

Why do some influenza virus subtypes die out?

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Every so often we hear about a new strain of influenza virus which has appeared and in some cases may sweep across the globe in a pandemic, much as the H1N1 virus did last year. What happens to the old seasonal viruses? In an opinion piece in the current issue of *mBio* Peter Palese and Taia Wang of the Mount Sinai School of Medicine in New York City postulate one theory.

"The emergence of novel viruses, historically, has often been coupled with the disappearance of existing seasonal [virus strains](#)," they write. "Here, we propose that the elimination seasonal strains during virus pandemics is a process mediate, at the population level, by humoral immunity."

Specifically, Palese and Wang think the reason may be that the new strain retains a critical characteristic of the old strains: the stalks that holds up the hemagglutinin blobs on the surface of the virus (i.e. the 'H' in H1N1).

They suggest that infection with the new influenza virus in people who have been previously infected with influenza virus elicits an anti-stalk antibody response. These antibodies are not strong enough to prevent infection but can recognize a wide variety of [influenza viruses](#). When the immune system confronts the new flu virus, these broadly-neutralizing anti-stalk antibodies are deployed to fight it, lessening the severity of the [novel virus](#), but also eliminating the old virus. Palese and Wang say antibodies against another surface protein, viral neuraminidase (i.e. the

'N' in H1N1), can act in much the same way.

"The present discussion suggests that the induction of a large-scale humoral immune response against conserved hemagglutinin stalk epitopes and/or against the neuraminidase protein results in the clearance of old seasonal [influenza virus](#) strains," they write.

More information: Why Do Influenza Virus Subtypes Die Out? A Hypothesis, 30 August 2011 *mBio* vol. 2 no. 5 e00150-11. doi: 10.1128/mBio.00150-11

ABSTRACT

Novel pandemic influenza viruses enter the human population with some regularity and can cause disease that is severe and widespread. The emergence of novel viruses, historically, has often been coupled with the disappearance of existing seasonal virus strains. Here, we propose that the elimination of seasonal strains during virus pandemics is a process mediated, at the population level, by humoral immunity. Specifically, we suggest that infection with a novel virus strain, in people previously exposed to influenza viruses, can elicit a memory B cell response against conserved hemagglutinin stalk epitopes and/or neuraminidase epitopes. The anti-stalk and/or anti-neuraminidase antibodies then act to diminish the clinical severity of disease caused by novel influenza viruses and to eliminate seasonal virus strains.

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