

Healthcare industry BW

Biotechnology – key technology of the 21st century

According to a study published by the German National Academy of Science and Engineering (acatech) on 5th April, biotechnology is a key technology of the 21st century and has huge innovation potential. What are the trends within the industry and what are the challenges we face?



Biotechnology is considered a key technology of the 21st century. It offers huge potential for economic value creation and the creation of highly skilled jobs, and therefore will play an important role now and in the future.

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Biotechnology is the use of cell components, cells and organisms for many different purposes such as producing goods and services, providing services or for research and development. Biotechnology makes gentler and more effective individualised therapies possible. It can also contribute to optimising industrial processes and helping agriculture adapt to climate change. Scientific breakthroughs such as the rapid improvement in the performance of genome sequencing and the development of new tools such as the CRISPR-Cas genome editing tool open up new areas and application possibilities. Trends can be seen in the areas of analysis, diagnostics, gene therapy, but also in cancer therapy and the use of induced pluripotent stem cells (iPS)¹.

Biotechnology – Baden-Württemberg offers exciting opportunities

In the latest issue of IMPULSE, acatech draws attention to Germany's outstanding position in science and research in the life sciences and biotechnology sectors. With its 156 biotechnology companies, Baden-Württemberg has positioned itself as a first-class location second only to Bavaria in a Germany-wide comparison. Baden-Württemberg offers exciting opportunities among the biotechnology trends listed in the acatech study.

One such interesting development involves the application of biotechnological processes for cancer treatment. Three companies focusing on cancer research and treatment are Scioomics GmbH, TherapySelect and biosyn Arzneimittel GmbH, and represent just a fraction of the many Baden-Württemberg biotechnology companies working in this area². Another major priority is research in the field of diagnostics. Companies such as Curetis N.A., Hain Lifescience GmbH and SpinDiag GmbH have developed test systems for the early diagnosis of pathogens that enable the precise and rapid determination of disease-causing pathogens. These methods can be used to diagnose many diseases earlier and more effectively, thus improving the effectiveness of treatment³. However, progress in the field of life sciences and biotechnology is always associated with very long development and innovation cycles.

Challenges in the biotechnology sector

Development cycles of more than 20 years are not unusual in this sector. In 1976, Harald zur Hausen, winner of the 2008 Nobel Prize in Physiology and Medicine, came up with the hypothesis that human papillomaviruses (HPV) play a key role in the development of cervical cancer. His suspicion was confirmed in the early 1980s. He was the first to succeed in isolating HPV 16 and HPV 18 in a cervical tumour. HPV vaccines have been on the market since 2006 and offer completely new prospects for prevention^{4,5}.

However, it can take a long time before basic research findings result in practical applications such as new medicines and industrial processes. And sometimes processes that were previously considered appropriate need to be revised. An example of this is the theory of transformation published by Jean-Baptiste de Lamarck some 200 years ago. In it, Lamarck describes a mechanism by which change is gradually introduced into species and passed on through the offspring. Lamarck's conviction has recently achieved greater recognition among geneticists. For some years now, it has been known that environmental influences can leave their mark in the DNA in the form of epigenetic modifications⁶. These examples show how dynamic this field is and the kind of challenges that arise due to the complexity of biological processes. Stable conditions and continuous funding are thus indispensable. The acatech study has also found that digitization will be followed by the next revolution in the world of business and society, namely the broad application of biotechnology in medicine, agriculture and industry. Biotechnology offers tremendous potential for the creation of economic value and highly skilled jobs, and will therefore also play an important role in the future. Public awareness and understanding of the benefits of biotechnology is required in order for biotechnological innovations to be accepted. BIOPRO Baden-Württemberg has contributed to this for many years by providing valuable information in the biotechnology and other sectors.

"We provide a wide range of information in our specialist portals on the healthcare industry and the bioeconomy, as well as in the BIOPRO Magazin, which also provide insights into advances in the life sciences and answers to major societal challenges, also for those who have not studied biology," says Dr. Barbara Jonischkeit, Head of Communication at BIOPRO Baden-Württemberg.

acatech

acatech⁷ – the National Academy of Science and Engineering – represents the German engineering sciences in Germany and abroad in a self-determined, independent and public-oriented way. As a working academy, acatech provides advice to government and the public on engineering science and engineering

policy issues. In addition, acatech aims to support the transfer of knowledge between science and industry as well as promoting the new generation of engineering scientists. acatech focuses on four main areas:

- Scientific recommendations: acatech provides advice on technology-related issues based on state-of-the-art research to government and the public.
- Practical transfer: acatech offers a platform for exchanges between science and industry.
- Promotion of up-and-coming scientists: acatech is committed to young engineering scientists
- Voice of the engineering sciences: acatech represents the interests of the engineering sciences on the national and international level

References

¹ http://www.acatech.de/fileadmin/user_upload/Baumstruktur_nach_Website/Acatech/root/de/Publikationen/Stellungnahmen/IMPULS_Biotechnologie_KF_final.pdf

² <https://www.gesundheitsindustrie-bw.de/de/presse/pressemitteilungen/neue-ansatze-gegen-krebs-gewünscht/>

³ <https://www.gesundheitsindustrie-bw.de/de/fachbeitrag/pm/fruhdiagnostik-aus-baden-wuerttemberg-hilft-sie-zu-stoppen/>

⁴ <https://www.gesundheitsindustrie-bw.de/de/fachbeitrag/pm/nobelpreis-fuer-medizin-an-harald-zur-hausen/>

⁵ <https://www.gesundheitsindustrie-bw.de/de/fachbeitrag/aktuell/humane-papillomviren-und-gebaermutterhalskrebs-ueber-die-zusammenhaenge-aufklaeren/>

⁶ <https://www.gesundheitsindustrie-bw.de/de/fachbeitrag/pm/epigenetische-veraenderungen-sind-selten-von-dauer/>

⁷ <http://www.acatech.de/>

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