Analysis of the vaccine potential of nine MAP specific proteins, identified by immunoproteomics and in silico bio-informatic screening, in a murine model

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OBJECTIVE
Control of Mycobacterium avium subsp. paratuberculosis (MAP) is seriously hampered by the lack of adequate diagnostic tools, vaccines and therapies. In this study, we have evaluated the vaccine potential of nine MAP proteins: MAP3199, MAP2677c, MAP1693c, previously identified by immunoproteomic analysis of MAP secretome (Leroy et al., 2007) and Ag5, Ag6 (not-annotated), MAP1637c, MAP0388, MAP3743 and MAP3744 identified by bioinformatic in silico screening of the MAP genome.

MATERIALS AND METHODS
BALB/c and C57BL/6 mice were vaccinated with plasmid DNA encoding the nine selected candidates as described before (Roupie et al., 2008). Three weeks after the last immunisation, Th1 type cytokine responses (IL-2 and IFN-γ) against the respective purified recombinant proteins were tested on spleens from individual mice. Levels of antigen-specific total immunoglobulin G (IgG), IgG1, IgG2a and IgG2b antibodies were determined by ELISA. Six weeks after the last immunization, mice were challenged intravenously with luminescent MAP ATCC 19698 (2X10⁶ CFU/mice). Mice were sacrificed and the number of bioluminescent bacteria was determined in spleen and liver homogenates at 4, 8 and 12 weeks after challenge (Rosseels et al., 2006).

RESULTS
Vaccination with DNA encoding MAP1637c (predicted carboxylase) induced the strongest Th1 type immune responses, both in BALB/c and C57BL/6 mice, confirming previous findings on the potential of this in silico selected antigen for the serodiagnosis of bovine paratuberculosis in cattle (Leroy et al., 2009). Protective potential of the nine antigens was weaker than the one we have reported for the putative transglycosylase MAP0586c (Roupie et al., 2008).

CONCLUSION
Plasmid vaccination, coupled to the use of bioluminescent MAP is a powerful tool for the screening of the vaccine potential of paratuberculosis antigens in mice.

REFERENCES