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Novel approaches for the development of live attenuated influenza vaccines

Influenza virus still represents a considerable threat to global public health, despite the advances in the development and wide use of influenza vaccines. Vaccination with traditional inactivate influenza vaccines (IIV) or live-attenuated influenza vaccines (LAIV) remains the main strategy in the control of annual seasonal epidemics but it does not offer protection against new influenza viruses with pandemic potential those that have shifted. Moreover, the continual antigenic drift of seasonal circulating influenza viruses requiring yearly reformulation of seasonal influenza vaccines, seriously compromises vaccine efficacy. Therefore, the quick optimization of vaccine production for seasonal influenza and the development of new vaccine approaches for pandemic viruses is still a challenge for the prevention of influenza infections. Moreover, recent reports have questioned the effectiveness of the current LAIV because of limited protection, mainly against the influenza a virus (IAV) component of the vaccine. Although the reasons for the poor protection efficacy of the LAIV have not yet been elucidated, researchers are encouraged to develop new vaccines that overcome the limitations that are associated with the current LAIV. The discovery and implementation of plasmid-based reverse genetics has been a key advance in the rapid generation of recombinant attenuated influenza viruses that can be used for the development of new and most effective LAIV. In this review, we provide an update regarding the progress that has been made during the last five years in the development of new LAIV and the innovative ways that are being explored as alternatives to the currently licensed LAIV. The safety, immunogenicity and protection efficacy profile of these new LAIVs reveal their possibility in combating influenza infections. However, efforts by vaccine companies and government agencies will be needed for developing and approving respectively these new vaccine methodologies for the control of influenza infections.

Biography

Huan Xu has her expertise in discovery of new biotechnology drugs, including recombinant long-lasting protein, bi-specific antibody and vaccines. She received her Bachelor and Doctoral degree both from Peking University. After graduation, she joined the North China Pharmaceutical Company as a Senior Scientist. The methods presented here utilize expansion of the genetic code (Lei Wang, 2001) of influenza a virus. It may become a general approach for generating live virus vaccines.