

International research project *microONE* provides first answers

Is microplastic carcinogenic?

The effects of micro- and nanoplastic particles (MNP) in the human body are being investigated in depth for the first time worldwide as part of a four-year research project. From 2022 to 2025, research will be carried out at the CBmed research center together with international partners to elucidate potential health effects of microplastics in the human gut.

(Graz/Vienna, March 30, 2022) Every single person in developed Western countries currently ingests an average of five grams of plastic material per week - that's as much as a full teaspoon or a standard credit card. What these micro- and nanoplastic particles (MNP) do to the human organism and especially to the intestinal tract has hardly been researched so far. However, initial research results indicate that MNP do pose a health risk but need further in depth investigation. '**microONE**', a research project which will run from 2022 to 2025 with a project volume of around four million euros and more than 20 national and international partner organizations from science and industry, aims to provide scientifically sound answers to this pressing question.

Prof. Wolfgang Wadsak PhD, general manager *microONE*: "The impact of this research project is enormous, because in the end we want to find out whether certain microplastic particles lead, for example, to an accumulation or to an increase in the aggressiveness of colon cancer or influence the intestinal flora or the microbiome. Based on these findings, we may have to change the use of plastic in the food and packaging cycle. With this project, we can initiate changes worldwide from Austria as a frontrunner together with key international partners."

Prof. Lukas Kenner MD, scientific lead *microONE*, on the scientific focus: "*microONE* will investigate the accumulation of micro- and nanoplastic particles in the human body and also find out whether they contribute to carcinogenesis or even metastasis in the human body. We are very grateful to the Austrian funding agency, FFG, as well as the provinces Styria and Vienna for funding this visionary project."

Scientific approach

The goal of this four-year research project is to generate evidence on the potential association between MNP particles and cancer. Colon cancer was chosen as a model because the majority of MNP uptake occurs through the gastrointestinal tract and colorectal cancer (CRC) is the most common variant in this region of the body. Research is also being conducted on the impact on the gut. To do this, it must be possible to produce and label MNPs "cleanly" and to measure them in complex samples (e.g., tissue). Comparison with biodegradable materials is also envisioned within *microONE*.

To this end, the interactions between colon cancer cells obtained directly from patients with MNP will be investigated, and a suitable high-throughput method for the detection and characterization of these same plastic particles must be established and optimized. Supported by supercomputers, the interactions with molecular target structures are to be calculated together with the international partner network and then verified in cell experiments. Also being explored are the interactions of MNP with modern targeted anticancer drugs using the "drug screening platform" established at the CBmed center in Graz, as well as the effects of exposure to micro- and nanoparticles on the microbiome.

"The planned research will provide groundbreaking insights into how MNPs interact with targets and substances in the body and thus influence the development of colon cancer. We will generate evidence on how tumor growth depends on the nature of MNP, to what extent the immediate environment, the microbiome, is also affected, and how these effects can be positively influenced by the use of, for example, probiotic cultures," report the responsible researchers **Lukas Kenner and Wolfgang Wadsak**. "By the end of the project in 2025, we will also have developed and established preparation and analysis methods that will allow tissue sections to be screened for microplastic contamination in addition to the already established technique of immunohistochemical staining. From these measurements, biomarkers can be derived that allow direct conclusions to be drawn about molecular events and predictions to be made about therapeutic success."

Significance of *microONE* for CBmed

For **Prof. Thomas Pieber MD**, CSO CBmed, *microONE* is "another giant step towards a modern biomarker research center, because this project addresses topics that are extremely important for human health. With *microONE*, CBmed becomes a frontrunner in a new field of research."

For **Robert Lobnig**, CFO CBmed, *microONE* is "one of the essential basic research projects with which we are further expanding CBmed's status as an internationally recognized research center. We have formed a large international scientific consortium for the project and are working very closely with national partners on the industry side. With the project volume for *microONE* of around four million euros over four years, we can significantly expand the basic scientific research program at CBmed."

The scientific and business consortium of more than 20 partner organizations includes companies as well as universities and research institutions from Austria, Germany, Italy, England, Hungary, Lithuania, the USA and China. Amongst researchers at the Universities of Cambridge and Nottingham (UK) as well as Case Western Reserve University (OH, USA) will closely work together with their Austrian colleagues to elucidate potential health effects of MNP in the human gut.

(end)

Statements

"To find out what effects microplastic particles have on human health, *microONE* integrates a wide range of disciplines from materials science and analytical chemistry to microbiome research and tumor science. The impact of this research project is enormous, because in the end we want to find out whether certain microplastic particles lead to an accumulation or increase in the aggressiveness of colon cancer, for example, or influence the intestinal flora or microbiome. Based on these findings, we may have to change the use of plastic in the food and packaging cycle. We can use this project from Austria as a frontrunner

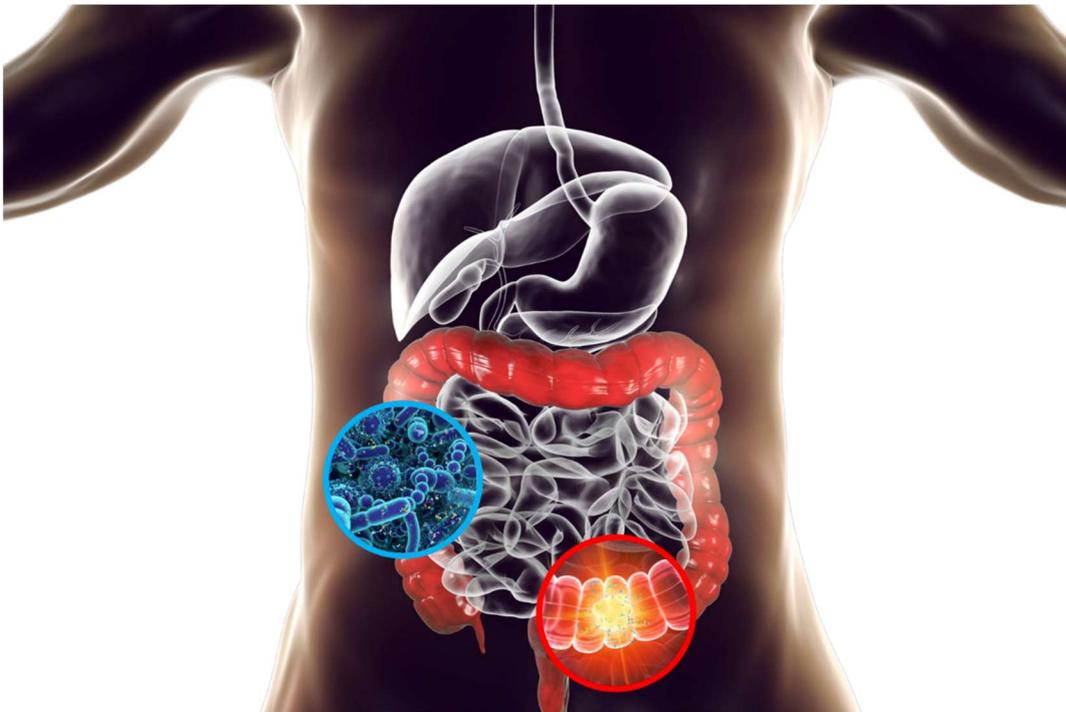
together with key international scientific partners to initiate changes worldwide."

Prof. Dr. Wolfgang Wadsak, general manager *microONE*



[IMAGE: The Microplastic Food Chain. © George Rothert / CBmed GmbH]

"Micro and nano plastic particles are a huge global problem because their production is increasing exponentially worldwide and these particles are spreading everywhere. The particles are found in marine organisms as well as in the human body. *microONE* will investigate the accumulation of these particles in the human body and also aims to find out if they contribute to carcinogenesis or even metastasis in the human body. We are very grateful to the Austrian funding agency, FFG, as well as the provinces Styria and Vienna for funding this visionary project." **Prof. Dr. Lukas Kenner**, scientific lead *microONE*



[IMAGE: Effect of microplastic particles within the human gut. © CBmed GmbH]

"*microONE* is another giant step for CBmed towards a modern biomarker research center, because this project addresses topics that are extremely important for human health. With *microONE*, we become a

frontrunner in a new field of research. It's about finding out what impact microplastics have on human health and carcinogenesis, and how we can tackle the big problem of microplastic spread." **Prof. Dr. Thomas Pieber, Chief Scientific Officer CBmed**

"*microONE* is one of the essential basic research projects for us, with which we are further expanding CBmed's status as an internationally recognized research center. We have formed a large international scientific consortium for the project and are working very closely with national partners on the industry side. With the project volume for *microONE* of around four million euros over four years, we can significantly expand the basic scientific research program at CBmed." **Robert Lobnig, Chief Financial Officer CBmed**

The project *microONE* is investigating the question of whether and, if so, what health effects occur in the intestine as a result of tiny plastic particles (micro- and nano-plastic particles / MNP). © CBmed

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www.microone.at/press

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About CBmed GmbH – Center for Biomarker Research in Medicine

The COMET K1 Center for Biomarker Research in Medicine, CBmed was founded in 2014 and combines excellent research infrastructure, scientific expertise, medical know-how, and national and international industry partners for systematic biomarker research in the field of precision medicine. CBmed links researchers with leading pharmaceutical, diagnostic, medical device and IT companies. Research projects include the identification of new biomarkers, validation of known biomarkers, and translation into products and services for use in clinical practice. Within the COMET program - Competence Centers for Excellent Technologies – which is implemented by the Austrian Research Promotion Agency (FFG), CBmed is supported by the Austrian Federal Ministries BMVIT and BMDW, Land Steiermark (SFG) and Land Wien (WAW).

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