©istockphoto/gorodenkoff

Health and Medicine

Improving health care, increasing the chances of healing, supporting diagnoses – these are some of the goals that Fraunhofer-Gesellschaft aims to achieve with results in medical, environmental and nutritional research. Intelligent, assistive systems that provide support in preventive health care, diagnostics, therapy and nursing care and make a significant contribution to safeguarding society's future are intended to help achieve these goals. We are focusing, in particular, on tools to support decision-making in therapy planning and to strengthen resilience.

Health 4.0: Accelerating the Development and Production of New Medicines


© Fraunhofer IZI

In the Fraunhofer Innovation Cluster "Production for Intelligent Medicine", research is carried out on how gene or cell therapeutics as well as vaccines can be produced in large quantities in an automated, fast, and cost-effective way. 23 Fraunhofer institutes are involved, including the "Optimization" department of ITWM.

Innovative advanced therapy medicinal products (ATMPs) represent a new, promising class of therapeutics as "living medicines". They have the potential to offer new therapeutic options to people suffering from diseases that have so far been untreatable or insufficiently treatable. This applies to some cancers, some of which even have a chance of being cured by such new therapies. However, the production of these cell-based, new therapeutics has so far been highly manual, making them time-consuming and expensive and limiting their availability to patients.

Combining Industry 4.0 with Health 4.0

To further develop this promising approach, Fraunhofer researchers from different disciplines want to fundamentally redesign the production of such ATMPs. In the cluster, experts from biological and medical research have worked closely with their colleagues from the fields of automation, process control, quality management, robotics and mathematics to set up the processes for high throughput and reasonable manufacturing costs in the future. In the first phase of the project, a modular pilot plant was designed for the automated production of therapeutics.

To this end, a team led by department head Prof. Michael Bortz modeled bioprocesses that can now be optimized virtually. Researchers led by Dr. Heiner Ackermann were responsible for questions relating to the capacity planning of production plants. The aim is to maximize throughput at the lowest possible cost. Dr. Neele Leithäuser and colleagues developed methods for analyzing data streams (time series) that are continuously collected for monitoring production processes.

More about the innovation cluster at s.fhg.de/pharmaproduction

Contact

Prof. Dr. Michael Bortz
Head of department "Optimization – Technical Processes"
Phone +49 631 31600-4532
michael.bortz@itwm.fraunhofer.de