Venules in Lymphoid Tissue During an Immune Response

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(Received February 3, 1975)

Sordat *et al*[1] have recently demonstrated the presence of immunoglobulins in the walls of venules in human tonsils and suggested that it may relate to the recirculation of lymphocytes. Since lymphocyte traffic is augmented during an immune response[2),3)] we have studied the localization of antibody in relation to the venules in lymph nodes of mice immunized with horseradish peroxidase (HRP).

The antigen (0.125 mg HRP in Freund complete adjuvant, FCA) was injected into both hind footpads of C57BL and outbred mice. Uninjected animals, or animals injected only with FCA served as control. The popliteal lymph nodes were removed 1–3 weeks later. The tissues were fixed up to 2 hours in a glutaraldehyde/formaldehyde mixture (perfusion and immersion) and then sectioned (~40 μm) with a Sorvall TC-2 tissue sectioner or a cryostat. Sections were washed in buffer and were incubated in HRP and subsequently in diaminobenzidine and hydrogen peroxide[4)]. In controls, incubation in HRP or in the substrate were omitted.

Reaction product was present in antibody-forming cells one week after the injection, by three weeks it was also detected in the interstitial spaces of the cortex (Figs. 1, 2). Of particular interest was the presence of reaction product in the subendothelial space (Figs. 2, 3, 4) of some venules in the paracortical area. Occasionally, it had also penetrated into caveolae (Fig. 4) and between adjacent endothelial cells (Fig. 3). Reaction product was not seen in any of the controls.

The presence of antibody appeared to be related to the proximity of antibody-forming cells. No consistent association of reaction product and venules of the paracortical area has so far been noted.

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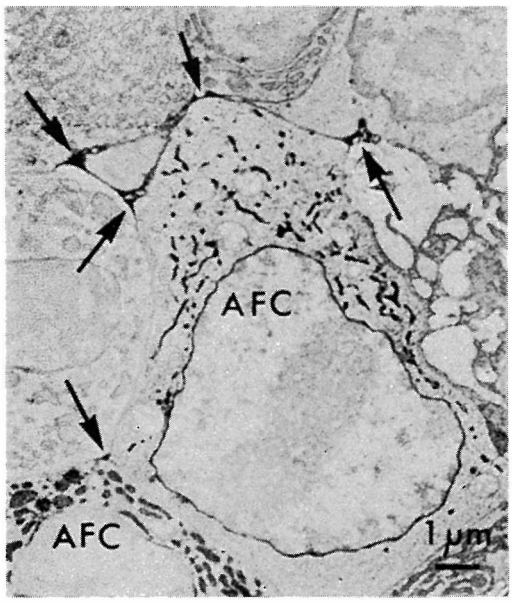

Fig. 1. Antibody-forming cells in deep cortex. Arrow indicates reaction product in the interstitial space.

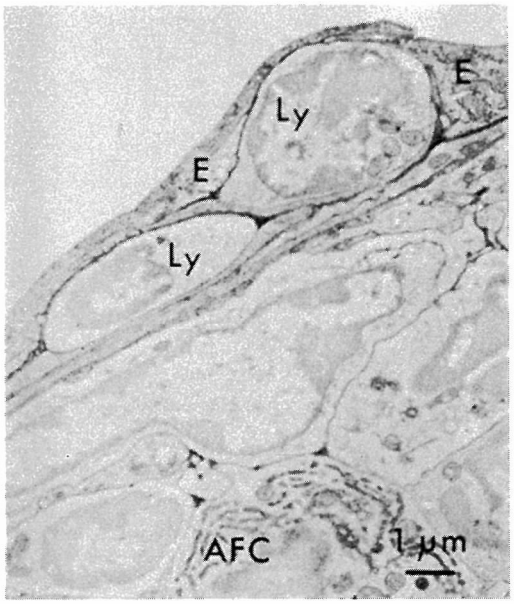

Fig. 2. Venule in the paracortical area. Note subendothelial localization of reaction product partially surrounding lymphocyte.

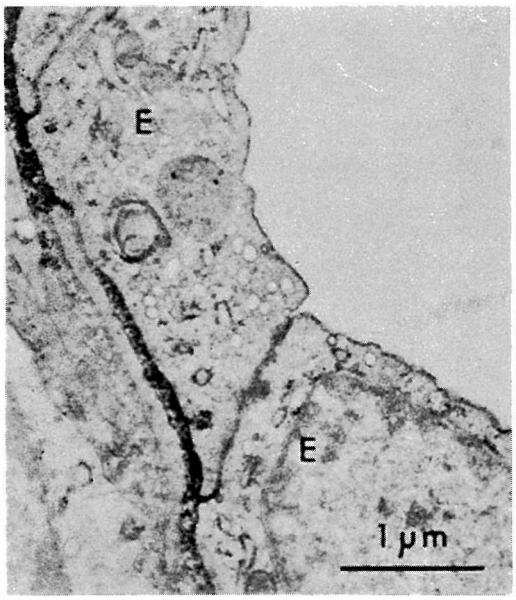

Fig. 3. Subendothelial area. Extension of reaction product into the space between adjacent cells.

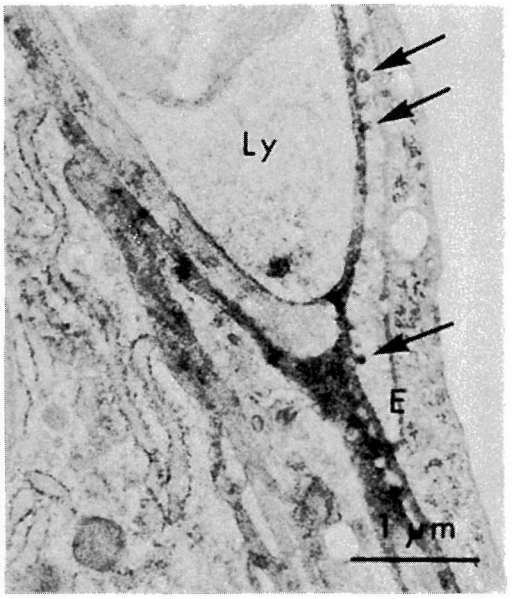

Fig. 4. Presence of reaction product in subendothelial space and in caveolae (arrow).

All electron micrographs are taken from lymph nodes of mice three weeks after the injection of HRP. Lead citrate stain.
Lymphocyte (Ly), endothelium (E), antibody-forming cell (AFC).