

Healthcare industry BW

Vaccine development

As the recent discussion on the pros and cons of swine flu vaccinations has shown, vaccinations are not very popular in Germany. However, people tend to forget that no other medical development has helped people to the same extent as immunisation with vaccines has done. Examples include the discovery of the cow pox vaccination by Edward Jenner in 1796 and all the programmes that have been set up by the Global Alliance for Vaccines and Immunisation (GAVI) since 2000, which have enabled more than 250 million children in developing countries to be vaccinated, saving an estimated five million lives.

For a long time, the pharmaceutical industry was not particularly interested in the development of new vaccines. A handful of large pharmaceutical companies and a few specialised medium-sized companies divided amongst themselves the market for the production of established vaccines against the causative pathogens of diphtheria, measles, mumps, ruby, polio, typhus, tetanus, etc. This also includes vaccines against constantly changing influenza viruses. New influenza vaccines, developed with known methods, are continually being developed. The objective, which is to produce inexpensive vaccines for large numbers of people, has greatly hindered the industrial development of new vaccines against diseases that either affect only a limited number of people or that affect people without the means to pay for the vaccines. This is all despite the fact that academic research had come up with promising new approaches.

The decade of vaccines



The situation has since changed. The "Insight Pharma Reports 2010" published by the renowned Cambridge Healthtech Institute (CHI) estimates that the vaccine market will achieve annual growth rates of 14 per cent over the next five years, making it the fastest growing sector in the whole pharmaceutical industry. Vaccine development will outpace oncology, which is currently the biggest therapeutic market segment with an annual growth of around 11 per cent.

There are two major reasons for this boom. On the one hand, financial injections from government programmes and non-governmental organisations (NGOs) have boosted the research and development of vaccines for some of the most devastating epidemics such as malaria, tuberculosis, bilharziosis (which mainly affect the poor).

One example of this development is Bill and Melinda Gates' announcement at the annual meeting of the World Economic Forum at the end of January 2010 to the effect that their foundation will provide 10 billion US-Dollar for the next ten years for the research, development and supply of vaccines to the world's poorest countries. "This century must be a century of vaccines," said Bill Gates speaking in Davos, Switzerland. "In developing countries, vaccines save and improve the lives of millions of people. Innovations will in future make it possible to save the lives of increasing numbers of

children.” The two founders of the Bill and Melinda Gates Foundation along with Julian Lob-Levyt, the chairman of GAVI (which was also established in Davos 10 years ago), called on governments and private individuals to close critical financing gaps in order to ensure the provision of research tools and immunisation programmes for children. According to the three, the major priority is the establishment of an effective malaria vaccine and the implementation of a Pneumococcus vaccination programme.

New impulses for the vaccine market through biotechnology

The second reason behind the increased interest in vaccines is the recombinant genetic engineering methods that enabled innovative vaccines against indications such as cancer to be developed. A first milestone along this particular road was the hepatitis B vaccine, which received marketing authorisation in 1986. Indirectly, this vaccination also provides protection against the risk of developing liver cancer, which is associated with hepatitis infection. The second milestone was the development of prophylactic vaccines against papillomaviruses that cause cervical cancer. Professor Harald zur Hausen was awarded the Nobel Prize in Physiology and Medicine in 2008 for this innovation. At present, 14 genetically engineered vaccines are approved for sale on the German market (according to information from the Association of Research-based Pharmaceutical Companies, VfA, 2009).

Many other anti-cancer vaccines are in the development pipeline. The Freiburg-based company Cellgenix is currently investigating a therapeutic vaccine against non-Hodgkin lymphomas in a clinical Phase II trial. Supported with funds from the German Federal Ministry of Research and Education, researchers from Tübingen are developing the world’s first therapeutic vaccine for the treatment of liver cancer. German Cancer Aid is funding another research project whose objective is to develop a vaccine against *Helicobacter pylori*, a bacterium that is the main cause of stomach cancer.

The new technologies are not only being used for tumour diseases. One of the biggest challenges is the development of a vaccine against Alzheimer’s, which has experienced a number of failures in the past. But new concepts such as the ones that the University of Constance is working on provide hope. Other strategies, including a project at the University of Ulm designed to find ways to treat previously untreatable diseases, are aimed at developing vaccines that induce a humoral, antibody-based immune response as well as a cell-based immune response through the stimulation of antigen-presenting cells (T-cells, dendritic cells).

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