The evolutionary dynamics of LPAI H9N2 virus circulating in vaccinated and unvaccinated poultry.

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There are two problems with avian influenza (AI) virus that cause flu in poultry: pathogenicity in poultry and possible effects on human health. Different from the high pathogenic avian influenza (HPAI), the outbreaks of low pathogenic avian influenza (LPAI) that occurred among wild birds naturally, and causing no symptoms or only mild disease in poultry. It seems less severe but deserves sufficient attention as well. In some countries promoting vaccination policy (including China), the avian influenza vaccines used in poultry are increasingly used at a large-scale and long-term. This might force AI viruses to escape the immunity from the current-used vaccine. As a typical LPAI, H9N2 subtype AI virus is frequently isolated and widespread in China. Besides, for domestic poultries, the H9N2 subtype AI viruses could circulate in the host population for a long time. In this period, it has a good chance to mutate, adapt further to the host and escape the immunity. In addition, the long-term vaccination in commercial poultry determines the immunity encountered by the viruses and thus already triggered the antigenic drift. However, information on the impact of poultry vaccination on the evolutionary dynamics of AI viruses in the field is limited. In this research project, we will study the role of virus evolution in the failing vaccination program against H9N2 viruses in China. We are curious that if these evolutionary patterns could help generate the immune-escape strains.