

Transmission of highly pathogenic avian influenza H5N1 virus in pekin ducks is significantly reduced by a genetically distant H5N2 vaccine

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Domestic ducks play an important role in the epidemiology of H5N1 avian influenza. It has been shown that free-ranging ducks act as a reservoir of H5N1 avian influenza viruses (Songserm et al., 2006), and are a risk factor for the presence of H5N1 virus infections of domestic poultry (Gilbert et al., 2006; Gilbert et al., 2008). Vaccination is a potentially attractive tool for the prevention and control of avian influenza outbreaks. It is known that vaccines that have a high homology with the challenge virus are able to prevent infection in ducks, but not all currently used vaccines have this high homology with the recent Asian H5N1 viruses. To study and quantify the effectiveness of a widely used, genetically more distant vaccine (A/Chicken/Mexico/232/94/CPA) we performed transmission experiments.

Vaccinated Pekin ducks were inoculated with H5N1 virus (A/Chicken/China/1204/04), and housed together with five uninfected vaccinated ducks. The infection chain was monitored using tracheal and cloacal swabs. The swabs were analyzed using virus isolation in embryonated chicken eggs and RRT-PCR. The statistical analyses are based on a stochastic SEIR epidemic model, with the aim to obtain estimates of the basic reproduction ratio (R), as well as the infectious period and the transmission rate parameter (I^2).

The quantitative analyses show that despite the low level of homology between the virus and vaccine strain transmission was significantly reduced two weeks after a single or double vaccination. Mortality and disease rates were reduced markedly already one week after a single vaccination.