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 7^{th} 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.

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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 pathgnomonic 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 resitance. A further major contribution to the problem is that chemotherapy against *T. spiralis* is not effective unless the drugs are administrated 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 etal., 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