

Adaptation of Avian Influenza A (H6N1) Virus from Avian to Human Receptor-binding Preference

Jianxun Qi^{1*}

¹Institute of Microbiology, CAS

Background/Objective

The receptor-binding specificity of influenza A viruses is a major determinant for the host tropism of the virus, which enables interspecies transmission. In 2013, the first human case of infection with avian influenza A (H6N1) virus was reported in Taiwan.

Method

To gather evidence concerning the epidemic potential of H6 subtype viruses, we performed comprehensive analysis of receptor-binding properties of Taiwan-isolated H6 HAs from 1972 to 2013.

Result

We propose that the receptor-binding properties of Taiwan-isolated H6 HAs have undergone three major stages: initially avian receptor-binding preference, secondarily obtaining human receptor-binding capacity, and recently human receptor-binding preference, which has been confirmed by receptor-binding assessment of three representative virus isolates. Mutagenesis work revealed that E190V and G228S substitutions are important to acquire the human receptor-binding capacity, and the P186L substitution could reduce the binding to avian receptor. Further structural analysis revealed how the P186L substitution in the receptor-binding site of HA determines the receptor-binding preference change.

Conclusion

We conclude that the human-infecting H6N1 evolved into a human receptor preference.