Book Review

Potter, C. W. (ed.): Influenza. Perspectives in Medical Virology vol. 7. 280 pp, Elsevier Science, Amsterdam, 2002. ISBN 0-444-50627-6 Hardcover \$99.-, EUR 99.-.

Influenza is a clinical syndrome combining cough and fever which in the 13th century was described in Italy as being influenced (Italian influenza) by stars and heavenly bodies. This description seems to be the likely source of the term influenza.

Influenza epidemics can infect as many as 50% or more of a population, causing symptoms in half the infected persons. The epidemics cause significant morbidity; they are debilitating to patients and are socially and economically disruptive. In the United States, influenza kills 20 000 to 40 000 people in an average year, a figure which dwarfs the current SARS death rate of a few hundred worldwide.

Although our information on the disease and the virus that causes it is probably more detailed than for any other virus infection, except HIV, the disease remains very much uncontrolled.

This refreshing volume, edited by C W Potter, offers personalized accounts by some of the key players in influenza research of what has been done in the past 50 years and what the prospects are for developing therapeutic agents and better vaccines in the future. Two chapters devoted to influenza virus structure and replication give an overview of virus entry, assembly and release, as well as of some aspects of host cell-virus interactions. In particular, the role of the NS1 protein of influenza virus A in inhibiting host transcription and processing and in enhancing the synthesis of viral components is highlighted.

Three chapters discuss the history of antigenic drift and shift and the appearance of new influenza viruses from China. The spread of influenza in human populations is so rapid that populations quickly become immune. The viruses are then able to persist mainly because of their remarkable capacity for antigenic change. As a result, vaccines have to be updated yearly to include recent virus isolates. Although immunity to influenza is largely mediated by antibodies directed to the haemagglutinin, there is increasing evidence that anti-neuraminidase and anti M2 antibody may also contribute to protection against infection.

Influenza viruses transfer from aquatic birds that are infected without showing symptoms, to pigs, horses, poultry and humans. Genetic changes in the haemagglutinin and neuraminidase genes occur in these species but only in humans do the viruses undergo an immune selection which leads to antigenic drift. Pigs become infected relatively easily by avian and human influenza A viruses and serve as «mixing vessels» for the creation of new pandemic influenza viruses. Most pandemics start in Southeast Asia where farming practices facilitate double infection of pigs.

One chapter in the book discusses the 1957 and 1968 influenza pandemics caused by a genetic reassortment in which the entire haemagglutinin gene was replaced by another gene corresponding to a different influenza subtype. As a result the new viruses did not cross-react with anti-haemagglutinin antibodies directed to previously circulating influenza A viruses. Such an antigenic shift can occur during the double infection of pigs with an avian influenza virus and the prevailing human influenza virus at that moment.

One chapter is devoted to the devastating 1918 «Spanish» influenza pandemic which is estimated to have killed 20 to 40 million people worldwide. This high mortality was linked to an unusually high proportion of cases that developed pneumonia, especially in infants and young adults. Much of our recent knowledge was obtained because the genetic material of the 1918 virus could be sequenced from frozen lung tissue obtained from influenza victims who died in 1918.

The remaining four chapters discuss various clinical issues that are particularly relevant at a time when there is considerable anxiety about the threat of a new pandemic. Two chapters are devoted to

the existing inactivated vaccines which induce a protection that is less effective than desired, especially among young children and elderly persons. There is a clear need for improved vaccine efficacy and effectiveness and the immunologic options for developing an improved vaccine are described in detail, in particular nasally administered vaccines. According to J Jennings and R C Read, «it seems probable that within the coming five years, a new generation of efficacious, inactivated, intranasally delivered, adjuvanted influenza virus vaccines will become commercially available». The final chapter reviews the contribution that drugs could make to the control of influenza.

This volume offers many interesting perspectives and is a welcome addition to the scientific literature on influenza. It is highly recommended to anyone who wants a better understanding of the virus, the disease it causes and the prospects for better vaccines and therapeutic agents.

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