A STUDY ON TRICHOMONIASIS

THESIS

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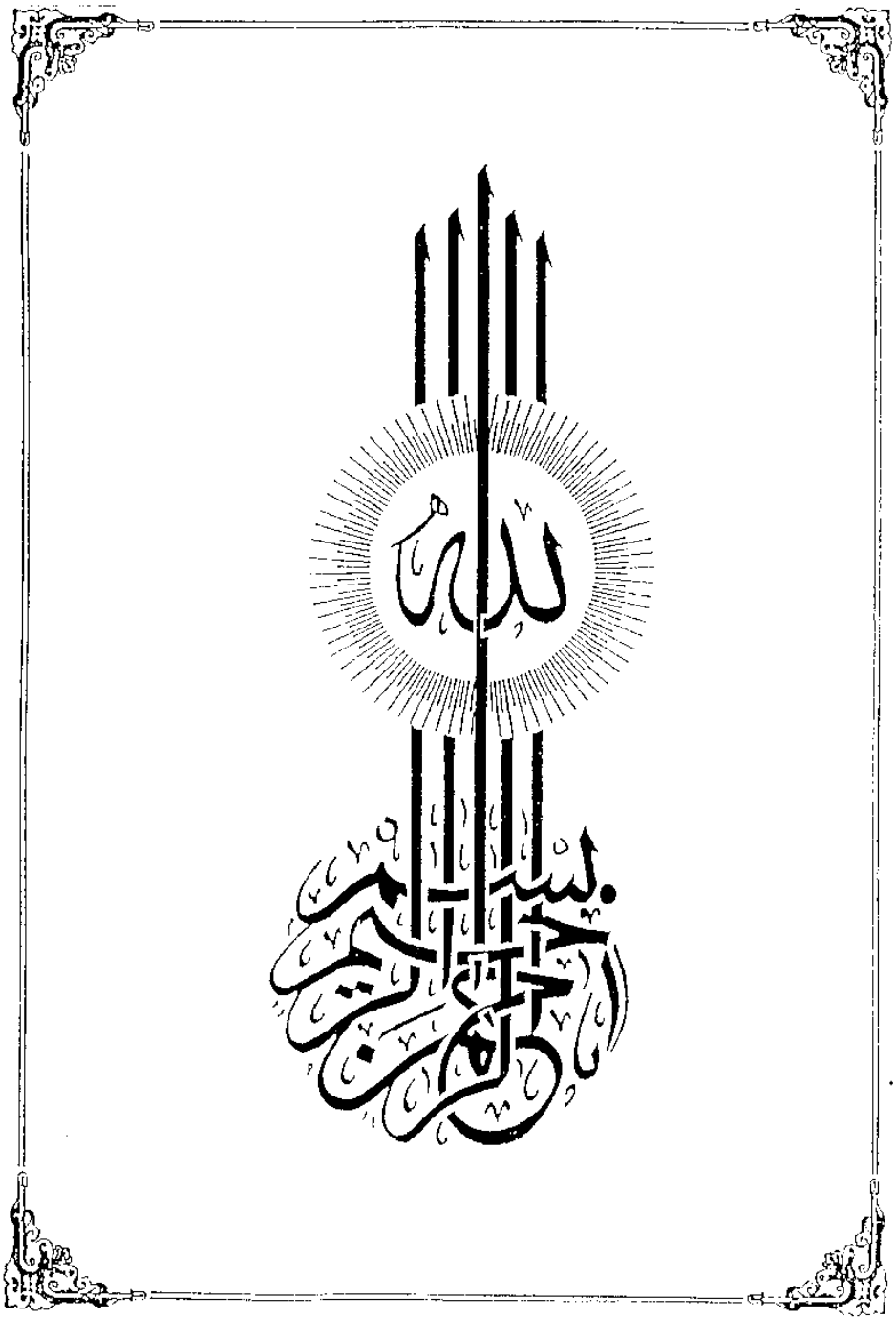

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INTRODUCTION

Trichomoniasis, is a condition caused by infection of the genitourinary tract of female and male by the pathogenic protozoa Trichomonas vaginalis (Ackers et al., 1975).

The condition is usually sexually transmitted and produces vaginitis and a vaginal discharge in women and urethritis and postatitis in men (Catterall, 1972).

The condition is also commonly asymptomatic in both sexes (Catterall, 1972).

The incidence of the disease is about 20% in women at some time during their lives and between 5-15% in men presenting with nongonococcal uretheritis (Morton, 1975).

The causal organism, Trichomonas vaginalis was first described by Donné, a Frenchman,in 1836. He found it in the purulent discharges of the genital tract in both men and women.

Two other flagellate Trichomonads can infest humans T.buccalis in the mouth and T.hominis in lower gastrointestinal tract, but only T.vaginalis infest the genitourinary tract. The three types can be differentiated morphologically and by cultural differences (Faust et al.,1970).

TAXONOMY OF TRICHOMONAS VAGINALIS

The parasite was first described by Donné (1836), for which he designated a new genus and type species of protozoa namely Trico-monas vaginale. Apparently Ehrenberg (1838) was the first to alter Donné's nomenclature to Trichomonas vaginalis which has come into common usage.

The taxonomic position of T.vaginalis may be summarized as follows:

KINGDOM:	ANIMALIA
PHYLUM:	PROTOZOA
SUBPHYLUM:	SARCOMASTIGOPHORA
SUPERCLASS:	MASTIGOPHORA
CLASS:	ZOOMASTIGOPHORA
FAMILY:	TRICHOMONADIDAE
GENUS:	TRICHOMONAS
SPECIES:	TRICHOMONAS VAGINALIS

(Faust et al.1970).

PHYLUM PROTOZOA

Protozoa are unicellular animals that occurs singly or in colonies, although many protozoologists prefer to consider them as "acellular" because the single unit of

which the protozoa typically consists, performs all of the functions of life (Faust et al, 1970). For the most part they are free living, but some are parasitic (Belding, 1965).

SUPERCLASS MASTIGOPHORA

The MASTIGOPHORA, the largest class of protozoa , possess in the adult stage one or more flagella. The typical flagellate is an elongated unicellular organism with a nucleus, one or more flagella, and is usually enclosed in a pliable cell membrane.

Locomotion is effected by the flagella and it follows a spiral course (Belding, 1965).

CLASS ZOOMASTIGOPHORA

Members of this class lack chromatophores (a pigment-bearing cell) and thus depend on previously manufactured plant and animal foods. Their nutrition is holozoic (having the nutritional characters of an animal i.e digesting protein) or parasitic.

They have a single nucleus and a neuromotor apparatus. Most species of flagellate protozoa have a rudimentary mouth, the cystostome.

Reproduction is by longitudinal binary fission, in which mitotic division of the nucleus and binary

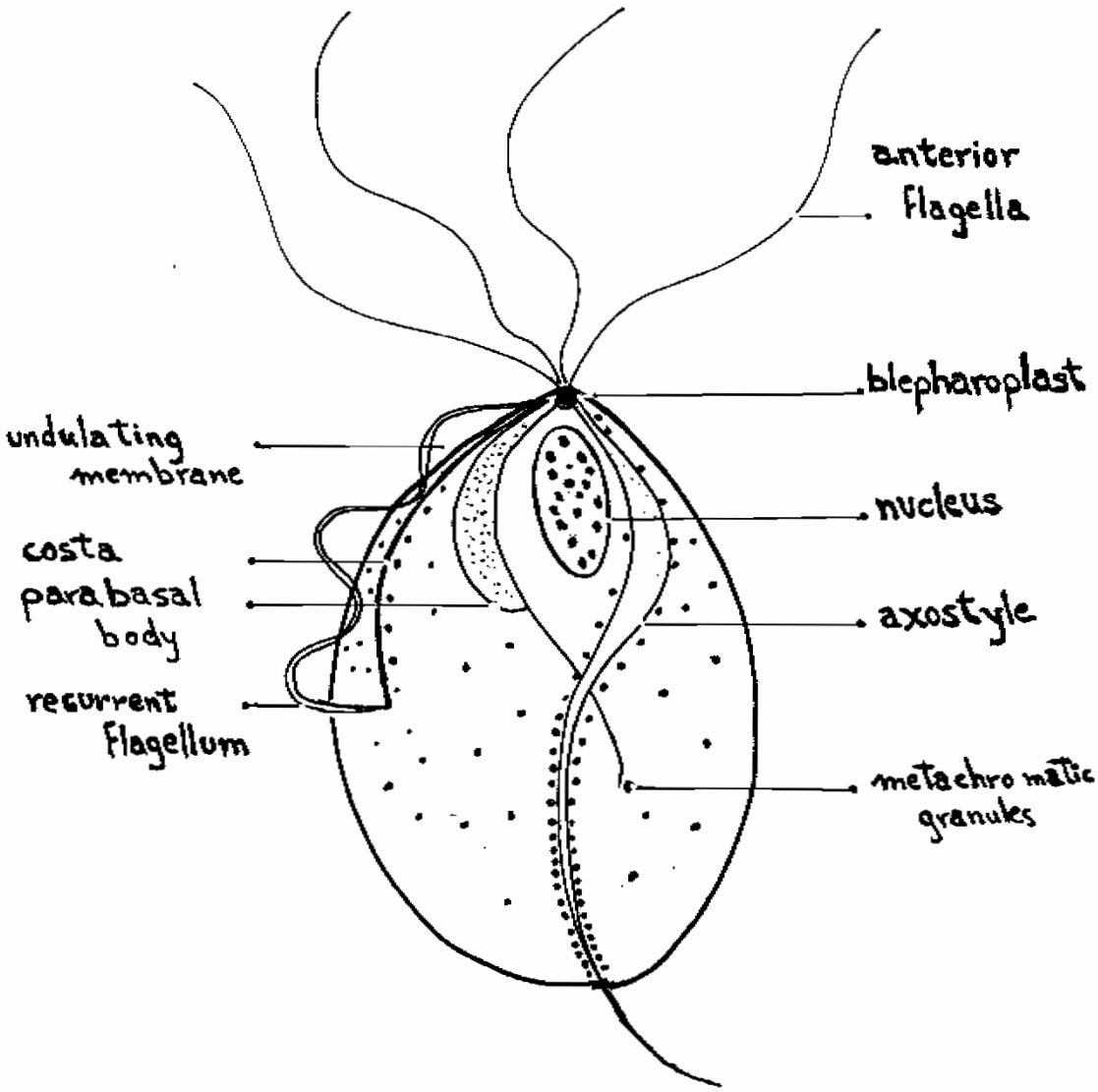
division of the kinetoplast (an accessory body consisting of the parabasal body, and the blepharoplast that serves as the neuromotor apparatus for the flagellum) preceede that of the cytoplasm (Faust et al.,1970).

FAMILY TRICHOMONADIDAE

Members of this family are provided with a cytostome (the oral apperature of a unicellular organism), three or five free flagella, an additional flagellum on the margin of an undulating membrane, and an axostyle which usually protrudes through the posterior end of the body (Faust et al., 1970).

GENUS TRICHOMONAS

The trophozoites (the active motile feeding stage) of Trichomonas typically have 4 free flagella and a fifth one along the outer margin of the undulating membrane , a costa (a rod-like structure) and an axostyl. All described species of this genus are parasitic, and without exception non-producer cyst (Faust et al., 1970). Species of Trichomonas are found in man, monkeys, rodents, fowls, pigeons and doves (Faust et al.,1970). Three species occur in man, T.tenax, T.hominis and T.vaginalis (Schmidt and Roberts, 1977).



Trichomonas vaginalis

(From Honigberg, B.M., and King, V.M. 1964.
J. Parasitol. 50: 345-364)

TRICHOMONAS VAGINALIS

In 1836 Alfred Francois Donné, a French investigator, discovered the presence of microscopic animals of a form previously unreported in the purulent fluids and secretions of the genital organs of women and men. He was not able to state the organism's pathological significance but sketched its appearance and size, and also carefully noted that it occurs in a medium which became acidic although normally alkaline. After advice from a colleague, Professor Dujardin, a zoologist, he called this protozoon "Trichomonas" because of its similarity with the Monas genus, in the anteriorly directed structure, while the cilia suggested Tricodes.

Later, it was given the specific name by Ehrenberg (1838) Professor of protozoology in Berlin.

Trichomonas vaginalis is known only in the trophozotic stage, the cyst formation has been reported, but it is denied by most observers (Belding, 1965).

Infection produced by this organism has been found wherever search has been made i.e. cosmopolitan species (Faust et al.,1970).

a. MORPHOLOGY

Trichomonas vaginalis is the largest Trichomonad found in man (Chandler, 1955).

It is a colorless flagellate, usually measures from 8 to 30 microns in length and from 5 to 15 microns in breadth (Belding, 1965).

The shape of the body is variable in both living and fixed and stained organisms, but typical actively swimming organisms are ellipsoidal or ovoidal. In many strains, particularly in those studied in the vaginal secretions and in freshly isolated cultures, numerous organisms appear quite ameboid (Honigberg & King, 1964).

All strains have the capacity for the formation of pseudopodia like extensions which are employed in feeding and serve for attachment of the flagellates to various stationary objects (Honigberg & King, 1964). All normal organisms have four anterior flagella, with a fifth flagellum curving back along the margin of an undulating membrane which does not reach the posterior end of the body (Schmidt & Roberts, 1977).

The nucleus is situated quite close to the anterior end of the body, it appears ellipsoidal or somewhat ovoidal, with scattered masses of chromatin, and small spherical nucleolus surrounded by a chromatin-free

area (Honigberg & King, 1964).

Anterior to the nucleus is the blepharoplastic complex of dark-staining granules, from which the flagella arise (Belding, 1965).

The cytoplasm contains remarkably la rge amount of siderophil granules, which are numerous around the costa and the axostyle (Faust et al., 1970).

The costa or the chromatic basal rod runs superficially beneath the undulating membrane, it distinguishes the Trichomonadidae from other families in its order, and probably serves as a strong flexible support in the region of the undulating membrane (Schmidt and Roberts, 1977).

The axostyle originates near the blepharoplast and extends as a sharp object a considerable distance behind the body (Faust et al., 1970).

The spatulate capitulum of the axostyle represents a flattened sagment that accounts for about one-third of the total length of this hyaline organelle. The capitulum continues anteriorly into the crescent-shaped pelta which is a membranous extension, covers part of the anterior surface of the organism (Honigberg & King, 1964).

The parabasal apparatus is a sausage shaped , rather faintly stained body lying beside the nucleus, and a more slender but deeply stained fibril reaching to near the middle of the body (Chandler, 1955).

b. ULTRASTRUCTURE

The structure of Trichomonas vaginalis is much more complicated, when studied by electron microscopy, than was previously considered by descriptions based on optical microscopy.

When examined under the electron microscope by the negative contrast method, the Trichomonads may have one of the three main shapes: bulbous, amoeboid or spherical (Ovčinnikov et al.,1974).

Under the scanning electron microscope its surface appears creased with numerous crater-like depressions (Ovčinnikov et al., 1975). And from the anterior pole emerge the four anterior flagella, the fifth recurrent flagellum, and the undulating membrane. In some organisms the bases of these organelles lay in a shallow depression (Heath, 1981).

The undulating membrane projects from the body for 1 um, the recurrent flagellum is attached to the membrane and lies parallel to and about 0.5 um from, its free edge. Together these two structures pass posteriorly and terminate about halfway down the Trichomonad. The axostyle protrudes from the posterior pole, it is a tapering structure with a membrane