Poster

In vivo testing of safety and immunogenicity of new vaccine candidates against PCV2 designed for a better performance than that showed by currently marketed vaccines

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ABSTRACT

Porcine circovirus type 2 (PCV2) is a globally distributed virus causing considerable economic losses. It affects mainly piglets after the weaning, leading to the disease known as postweaning multisystemic wasting syndrome, whose consequences are death or a significant reduction of pigs fattening rate. PCV2 also affects pregnant sows, leading to abortions. There are four commercial vaccines against PCV2, two killed vaccines and two recombinant vaccines. All of them are based on PCV2 strains of genotype a, which was predominant in the field when the vaccines were marketed. Since live replicative virus could not be used as vaccines, these vaccines lead to prevention of symptoms but not to complete viral clearance. Vaccinated and infected pigs can still infect other pigs. Today the predominant genotypes are PCV2 b and d. Although the marketed vaccines showed cross-protection against heterologous genotypes, it is suboptimal and there are increasing cases of vaccine escape by new PCV2 strains. ADL Bionatur Solutions designed and produced three new generation recombinant vaccine candidates, BNT029, 030, and 031 with two goals: improve antigenic presentation to achieve better viral clearance and to raise specific immunity against the new genotypes. In this project, the vaccine candidates have been tested in vivo for safety and immunogenicity in comparison with the current commercial leader, Ingelvac CircoFLEX® from Boehringer Ingelheim. In mice, the new candidates raised cell-mediated immunity of higher intensity than that raised by the commercial gold standard, and with a more significant Th1-specific component biased to the PCV2b and PCV2d genotypes. In an experimental trial in piglets, immunization with BNT029, 030, and 031 did not lead to any adverse effect. The three new candidates led to seroconversion, with antibody titers significantly higher than those raised by the commercial gold standard. While the antisera raised in piglets by Ingelvac CircoFLEX predominantly recognized viral antigens derived from a PCV2a strain, the antisera raised by BNT029, 030, and 031 predominantly recognized viral antigens derived from PCV2b and PCV2d strains. Therefore, we have confirmed the initial hypotheses aimed for the new candidates. Currently, we are carrying out serum neutralization assays to confirm that the immune response raised by the new candidates in piglets can neutralize effectively the infection by the currently predominant viral strains of PCV2.

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