Jin-Yong Noh et al., J Vaccines Vaccin 2018, Volume 9
DOI: 10.4172/2157-7560-C2-066

Development of a novel thermostable Newcastle disease virus vaccine vector from wild bird origin

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Newcastle disease (ND) is one of the most devastating diseases in poultry with huge losses worldwide. As a causative agent of ND, Newcastle disease virus (NDV) has a wide host range, more than 250 bird species have been reported to be susceptible to the virus. Each NDV isolated from different origins of birds exhibit different host ranges and tissue tropism. For example, NDV isolated from chicken couldn't transmit through ducks; however, NDV isolated from duck could transmit through chickens. Thus, the origin of NDV strain could be an important factor of vaccine use to specific hosts. In previous study, we found the NDV K148/08 strain from feces of wild mandarin duck and tested for its characteristics. This strain exhibited thermos-stability against heat treatment, enhanced immunogenicity and safety relative to commercially available vaccine strains in chicken. In this study, we utilized the K148/08 strain as a backbone virus to develop a thermostable NDV vaccine vector to broad-range of hosts by using reverse genetics technology. To evaluate the difference between its parental virus and rescued virus, pathogenicity and growth ability was examined by virus titration in eggs, mean death time (MDT), and intracerebral pathogenicity index (ICPI). The rescued virus showed similar features with parental virus as shown in long MDT and low ICPI. Also, it showed similar thermo-stability that can increase the value of vaccine because it does not require a cold chain. NDV vaccine with this strain could increase its utility by future study of adding foreign gene from pathogens that can affect a wide variety of poultry such as highly pathogenic avian influenza (HPAI) because it can be used to broad-range of hosts.

Biography

Jin-Yong Noh is a PhD candidate at Konkuk University, Seoul, South Korea. His primary research interest is evaluating the pathogenicity, transmissibility, and evolution of poultry pathogens such as avian influenza, Newcastle disease virus, avian reovirus, and making vaccines for these pathogens. He developed virus-like particle (VLP) vaccine against HPAI and ND by using baculovirus system and tested its efficacy in chickens. He also tested pathogenicity and transmissibility of clade 2.3.4.4 HPAI in ferret models to investigate its pandemic potential.

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