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Application of non-pathogenic PB2 gene of low pathogenic avian influenza virus to H5N1 highly pathogenic avian influenza to generate novel vaccine against HPAI in Korea

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Avian influenza (AI) vaccines for poultry are based on hemagglutinin (HA) proteins and protection is specific to the vaccine subtype. Since 2004, AI vaccine strains have been developed using reverse genetic systems. Recent pair-wise comparison with internal genes of A/chicken/Korea/01310/2011 (H9N2; 01310) and A/chicken/Korea/KBNP-0028/2000 (H9N2; 0028) revealed that recombinant PR8 viruses possessing the PB2 of 01310 or NS of 0028 decreased pathogenicity in mice, protected against PR8 challenge and increased replication efficiency in embryonated chicken eggs (ECEs). And the LPAI H5N1 recombinant virus containing PB2 of 01310 or NS of 0028 reduced pathogenicity in mice and had high replication efficiency in ECEs. In the present study, we generated PR8-derived H5N1 recombinant viruses which have HA and NA gene of H5N1 HPAI virus A/mandarin duck/Korea/K10-483/2010 (K10-483), PB2 of 01310 and NS of 0028. The reassorted H5N1 virus possessing PB2 of 01310 [rH5N1-PB2(01310)] showed significantly higher replication efficacy in ECEs than the control H5N1 recombinant virus that containing six internal genes of PR8 (rH5N1). In contrast, replication efficacy in MDCK cell of recombinant virus that is harboring PB2 of 01310 and NS of 0028 [rH5N1-PB2(01310)-NS(0028)] was significantly lower than that of rH5N1. All recombinant viruses did not cause body weight loss in mice, although only control rH5N1 virus replicated in the lungs of inoculated mice. Thus, the novel vaccine strains that containing PB2 and NS gene of LPAIV may be useful to develop safe and efficacious vaccines.

Biography

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