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Evaluation of nanoparticle-delivered inactivated whole antigen against *Chlamydia psittaci* infection in SPF chickens

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Avian *Chlamydia psittaci* (*C. psittaci*) is threatening to poultry industry as well as the closely contacted humans due to highly prevalence and lack of the commercial vaccine. A novel nanoparticle vaccine with the cellular-elicited adjuvant was prepared to achieve a better immune response against *C. psittaci* infection and it included a gel-formed or a microsphere-formed chitosan as a deliver particle, standard CPG or VCG as the adjuvant and the inactivated elemental bodies of *C. psittaci*. Total of 105 SPF chickens aged 7-day old was divided into seven groups, 15 birds per group. Chickens received the nanovaccine with CpG or VCG adjuvant by intranasal administration or by intramuscular route. Meanwhile, birds were inoculated with r-MOMP, or inactivated whole EB or gel chitosan or microsphere chitosan as the control group. All above groups were immunized and boosted with 14 day interval. Post immunization, *C. psittaci* specific antibodies were detected weekly. After boosting, lymphocyte proliferation, T cell subsets, cytokines were monitored using commercial kits. Finally, birds were challenged with 1×10^8 IFU/ml live EBs of virulent *C. psittaci* via larynx inoculation and chlamydial shedding were determined using cell culture. Post prime-boost strategy, birds with VCG-adjuvant nanoparticle induced an increasing-trend antibody and no statistical difference was found as compared to rMOMP vaccine. However, VCG-adjuvant nanoparticle yielded a highly splenic lymphocyte proliferation, CD4+/CD8+ ratio, as well as significant elevation of IFN- γ , IL-2 and IL12p40 in lung lavage fluids. Moreover, a reducing trend of chlamydial shedding was found in the birds with VCG-adjuvant nanoparticle. Lesion index in lungs and air sacs were also reduced in the birds with the VCG-adjuvant nanoparticle vaccine. Taken together, VCG-adjuvant nanoparticle vaccine via mucosal immunization is a promising approach against *C. psittaci* infection.

Biography

Cheng He completed his Bachelor of Veterinary Medicine at Beijing Agricultural University in 1990. As a Visiting Scholar, he studied at Manchester University, Moredun Research Institute in 2005 and Morehouse School of Medicine, USA in 2013. He focuses on "Epidemiology, infection and immunity of chlamydiosis". In addition to more than 40 peer-reviewed international publications, he was funded four projects by NSFC, five projects by Ministry of Science and Technology (MOST), China, two projects by Beijing National Natural Science Foundation, two PhD dissertations by Ministry of Education, China and three projects by National Bureau. Finally, he got one vaccine certificate against *C. psittaci* using recombinant MOMP as vaccine candidate and registered Salmovir against pigeon NDV and salmonellosis for Poland. With respect to his innovations, he received 16 Chinese patents.

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