

Comparison of protection against vvMDV induced by different Marek's disease vaccinations in SPF chickens

Jules Petits, Hanny Swam, Kimshana May, Ha-Jung Roh, Corrado Longoni, Fernando Vargas, Rik Koopman

Marek's disease (MDV) is a lymphoid neoplastic disease of chickens. Clinical signs of MD include depression, weight loss, and neurological disorders but some birds can show no visual symptoms until their sudden death. Oncogenic immunosuppression caused by MD greatly impacts production performance resulting in huge economic losses in the poultry industry. Marek's disease is caused by alpha-herpesvirus and establishes chronic infection in chickens and presents ubiquitously worldwide. To control MD, live attenuated strains of MDV such as CVI988/Rispens Gallid alphaherpesvirus 2 (serotype 1), and non-oncogenic Gallid alphaherpesvirus 3 (serotype 2) SB-1 strain, and herpes virus of turkey (HVT) Meleagrid alphaherpesvirus 1 (serotype 3) have been used as either single or combined vaccines depending on field challenge conditions. In this study, we compared the efficacy of Nobilis® Rismavac, Nobilis® Rismavac combined with Innovax®-ND-IBD, RN1250 (Marek's vaccine containing live herpes chimera strain called RN1250, company A), and RN1250 combined with rHVT-IBD following subcutaneous application. A total of 150 SPF layer chicks were randomly assigned into 5 groups of 30 birds: group 1 – no vaccination, challenge control, group 2 – vaccinated with Nobilis® Rismavac and challenged, group 3 – vaccinated with Nobilis® Rismavac + Innovax®-ND-IBD and challenged, group 4 – vaccinated with RN1250 and challenged, group 5 – vaccinated with RN1250 + rHVT-IBD and challenged. After SPF chicks are vaccinated at 1 day of age according to the group allocation, they are placed in separate negative pressured isolators (10 chickens per isolator). To evaluate the efficacy of vaccination, a very virulent MDV (vvMDV) RB1B challenge strain was inoculated intramuscularly at 5 days of age. Following the challenge, all groups were scored for clinical signs of MD for up to 70 days post-challenge (dpc). At the end of the study, all remaining chickens were humanely euthanized and evaluated for macroscopic lesions. The relative protection rate (RPP) was calculated for all groups according to MD vaccine (live) section 2-3-3 in the European Pharmacopeia (Ph. Eur.). The results of this study showed moderate to high levels of protection induced by vaccination against the vvMDV RB1B challenge. All chickens of group 1 (challenge control group) were euthanized between 10 to 11 dpc due to notable clinical signs of Marek's disease, which confirmed the virulence of the challenge virus used in the study. Among all vaccinated groups, the highest relative protection percentage (RPP) of 96.7% was observed in group 3: Nobilis® Rismavac + Innovax®-ND-IBD vaccinated birds. While the group vaccinated with RN1250 + rHVT-IBD (group 5) showed an RPP of 90%, the single RN1250 vaccination (group 4) showed 63.3% of RPP and scored the lowest among vaccinated groups, compared to an RPP of 89.7% of the Nobilis® Rismavac vaccinated birds (group 2). The birds vaccinated with RN1250 were the only group that did not meet the Ph. Eur. requirement of 80% protection. To summarize, the results confirmed that a proper vaccination against vvMDV can be acquired using a single MDV vaccine or combination with recombinant HVT vaccines, however, the results also confirm that not all MDV vaccines yield the same high-level protection, which needs to be reminded when selecting MDV vaccines for optimal protection.