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TITLE

HUMORAL AND CELLULAR IMMUNE RESPONSES AFTER ADMINISTRATION OF INNOVATIVE MYCOPLASMA HYOPNEUMONIAE BACTERINS IN PIGS

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CONTENT

Current vaccines against Mycoplasma hyopneumoniae only provide partial protection against clinical symptoms and lung lesions. New vaccine formulations that include novel strains of the micro-organism formulated with innovative adjuvants could improve vaccine efficacy. The aim of this experimental study was to screen innovative bacterin formulations based on the virulent and recently isolated M. hyopneumoniae field strain F7.2C for their ability to induce potent specific antibody and T-cell responses in pigs.

Seven groups (n=6) were primo- (D0; 39 days old) and booster (D14) vaccinated with five different experimental bacterin formulations, the commercial bacterin Hyogen® (Ceva) as a positive control or PBS as a negative control. The bacterin was either formulated with DPPC:DC-Chol liposomes + C-di-AMP (Lipo_AMP), DPPC:DC-Chol liposomes + Toll-like receptor (TLR) ligands (CpG ODN, resiquimod and Pam3Cys-SK4) (Lipo_TLR), PLGA:CTAB microparticles + TLR ligands (PLGA_TLR), squalene-in-water emulsion + TLR ligands (SWE_TLR) or DDA liposomes + mincle ligand TDB (Lipo_DDA:TDB). Mycoplasma hyopneumoniae-specific antibody levels in serum by ELISA and the production of cytokines (IFN-?, TNF, IL-17) by T-cells following restimulation with bacterin (intracellular multi-color flow cytometry) allowed us to assess the M. hyopneumoniae-specific immune responses induced by each formulation.

On D28, 6/6 pigs from groups Lipo_AMP, Lipo_TLR, SWE_TLR, Lipo_DDA:TDB and Hyogen, and 2/6 pigs from group PLGA_TLR were seropositive. Significant specific serum IgG responses were found in groups Lipo_AMP, SWE_TLR, Lipo_DDA:TDB and Hyogen ($p?0.05$), and were the highest for Lipo_DDA:TDB and Hyogen. In groups SWE_TLR, Lipo_DDA:TDB and Hyogen, three or more animals showed a Th1 response at D14. At D28, groups SWE_TLR and Lipo_DDA:TDB showed a significant Th1 response, while a significant IL-17 response was seen in group PLGA_TLR ($p?0.05$).

Considering their potency to induce Th1 or Th17 responses, formulations PLGA_TLR, SWE_TLR and lipo_DDA:TDB seem to be promising M. hyopneumoniae vaccine candidates and were selected for future testing in a vaccination-challenge study.