The memory of tumor cells: Kirsten Kübler researches the origins of cancer

Dr. Kirsten Kübler, a faculty member at Harvard Medical School, has been awarded the Johanna Quandt Professorship for Early Cancer Development and Prevention at the Berlin Institute of Health at Charité (BIH). The specialist in gynecology has so far been working at the Massachusetts General Hospital (MGH) of Harvard Medical School and the Broad Institute, a joint institution of the MIT and Harvard University, where her research has focused on molecular changes in the development of various tumors. She now wants to use bioinformatic and experimental methods to better understand the early development of cancer in order to be able to intervene and prevent it in the long term.

Before moving to the United States in 2015, Kirsten Kübler headed the outpatient clinic for genital dysplasia as part of her medical practice at the University Women’s Hospital in Bonn. “Here, we counseled women who had had an abnormal cervical smear, which can be an indication of precancer,” the gynecologist explains. “Early detection is highly successful in cervical cancer – and if you surgically remove the abnormal area, the risk of developing cancer is usually reduced.” Unfortunately, she adds, this doesn’t work as well in other tumor types.

Understanding how cancer starts

In her scientific work, Kirsten Kübler is therefore dedicated to finding ways of early detection and prevention for other cancer types as well.

“To do this, you have to understand how cancer starts,” the physician describes. “Which cell type is affected, and what do the very first changes in the genome of a single cell look like that initiate the development of a tumor precursor? What additional later changes cause such a precursor to become cancer?”

But because the very first stages of many tumor types are usually not yet suspicious, Kirsten Kübler has to work “backwards” and rely on the genomic “memory” of tumor cells. “We analyze the cancer cells of the tumor and the metastases, and evaluate which mutations have occurred in the still healthy tissue, which in the precursors and which in the tumor. We also want to understand which mutations promote tumor growth and metastasis and which ones happen incidentally.” With the help of computational analyses, Kirsten Kübler and her team of scientists can deduce the cell-of-origin of the tumor, which can also provide information about the further course of the disease.

Better therapies and prevention strategies

“The mutation spectrum is unique for each tumor and patient,” Therefore, each tumor must also be treated individually,” explains Kirsten Kübler. “Our goal is to advance personalized medicine in the field of oncology – with the hope that by uncovering the origins of tumors, we will also find a way to prevent them from developing.”
Professor Christopher Baum, Chair of the BIH Board of Directors and Chief Translational Research Officer of Charité – Universitätsmedizin Berlin, is pleased about the reinforcement in the field of personalized medicine: "Our Johanna Quandt Professorships are specifically aimed at top-level scientists who want to translate their discoveries into clinical applications. Kirsten Kübler’s research is outstanding in the way it combines single-cell analytics, bioinformatics and oncology. As a result, she will quickly build bridges to various working groups at the BIH and Charité. We look forward to working with her and her team."

Kirsten Kübler studied medicine at the University of Bonn, and completed her doctorate on genetic alterations in ovarian cancer. In 2015, she habilitated in obstetrics and gynecology at the University of Bonn with a thesis on the foundations of new therapeutic concepts for ovarian cancer. She then became a research fellow at the Broad Institute of MIT and Harvard University as well as at MGH. There she devoted herself primarily to research in the field of computational genome analysis of tumors. In Berlin, she will not only work with colleagues at BIH, but will also be affiliated with the Department of Hematology, Oncology and Cancer Immunology at the Benjamin Franklin Campus of Charité - Universitätsmedizin Berlin. She will of course also maintain her ties to the Broad Institute, MGH and Harvard Medical School.

About the BIH Johanna Quandt Professorships

Stiftung Charité and the BIH have jointly launched the BIH Johanna Quandt Professorships (temporary W2 professorships with a genuine tenure track). The novel professorship scheme targets specifically female scientists in order to provide an impetus for the promotion of equal opportunities in the life sciences. The professorships are filled through an international recruitment process and include a binding option for permanent tenure as a lifetime professorship (genuine tenure track). In addition, the professorships are open to all topics, offering the applicants the opportunity to develop the orientation of their professorships themselves, also beyond the usual biomedical disciplines, and to have an innovative impact on the BIH’s translational mission. Along with the three Johanna Quandt Professors selected in 2017, a total of seven BIH Johanna Quandt Professorships will enrich the life sciences in Berlin by the end of this year (see also the press release by Stiftung Charité from August 31, 2021, at https://www.stiftung-charite.de/fileadmin/user.upload/stiftungcharite/Presse/PM_2021-08-01.BerufungJQProfs.EN.pdf).

About the Berlin Institute of Health at Charité (BIH)
The mission of the Berlin Institute of Health at Charité (BIH) is medical translation: transferring biomedical research findings into novel approaches to personalized prediction, prevention, diagnostics and therapies and, conversely, using clinical observations to develop new research ideas. The aim is to deliver relevant medical benefits to patients and the population at large. As the translational research unit within Charité, the BIH is also committed to establishing a comprehensive translational ecosystem – one that places emphasis on a system-wide understanding of health and disease and that promotes change in the biomedical translational research culture. The BIH was founded in 2013 and is funded 90 percent by the Federal Ministry of Education and Research (BMBF) and 10 percent by the State of Berlin. The founding institutions, Charité – Universitätsmedizin Berlin and Max Delbrück Center for Molecular Medicine in the Helmholtz Association (MDC), were independent member entities within the BIH until 2020. Since 2021 the BIH has been integrated into Charité as its so-called third pillar. The MDC is now the Privileged Partner of the BIH.

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