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#### Pressemitteilung

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### Hidden health risks of endocrine disruptors? - Fraunhofer IBMT collaborates in new EU-funded research project ENDOMIX

The Fraunhofer Institute for Biomedical Engineering IBMT, with its long-term expertise in cell models and toxicology, contributes to a new EU-funded project on health risks of endocrine disruptors. Endocrine disruptors are chemical substances that may mimic endogenous hormones and thereby interfere with the endocrine system. The EU-funded research project »ENDOMIX«, started in January 2024, aims to comprehensively unravel how exposure to everyday chemicals with endocrine disrupting properties affect human health. The researchers will also elaborate recommendations to reduce exposure to these chemicals and minimize thereby health risks.

We are exposed to a multitude of chemicals every day, including those with endocrine disruption effects. Potentially harmful chemicals can enter into our body by eating or drinking, can be absorbed through the skin, or inhaled as tiny particles. "The exposure to even the smallest amounts of these substances, but over a longer period of time, can lead to serious effects on our health," says Dr. Yvonne Kohl, head of the project at the Fraunhofer IBMT. "Unfortunately, there are still many data gaps in this area of research in order to better assess the health risk of endocrine disruptors". Chemicals with the potential of disrupting endocrine processes in our body, may intensify, inhibit or just modify hormonal pathways. What are the consequences for our health? What diseases can these chemicals cause or accelerate? And where and how exactly do endocrine disruptors act in the body – especially as a mixture?

Cohort studies serve as a treasure of data

»ENDOMIX« is intended to find answers to these important questions. To do this, a consortium of 11 partner institutions from seven countries works together. The research project is based on several European cohort population studies. This provides a wealth of data. Because the biological samples of the participants have already been chemically analyzed, the research team knows which endocrine disruptors each person was exposed to at what time point in life.

In a first step, the scientists will dissect which mixtures of endocrine disruptors – found in the biosamples of the study participants – are associated with health-relevant effects. To do this, they use computer-based modelling methods and high-throughput cell culture experiments.

The mixtures that show particularly strong effects will be used for further investigations in order to better understand the starting points, molecular relationships and affected metabolic pathways involved in their effects. Various in vitro, in vivo and in silico methods as well as modern OMICS technologies will be used.

Effects of chemical mixtures on the immune system

One of the key questions of »ENDOMIX« is how mixtures of endocrine disruptors affect the immune system. Immune cells play a central role in the development of many chronic diseases such as asthma, allergies, reproductive disorders,

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and metabolic diseases. It is therefore important to gain a better understanding of the interactions between endocrine disruptors and the immune system. With the help of Artificial Intelligence (AI), among other tools, the »ENDOMIX« research team will investigate whether the data and results obtained from the experimental settings are indeed the underlying causes for the existing diseases of the study participants.

"With »ENDOMIX«, we want to uncover the real-life effects of endocrine disruptors on human health and identify possible differences between age and sex", says Prof. Ana Zenclussen, »ENDOMIX« coordinator and Head of the Department of Environmental Immunology at the Helmholtz Centre for Environmental Research in Leipzig, Germany.

»ENDOMIX« follows the special approach by scrutinizing exposure to endocrine disruptors and the associated health effects over the entire lifespan. An overarching aim is to identify the critical time windows in which the body reacts particularly sensitively to endocrine disruptors. If these time windows are better known, health risks can be minimized.

Effect on biological barriers and specific organs

In this project, the Fraunhofer Institute for Biomedical Engineering IBMT is leading the work package to investigate the influence of endocrine disruptors and their mixtures on physiological barriers of the human body, such as the lung, intestinal or placental barrier as well as the blood-brain barrier. To achieve this, novel in-vitro models are being developed and optimized, in particular to determine the influence of the immune system on the EDC effect. With its expertise in the field of advanced cell models and toxicology, the Fraunhofer IBMT uses specially developed stem cell-based cell models to simulate the blood-brain barrier and the lung barrier of the human body. Three-dimensional cell systems are also used to investigate organ-specific effects in the lungs and liver.

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Coordinator: Helmholtz Centre for Environmental Research UFZ, Germany

Project partners: Institut national de la santé et de la recherche médical INSERM, France Fundación Privada Instituto de Salud Global Barcelona, Spain Fundación para el Fomento de la Investigación Sanitaria y Biomedica de la Comunitat Valencia, Spain Imperial College of Science Technology and Medicine, United Kingdom Universiteit Utrecht, Netherlands Erasmus Universitair Medisch Centrum Rotterdam, Netherlands Federal Institute for Risk Assessment, Germany Masarykova univerzita, Czech Republic European Institute for Biomedical Imaging Research, Austria



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Logo EU-Project ENDOMIX.