

ATTEMPTS AT AXENIC CULTIVATION OF  
HISTOMONAS MELEAGRIDIS

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## INTRODUCTION

It has been suggested that Histomonas meleagridis is dependent upon one or more strains of cecal bacteria for survival (Delappe, 1953; Franker and Doll, 1964; Bradley, 1965; Bradley and Reid, 1966; Lesser, 1964b), however, the nature of this dependence remains unknown. The concept of dialysis systems seemed an ideal way for studying interactions of this protozoan and cecal bacteria.

The present study was directed toward developing a method for axenic cultivation of H. meleagridis in order to conduct future studies on the effects of metabolic products of cecal bacteria using a dialysis system. Such a system would enable determination of whether the protozoan was utilizing bacterial by-products or ingesting bacteria per se.

Although Lesser (1961) reported a method for obtaining bacteria-free in vitro cultures of Histomonas, I could not repeat his results. Various methods for purification of this protozoan are presented in this thesis. While some methods for purification were successful, all attempts to cultivate bacteria-free histomonads in vitro failed. However, possibilities of alternative methods for purification and possible successful cultivation are described in the Discussion.

## LITERATURE REVIEW

General Description and Life Cycle of Histomonas meleagridis:

Histomonas meleagridis (Smith, 1895) Tyzzer, 1920, a parasite of gallinaceous birds, particularly turkeys and pheasants, is a unicellular organism belonging to Phylum Protozoa, Class Mastigophora, Order Rhizomastigida. It ranges in size from 5 to 30 microns, has one flagellum but can display ameboid movement (Soulsby, 1968). Tyzzer (1919) described a cyst stage which since has not been reported by other researchers. A highly virulent strain will kill 100 per cent of infected turkeys. Typical pathognomonic symptoms are yellowish diarrhetic feces, loss of appetite, droopy wings, and ruffled feathers.

In nature the parasite is transmitted by means of embryonated eggs of Heterakis gallinarum, the common cecal nematode of domestic turkeys and chickens (Graybill and Smith, 1920). The histomonads are only mildly pathogenic in chickens and they serve primarily as a reservoir host (Soulsby, 1968). Tyzzer and Collier (1925) reported that turkeys may become infected with the histomonad by ingesting recently discharged feces containing the parasite. This mode of transmission was again reported by Horton-Smith and Long (1956). Lund, et al. (1966) reported that earthworms are capable of transmitting heterakid eggs containing the histomonads. The infection can be artificially induced by feeding turkeys male heterakids per os (Springer, et al., 1969) or by infecting birds rectally with cultures of the protozoa or ground infective tissues (Farmer and Stephenson, 1949).

The parasite survives in eggs of heterakids (Tyzzer and Fabyan,