

THE UNIVERSITY OF MANITOBA

STUDIES ON TETRATHYRIDIAL POPULATIONS OF MESOCESTOIDES
CORTI HOEPLI, 1925 (CESTODA: CYCLOPHYLLIDEA) IN MICE:
EFFECTS OF STEROID HORMONES, CASTRATION AND SPLENECTOMY

by

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A dissertation submitted to the Faculty of Graduate Studies of
the University of Manitoba in partial fulfillment of the requirements
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ABSTRACT

The volumes of tetrathyridial populations in the peritoneal cavity of mice increase exponentially with time. Thirty days post infection more larvae are in this cavity than in the liver. After that the increase of intraperitoneal populations continues, whereas the infection of the livers remains more or less constant.

Splenectomy and treatment with testosterone, oestradiol, and cortisone increase the total volumes of intraperitoneal populations in hosts of both sexes. Their efficiency decreases in the following order: cortisone > testosterone > oestradiol = splenectomy > control.

Gonadectomy depresses considerably the volumes of intraperitoneal populations, orchietomy being more efficient than ovariectomy. Testosterone increases considerably the size of tetrathyridial populations in castrates of both sexes, while oestradiol is much less efficient.

Both gonadectomy and the treatment with steroid hormones alter the infection of livers. Orchietomy lowers it, whereas ovariectomy and steroid hormones increase it.

There exists a negative correlation between the size of populations of tetrathyridia and the average size of larvae: the larger the populations, the smaller the larvae. Thus the tetrathyridia from orchietomized mice are the largest and those from cortisone treated males the smallest.

The sole factor found hitherto to depress the volumes of tetrathyridial populations is castration of the host.

INTRODUCTION

INTRODUCTION

The plerocercoid larvae, "tetrathyridia", of Mesocestoides corti Hoeppli, 1925, are the only known metacestodes multiplying by longitudinal fission. The intensity of their multiplication varies greatly from host to host. In some hosts, e.g. the muskrat, the multiplication is very slow, in others, as e.g. the jirds or the LDF₁ hybrid mice, very fast (Novak, 1972).

In this last study it was shown that the populations of tetrathyridia (Fig.1.) in contrast to the Echinococcus multilocularis cysts, grow much faster in male hosts, than in females. This suggested a study of the effect of sex hormones and of gonadectomy on the growth and the polymorphism of tetrathyridial populations in mice. Another steroid hormone, cortisone, suppresses the inflammatory reactions and the immunological responses in general, and is known to suppress the immunity to metacestodes (Olivier, 1962; Esch, 1964 & 1967; Lee, 1970). The present study was therefore extended to include three steroid hormones: testosterone, oestradiol, and cortisone (Fig.2.). As this last hormone depresses the reticuloendothelial system, it was interesting to compare its effect with that of splenectomy. Thus originated the plan of the present thesis, which comprises 4 chapters: 1. Effect of sex hormones on the growth and multiplication of tetrathyridia of M. corti in mice. 2. Gonadectomy, sex hormones, and the growth of tetrathyridial populations of M. corti in mice. 3. Cortisone and the growth of populations of Mesocestoides tetrathyridia in mice.

4. Acceleration of the growth of tetrathyridial populations of M. corti by splenectomy. In the course of the preliminary work on the effect of oestradiol on the tetrathyridial populations it was found that this hormone increases considerably the invasion of the liver. This observation was published as a letter to the editor in the Transactions of the Royal Society of Tropical Medicine and Hygiene. It appears as an introduction to the first part of this thesis.

Figure 1.

Population of tetrathyridia of Mesocestoides corti
from the peritoneal cavity of an SEC mouse; $\times 4$.