Characterizing the Secretion of the Francisella tularensis Protein FTL_1123

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Francisella tularensis is a gram-negative, highly infectious bacterium. It is the causative agent of the disease tularemia, which suppresses and evades intracellular innate immune responses. Recently, studies have examined the involvement of ToIC protein channels in F. tularensis pathogenesis because of its role in the secretion of virulence factors and therefore the survival of F. tularensis into host cells. ToIC channels often secrete proteins containing RTX (repeat in toxin) motifs which rely on secretion signals found in the C-terminus of such proteins. Using BLAST it was determined that the C-terminus of the FTL_1123 protein expressed by F. tularensis has a region of local similarity to the RTX protein FrpC expressed by Neisseria meningitidis. This suggested that the predicted RTX motif in FTL_1123 may serve as a domain required for its secretion through ToIC channels. Studies conducted aimed to determine If FTL_1123 is secreted in a ToIC dependent manner and whether its predicted RTX domain is required for outer membrane localization. It was found that FTL_1123 localized to the outer membrane without ToIC channels. However, these results cannot ascertain whether FTL_1123 is secreted in a ToIC dependent manner because of limitations regarding overexpression to detect the protein. Additionally, it was found that the predicted RTX motif was significant to FTL_1123 outer membrane localization. These results clarify the role of the predicted RTX motif and ToIC in F. tularensis secretion systems. This may allow scientists to create novel therapies and gain an improved understanding of infection mechanisms.

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