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Vaccination with peptides of *Mycobacterium avium* subsp. *paratuberculosis* (MAP) reduces MAP burden of infected goats

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Mycobacterium avium subsp. *paratuberculosis* (Map) is the cause of paratuberculosis, a chronic enteritis of ruminants that is widespread worldwide. We investigated the effect of post-exposure vaccination with Map specific peptides in a goat model aiming at developing a Map vaccine that will neither interfere with diagnosis of paratuberculosis nor bovine tuberculosis.

Peptides were initially selected by two strategies 1) in silico selection of unique Map peptides (compared to other *Mycobacteria*) (n =51) and with predicted binding to 5 known bovine MHC class II molecules or 2) hydrophobic peptides unique to Map from selected proteins (n =68).

For vaccination, 23 MAP peptides (20 µg each) were selected and formulated with Montanide ISA 61 VG adjuvant. At age three weeks 10 goats were orally inoculated with 4x10E9 live Map and assigned to two groups of 5 goats each: 5 vaccinated (V) at 14 and 18 weeks post inoculation (PI) and 5 unvaccinated (C). At termination 32 weeks PI, Map burdens in 15 intestinal tissues and lymph nodes were determined by IS900 qPCR.

Of the 75 tissue samples from the 5 C goats only 5 samples were IS900 qPCR negative. In contrast, only 9 samples in total from 5 V goats were IS900 positive. All V goats responded with strong IFN-γ responses to peptides after vaccination while C goats were unresponsive. IFN-γ responses to PPDj were low in all goats at all times, except for one V goat that responded from 26 weeks PI and onwards. A single goat in the C group seroconverted in ID Screen ELISA at last sampling.

The results indicate that a peptide vaccine against Map can induce a protective immune response against paratuberculosis.

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