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'*Candidatus* Liberibacter asiaticus' Encodes Two Novel Autotransporters that Target to Mitochondria

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As a phloem-limited, intracellular bacterial pathogen, '*Candidatus* Liberibacter asiaticus' (Las) has a significantly reduced genome and causes huanglongbing (HLB), a devastating disease of citrus worldwide. In this study, we characterized two novel autotransporter proteins of Las, and redesignated them as $LasA_I$ and $LasA_{II}$ in lieu of the previous names Hyv_I and Hyv_{II}. Proteins secreted by the type V secretion system (T5SS), known as autotransporters, are large extracellular virulence proteins localized to the bacterial poles. Bioinformatic analyses revealed that $LasA_I$ and $LasA_{II}$ share the structural features of an autotransporter family containing large repeats of a passenger domain and a unique C-terminal translocator domain. When fused to the GFP gene and expressed in *E. coli*, the $LasA_I$ C-terminus and the full length $LasA_{II}$ were localized to the bacterial poles, similar to other members of autotransporter family. Despite the absence of the signal peptide, $LasA_I$ was found to localize at the cell surface by immuno-dot blot using a monoclonal antibody against the partial $LasA_I$ protein. Its surface localization was also confirmed by the removal of the $LasA_I$ antigen using a proteinase K treatment of the intact bacterial cells. When co-inoculated with a P19 gene silencing suppressor and transiently expressed in tobacco leaves, the GFP-$LasA_I$ translocator targeted to the mitochondria. This is the first report that Las encodes novel autotransporters that target to mitochondria. These findings may lead to a better understanding of the pathogenesis of this intracellular "energy parasitic" bacterium, and to more efficient characterizing new molecular targets for HLB control.