



Chapter 9-15: The Lymphatic System

The lymphatic system is a series of vessels, structures, and organs that collect proteins and fluid that is lost from the blood and return it to the main circulation. This system contains cells known as lymphocytes that function in the immune process. In this plate, we examine the structure of the lymphatic system. This plate serves as prelude to the following one, which discusses the immune system.

Looking over the plate, you will note that it displays the layout of the lymphatic system. We also illustrate the two body regions drained by the two major vessels of the lymphatic system. Spots of color should be used, since lymph nodes are pockets of tissue. Begin reading below, and as you encounter anatomical structures, locate them on the diagram.

The fluid drained by the lymphatic system is called lymph. It is a clear fluid that is similar to the plasma portion of blood but contains no large proteins. The lymphatic system returns lymph to the blood by means of two major vessels. The first is the left lymphatic duct, which is also known as the **thoracic duct (A)**. The left lymphatic duct begins as a dilation called the **cisterna chyli (A₁)** and throughout its course it receives blood from the left side of the head, the left portion of the neck and chest, the left upper limb, and the entire body below the level of the ribs. Color this portion in the small diagram.

The second major duct of the lymphatic system is the **right lymphatic duct (B)**. It can be seen on the visual left (anatomical right) of the plate, where it empties its contents into the **right subclavian vein (a₁)**. In the same way, the left lymphatic duct empties lymph into the **left subclavian vein (a₂)**. Color the drainage area in the small diagram for the right lymphatic duct using the color you used for the duct.

Having noted the main drainage areas for the two main lymphatic vessels, we now focus on the lymph nodes, which are pockets of lymphatic tissue. Note that these organs are found throughout the body. Continue your reading below, and use spots of color to denote the various lymph nodes.

The vessels of the lymphatic system pass through small lymphatic structures known as lymph nodes. These approximately oval organs contain cells of the immune system, including phagocytes, which engulf foreign organisms and debris found in the lymph. Some lymph nodes you might be familiar with are the tonsils, which are in the pharyngeal area. The **palatine tonsil (C)** is shown in the plate, and the other tonsils are the lingual tonsils.

Many lymph nodes can be found along lymphatic vessels; we will only mention a few. The **submandibular lymph nodes (D₁)** are located beneath the mandible, and the **cervical lymph nodes (D₂)** are found in the neck region—these nodes drain the head area. **Axillary lymph nodes (D₃)** are situated in the region of the armpits, and the **mammary lymph nodes (D₄)** are close to the mammary glands in females.

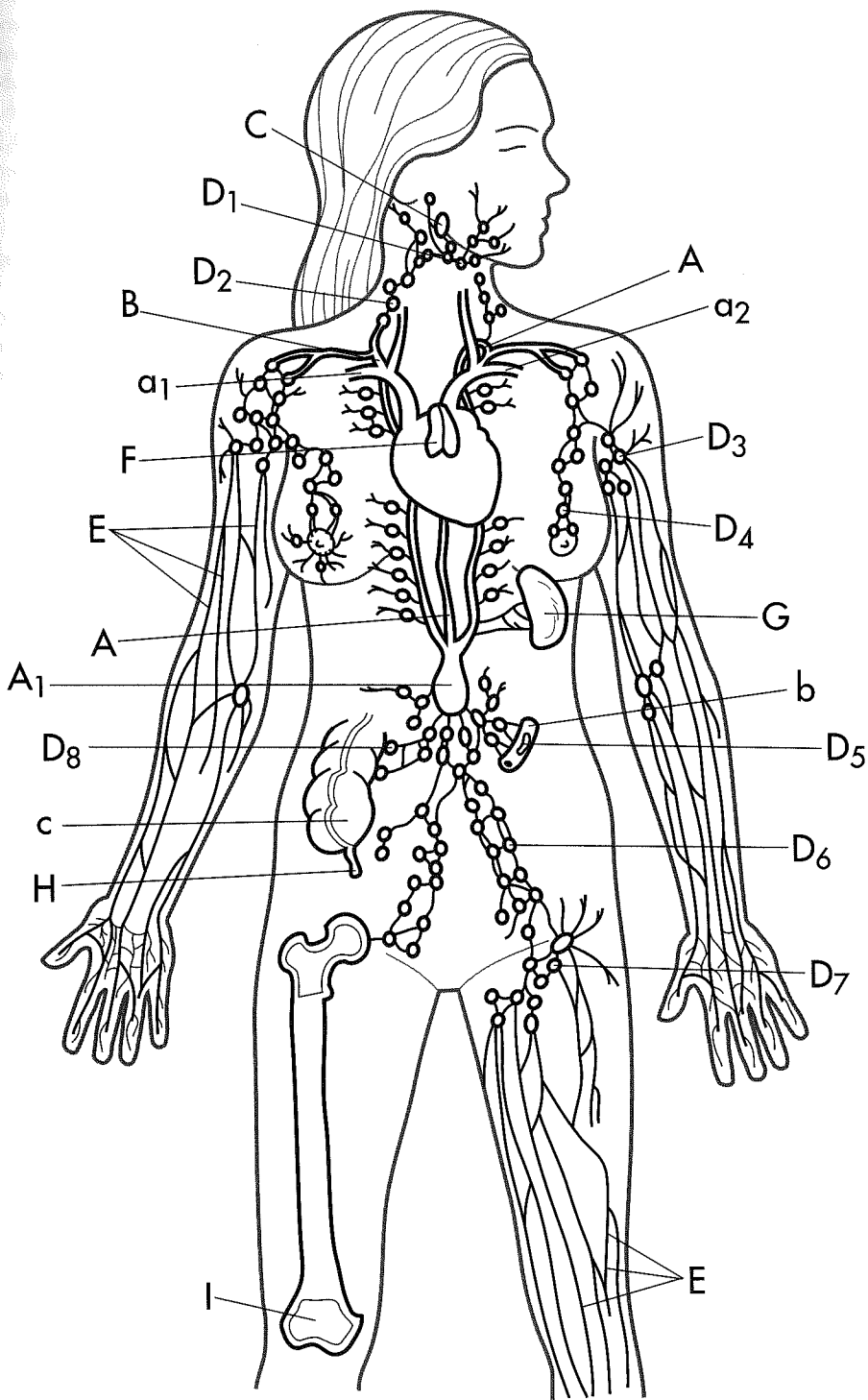
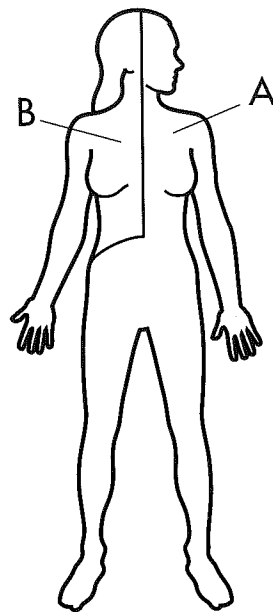
Many thoracic lymph nodes are found close to the thoracic duct, and a collection of lymph nodes called **Peyer's patch (D₅)** is located at the surface of the **small intestine (b)**. Also in the abdomen, near the major blood vessels, are the **iliac lymph nodes (D₆)**, which drain lymph that comes from the legs. The **inguinal lymph nodes (D₇)** are near the groin, and **intestinal lymph nodes (D₈)** are found near the **large intestine (c)**. These nodes receive lymph from the numerous **lymphatic vessels (E)** that are shown in the leg and arm.

There are many other organs that are associated with the lymphatic system, and as the organs are mentioned, color them.

The **thymus gland (F)** is prominent in young children, and it is within this organ that the T-lymphocytes of the immune system mature before they move to the lymph nodes. The thymus diminishes in size in the teenage years and is quite small in the adult.

Near the stomach and pancreas, on the left side of the body is the **spleen (G)**. Also a lymphatic organ, the spleen contains the B-lymphocytes and T-lymphocytes of the immune system, which we will discuss in the next plate. The **appendix (H)** is also associated with the lymphatic system because it contains many phagocytic white blood cells, which engulf debris in the digestive contents. Lastly, **bone marrow (I)** is associated with the lymphatic system because lymphocytes originate here.

The Lymphatic System



- The Lymphatic System
- Thoracic DuctA
 - Cisterna ChyliA₁
 - Right Lymphatic Duct ..B
 - Palatine TonsilC
 - Submandibular Lymph NodesD₁
 - Cervical Lymph Nodes ..D₂
 - Axillary Lymph Nodes ..D₃
 - Mammary Lymph Nodes ..D₄
 - Peyer's PatchD₅
 - Iliac Lymph NodesD₆
 - Inguinal Lymph Nodes ..D₇
 - Intestinal Lymph NodesD₈
 - Lymphatic VesselsE
 - Thymus GlandF
 - SpleenG
 - AppendixH
 - Bone MarrowI
 - Right Subclavian Veina₁
 - Left Subclavian Veina₂
 - Small Intestineb
 - Large Intestinec