Calreticulin, an *Anopheles albimanus* midgut protein binds to an ookinete protein (Pvs25) from *Plasmodium vivax* phenotypes VK210 and VK247

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Abstract

Ookinete invasion of the midgut is necessary for sporogonic development of the parasite in the mosquito. *Plasmodium* ookinetes interact with the mosquito midgut to establish the parasite and to continue further development into oocysts. Specific molecular interactions i.e. recognition, signaling and differentiation between the vector and the parasite must take place to allow the parasite to evolve until it reaches the infective sporozoite stage. We report herein an interaction between a mosquito midgut protein identified as Calreticulin (Crt) and a main ookinete protein (Pvs25) from the two phenotypes of *Plasmodium vivax* parasites (VK210 and VK247). Proteins from the membranous and aqueous phases of *An. albimanus* and *An. pseudopunctipennis* midguts were analyzed by overlay assays with recombinant Pvs25 from both *P.vivax* phenotypes in order to detect protein-protein interactions. Both recombinant proteins interacted with a protein of approximately 50 kDa identified as Calreticulin (Crt) from the membranous phase of *An. albimanus* midguts. Recombinant *An. albimanus* Calreticulin (rAnaCrt) was produced and used in overlay assays with the two recombinant Pvs25 proteins. *An. albimanus* recombinant calreticulin (rAnaCrt) was found to interact with both proteins. Antibodies against AnaCrt immunolocalized the protein along the microvilli area of *An. albimanus* midguts. By Western blot analysis, it was determined that antibodies recognized the native and recombinant protein. This study is the first to report a molecular interaction between a natural vector/parasite system. Identification of an interaction between AnaCrt protein from the midgut and the ookinete protein Pvs25 suggests that these two proteins could be interacting in a ligand/receptor manner.