# CYTOLOGICAL STUDIES

# OF OVINE ALVEOLAR MACROPHAGES: INTERACTION WITH

# *MYCOPLASMA OVIPNEUMONIAE IN VITRO*

This thesis is presented in partial fulfilment (30%) of the requirements for the degree of Master of Philosophy in Veterinary Pathology at Massey University.

AYAD AL.KAISSI

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# ABSTRACT

The attachment between *Mycoplasma ovipneumoniae* organisms and ovine alveolar macrophages was studied in culture for a 24 hour period and antibody-mediated phagocytosis of *M. ovipneumoniae* organisms was observed by both scanning and transmission electron microscopy. *Mycoplasma ovipneumoniae* organisms have the ability to attach to the alveolar macrophage membrane without inducing phagocytosis although they stimulated mitotic division in early cultured cells. The addition of specific antibody to the mycoplasma-macrophage cultures provoked phagocytosis of surface attached and surrounding *M. ovipneumoniae* organisms. Alveolar macrophages stimulated by specific antibody showed rapid and extensive spreading on the glass coverslip and prominent membrane ruffling and filopodia. Many exterior openings and fine cytoplasmic pits were also evident which may represent pinocytotic vesicle formation sites. With transmission electron microscopy *M. ovipneumoniae* organisms were observed surrounded by macrophage filopodia 2 hours after the addition of specific antibody and numerous micro-organisms were seen within phagocytic vacuoles. Some of the intracellular *M. ovipneumoniae* organisms appeared normal while others appeared partially or completely degraded. Twenty four hours after the addition of specific antibody, intracellular *M. ovipneumoniae* organisms had been digested.

A new procedure for collection of alveolar macrophages was developed. The procedure provides an alternative to other methods and may be particularly useful for collecting alveolar macrophages from the lungs of large animal species such as sheep and cattle. Acetone was used to dehydrate macrophages for SEM with excellent results.

In conclusion, it was found that the addition of specific antibody to an *M. ovipneumoniae* - macrophage culture stimulated phagocytosis of these micro-organisms. This suggests that if sheep gain high titres to *M. ovipneumoniae*, their alveolar macrophages will be able to destroy inhaled *M. ovipneumoniae* organisms quickly and effectively; a possibility which should be tested further *in vivo*.

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