SOME OBSERVATIONS ON *MYCOBACTERIUM LEPRAE*

Is the degree of granularity of *Mycobacterium leprœ* constant in the various nodules? Does it rise and wane? Does it attain a peak in the oldest nodules? These are questions for which we have as yet no definite answer. In the light of Hoffmann[1] and Manalang's[2] suggestion that under treatment the rod-like bacilli become granular the above questions assume an added significance. Hansen's[3] original description itself contains records of rods and granules and many who claim to have cultured these bacilli (Lowenstein,[4] Salle,[5] Ota and Sato[6]) describe rods, "seed rows" or "string of pearls" and granules. Hoffmann considers that Hansen's bacillus produces "in its evolutionary cycle great numbers of granular forms which are found both within the bacilli and as free lying bodies". In the case of the tubercle bacillus Kahn and Nonidez[7] conclude that granule formation "is a type of segmentation rather than direct fission in which the rate of segmentation surpasses the ability of the elements to elongate". Marchoux[8] states that like Hansen's bacillus "the Stefansky bacillus may break up into granules". If the suggestion that the formation of granules is an essential phase in the life-cycle is accepted, then, how are we to distinguish these from

those formed by degeneration or disintegration as a result of treatment? It will be seen, therefore, how necessary it is to have an idea of the picture presented by young and old nodules in one and the same patient.

Very recently through the kindness of Dr. A. Shama Rao, Leprosy Officer to the Government of Hyderabad, I obtained smears and biopsy specimens from a lepromatous case which presented some peculiar features which are recorded below. Dr. Shama Rao's diagnosis is as follows:—"A. K., aged 30. Lepromatous case under treatment for the last ten years. He was an L_1 case but has now become L_3. He has nodules on the ears some of which are small and others big. A few are scattered on the body also. The face is infiltrated. There is no deformity of hands and feet and neural and acroteric symptoms are absent." On Sunday, 18-6-1944, a large nodule from the lobe of the right ear was removed and after making a few smears was fixed in Regaud's fluid. Again on Wednesday, 21-6-1944, a small nodule from the left ear was clipped and a few smears made. All the smears were stained in Ziehl-Neelsen and counterstained with Loffler's alkaline methylene blue.

In the smears made on Sunday from the large nodule, the following picture was observed. The bacilli in the globi are irregularly scattered, and those at the periphery have often a concentric arrangement. Though in most of the globi no stainable content other than the bacilli occur, yet in a few large ones where the clumped masses of bacilli occupy half or three-fourths the area of the globi only, the bacteria-free portion is stained by methylene blue and present a granular appearance. The walls of the globi are well defined and nuclei may be seen sticking to the walls. But whether these nuclei belong to the globi could not be made out from the smears. The smallest globi are less than 7 μ in size and are generally spherical. In the smear many empty spaces comparable to globi but devoid of bacilli could be seen. Since the outer limiting membrane of these clear spaces appears to be incomplete it seems as if these are globi which have got ruptured during the smearing process.

The bacilli in these globi are short rods, the longest of which is 5 μ long. But these long ones are rare as also granular forms. Very few—one in each field—of the long rods showed any beaded appearance. In one or two in each field there was just the suggestion of development of a bead at one end. In some regions the alignment of the short rods suggest as if they have separated from a beaded chain.

Typical "cigar packs" without any limiting membrane could be observed in various regions of the smear. These are always composed of long bacilli. From comparison with larger bundles all these long packs of bacilli could be arranged in a linear series. Single long bacilli lying free have lightly stained halos which do not completely envelope them. When two long rod-like bacilli lie side by side, they appear enclosed by the halo. In sc globi which present the typical 'cigar pa arrangement, one can see gradations fr long rods 7-8 μ long with a very faint s gestion of beading, to the smallest granu Rarely single rods taper to the ends, sometimes a beaded rod alone may be seen a clear vacuole.

In the smallest globi measuring 5-6 μ short rods have a peculiar arrangement. T form a regular row at the periphery, with one or two lying in the middle. Denney[1] scribes longitudinal splitting and branch but no such forms were found in the smea

Except in the larger globi, where the line of the globus stains deeper with met lene blue suggesting a definite membrane, the smaller forms there is no such unif differential staining. Often bacilli obser projecting into the blue stained cytoplas area suggest that the membrane is a l formation. Only careful study of serial tions would clarify this question. Irrespec of the size of the globi, the bacilli seen them differ in shape. Some are packed small rods and others with longer ones. majority of course belong to the former c gory and only one in fifty to the latter. in every hundred of these globi show arrar ment of short rods suggestive of the fact they may have belonged to chains. In others, the arrangement is very irregular.

In the smaller nodule from which the sm was made on Wednesday the appearance of bacilli is entirely different. About 90 cent. in any field are long beaded ones the other 10 per cent. being composed of rods without beads, short rods and granu Bacilli possessing from 2 to 8 beads could observed in any field and even the alignm of the short rods and granules suggest a they have just separated from chains. impression is accentuated by the fact that with variable number of beads and free nules or small rods aligned in the same lo tudinal plane could be seen in any field. of the globi are packed with these "seed rc which if carelessly stained give the impres of a clump of grains.

It would be seen from the above descrip that though the degree of granularity may said to be constant for a single nodule it is constant for all nodules in the same pat and neither does it reach a peak in the ol nodule. One is led to agree with Cowd that "though a single biopsy specimen exhibit marked granularity, this may or not be a favourable sign". When we cons that the patient has been under treatment ten years and when different nodules different pictures, the suggestion that u treatment the rod-like bacilli become segme and granular and that such an appear indicates a favourable prognosis appears t of questionable validity.

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