WWTF Project LS20-045

Validation of a liquid biopsy based molecular diagnostic toolkit for pediatric sarcomas

Abstract

Liquid biopsy provides a minimally invasive alternative to conventional tumor biopsies, holding great promise for precision medicine. For Ewing sarcoma, a childhood cancer with major unmet clinical need, we found widespread epigenetic aberrations (Sheffield et al. 2017 Nature Medicine). This discovery opens up new perspectives for precision medicine in cancers with low mutation burden. We have developed an integrated approach for liquid biopsy analysis that exploits non-genetic properties of cell-free DNA (Tomazou, Bock, Metzler and colleagues, manuscript submitted). Our method combines genome sequencing of cell-free DNA with bioinformatic methods to assess tumor-specific cell-free DNA fragmentation. Here, we will clinically validate our liquid biopsy assay to enable precision medicine in Ewing sarcoma. Our analysis builds on a large biobanked clinical trial cohort of serial blood plasma samples. We will pursue three applications: risk stratification and detection of occult metastasis at diagnosis; response monitoring during induction chemotherapy; early detection of relapse during maintenance therapy and follow-up. Successful completion will qualify our assay as a molecular biomarker for inclusion in prospective clinical trials. Alignment with the call: High translational relevance; strong preliminary data; experienced & synergistic team; large international cohort; broad relevance for cancers with low mutation rate; novel direction for precision medicine.

Scientific disciplines:
106014 - Genomics (40%) | 106005 - Bioinformatics (30%) | 301904 - Cancer research (30%)

Keywords:
liquid biopsy, pediatric sarcomas, machine learning, tumor evolution, drug resistance

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Further links about the involved persons and regarding the project you can find at
https://archiv.wwtf.at/programmes/life_sciences/LS20-045