



Anatomy of the Human Body - Book VIII The Lymphatic System

Henry Gray

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THE LYMPHATIC SYSTEM consists (1) of complex capillary networks which collect the lymph in the various organs and tissues; (2) of an elaborate system of collecting vessels which conduct the lymph from the capillaries to the large veins of the neck at the junction of the internal jugular and subclavian veins, where the lymph is poured into the blood stream; and (3) lymph glands or nodes which are interspaced in the pathways of the collecting vessels filtering the lymph as it passes through them and contributing lymphocytes to it. The lymphatic capillaries and collecting vessels are lined throughout by a continuous layer of endothelial cells, forming thus a closed system. The lymphatic vessels of the small intestine receive the special designation of lacteals or chyloferous vessels; they differ in no respect from the lymphatic vessels generally excepting that during the process of digestion they contain a milk-white fluid, the chyle.

The Development of the Lymphatic Vessels.—The lymphatic system begins as a series of sacs 108 at the points of junction of certain of the embryonic veins. These lymph-sacs are developed by the confluence of numerous venous capillaries, which at first lose their connections with the venous system, but subsequently, on the formation of the sacs, regain them. The lymphatic system is therefore developmentally an offshoot of the venous system, and the lining walls of its vessels are always endothelial.

In the human embryo the lymph sacs from which the lymphatic vessels are derived are six in number; two paired, the jugular and the posterior lymph-sacs; and two unpaired, the retroperitoneal and the cisterna chyli. In lower mammals an additional pair, subclavian, is present, but in the human embryo these are merely extensions of the jugular sacs.

The position of the sacs is as follows: (1) jugular sac, the first to appear, at the junction of the subclavian vein with the primitive jugular; (2) posterior sac, at the junction of the iliac vein with the cardinal; (3) retroperitoneal, in the root of the mesentery near the suprarenal glands; (4) cisterna chyli, opposite the third and fourth lumbar vertebræ (Fig. 592). From the lymph-sacs the lymphatic vessels bud out along fixed lines corresponding more or less closely to the course of the embryonic bloodvessels. Both in the body-wall and in the wall of the intestine, the deeper plexuses are the first to be developed; by continued growth of these the vessels in the superficial layers are gradually formed. The thoracic duct is probably formed from anastomosing outgrowths from the jugular sac and cisterna chyli. At its connection with the cisterna chyli it is at first double, but the two vessels soon join.

All the lymph-sacs except the cisterna chyli are, at a later stage, divided up by slender connective tissue bridges and transformed into groups of lymph glands. The lower portion of the cisterna chyli is similarly converted, but its upper portion remains as the adult cisterna.

Lymphatic Capillaries.—The complex capillary plexuses which consist of a single layer of thin flat endothelial cells lie in the connective-tissue spaces in the various regions of the body to which they are distributed and are bathed by the intercellular tissue fluids. Two views are at present held as to the mode in which the lymph is formed: one being by the physical processes of filtration, diffusion, and osmosis, and the other, that in addition to these physical processes the endothelial cells have an active secretory function. The colorless liquid lymph has about the same composition as the blood plasma. It contains many lymphocytes and frequently red blood corpuscles. Granules and bacteria are also taken up by the lymph from the

connective-tissue spaces, partly by the action of lymphocytes which pass into the lymph between the endothelial cells and partly by the direct passage of the granules through the endothelial cells.

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