EDITORIAL

Current and Future in Influenza Treatment and Prevention

We have been now experiencing 2009 influenza pandemic with a novel influenza virus type A (H1N1), triple-reassortant viruses containing swine, avian and human virus genes. In addition, we still face the potential threat of a new pandemic of highly pathogenic avian influenza viruses (H5N1). During this decade, the study of influenza has witnessed an enormous expansion in clinical and basic data. The molecular virology, pathogenicity, and transmission of influenza viruses are revealed. Data obtained from influenza animal models are expected to contribute for the development of vaccines and treatments to improve the lives both humans and animals. The induction of apoptotic cell death and macrophage activation by influenza virus infection is implicated in not only the construction of host defense mechanisms but also the pathogenesis of influenza.

The effective vaccination is the most reliable prophylactic measures against influenza virus infection. However, currently licensed influenza vaccines still have some inevitable problems. The use of anti-influenza drugs is receiving much greater attention to playing an important role as a first-line defense against the new pandemic. Currently, two classes of anti-influenza drugs, the inhibitors for viral M2 membrane protein as the first-generation and the inhibitors for viral neuraminidase (NA) as the second-generation, are available for the treatment and prevention of influenza. However, influenza viruses resistant to the M2 and NA inhibitors frequently emerge during treatments of patients with the drugs. Moreover, the resistant viruses were also frequently found in birds. These suggest the need for development of the third-generation anti-influenza drugs with alternative antiviral mechanisms, and prevention methods of influenza virus infection using new vaccine devices and chemical agents.

Synthetic glycopolymers carrying multivalent sialylated lactosamine residues inhibit influenza virus infection. The combination of selected antioxidants with current anti-influenza drugs can improve usual influenza chemotherapy. Natural products help in developing anti-influenza virus medicines. New devices for influenza vaccination, such as live attenuated vaccine, reverse genetic vaccine, DNA vaccine, universal vaccine and co-administration with adjuvant, are developed in order to solve the problems in split vaccine used worldwide. Chlorine dioxide gas at safety levels for humans inactivates influenza viruses in the air.

This special issue involves the up-dated information on “pathogenesis”, “treatment” and “prevention” of influenza. I hope this will provide a comprehensive and thought-provoking text for a wide range of readers - from undergraduates in biology, pharmacy or medicine to scientists and clinicians working on influenza-related topics.

Noboru Uchide
(Guest Editor)
Department of Clinical Molecular Genetics
School of Pharmacy, Tokyo University of
Pharmacy and Life Sciences
1432-1 Horinouchi
Hachioji, Tokyo 192-0392
Japan
Tel: +81 42 676 5760
Fax: +81 42 676 5738
E-mail: uchide@toyaku.ac.jp

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