SOME IMMUNOLOGICAL ASPECTS OF *TAENIA HYDATIGENA* INFECTIONS IN SHEEP.

A thesis presented in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Veterinary Science at Massey University.

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1991

ABSTRACT

The literature on the biology, distribution, prevalence and importance of *T.hydatigena*, the biology of its life cycle, and the immunology of the relationships between taeniids and their hosts, is reviewed.

In three experiments, serum was transferred from immune donors to non-immune recipients before the latter were given a homologous challenge infection. Highly significant protection was achieved in recipients of serum from lambs given three immunizations of solubilized *T.hydatigena* oncospheres or three oral infections, but not in recipients of serum from lambs given a single low-level oral infection. Comparison of sera of recipients by ELISA using solubilized *T.hydatigena* oncosphere antigen, revealed that unprotected recipients had substantially lower levels of anti-*T.hydatigena* antibodies than protected recipients. The donors of the sera which did not protect the recipients also had low ELISA absorbances but were, themselves, immune to a challenge infection.

The importance of antibody in causing death of oncospheres was examined *in vitro*. Oncospheres were cultured in the presence or absence of antibody, complement, and leukocytes from immune or non-immune animals, and their effects and interactions on larval survival assessed after 10 days culture. No reduction of larval survival occurred when antibody was absent. The major effect of antibody was mediated by complement. In the presence of antibody and complement, leukocytes further reduced larval survival but in the absence of complement, their influence was unclear.

The involvement of colostral antibody from orally infected ewes in protecting neonatal lambs was also examined. A significant, short-acting, immunity was transferred from ewes which had received either three oral doses of 150 activatable oncospheres, or an initial dose of 100 activatable oncospheres followed by two of 10 000. The correlation between the number of cysts resulting from the challenge infection and the level of anti-*T.hydatigena* antibody in their serum at the time of challenge, was highly significant. There appeared to be a critical level of antibody, above which virtually complete protection resulted and below which, there was very little. Significant relationships existed between the levels of antibody in the sera of the one-week-old lambs and their dams on the day of parturition, and in the whey of colostrum collected on the same day.

The duration of the colostral immunity suggested that IgG_2 might be more effective than IgG_1 against *T.hydatigena* oncospheres. Culturing oncospheres with fractionated IgG from serum and colostrum indicated that increasing levels of both IgG_1 and IgG_2 resulted in decreasing levels of larval survival. However, the effect of increasing levels of IgG_2 was much more marked than with IgG_1.

A preliminary attempt to identify antigens able to induce protection against a challenge infection in sheep, indicated that antigens of less than 30 kDa molecular weight significantly protected recipients of them. The antigens on a Western blot of *T.hydatigena* oncospheral antigen which were recognized by immune sheep serum did not correspond with the antigens stained by the protein stains, Coomassie blue or silver stain. This suggests that protective antigens may be predominantly carbohydrate rather than protein.

ACKNOWLEDGEMENTS

Many people have been a great help to me in all aspects of the completion of this study and thesis. I thank all those who have played any part in its outcome.

In particular, I would like to thank my supervisors Assoc. Professors K.M. Moriarty, and W.A.G. Charleston and Dr David Heath for their invaluable advice, encouragement and patience throughout the experimental work and preparation of the thesis. Steve Lawrence, Dick Ris, and Mark Ralston, of the Hydatids Section at MAF Wallaceville, gave a great deal of practical help and information in the experimental part of this study, for which I am very grateful. Dr Gavin Harrison kindly provided the sheep IgG_1 and IgG_2, and Robert Dempster practical help. Both were always very willing to give advice and discuss procedures and results.

The anti-IgG_1 and -IgG_2 monoclonal antibodies were kindly provided by Dr Marshall Lightowlers, Werribee, Victoria, Australia, not to mention the many stimulating ideas and much encouragement from Marshall, Professor Mike Rickard (CSIRO) and their colleagues during the "*Taenia ovis*" meetings between MAF Wallaceville, Pitman-Moore and Melbourne University.

I acknowledge, with thanks, the financial support for this study provided by Pitman-Moore N.Z., MAF Wallaceville, and Massey University, and also the permission of Massey University for the experimental work to be carried out off-campus.

Many of the MAFTech staff at Wallaceville Animal Research Centre, not previously mentioned, were always eager to help and provide expertise whenever asked, including Drs Warren Jonas, Bryce Buddle, Keith Miller, and Phil Douch. I very much appreciate the assistance given by the farm staff at the Wallaceville and Kaitoke farms with special thanks to Bob, Doug, Richard, Henry, Les and Allan for their work with the sheep, and Rosemary for her care of the dogs. Thanks also to Carol Devine for her efficiency and helpfulness in carrying out the literature searches. For the photography of gels, Western blots, PAGE gels and livers I am indebted to Allan Barkus, Christa Bollard, and Kitty Mullgan, and for all the printing of photographs to Allan Barkus.

At Massey University, the statistical advice given by Hugo Varela-Alvarez and Greg Arnold is very much appreciated. My thanks also go to Olive and Tracey Harris for

typing the references, to Olive, Allain Scott and Sheryll Crawford for their help with wordprocessing.

During my time at MAF Wallaceville and Massey University, I enjoyed the friendship of so many of the staff that they are too numerous to mention individually, but my thanks go to all of them.

Thanks go to my friends who have all helped in many ways, especially Steve Smith for helping to organize my reference system and Deb Anthony for her help with mounting the photographs, and a very special thankyou goes to my parents and family for their encouragement and support throughout this time.

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