LS25-045 - Personalized risk assessment for embryonal tumor predisposition

Zusammenfassung

Cancer is a leading cause of death in children in Europe. Embryonal tumors, which arise in the fetus and are diagnosed in infants, are among the most devastating malignancies in dire need of therapies that reduce mortality and long-term effects. As for other cancers, current treatments for embryonal tumors aim at removing malignant cells from the body. We propose to shift the focus on intercepting tumor formation. Given that at least a tenth of pediatric cancers are linked to a cancer predisposition syndrome (CPS) known before tumors are diagnosed, there is an actionable window of opportunity to implement interceptive treatments. However, incomplete penetrance of predisposing mutations and concerns about side effects have hindered progress.

This project aims to develop an experimental pathology platform for personalized risk prediction and treatment prioritization for children with a CPS. Using a specific group of CPS linked to Wilms tumor as a model, we will leverage gene-edited induced pluripotent stem cells (iPSCs), genetic screens, single-cell multiomics, and integrative bioinformatics to investigate the cell-intrinsic genetic and epigenetic modifiers of CPS penetrance. These insights will enable rational risk assessment and guide the selection and preclinical testing of interceptive therapies.

While other research in CPS is foremost dedicated to detection of mutations, surveillance, and treatment, this project innovates by tackling the black box between detection and surgery, thereby empowering future interventive medicine.

Wissenschaftliche Disziplinen:
Experimental pathology (33%) | Molecular biology (33%) | Genomics (34%)

Schlagworte:
cancer predisposition risk prediction Wilms tumor stem cell models genomics diagnostics CRISPR xenografts embryonal tumors WAGR Denys-Drash WT1 iPSC

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Weiterführende Links zu den beteiligten Personen und zum Projekt finden Sie unter
https://wwtf.at/funding/programmes/ls/LS25-045/