Observations on Leishmania chagasi

by

S. Adler

(Department of Parasitology, Hebrew University, Jerusalem)

The name Leishmania chagasi Da Cunha & Chagas 1937 was given to the causative agent of visceral Leishmaniasis in South America to distinguish it from L. infantum and L. donovani. L. Chagasi was at first thought to be a distinct species because it did not infect animals in the laboratory and was serologically different from other Leishmania species. Da Cunha (1938) and Adler (1938) however showed that L. chagasi was infective for hamsters and Da Cunha further showed that dogs can be infected. The pathological findings in infected dogs in Brazil were identical with those recorded in the Mediterranean basin. Da Cunha was inclined to consider L. chagasi a synonym of L. infantum. Ferreira, Deane and Mangabeira (1938) infected Phlebotomus longipalpis with L. chagasi and recorded flagellates in the midgut seventy to ninety hours after feeding.

In Palestine laboratory-bred sandflies P. papatasii were infected by feeding on cultures of L. chagasi. This species behaved similarly to the Old World L. infantum and L. donovani, i.e. the flagellates after establishing themselves in the sandfly tended to adopt an anterior position and were traced to the anterior part of the pharynx within five days. The infection rate in the sandflies was 24% when the emulsion of flagellates used contained 300 parasites per 0.1 mm³ and rose to 71% with emulsions of 1000 to 2000 flagellates per 0.1 mm³ and to 89% with richer concentrations. Quantitatively as well as qualitatively L. chagasi behaved like L. infantum and L. donovani in the sandflies.

So far it has been impossible to distinguish L. chagasi from L. infantum by any laboratory test but a final judgment must be reserved until further experiments with different species of sandflies have been carried out. The strain of L. tropica in the Old World which is transmissible both by P. papatasii and P. sergenti can be distinguished from the strain transmissible by P. sergenti (but not by P. papatasii) only by comparative infection rates in these two species of sandflies. In all other respects they are indistinguishable. A similar biological distinction may yet be found between L. chagasi and L. infantum. L. infantum
and *L. donovani* in the Old World are strictly confined in their distribution to that of various species of sandflies of the *major* group and are not, as far as is known, transmitted by other sandflies. No sandflies of the *major* group are known in the New World and *P. longipalpis* is systematically very remote from this group.

The possibility of the introduction of *L. infantum* from the Old World to the New has to be considered. In the case of *L. infantum* man does not serve as a source of infection even in endemic foci; this rôle is played entirely by dogs because of the uniform infection of the unbroken skin in infected animals. In the New World the dog apparently plays a similar rôle with regard to *L. chagasi*. The disease has therefore either been imported by infected dogs from Europe or is autochthonous.

Espundia was certainly present in America in pre-Columbian times for it is depicted on the drinking jars of the Incas. The existence of a parasitic protozoon *L. brasiliensis* in the New World and a very closely related species *L. tropica* in the Old World at a period when there was no communication between the two is a strong proof of the antiquity of *Leishmania* as a parasite of man. Leishmaniasis must therefore be regarded as one of the oldest of human diseases.

The cutaneous Leishmaniasis of South America is certainly not due to recent introduction from Europe even though some cases of *L. brasiliensis* are indistinguishable clinically and histologically from cases of *L. tropica*, and the clinical similarity between South American and Mediterranean visceral Leishmaniasis does not necessarily imply that the latter disease has been introduced into South America by infected dogs from the Mediterranean basin. Up to the present there have been no proved instances of the formation of new foci of *L. infantum* even in the Old World itself where the disease is remarkably static in its distribution.

For the above reasons we think that visceral Leishmaniasis is not a recent introduction but has for long been indigenous in South America.

**REFERENCES**

**ADLER, S.**


**ADLER, S. & THEODOR, O.**

MARQUES DA CUNHA, A. & CHAGAS, E.


MARQUES DA CUNHA, A.


FERREIRA, L. C., DEANE, L. & MANGABEIRA, F.º, O.