Antiviral Therapeutics - Technologies, Markets and Companies

Description: This report reviews the current state-of-art of antiviral approaches including vaccines, pharmaceuticals and innovative technologies for delivery of therapeutics. The introduction starts with a practical classification of viral diseases according to their commercial importance. Various antiviral approaches are described including pharmaceuticals and molecular biological therapies such as gene therapy and RNA interference (RNAi) as well as vaccines for virus infections. Expert opinion is given about the current problems and needs in antiviral therapy. SWOT (strengths, weaknesses, opportunities and threats) analysis of antiviral approaches is presented against the background of concept of an ideal antiviral agent.

A novel feature of this report is the use of nanotechnology in virology and its potential for antiviral therapeutics. Interaction of nanoparticles with viruses are described. NanoViricides are polymeric micelles, which act as nanomedicines to destroy viruses. Various methods for local as well as systemic delivery of antiviral agents and vaccines are described. Nanobiotechnology plays an important role in improving delivery of antivirals. Advantages and limitations of delivery of gene-based, antisense and RNAi antiviral therapeutics are discussed.

Anti-influenza measures applicable to human as well as avian forms are described including the recent epidemic of swine flu. Resistance can develop against neuraminidase inhibitors although it is less than that with adamantanes. Considering these problems, there is need for a more effective agent. Investigations into alternative anti-influenza target will probably expand in the coming years. These include the development of mechanisms to inhibit fusion between the virus envelope and the cell membrane.

After a discussion of current therapies of AIDS/HIV and their limitations, new strategies in development of antiviral agents are described. Drug resistance and toxicities are emerging as major treatment challenges. Based on a review of technologies and drugs in development, it can be stated that there are good prospects are of finding a cure for HIV/AIDS in the next decade.

Hepatitis viruses are described with focus on hepatitis C virus (HCV) and hepatitis B virus (HBV). Despite the presence of numerous drug candidates in the anti-HCV pipeline, and the commitment of major R&D resources by many pharmaceutical companies, it might still take several years for any new anti-HCV drugs to reach the market. Although many companies are focusing their efforts on developing viral inhibitors, cellular targets in the host are beginning to emerge as attractive possibilities because they might enable the development of broad-spectrum antiviral drugs with less chance for developing viral resistance.

Various commercially important viruses include herpes simplex (HSV) and human papilloma virus (HPV). There a number of treatments but HSV is not destroyed completely and remains dormant and activates from time to time to cause various clinical manifestations. There is discussion about the role of HPV in cervical cancer and vaccines available now seem to be adequate in preventing HSV-induced cervical cancer. There is no effective vaccine for respiratory syncytial virus (RSV) although monoclonal antibody (MAb) treatment is useful for prophylaxis and reducing the clinical manifestations. There is a need for an agent to eliminate this virus.

Various viruses that either occur in epidemics or in tropics and some naturally emerging infectious diseases are described, e.g. viral hemorrhagic fevers such as dengue and West Nile virus infection. These are a constant threat and impossible to anticipate. Some of these lack antiviral agents or vaccines for prevention. Although these include some of the most serious viral disorders, the development of antiviral agents for these is not commercially attractive. Current research and approaches to these virus infections are discussed.

Markets for antivirals are considered according to viruses and diseases caused by them and also according to management approaches: antiviral drugs, vaccines, MAbs and innovative approaches that include immunological and use of other technologies such as gene therapy, antisense, RNAi and nanobiotechnology. Antiviral markets are estimated starting with 2015 with projections up to the year 2025.

Profiles of 194 companies that are involved in developing various technologies and products are profiled and with 173 collaborations. These include major pharmaceutical companies (12), Biopharmaceutical companies with antiviral products (86), Antiviral drug companies (26) as well as viral vaccine companies (70).
The report is supplemented with 52 tables, 13 figures and 540 references from the literature.

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