Millions are affected by the influenza virus each year. Although vaccines are available, they must be updated on a yearly basis to match the circulating viruses; these updates are based on what epidemiologists predict will be circulating. A vaccine that provides broad immunity against the virus would reduce the frequency of needed updates and could potentially limit both epidemic and pandemic influenza virus outbreaks.

Drs. Huber and Fang have used DNA shuffling to combine immunogenic epitopes from H1N1 influenza A HA genes. The parental viruses used represent major phylogenetic clusters including HA from both human and swine viruses. The novel HA antigens developed were designed to induce broad immunity against both swine- and human-origin influenza A viruses within the H1N1 subtype.

The data gathered suggest that chimeric HA antigens generated by DNA shuffling have the ability to induce broad, protective antibody responses to H1N1 influenza A virus challenge. Vaccines generated using this approach incorporate a variety of epitopes that are not expressed by a single natural HA, and inoculation with these diverse epitopes can increase the breadth of antibody response. As both human and swine origin HA genes were used to construct these vaccines, the resulting product has the capacity to limit influenza virus transmission in both pigs and humans. Additionally, the vaccines could be delivered early in a pandemic, or in the pre-pandemic phase, to limit interspecies transmission events that are often associated with pandemic events.