

**The Lymph Node in Experimental Xanthomatosis\***

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*Summary*

There is significant, progressive replacement of the lymphoid elements of the lymph node by foam cells in experimental xanthomatosis. These cells first form islands in the subcortical area. Subsequently they involve the medullary cords and finally, they replace the cortex.

The xanthomata are highly vascular, consisting of a dense capillary network of small and short capillaries. These newly visualized capillaries are fully integrated and incorporated in the normal blood supply of the lymph node. No significant distortion of the larger venules and arterioles were observed. It is noteworthy to observe the great capacity of the vascular supply of the lymph node in reacting to situations of significant enlargement and replacement of the lymphoid elements.

*Introduction*

We observed that rabbits on atherogenic diet develop significant enlargement of the lymph nodes which histologically show extensive xanthomatosis. Because of the extensive replacement of the lymphoid elements within the enlarged xanthomatic lymph node, we felt that it could serve as a model to study various replacement states of the node. In addition the microvascular morphology during xanthomatous replacement might help to clarify the functional behavior of the nodes, particularly concerning the immune responsiveness, (1), and the filtering function.

*Materials and Methods*

Twenty-five male New Zealand white rabbits weighing 6 to 8 pounds were studied. The experimental xanthomatosis was induced by placing the rabbits on an atherogenic diet of Purina rabbit chow containing 1% cholesterol and 2% corn oil in 1/4-inch pellets. The animals were on the atherogenic diet from 7 days to 160 days. The serum cholesterol was periodically determined.

At various time intervals the entire vascular system was opacified using the total body perfusion technique. After infusion of 100 ml of clinical dextran, 1000 ml of clinical dextran containing 7% Micropaque by weight was infused. The lymph nodes were removed and weighed.

The removed lymph nodes were serially sectioned: 250- $\mu$  thick for microradiography, and 6- $\mu$  for histologic analysis (2).

*Development of Xanthomatosis in the Lymph Node.* The earliest manifestations of xanthomatosis were observed after 14 days on the atherogenic diet. The foam cells appeared first in the subcortical portion of the lymph node and subsequently were extensively deposited within the enlarged medullary cords. In the most advanced cases the foam cells almost completely replaced all of the lymphoid elements, leaving only occasional islands of lymphocytes. The lymph nodes became significantly enlarged.

*Microangiographic Findings.* Figure 1 shows the microangiogram of a normal rabbit popliteal lymph node. Note the degree of vascularity in the medullary cords and in the subcapsular capillary arcade.

Corresponding to the involvement by xanthomatosis, we observed extensive hypervascularity,

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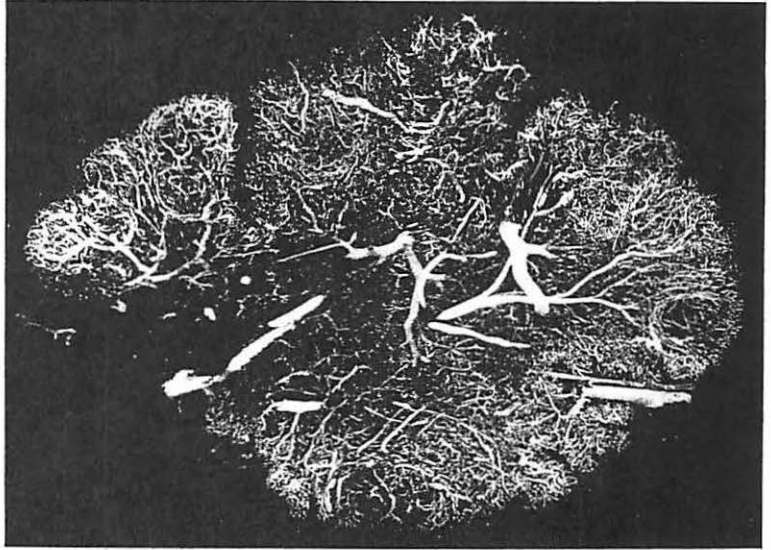


Fig. 1 Microangiogram of the normal rabbit popliteal lymph node (35x).

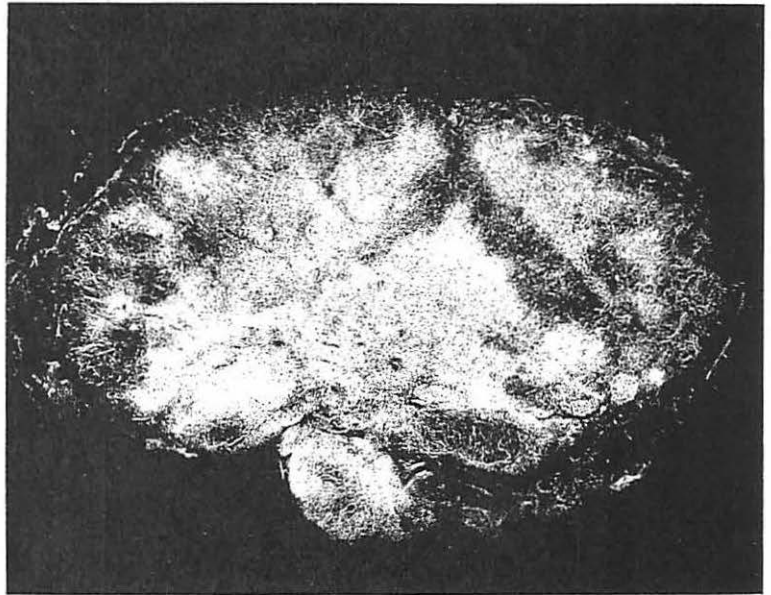


Fig. 2 Microangiogram of a rabbit lymph node with extensive xanthomatosis. Note the marked hypervascularity present in the medullary cords and part of the cortex (35x).

showing a very rich capillary supply mostly 5 to 7  $\mu$  in diameter. The extent of hypervascularity, and the very small size of these capillaries raised the possibility of angiogenesis.

In the very advanced states of xanthomatosis, when almost the entire lymph node is replaced, capillaries of small caliber are present throughout the foam cell mass. The normally present arterial and venous structures are somewhat stretched but are not significantly distorted (Figs. 2 and 3).

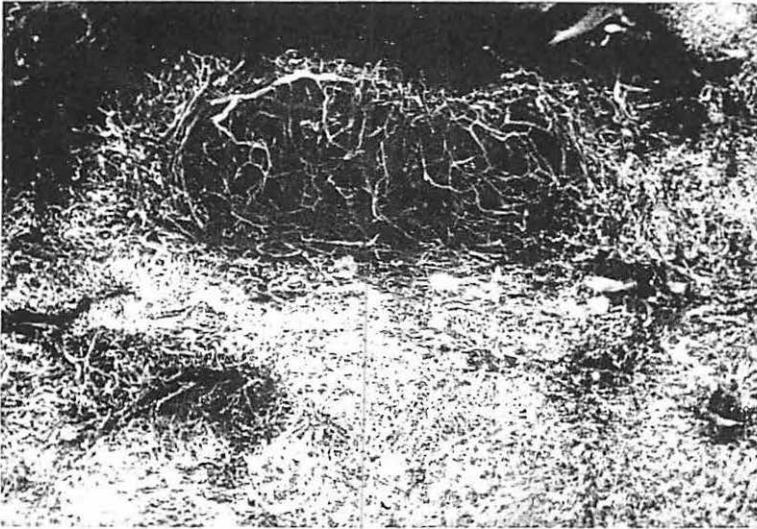


Fig. 3 Magnified view showing the xanthomatous medullary cords and the relatively normal vascular supply of the normal lymphoid tissues (80x).

### *Discussion*

Although involvement of the reticuloendothelial system in xanthomatosis is well known, the extensive involvement of lymph nodes was not fully appreciated. The marked hypervascularity of xanthomata observed on the microangiograms could not be anticipated from the review of the histologic sections.

The origin of the visualized small capillaries cannot be unequivocally determined. The morphologic appearance (size and shape) of these capillaries would favor the possibility of angiogenesis. An alternate possibility is recruitment of existing capillary structures which normally are not utilized.

The lack of distortion of the larger arteries and veins of the lymph node in a very extensive replacement state substantiates the hypothesis that the vascular structures serve as a basic morphologic framework.

### *References*

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- 2 Herman, P., S. Ohba, H.Z. Mellins: Blood microcirculation in the lymph node. *Radiology* 92 (1969) 1073

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