

**HISTOPATHOLOGICAL STUDY  
OF THE MAJOR SALIVARY GLANDS  
IN *TRYPANOSOMA CRUZI* INFECTED MICE**

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**Étude histopathologique des glandes salivaires de souris au cours de l'infection avec  
*Trypanosoma cruzi*.**

**RÉSUMÉ.** Une étude histopathologique au cours de l'infection expérimentale de *Trypanosoma cruzi* a été réalisée chez la souris. Dans le parenchyme des glandes salivaires principales, des amastigotes ont été observés, en particulier, dans la lumière des tubes striés.

**Mots-clés :** Maladie de Chagas. *T. cruzi*. Glandes salivaires. Souris.

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*Trypanosoma cruzi* (Chagas, 1909) attacks reticulo-endothelial and other tissue cells of the body by the growth and development of the parasite within these cells (mainly smooth, cardiac and skeletal muscle, peripheral neurons and macrophages). The thyroid, pre-auricular, parotid and submandibular glands, lymphonodes, spleen and liver are usually enlarged.

The alterations induced by *T. cruzi* in the salivary glands have been described by Chagas and Villela (1922) in chagasic patients with megaesophagus. In these patients the impairment of free passage of food in the esophagus may cause a reflex stimulation of the salivary glands, with consequent increased production of saliva and hypertrophy of the gland (Correia Neto, 1935 ; Vieira and Hadler, 1961).

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Marsden and Hagstrom (1966) observed pseudocysts in salivary glands of dogs inoculated with a strain of *T. cruzi* obtained originally from Peru, and indicated that the possibility exists that amastigote nests in close proximity of the salivary ducts could result in trypomastigotes being passed in the saliva.

Among rodents, atrophy (Ribeiro *et al.*, 1977; Utrilla *et al.*, 1982, 1985; Martini *et al.*, 1986) and accelerated acinar development and retarded duct system maturation (Alves and Machado, 1980) of the mouse and rat salivary glands has been reported to occur during infection with Y and Bolivia strains of *T. cruzi*. Pseudocysts were found in the salivary glands of mice inoculated with Chinga strain from Costa Rica (Bice and Zeledon, 1970) and with Y and CL strains from Brazil (Gonçalves da Costa *et al.*, 1984, 1986). These pseudocysts were in the surrounding connective tissue and less frequent in glandular cells. Amastigotes were not observed in sections of salivary glands of female albino mice inoculated with Brazil strain of *T. cruzi* (Hanson and Roberson, 1974).

We undertook a histopathological study showing amastigotes in the parenchyma of the major salivary glands of mice experimentally infected with *T. cruzi*.

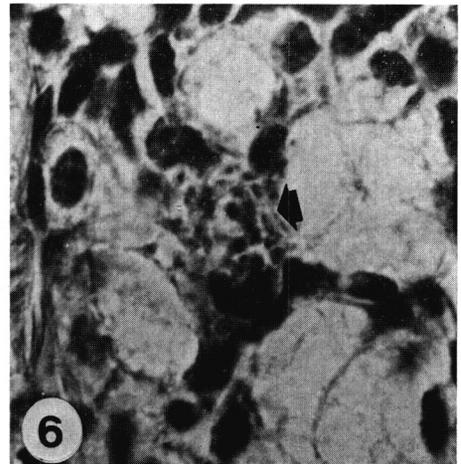
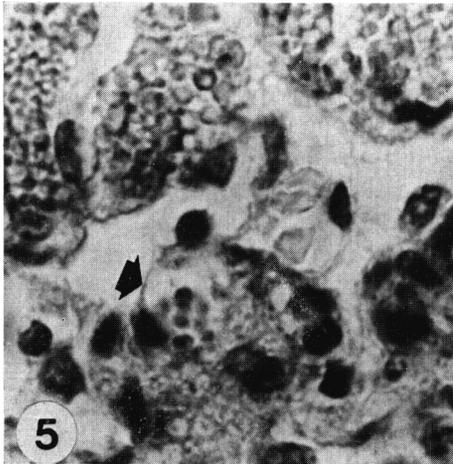
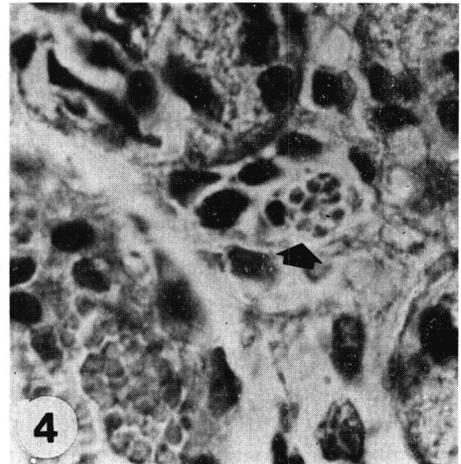
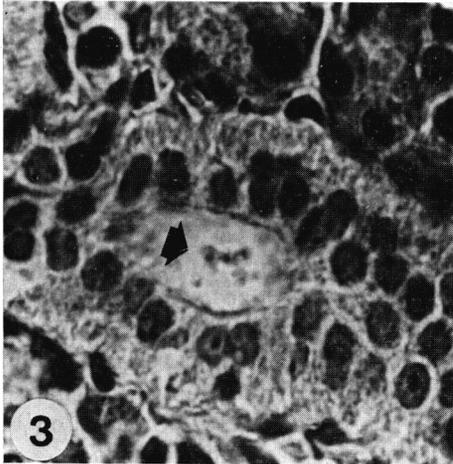
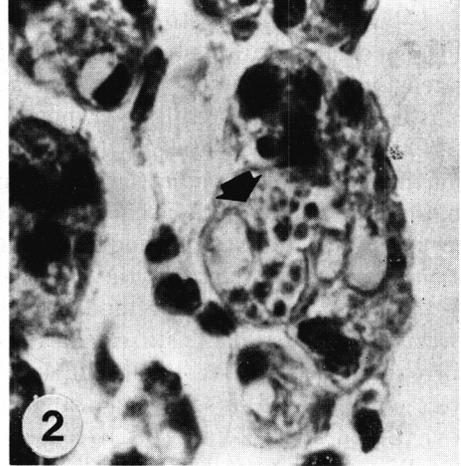
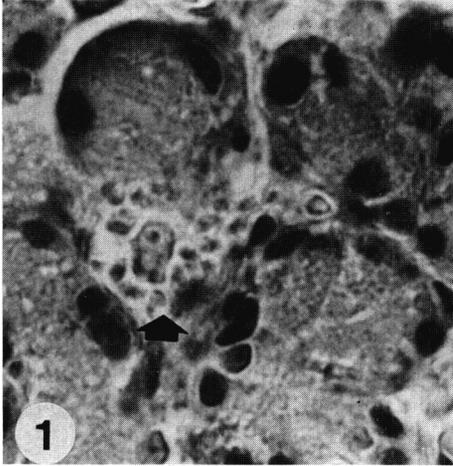
Ten male albino mice injected intraperitoneally with  $2 \times 10^4$  blood trypomastigotes of the Bolivia strain were used. The Bolivia strain, which has polymorphic characteristics and whose blood forms are predominantly large, was isolated from feces of *Triatoma infestans* bugs from Vitichi, Bolivia (Funayama and Prado, 1974) and is being maintained in mice by biweekly reinoculation.

All animals received balanced ration and water *ad libitum* and were killed under ether anesthesia at 42 days of age (14th of inoculation). The salivary glands (parotid, submandibular and sublingual) were dissected and immediately immersed in a solution of alcohol 80° (85 ml), formalin (10 ml) and acetic acid (5 ml). After 24 hours of fixation, the material was embedded in paraffin, cut into 6  $\mu$ m thick sections and stained with Hematoxylin-Eosin (HE) for histological study.

Morphological analysis of the major salivary glands of animals inoculated with the Bolivia strain of *T. cruzi*, showed the following features in relation to the controls: compact parenchyma with impairment at the acinar and duct level. The acinar cells exhibited reduced eosinophilia, greater chromatin condensation, reduced height and consequent dislocation of the nucleus towards the basal pole. Their lumen was reduced. The ducts were dilated and lined with low cylindrical epithelium. The septa were widened. We emphasize the presence of an intense lymphoplasmocytic infiltrate, especially near the interlobular ducts.

In the present study, *T. cruzi* (amastigotes) was found in the major salivary glands acini cells, striated ducts cells, inter- and intralobular connective tissue, muscle walls of blood vessels, and inside the striated duct lumen (*fig. 1-6*). These results suggest that trypanosomes might actively gain access to the duct system in the salivary gland. Marsden and Hagstrom (1966) discussed the presence of trypanosomes in the saliva of dogs; and Hoare (1965) discussed the presence of equine and bovine trypanosomes in the saliva of vampire bats.

The need for careful handling of animals infected with *Trypanosoma cruzi* should be emphasized.



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- FIG. 1-3. — Parotid gland in *T. cruzi*, infected mice, H. E., (400 ×), showing amastigotes in connective tissue (fig. 1), acinar cells (fig. 2), and inside the striated duct lumen (fig. 3).  
 FIG. 4 and 5. — Submandibular gland in *T. cruzi*, infected mice, H. E. (400 ×), showing amastigotes in connective tissue (fig. 4) and in acinar cells (fig. 5).  
 FIG. 6. — Sublingual gland in *T. cruzi*, infected mice, H. E. (400 ×), showing amastigotes in connective tissue and in acinar cells.