

Does a Species of *Leishmania* occur in the Goat?

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WHILE examining a blood-smear (No. 955 stained by Giemsa) from an apparently healthy Zulu goat at the Nagana Research Laboratory, Zululand, on 13th April, 1922, the writer encountered the parasites shown in Plate. The goat was being used by the Entomologist in Charge, Tsetse Fly Investigations, for the artificial feeding of flies, and since the animal had been bitten hundreds of times both experimentally and under natural conditions, it was desired to ascertain, as a matter of interest, whether or not trypanosomes were present in the blood. A smear, obtained 11th April, 1922, from an incision of the ear, was accordingly stained and examined microscopically, with the result that no trypanosomes were seen; but instead, the collection of parasites referred to above, along with other similar rare organisms, was observed. Their morphology at once suggested *Leishmania*.

Now, the Leishmaniasis (the group of diseases due to parasites belonging to the genus *Leishmania*) have been described* as follows:—

- (1) Visceral Leishmaniasis (Kala Azar), affecting primarily the spleen and liver, occurs in Asia, in those countries bordering the Mediterranean, and in the Sudan. The causal parasite is *Leishmania donovani*, Ross, 1903.
- (2) Cutaneous Leishmaniasis, due to *Leishmania tropica*, Wright, 1903, occurs in the Middle East, along the shores of the Mediterranean, and in the Sudan.
- (3) American Leishmaniasis appears to be limited to Central and South America. The identity of the causal organism has not yet been settled, but it is likely to be *Leishmania tropica*. A characteristic of the malady is that "there is no enlargement of the spleen or liver."

The above diseases occur naturally in man.

- (4) Canine Leishmaniasis, caused by parasites morphologically resembling *Leishmania donovani*, affects dogs in those countries bordering on the Mediterranean, in Senegal, and in the Middle East.

Actually the exact position with regard to the known species of *Leishmania* is not quite clear, for while they differ in their biological characteristics, morphologically they are very much alike. Evidence is forthcoming that the goat is refractory to *Leishmania donovani* and

* By Byam and Archibald, in "The Practice of Medicine in the Tropics," vol. II, 1922

Leishmania tropica, but, as in trypanosomiasis, animal experimentation is not entirely satisfactory for purposes of differentiation. It is clear from what has been said that Leishmaniasis has not yet been described in Africa south of the Equator.*

As will be seen in the illustration, what appears to have been a cell, containing approximately two dozen parasites, has ruptured, liberating the parasites in the blood-stream. The individual organisms are rounded or ovoid, measuring from 2μ to 5μ in length, and from 1μ to 3μ in breadth. A relative idea of their size may be gained by comparing them with the erythrocytes of the goat, also shown in the plate. The cytoplasm is bounded by a fine membrane, and contained within is a macronucleus and a micronucleus, both of which vary in size and position. The cytoplasm stains a pale blue, but at the margin the tint is deeper. The nuclei stain dark red, and the micronucleus was not observed to stain more deeply than the macronucleus. Further, the micronucleus is not rod-shaped, as is often the case in the Leishmaniasis described above.

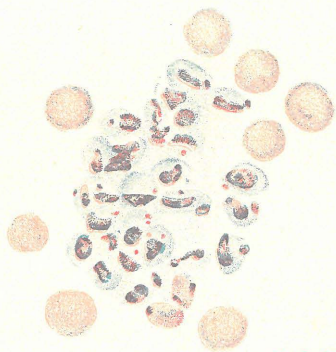
Unfortunately, circumstances were such that further investigations into this interesting subject could not be pursued, but it is certain that no explanation is forthcoming from the stain or water † employed, as both were thoroughly examined for contaminating organisms. Further, adventitious infection such as fly faeces may be ruled out, as the smear was under the personal care of the writer. With regard to the possibility that the parasites represent a method of trypanosome multiplication—for example, as seen in *Schizotrypanum cruzi* of South America—it may be stated that no such phenomenon has been observed in the trypanosomes ‡ of nagana in Zululand.

Under the circumstances, it is felt that, provisionally at any rate the parasite may be considered as a species of *Leishmania*, and it is proposed that it be named *Leishmania caprae*, n.s. The smear is now in the possession of Dr. P. J. du Toit, Deputy-Director of Veterinary Education and Research, Pretoria.

* Since writing the above, Dr. P. J. du Toit has drawn my attention to an article by Shortt and Swaminath, describing the transmission of Kala Azar to a mouse.—*Ind. Jn Med. Res.*, 11, 3, p. 965, 1924. (For abstract see T.V.B., 12, 4, p. 115, 1924.)

† On one occasion a small oval flagellate with three anterior flagella (*Trichomonas* sp.) was found in the distilled water used for staining purposes.

‡ *T. congolense*, *T. brucei*, and *T. vivax*.



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Leishmania caprae, Curson 1925, sp.n.