**Supplementary Table 1. Summary of protein antigen and assay characteristics**

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| **Protein** | **Size** | **Function** | **Expression**  **Vector** | **Presence of histidine tag (HIS-tag)** | **Endotoxin concentration** | **Putative chargea** | **Preferentially bound lipopeptide adjuvant** |
| MUL\_3720 | 22kDa | Putative cell-wall associated protein | pDest17 | N-terminal 6x histidine tag | Below detectable limit | -13.7 | R4Pam2Cys at 1:5 protein to lipopeptide ratio |
| Hsp18 | 18kDa | Heat shock protein | pET-30b MODb | N-terminal 6x histidine tag | Below detectable limit | -5.8 | R4Pam2Cys at 1:5 protein to lipopeptide ratio |

a As calculated by <https://pepcalc.com/protein-calculator.php> (Innovagen) using translated amino acid sequence from DNA sequence.

b Commercial Novagen pET-30b vector was modified to exclude DNA sequence from the end of the *Nde*I restriction site and three bases from the beginning of the *Eco*RV restriction site.