



Press Release

Shining New Light on the Onset of Childhood Cancer

Cell mutations can occur during human embryonic development, potentially leading to childhood cancer such as neuroblastoma. Polina Kameneva, recently appointed as Principal Investigator at St. Anna Children's Cancer Research Institute (St. Anna CCRI), is dedicated to investigating these critical phases. She employs mini-organ cultures and genetic engineering to study what happens after mutations hit the cells and how can we prevent pediatric cancer from starting at first place.

One day there might be a therapy that makes it possible to prevent cancer from developing in the first place. To reach such point many questions need to be answered. Neuroblastoma is a common pediatric tumor with an enigmatic origin. It is composed of immature neurons and most often found in the adrenal gland medulla. "Our research indicates that neurons and cells of adrenal gland medulla develop in synergy to build healthy organs. Some aspects of adrenal gland development are unique for human and may predispose for neuroblastoma emergence" explains Polina Kameneva, PhD, Principal Investigator at St. Anna Children's Cancer Research Institute (St. Anna CCRI).

New Approaches to Cancer Prevention

To explore why the early phase of development can be vulnerable for neuroblastoma initiation, Dr. Kameneva constructs mini-organs from human cells to replay the development in the controlled environment. This allows her to meticulously trace cell after introducing mutations, potentially triggering cancer onset. "By introducing mutations and tracking individual cells, we can better understand how and when cancer starts and find the ways to intervene," says Kameneva. Her work could, in the long term, contribute to the development of new therapies that specifically prevent the onset of children's cancer.

Human stem cell model

After obtaining her PhD, Polina moved to Sweden to work at the renowned Karolinska Institute. There, she specialized in the developmental biology of the adrenal gland to bridge the gap between development and the oncological pathologies associated with this organ. During her time in Sweden, she developed a vision that human stem cell models are instrumental to investigate human specific aspects of cancer development. She got a chance to develop her expertise in human stem cell models at the Medical University of Vienna, Austria.

Since June 1, 2024, Polina Kameneva has been Principal Investigator at St. Anna Children's Cancer Research Institute. This appointment coincides with being one of eight winners of the prestigious START Prize from the Austrian Science Fund (FWF). The fact that Polina has won the FWF-START Prize is testimony to the joint stride for excellence at St. Anna CCRI "The START Prize allows me to pursue innovative approaches in pediatric cancer research," says Kameneva.

Kameneva plans to use her knowledge of developmental biology to investigate the fundamental question of cancer initiation running her independent line of research at St. Anna Children's Cancer Research Institute, which provides the unique opportunity for translational research. "I firmly believe that only through tight collaboration with clinicians, basic research scientists with different perspectives and bioinformaticians we can learn new aspects of tumor biology and apply to it the benefits of patients" she says.

Kaan Boztug, MD, Scientific Director of St. Anna CCRI, looks forward to working with Kameneva: “Polina Kameneva’s topic is amongst the most important ones – and yet unresolved – in childhood cancer research: why does cancer actually occur in children? Many childhood cancers arise from defects in cell development and differentiation. If we only knew what are the molecular events that control these processes, we could possibly target such cancers much more efficiently. And, as a longer-term vision, even prevent a considerable fraction of such tumors.”

About St. Anna Children’s Cancer Research Institute, St. Anna CCRI

St. Anna CCRI is an internationally renowned multidisciplinary research institution with the aim to develop and optimize diagnostic, prognostic, and therapeutic strategies for the treatment of children and adolescents with cancer. To achieve this goal, it combines basic research with translational and clinical research and focus on the specific characteristics of childhood tumor diseases in order to provide young patients with the best possible and most innovative therapies. Dedicated research groups in the fields of tumor genomics and epigenomics, immunology, molecular biology, cell biology, bioinformatics and clinical research are working together to harmonize scientific findings with the clinical needs of physicians to ultimately improve the wellbeing of our patients.

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