THE ROLE OF THE CAPILLARY PERITHELIUM IN THE FORMATION OF THE CUTANEOUS LEPROMA[1]

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Very different opinions have been advanced in the course of time regarding the origin of the cells found in the cutaneous leproma. For the school represented by Virchow, Baumgarten, Philipson, and Favre and Savy they were derived from the fixed cells of the connective tissue, although Neisser ascribed them to the lymphocytes. Touton, Gougerot, Jeanselme, and Marchoux have regarded them as monocytes from the blood. Herxheimer, Klingmüller, Stein, Timofejewsky and Cowdry have connected them with the histiocytes of the reticuloendothelial system, and Chuma and Gujo confirmed this view by means of vital staining. Herxheimer, and also Lefrou and Querangal des Essarts, have remarked on the perivascular predominance of these elements.

It is now generally recognized that the reactional cells found in the cutaneous leproma are histiocytes. We have tried to clarify the two following points: (1) Where do these histiocytes come from? (2) Are they the first cells to appear in the initial stage of the evolution of the lesion? With this end in view we have studied three successive biopsy specimens from the same macule in a case of early lepromatous leprosy.

1. *Specimen taken three days after the appearance of the macule.*—The papillary layer of the epidermis, though thin and irregular, is preserved. The dermis presents its normal fibrillary structure, made up of small bundles anastamosing in all directions. There is no diffuse inflammatory infiltration.

The capillaries are easily observed and appear, in the clear background of the reticular layer, as tracts which vary in thickness. With high magnification they are seen to be composed of endothelial cells, sometimes turgescent, surrounded by a more or less thick adventitia. The adventitia is composed of cells evidently of the histiocyte type.

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[1] For abstract of earlier studies by these authors, see THE JOURNAL **16** (1948) 506—EDITOR.

The protoplasmic bodies of these cells, mostly rounded in shape, are sometimes provided with more or less extensive prolongations which ramify into similar prolongations of the neighboring cells, a condition which produces a veritable mat of histiocytes. These cells, after injection of trypan blue, electively absorb the dye particles. They constitute the reticuloendothelial elements, known since the now distant time when Goldmann first brought them to notice. These elements multiply actively by indirect cellular divisions. Mitoses are in fact frequent, and one can see the ring of perithelial cells gradually growing larger, the vascular tract becoming proportionately conspicuous. (See Figs. 1 and 2.)

One or more Hansen bacilli may sometimes be seen, in either the endothelial or perithelial cells. At this stage the bacilli are few, and they are all intracellular.

At the start this perithelial reaction is the only perceptible one. It is only later, when the rings are more dense, that lymphocytes appear. In short, in this first stage the reaction is exclusively perivascular—it might even be called pericapillary —and consists solely of multiplication of the adventitial reticuloendothelial cells. The reticuloendothelial system reacts first and electively.

2. *Specimen from the same macule taken six months later.* —Clinically, the lesion is evidently in evolution. Histologically, the papillae have almost disappeared beneath the epidermis, which now appears to be covered with a thin desquamating layer. The dermis is now coarsely fibrous, made up of voluminous bundles interwoven in every direction.

The inflammatory infiltration still appears to be localized around the capillaries, but, starting from them, it may be seen to spread into some of the interstices between the fibrous bundles. We also find a mass of cells, including some histiocytes and some lymphocytes, scattered in the fibrillary matting of the subpapillary layer.

On the whole the perivascular arrangement is not so plain as in the earlier stage. Nevertheless, the pericapillary reactional rings have increased in thickness, and especially in density, the cells being more numerous and more closely packed. Besides the pericytic histiocytes, which have increased in number, there may be recognized some cells with the *"tache d'encre"* nucleus of the lymphocyte type. Rarely, a mast cell may also be seen. In a few cases some plasma cells occur with the other types. The inflammatory reaction appears particularly plain and dense around the sudoriferous and sebaceous glands.

Bacilli are more numerous than at first, occurring in bunches of several within the protoplasm of the histiocytes. It may be that some exist outside the cells, but that is exceptional.

3. *Specimen from the same macule taken seven months after the first one.*—The patient is in reaction and the clinical lesion is plainly worse. Histologically, the epidermis shows the same characteristics as before; the papillae, however, have disappeared over a large area. Throughout the whole of the specimen the inflammatory infiltration involves the entire dermis, though it is still cut off from the basal layer of the epidermis by a thin layer of uninvaded connective tissue, as is characteristic of lepromatous leprosy. The areas of inflammatory infiltration are evidently traversed by vessels whose presence indicates the pericytic organ of the cell masses, but because of their progressive density the course of these vessels is seen but indistinctly.

These areas are constituted above all by histiocytes, with numerous lymphocytes and a few plasma cells. They appear to be full of Hansen bacilli phagocytosed by the histiocytes. Some of these histiocytes show, besides the bacilli enclosed in their cytoplasm, a vacuole which is the first stage in the massive vacuolisation characteristic of the Virchow cell, the specific one of leprosy. At this stage there may be seen, besides the phagocytosed bacilli, smaller numbers of extracellular bacilli.

In conclusion, it seems that we can affirm that, in the course of the first stages of its evolution, the lepromatous lesion is essentially characterized by the elective hyperplasia of cells of the reticuloendothelium system which surround the capillaries. The lymphocytic reaction comes later and, in any case, is always secondary.

DESCRIPTION OF PLATES

PLATE 6.

FIGS. 1 AND 2. First stages of the perithelial reaction in the cutaneous lesion of an early lepromatous case.

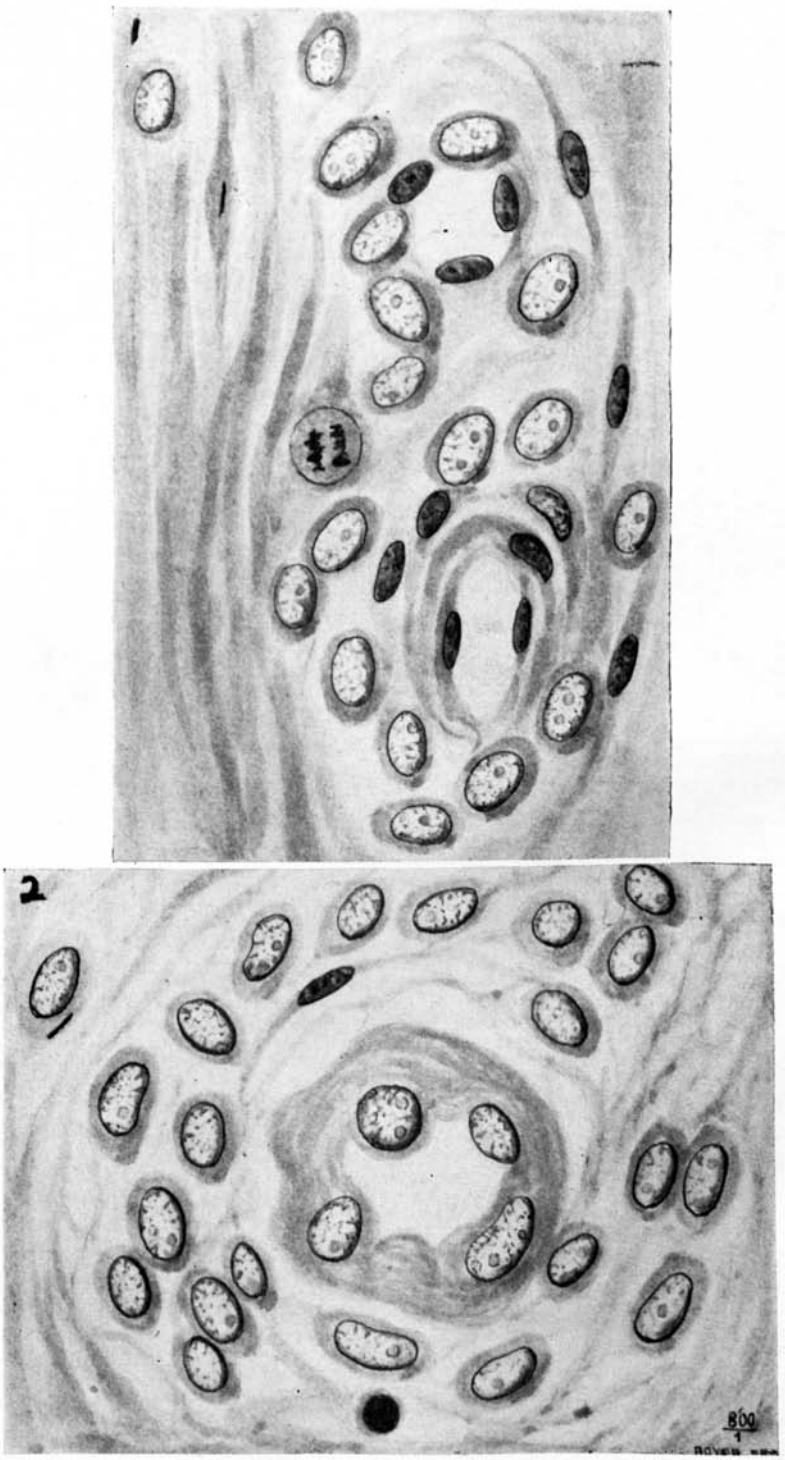

PLATE 6.