Remodeling the surface proteome of *Anaplasma marginale* at the mammalian-vector interface

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In order to survive as a population, tick borne pathogens within the genera *Anaplasma* and *Ehrlichia* must be able to colonize both tick and mammalian cells. The interaction between the bacterial pathogen and the host cell is likely mediated by the surface proteome. Members of the *msp2* gene superfamily are conserved between these two genera, and are the predominant surface proteins. In addition to members of the *msp2* superfamily, other less well characterized, highly conserved proteins unrelated to *msp2* have been identified through genome sequencing and are also predicted to be surface expressed.

Proteomic analysis of the surface of *A. marginale* has verified that both *msp2* superfamily and non-superfamily proteins are expressed on the surface of *A. marginale* in close proximity to one another. Through cross-linking of *A. marginale* isolated from mammalian cells, a single, large protein complex is identified and analyzed by LC-MS/MS. Members of this protein complex include MSP1a, MSP2, MSP3, MSP4, OMP1, OMP7, OMP8, OMP9, OMP11, OpAG2, AM779, AM780, AM1011, AM854, and VirB10. In contrast, the similarly sized protein complex from *A. marginale* isolated from tick cells is composed of AM778, MSP2, MSP3, MSP4, and AM854. In addition, transcript levels of many of these *omps*, including *omp1*, *omp7*, *omp8*, *omp9*, and *omp11* are expressed at markedly lower levels in tick midgut cells than in mammalian cells. Protein expression of these OMPs, as determined by western blotting, is also decreased in tick cells as compared to mammalian cells.

These data indicate that dramatic remodeling of the surface of *A. marginale* occurs within the tick cell, and is partially regulated at the transcriptional level. The signals that induce this remodeling, the mechanism by which it occurs, and the functional significance of this remodeling are unknown. Understanding these mechanisms may lead to more targeted and effective methods to prevent the transmission of tick borne pathogens.