

ON THE LANGHANS GIANT CELL IN LEPROSY AND THE STELLATE BODY IN NODULAR LEPROSY

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There are in leprosy at least three situations in which the Langhans giant cell is observed. These are: (1) tuberculous complications in the skin, lymph node and elsewhere in nodular leprosy, (2) the skin and nerves in macular leprosy, and (3) the skin and epididymis in nodular leprosy. In the latter case they may contain an interesting star-shaped inclusion.

1. *Tuberculous complications in nodular leprosy.*—It is a well-established fact that leprosy patients are extremely susceptible to tuberculosis. In autopsies especially we very frequently see two kinds of tissue reaction, leprosy and tuberculous, in the lymph node, liver, spleen, lungs and bones. If it is asked why these two diseases occur together, our explanation is that the organs are first weakened by the leprosy bacilli and then are attacked by those of tuberculosis. The latter stimulate the tissue and produce inflammation, the exudation of leukocytes, and finally caseation. In these cases, where we find both leprosy and tuberculosis bacilli in the tissue, both are found in the Langhans cells, which occur either in the caseous foci or in the surrounding tissues. This fact shows the intimate relation between these two forms of acid-fast bacilli.

2. *Giant cells in macular leprosy.*—In the initial stage of leprosy Langhans giant cells appear, together with epithelioid cells and sometimes caseation—exactly as in tuberculosis—in the border of the macules, in tuberculoid macules, and in the nerves of such cases. Similar changes are also seen in the so-called reaction (*acuter Schub*) of the macular or neural types. These pathological changes have been studied by investigators like Dohi, Shioda, Klingmüller, Hodalla and others, some of whom have said that, clinically, they belong to one special type of macule, while others hold that they are only the usual changes that occur in macules. But no one has yet explained the significance of these changes.

When we study their histopathology their explanation becomes quite simple. It is then seen that when the leprosy bacilli enter the skin or nerves they stimulate the tissues strongly, counteract acute or sub-acute inflammation, and cause infiltration of epithelioid cells, giant cells, lymphocytes, plasma cells and leukocytes. In such cases the number of bacilli is so small that some authors have believed the condition due to an invisible leprosy virus instead of Hansen's bacillus. However, a few bacilli can always be found in these tuberculoid changes. We explain this phenomenon as a manifestation of the resistance of the body to the invasion of the bacilli.

When boiled leprosy bacilli are injected intradermally (Mitsuda's leprolin test) in cases of macular or neural leprosy, which show strong resistance to the bacilli, there occurs a strong reaction *in loco*, with the same pathological changes as in tuberculoid cases— infiltration of epithelioid cells, giant cells, etc. Clinically, this leprolin test is an indispensable method of determining whether the patient belongs to the nodular or to the maculo-neural type, and for determining whether the patient possesses resistance to leprosy bacilli.

3. *Giant cells in the skin and epididymis in nodular leprosy.*— For a long time we doubted whether Langhans giant cells were to be found at all in nodular leprosy patients. For several decades leprologists have been seeing these cells in tuberculous foci together with leprotic changes, and have reported them as leprotic Langhans giant cells, but as was said in the first section such giant cells do not come from leprosy but from tuberculosis when the latter is present, which is indicated when we see at the same time swelling and tuberculous changes in the regional lymph nodes of the mediastinum, the intestine, the peritoneum and the lung. However, it is a fact that we often find Langhans giant cells in nodular leprosy, even without complicating tuberculosis.

These giant cells are similar to those found in macular tissue as described in the second preceding section, and are similarly located in the superficial capillary network of the corium, but in this case they are mingled with foamy cells and foamy giant cells. Sometimes we find them in the deeper capillary network and near sweat glands, but for the most part they are in the superficial capillary layer.

The axis of these cells lies parallel to the surface, but they are sometimes rectangular. In diameter they measure from about 0.04 by 0.01 mm. to 0.1 by 0.06 mm. They sometimes contain globi;

in some cases they are filled with them, with a crescent-shaped nucleus remaining in one corner. The chromatin of the nucleus is scanty, though the nuclear membrane is clear; in shape it is round or oval. Depending upon its size, the cell contains from five to ten nuclei, which often lie in a row on one side, though in some cases they are grouped in the center. Here and there are seen leprosy bacilli, and of course in the globi we find masses of them. The giant cell becomes less foamy than other lepra cells, and the leptotic lipid occurs as fine, dust-like granules. Usually the protoplasm around the nucleus remains almost intact.

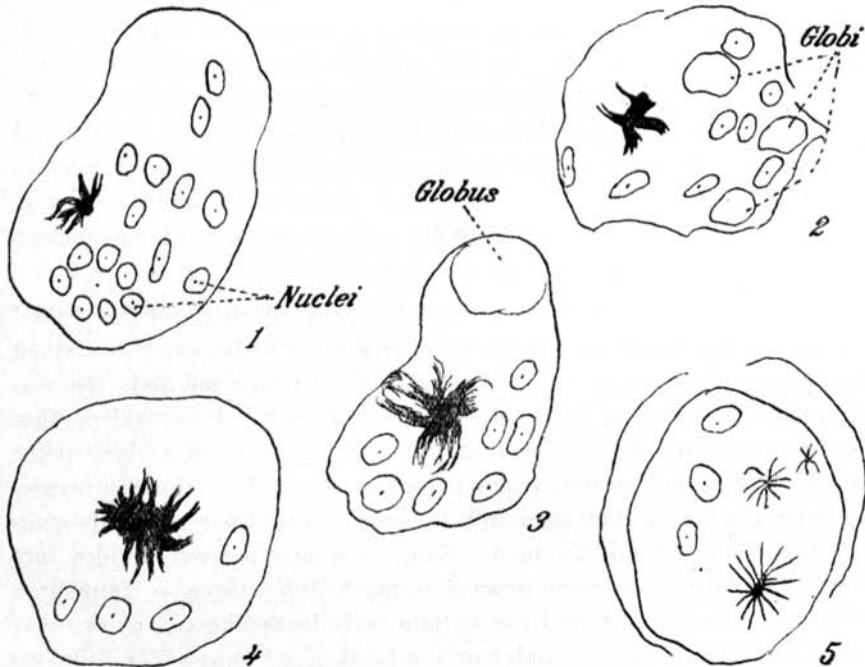
In addition to the nucleus, globi, leprosy bacilli and fine lipid granules, the giant cell contains a star-shaped body which is stained by elastic-tissue stains or by Bielschowsky's silver method. In size it varies from that of the nucleus to that of the whole central portion of the cell protoplasm. At first this body appears as a black point from which four or five sharp processes protrude. These processes become thicker as they approach the center, and their two ends stain darker than the middle part. Sometimes one process divides into two. A fully developed process is marked by three or four lines like a bundle of hair, and the stellate body looks like an ant or other insect, sometimes like a spider or the head of a "kappa" (a fabulous Japanese amphibian), with the ends of the processes curved.

Usually there is only one of these stellate bodies in a giant cell, but I have found such cells in the epididymis which contained two to four star-bodies in various stages of development. Since these bodies are not infrequently seen in the skin, mucous membrane and the testicle of nodular lepers, other authors must have reported them already. According to Klingmüller (in his book "Lepra") Lombardo reported them in 1913-1914. Klingmüller writes:

Von Lombardo sind Einschlüsse in form von sternförmigen Körpern, die aber nicht als Fremdkörper auf phagocytärem Wege in die Zelle gelangen, sondern ein besonderes Product der Riesenzell darstellen, die aus einer fixen, elastische Fasern bildenden Bindegewebszelle hervorgegangen ist.

As said before, these giant cells appear near the blood-vessel network of the skin or in the testicles or epididymis, which suggests that there is some relation between them and the elastica-producing cells of the blood vessels. Since this stellate body is composed of elastica, as reported by Lombardo, the fact that it begins as a black

point is suggestive with respect to its process of development.



TEXT-FIG. 1.—Outline sketches of giant cells with stellate bodies, as shown by elastica staining. Nos. 1 to 4 are from the papillary layer of the corium, No. 5 from the epididymis. 1. At the left, one star-shaped body with five needle-like processes; at the right a black point, the earliest stage of a stellate body. 2. An insect-like stellate body. 3. A star-body which almost fills the central portion of the giant cell. 4. A massive one with straight pointed processes. 5. Three stellate bodies in one giant cell, in the epididymis.

SUMMARY

1. When leprosy and tuberculosis attack the same organ we often find Langhans giant cells which contain bacilli of both kinds.

2. Tuberculosis-like changes in leprous macules, tuberculoid macules and neural changes indicate the resistance of the body to the bacilli. The same histopathological changes can be seen in Mitsuda's skin reaction.

3. Langhans giant cells may also be seen in the skin, testicle and epididymis in nodular cases. These differ from giant cells of the other type (a) in having a lower degree of foamy reaction, and (b) in the presence of one or more stellate bodies which can be stained with elastic-tissue or Bielschowsky's stain.