

*Mycoplasma penetrans* is an opportunist described primarily in the urogenital tracts of HIV/AIDS patients, where it has the potential to be an AIDS cofactor. Similar to several other species of the bacteria of the genus *Mycoplasma*, it has a cell pole that is modified for adherence to host cells and movement along surfaces, called an attachment organelle. Biochemical, cell biological, and microscopy-based experiments on *M. penetrans* have allowed us to infer the protein composition and some of the physical characteristics of the structural material within the interior of the attachment organelle, revealing a heterogeneity in construction that is distinct from other mycoplasma species. The results support our model that mycoplasmas have convergently evolved superficially similar polar adherence-associated structures for interactions with host cells.