Interaction between Pasteurella multocida B: 2 and its derivatives with bovine aortic endothelial cell (BAEC)

ABSTRACT

Background: *Pasteurella multocida* B:2 causes bovine haemorrhagic septicaemia (HS), leading to rapid fatalities in cattle and buffaloes. An attenuated derivative of *P. multocida* B:2 GDH7, was previously constructed through mutation of the *gdhA* gene and proved to be an effective live attenuated vaccine for HS. Currently, only two potential live attenuated vaccine candidates for HS are being reported; *P. multocida* B:2 GDH7 and *P. multocida* B:2 JRMT12. This study primarily aims to investigate the potential of *P. multocida* B:2 GDH7 strain as a delivery vehicle for DNA vaccine for future multivalent applications. Results: An investigation on the adherence, invasion and intracellular survival of bacterial strains within the bovine aortic endothelial cell line (BAEC) were carried out. The potential vaccine strain, *P. multocida* B:2 GDH7, was significantly better ($p \leq 0.05$) at adhering to and invading BAEC compared to its parent strain and to *P. multocida* B:2 JRMT12 and survived intracellularly 7 h post treatment, with a steady decline over time. A dual reporter plasmid, pSRGM, which enabled tracking of bacterial movement from the extracellular environment into the intracellular compartment of the mammalian cells, was subsequently transformed into *P. multocida* B:2 GDH7. Intracellular trafficking of the vaccine strain, *P. multocida* B:2 GDH7 was subsequently visualized by tracking the reporter proteins via confocal laser scanning microscopy (CLSM). Conclusions: The ability of *P. multocida* B:2 GDH7 to model bactofection represents a possibility for this vaccine strain to be used as a delivery vehicle for DNA vaccine for future multivalent protection in cattle and buffaloes.

Keyword: Pasteurella multocida; Haemorrhagic septicaemia; Bovine aortic endothelial cell; Bactofection; DNA vaccine