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An Autotransporter Protein of *Orientia tsutsugamushi* Promotes Adherence to Non-phagocytic Host Cells

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Orientia tsutsugamushi, the causative agent of Scrub typhus, is an obligate intracellular bacterium that can replicate only within eukaryotic host cells. Bioinformatic analysis of *Orientia* genome revealed the presence of six genes termed sca that are predicted to encode for proteins with homology to autotransporter domain of Gram-negative bacteria. It has been reported that several members of the sca family in other *Rickettsia* are involved in the interaction with eukaryotic host cells, especially in adherence to and invasion of host cells. However, little is known about the function of *Orientia* Sca proteins. In this report, we demonstrate that one of the Sca proteins, OTBS_1686, is actively expressed in *O. tsutsugamushi* cells.

Sequence comparison of the sca genes from other strain illustrates that OTBS_1686 shows a high degree of sequence identity and conservation, suggesting that the Sca protein may play a conserved function. Using a surrogate expression system, the production of *O. tsutsugamushi* OTBS_1686 in *E. coli* outer membrane is sufficient to mediated adherence to but not invasion of non-phagocytic eukaryotic cells. We also examined whether pre-incubation of host cells with passenger domain of the Sca protein could affect the bacterial adhesion or invasion into eukaryotic host cells.

These results suggest that the identified sca gene of *O. tsutsugamushi* could be a novel target for Scrub typhus diagnosis or vaccine development

Keywords: *Orientia tsutsugamushi*, Autotransporter protein, Sca family, Adhesion