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FRAUNHOFER INSTITUTE FOR CELL THERAPY AND IMMUNOLOGY IZI

PRESS INFORMATION

New procedure for manufacturing safe and effective vaccines

Fraunhofer Institute for Cell Therapy and Immunology IZI receives funding from the Bill & Melinda Gates Foundation.

Together with three other Fraunhofer institutes, the Fraunhofer IZI is developing a way of inactivating viruses and other pathogens based on low energy electron irradiation. This may aid the manufacture of more effective, safe and also more cost-effective vaccines. The Bill & Melinda Gates Foundation-funded project will be initially applied to make new polio vaccines.

Since as early as the 1950s, toxic chemicals such as formaldehyde have been used to inactivate pathogens for so-called killed vaccines (e. g. to fight influenza, polio or hepatitis A viruses). This procedure, which has barely changed since, marked a milestone in infection biology at the time, however it is still subject to various limitations to this day. The chemical treatment, which can last several weeks, also destroys some of the pathogens' surface structures that the immune system could use to recognize and attack following infection. Drugs manufactured in this way either have to be administered in high concentrations or have to be boosted at regular intervals in order to offer sufficient protection – a fact that hampers their use in poorer and structurally weak countries.

"Inactivation by means of low energy electron irradiation could well be the next major milestone in vaccine research," remarks Project Manager Dr. Sebastian Ulbert from Fraunhofer IZI, summing up the advantages of the new technology. For the past three years, he has headed a consortium of four Fraunhofer institutes that are working on the development of irradiation technology for vaccine manufacturing. The project results show that the technology is fundamentally applicable to an entire spectrum of different types of virus (e. g. polio or influenza) as well as other kinds of pathogens (bacteria, parasites). Irradiation destroys the genetic substance the viruses need to multiply. Unlike chemical inactivation using formaldehyde, the structural proteins (antigens) that are vital to the immune response remain intact. The hope is that this enables to the body to form much more specific antibodies against the pathogens, keeping it better protected. Ultimately, lower doses may be able to be used in vaccinations.

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With a grant of USD 1.85 million, the Bill & Melinda Gates Foundation is now funding the application of the irradiation technology in order to develop a new polio vaccine (Grant Agreement Investment ID: OPP1154635). "We are happy to have found such an established and excellent partner in the Bill & Melinda Gates Foundation with which we can develop our technologies further in order to produce efficient, safe and affordable vaccines," says Ulbert.

The Fraunhofer Institute for Organic Electronics, Electron Beam and Plasma Technology FEP and the Fraunhofer Institute for Manufacturing Engineering and Automation IPA are jointly developing the basic design of a prototype for an automated irradiation installation. This experimental unit should be installed at Fraunhofer IZI in Leipzig by autumn 2018. The Fraunhofer Institute for Interfacial Engineering and Biotechnology IGB is working in collaboration with the Fraunhofer IZI on the manufacturing and immunological characterization of the pathogens.

Further information about the Bill & Melinda Gates Foundation:
www.gatesfoundation.org

The Fraunhofer Institute for Cell Therapy and Immunology IZI

The Fraunhofer Institute for Cell Therapy and Immunology IZI investigates and develops solutions to specific problems at the interfaces of medicine, life sciences and engineering. One of the institute's main tasks is to conduct contract research for companies, hospitals, diagnostic laboratories and research institutes operating in the field of biotechnology, pharmaceuticals and medical engineering. The Fraunhofer IZI develops, optimizes and validates methods, materials and products for the business units Cell and Gene Therapy, Drugs, Diagnostics and Biosystems Technology. Its areas of competence lie in cell biology, immunology, drug biochemistry, biomarker, bioanalytics and bioproduction as well as process development and automation. In these areas, research specifically focusses on the indications oncology, neuropathology, autoimmune and inflammatory diseases as well as infectious diseases and regenerative medicine.