen and nutrients to the body's cells, and carries waste materials away. Blood also carries hormones, which control body processes, and antibodies, to fight invading germs. The heart is the pump that keeps this transport system moving. Together, the blood, heart, and blood vessels form the circulatory system.

The lymphatic system (lymph, lymph nodes and lymph vessels) supports the circulatory system by draining excess fluids and proteins from tissues back into the bloodstream, thereby preventing tissue swelling. It also serves as a defense system for the body, filtering out organisms that cause disease, producing white blood cells, and generating antibodies.

The biochemical make up of lymph — the fluid found in the lymphatic vessels — varies with the site of origin. For example, lymph from bone marrow, spleen, and thymus have high concentrations of white blood cells for fighting infection, while lymph from intestines is high in fat that has been absorbed during digestion. Damage to the lymphatic and circulatory systems leaves the body more susceptible to sickness and infection, as well as to serious conditions such as cancer.

Diseases

Anemia, sickle cell

Burkitt lymphoma

Gaucher disease

Hemophilia A

Leukemia, chronic myeloid

Niemann-Pick disease

Paroxysmal nocturnal hemoglobinuria

Porphyria

Thalassemia