

## **A NOVEL MALARIA GENE, PG4, IS EXPRESSED PREFERENTIALLY IN SPOROZOITES ISOLATED FROM MOSQUITO SALIVARY GLANDS**

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In the Beerntsen laboratory one area of research focuses on gene expression in *Plasmodium* sporozoites, which are key developmental stages of the malaria parasite. Because the sporozoites exhibit infectivity for both mosquito salivary glands and vertebrate host tissue, they are excellent targets for efforts designed to prevent malaria transmission. Novel sporozoite genes are currently being isolated and characterized at the molecular, cellular and biochemical levels. Ultimately, characterization of these sporozoite genes may result in new or improved ways to control malaria by discovering new drug targets, potential vaccine candidates and/or molecules that can be used to genetically manipulate the mosquito vector to prevent malaria transmission. In the present study, *Plasmodium gallinaceum* sporozoites were isolated from mosquito salivary glands and a cDNA library was constructed. Following a heterologous screening technique, a gene, designated Pg4, was isolated from this sporozoite cDNA library. Pg4 is a novel gene as determined by BLAST analysis of its DNA sequence and translated protein sequence. It contains a signal peptide sequence that encodes a transmembrane domain as determined by PSORT, a protein sequence analysis program, and located near the carboxy terminus of the protein are amino acid tandem repeats. Transmembrane domains and repetitive sequences are characteristic of other *Plasmodium* surface antigens, suggesting that Pg4 may be a novel sporozoite surface antigen. Recombinant Pg4 protein (rPg4) was made and used to generate polyclonal antibodies that then were used in immuno-localization studies. Immuno-fluorescence assays suggest that Pg4 is a surface molecule and immuno-electron microscopy is being performed to confirm this cellular location. Interestingly, data suggest that Pg4 is preferentially expressed, at the mRNA and proteins levels, in the sporozoites isolated from mosquito salivary glands as compared to those isolated from oocysts located on the mosquito midgut. Homologs of Pg4 have been isolated from *P. falciparum* and *P. berghei* and their characterization is now in progress. Future studies include the use of the anti-Pg4 polyclonal antibodies as well as rPg4 in *in vivo* blocking studies to determine if Pg4 may play a role in the invasion of mosquito salivary glands or vertebrate host tissue.