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THE DEVELOPMENT OF THE POSTERIOR LYMPH HEARTS OF THE LOGGERHEAD TURTLE.

FRANK A. STROMSTEN.

Recently, in a paper read before the American Society of Zoologists, central section, the writer presented some observations which indicated that the lymphatic system of turtles has an origin more or less independent of the venous system. Since then later investigations on the Chelonian lymphatics confirm and strengthen this view. Even in the development of the posterior lymph hearts, which are generally conceded to be direct derivatives from early redundant embryonic veins, we find that the process is initiated, at least, by the dilation and confluence of mesenchymal spaces.

The posterior lymph hearts are a pair of elliptical or ovoid, pulsating organs found just below the carapace in the post-iliac regions of the turtle, one on each side of the body. They drain the lymph cavities and spaces of the posterior part of the body, and open into the tributaries of the posterior renal advehent veins.

The development of the posterior lymph hearts is initiated by the vacuolation of the subcutaneous mesenchymal tissue of the post-iliac region outside of the muscle plates. Toward the close of the second week of development the spongy tissue thus formed is invaded by capillaries from the first two caudal branches of the postcardinal veins. The confluence of the mesenchymal spaces with each other and with the invading capillaries forms a spongy network of minute channels which collects the lymph from the rapidly growing limbs and tail, and conveys it to the postcardinal veins. Near the middle of the third week, a longitudinal anastomosis of the segmental branches of the postcardinal veins takes place outside of the muscle plates. This forms a large vein on each side of the body which continues forward in the adult, to form the main branch of the posterior renal advehent vein, and backward into the tail as the lateral coccygeal vein. This pair of newly-formed veins now receives all of the lymph from the anlagen of the lymph hearts. The process of the dilation and confluence of the mesenchymal spaces with each other and with the capillaries continues with increasing rapidity throughout the latter part of the third week, forming a number of large

anastomosing spaces, the veno-lymphatic channels. These channels extend parallel with the veins and open into them at two or three points. At first the veno-lymphatic channels contain red blood cells and are indistinguishable from the veins as regards size and general appearance. Later, however, they acquire rather dense walls which contain striated muscle fibres. The cardiac muscle fibres of the lymph hearts are derived from the adjacent muscle plates. The partitions between adjacent veno-lymphatic channels begin to atrophy toward the beginning of the fourth week, so that by the end of the week we find a pair of large sacs with muscular walls, each with a single central cavity.

Thus we see that the posterior lymph hearts of the loggerhead turtle are developed from embryonal capillaries which have been captured and modified by the dilated mesenchymal spaces of the post-iliac regions of the body.