

**10. BACTERIUM HOST CELL INTERACTIONS: EFFECT OF  
HAEMOPHILUS SOMMUS ON PHAGOCYTOSIS, NITRIC  
OXIDE PRODUCTION AND CHEMILUMINESCENCE  
RESPONSE OF BOVINE MONONUCLEAR PHAGOCYTES**

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The interaction between bovine mononuclear phagocytes (BMP) and *Haemophilus sommus* are known to be complex. Using a flow cytometric phagocytosis assay, it was found that logarithmically growing *H. sommus* significantly inhibited the phagocytosis of opsonized *S. aureus* by bovine alveolar macrophages (BAM) obtained both from healthy calves and from cattle experimentally infected with *H. sommus*. However, neither heat- nor formalin-killed, logarithmically growing *neither H. sommus* nor *in vitro* passaged *H. sommus* showed any effect on the phagocytic activity of these cells. In contrast to BAM, bovine blood monocytes (BBM), had a significant increase in their phagocytic activity following *in vitro* exposure to logarithmically growing *H. sommus*. The bactericidal ability of bovine mononuclear phagocytes in interaction with *H. sommus* was studied using two *in vitro* assay systems measuring nitric oxide (NO) production and chemiluminescence response. *H. sommus* rapidly inhibited the Luminol-dependent chemiluminescence (LDCL) of BBM, and of BAM costimulated with opsonized *Staphylococcus aureus*. Inhibition of the LDCL response of BBM and BAM was abrogated with either opsonized or killed *H. sommus*. In contrast to inhibition LDCL of BMP, both BBM and BAM infected with *H. sommus* had stimulated production of NO. Using a calorimetric bactericidal assay, it was found that: (1) *H. sommus* was able to survive within BBM *in vitro* and the kinetics of its survival were similar to that seen in BBM isolated from experimentally infected cattle; (2) treatment of BBM with varying concentrations of  $\tau$ BoIFN- $\gamma$ , BoTNF- $\alpha$ ,  $\tau$ BoIL- $\beta$ ,  $\tau$ BoGM-CSF and *E. coli* LPS had no effect on the survival of *H. sommus*. Moreover, using ultrastructural studies, and <sup>3</sup>H-uracil incorporation into nucleic acids, it was possible to demonstrate the survival of *H. sommus* in BMP. These results indicate that the ability of *H. sommus* to modulate microbicidal activity of BMP would, in turn, assist the intracellular survival and immunopathogenesis of bovine haemophilosis.