

Inoculation of fowlpox viruses coexpressing avian influenza H5 and chicken IL-15 cytokine gene stimulates diverse host immune responses

ABSTRACT

Fowlpox virus (FWPV) has been used as a recombinant vaccine vector to express antigens from several important avian pathogens. Attempts have been made to improve vaccine strains induced-host immune responses by coexpressing cytokines. This study describes the construction of recombinant FWPV (rFWPV) strain FP9 and immunological responses in specific-pathogen-free (SPF) chickens, co-expressing avian influenza virus (AIV) H5 of A/Chicken/Malaysia/5858/2004, and chicken IL-15 cytokine genes. Expression of H5 (50 kD) was confirmed by western blotting. Anti-H5 antibodies, which were measured by the haemagglutinin inhibition test, were at the highest levels at Week 3 post-inoculation in both rFWPV/H5- and rFWPV/H5/IL-15-vaccinated chickens, but decreased to undetectable levels from Week 5 onwards. CD3⁺/CD4⁺ or CD3⁺/CD8⁺T cell populations, assessed using flow cytometry, were significantly increased in both WT FP9- and rFWPV/H5-vaccinated chickens and were also higher than in rFWPV/H5/IL-15- vaccinated chickens, at Week 2. Gene expression analysis using real time quantitative polymerase chain reaction (qPCR) demonstrated upregulation of IL-15 expression in all vaccinated groups with rFWPV/H5/IL-15 having the highest fold change, at day 2 (117±51.53). Despite showing upregulation, fold change values of the IL-18 expression were below 1.00 for all vaccinated groups at day 2, 4 and 6. This study shows successful construction of rFWPV/H5 co-expressing IL-15, with modified immunogenicity upon inoculation into SPF chickens.

Keyword: Avian influenza virus; Fowlpox virus; Haemagglutinin; Interleukin-15; Interleukin-18