Ascaridia galli infection influences the development of both humoral and cell-mediated immunity after Newcastle Disease vaccination in chickens - DTU Orbit (28/03/2019)

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Potent vaccine efficiency is crucial for disease control in both human and livestock vaccination programmes. Free range chickens and chickens with access to outdoor areas have a high risk of infection with parasites including Ascaridia galli, a gastrointestinal nematode with a potential influence on the immunological response to vaccination against other infectious diseases. The purpose of this study was to investigate whether A. galli infection influences vaccine-induced immunity to Newcastle Disease (ND) in chickens from an MHC-characterized inbred line. Chickens were experimentally infected with A. galli at 4 weeks of age or left as non-parasitized controls. At 10 and 13 weeks of age half of the chickens were ND-vaccinated and at 16 weeks of age, all chickens were challenged with a lentogenic strain of Newcastle disease virus (NDV). A. galli infection influenced both humoral and cell-mediated immune responses after ND vaccination. Thus, significantly lower NDV serum titres were found in the A. galli-infected group as compared to the non-parasitized group early after vaccination. In addition, the A. galli-infected chickens showed significantly lower frequencies of NDV-specific T cells in peripheral blood three weeks after the first ND vaccination as compared to non-parasitized chickens. Finally, A. galli significantly increased local mRNA expression of IL-4 and IL-13 and significantly decreased TGF-β4 expression in the jejunum two weeks after infection with A. galli. At the time of vaccination (six and nine weeks after A. galli infection) the local expression in the jejunum of both IFN-γ and IL-10 was significantly decreased in A. galli-infected chickens. Upon challenge with the NDV LaSota strain, viral genomes persisted in the oral cavity for a slightly longer period of time in A. galli-infected vaccinees as compared to non-parasitized vaccinees. However, more work is needed in order to determine if vaccine-induced protective immunity is impaired in A. galli-infected chickens.

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