

Study of The Protective Effect of Some Trichinella Spiralis Antigens Against Experimental Trichinellosis

Thesis

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Abstract

The development of vaccines capable of preventing swine and other possible hosts from becoming infected with *T. spiralis* would make a substantial contribution towards the ultimate goal of disease elimination. The aim of this study is to compare the protective effects of crude larval extract vaccine and irradiated larval vaccine as regards immunization against trichinellosis.

Study design: A prospective randomized controlled study including four groups of mice; (group A: immunized with irradiated larval vaccine; group B; immunized with crude larval extract; group C; non-immunized adjuvant group; group D: non-immunized infected control group). Animals will be examined for the adult and larval burden as well as for the humoral response against challenge infection. **Results:** Among the immunized groups there was a statistically significant lower adult worm count at the 7th day following challenge infection as well as reduced larval muscle count at the days 30 and 45 following challenge infection in comparison to the non-immunized control groups. There was a significantly higher serum antibody response and higher lymphocytes proliferative response among the immunized groups in comparison to the non-immunized groups. The protective effect was better among the group of mice immunized with crude larval extract antigen in terms of reduced adult worm

and larval burden as well as humoral and cell mediated immune responses. **Conclusion:** immunization against trichinellosis using crude larval extract and irradiated larval vaccine is effective and could be useful for protection of different *T. spiralis* hosts in particular swine and this could provide hope in the disease elimination.

Key words: Trichinellosis, *T. spiralis*, vaccination, immunization, crude larval antigen, irradiated larvae.

contents

	Page
Introduction	1
Aim of work	4
Review of literature	5
Taxonomy	5
Historical Review	8
Morphology of <i>Trichinella spiralis</i>	10
Epidemiology	14
The prevalence of trichinosis in Egypt	22
Life cycle and pathogenesis	26
Symptoms and signs of trichinosis	34
Clinical and pathological aspects of trichinosis	37
Immunology	39
Laboratory diagnosis	47
Treatment and Prevention	54
Material and Methods	60
Results	76

Discussion	94
Summary	107
Conclusion and Recommendations	110
References	112
Arabic summary	156

list of Tables

Table No		Page
Table (1)	Biological and distributional characteristic of <i>Trichinella spiralis</i> .	7
Table (2)	Biological stages of <i>T. spiralis</i> .	29
Table (3)	Adult count in the intestine at the day 7 post-infection.	83
Table (4)	Total muscle larval counts at the days 30 and 45 post-infection.	84
Table (5)	Statistical analysis for correlation between the immunized groups (A&B) and control groups (C&D) using paired samples t. test.	85
Table (6)	Statistical analysis for correlation between the two immunized groups (A&B) using paires samples t. test.	85
Table (7)	Statistical analysis for correalation between the control groups (C&D) using paired samples t. test.	85
Table (8)	Lymphocyte proliferation response at the 28 th day post-immunization; showing the optical density values, stimulation indices and activation percentages.	86
Table (9)	Lymphocyte proliferation response at the 30 th day post-infection; showing the optical density values, stimulation indices and activation percentages.	86

Table (10)	Lymphocyte proliferation response at the 45 day post-infection; showing the optical density values, stimulation indices and activation percentages.	86
Table (11)	ELIZA means optical densities of the four groups for detection of the serum antibody levels at the different studied intervals.	88

List of Figures

Table No		Page
Figure (1)	Schematic representation of <i>Trichinella spiralis</i> .	13
Figure (2)	Life cycle of <i>T. spiralis</i> .	33
Figure (3)	Equipment used for ELIZA testing.	70
Figure (4)	Equipment used for ELIZA testing.	70
Figure (5)	Chart: boxplot for adult count at day 7 post0infection.	83
Figure (6)	Chart: boxplots for muscle larval counts at days 30 and 45 post-infection.	84
Figure (7)	Chart: histogram showing activation percentages of the lymphocytes proliferation response at different phases of the study.	87
Figure (8)	Chart: histogram showing the antibody response at different phases of the study.	88
Figure (9)	Pathology: skeletal muscle of mice showing normal histological pattern.	89
Figure (10)	Pathology: muscle of mice of the control group.	90
Figure (11)	Pathology: muscle of mice of group immunized with irradiated larval vaccine.	90

Figure (12)	Pathology: muscle of mice of group immunized with crude larval extract vaccine.	91
Figure (13)	Pathology: muscle of mice of group immunized with irradiated larval vaccine.	91
Figure (14)	Pathology: muscle of mice of group immunized with crude larval extract vaccine.	92
Figure (15)	Pathology: muscle of mice of group immunized with irradiated larval vaccine.	92
Figure (16)	Pathology: muscle of mice of group immunized with crude larval extract vaccine.	93

Introduction

Introduction

Trichinella spiralis is a tissue nematode infecting numerous species of carnivorous and omnivorous animals, both wild and domesticated as well as man (**Zimmerman, 1973**). Trichinosis remains an important food-borne parasitic disease of world wide distribution (**Murrel, 2001**).

Trichinellosis is caused by the small nematode parasite *trichinella spiralis* that inhabit the small intestine. The main injury caused by infection with this parasite is attributed to the multiplication of the parasite within the same host. Swine is considered the main host, however wide range of mammals including man is infected (**Kim, 1993; Viveros et al., 2001; Pozio et al., 2002 and Piergili et al., 2001**).

Since there are no pathognomonic signs or symptoms; clinical diagnosis of trichinosis is difficult (**Dupouy-Camet et al., 2002 and Pozio et al., 2003**). So the best diagnostic methods are serodiagnosis and muscle biopsy (**Pozio et al., 2003**). However, a tissue biopsy has a low sensitivity in light and moderate infection (**Moskwa et al., 2006**) and representative biopsies are uncomfortable for patients (**Bruschi and Murrell, 2002**). Moreover, serological techniques are frequently used to detect parasite status and to monitor epidemiology and disease prevalence in important reservoir hosts of zoonotic diseases (**Reiterova et al, 2009**).

No doubt chemotherapy against trichinosis is possible but rather costly with side-effects and may need repeated administration, in addition to the emerging drug resistance. A further major contribution to the problem is that chemotherapy against *T. spiralis* is not effective unless the drugs are administered early before the end of the acute stage (**Pozio et al., 2003**). On the other hand, immunization proved to be one of the most powerful strategies to prevent infection (**Gamble and Murrell, 1978**). In the field of immuno-parasitology one of the major goals is to develop vaccines against parasitosis, as it is roughly estimated that about three quarters of the global population currently harbor single or multiple parasitic infections (**Liyod, 1981**). The threat of drug resistance of parasites against antihelminthes and the awareness about drug residues made vaccination an important and desirable control measure (**Melaren and Terry, 1989**).

The history of productive research on the protective antigens of *T. spiralis* suggests that the prospect of developing vaccines for trichinellosis is promising. The parasite is a highly immunogenic nematode that can provoke powerful protective immune responses directed at various stages of the parasite in its mammalian host following primary inoculation (**Wang, 1998; Zhul et al., 1993**). Exposure to primary infection confers strong or nearly complete immunity to re-infection (**Murrell, 1985; Smith, 1987**). Immunization against infection is based on such

acquired protective immunity, whereas, it leads to increase in the host resistance and immunity against the invading parasite and hence induce protection against infection (**El Ganayni et al., 1990**). Moreover animals immune to trichinella will demonstrate cross-reactions to antigens of different parasites and bacteria. There is some evidence that immunity to trichinellosis is an important factor in the total resistance of the host, not only inducing a high power immunity against the disease, but also giving a great hope in controlling immune deficiencies (**Britov, 1993**).

Positive immunity against trichinellosis has been produced by immunization with different antigenic preparations (**Despommier & Laccettii 1981a & b; Onah and Wakelin 2002, El-Shazly et al., 2002 and Goyal et al.. 1997**).

Aim of Work