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Comparison of the efficacy of different commercial and experimental vaccines against H5N1 highly pathogenic avian influenza

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Several vaccines are in use or in development which are claimed to confer protection against highly pathogenic avian influenza virus (HPAIV) infections. However, their efficiency has primarily been assessed individually, making a comparative appraisal difficult due to varying experimental designs. Thus, we conducted an animal trial to evaluate in parallel the protective efficacy of three commercially available inactivated vaccines based on influenza strains H5N2 (A), H5N3 (C) and H5N9 (B) as well as two hemagglutinin expressing vector vaccines (Modified vaccinia virus Ankara (MVA)-H5 and Newcastle disease virus (NDV)-H5)) against HPAIV of subtype H5N1. After a single immunization of specific-pathogen-free chickens a faster onset of immunity was induced by live virus vaccination, whereas in birds immunized with the inactivated vaccines higher H5-specific humoral antibody titers were observed at the time of challenge infection. All vaccines significantly protected against a lethal dose of A/duck/Vietnam/TG24-01/2005 three weeks after immunization. No viral shedding could be detected in birds immunized with vaccine A. In contrast, viral RNA was detected by real-time RT-PCR in swabs of 10%, 20%, 50% and 70% of NDV-H5, vaccine C, MVA-H5 and vaccine B immunized chickens, and 0%, 10%, 30% and 50% of animals, respectively, shed infectious virus. Considering the advantage of live NDV which is suitable for mass application as well as the potential use of this H5-expressing vector vaccine for easy identification of infected flocks based on antibodies against conserved AIV proteins, NDV-H5 could represent an alternative for extensive vaccination against AI in chickens.

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