

Hosting group information for applicants

Name of DKFZ research division/group:

Cell Cycle Control and Carcinogenesis (F045)

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Group homepage: <https://www.dkfz.de/en/f045/index.php>

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RESEARCH PROFILE AND PROJECT TOPICS:

Project Topic: Genomic Instability and cancer – a tale of too many centrosomes

Genomic instability is a hallmark of cancer cells but at what stage of cancer development it arises and what its molecular basis is are questions to which we are only beginning to get answers.

Centrosomes form the spindle poles of the mitotic spindle. Having the correct number of centrosomes is crucial for proper chromosome segregation during cell division and for the prevention of genomic instability. Errors in centrosome duplication lead to cells with too many centrosomes which is frequently observed in cancer cells. Centrosome aberrations correlate with tumor aggressiveness, metastasis and poor prognosis. The biochemical pathways underlying centrosome duplication and how this process is dysregulated in cancer are poorly understood.

The goal of the project is to understand the origins of centrosome defects in cancer. To achieve this, we will both induce centrosome duplication errors (by targeting the key kinase, which is polo-like kinase 4 (Plk4) and structural centrosome defects by expressing the centrosomal proteins Nlp and Cep131) in normal/primary breast cancer cells with the aim to generate a model on how centrosome defects can cause cancer.

To successfully carry out the project we plan to apply a variety of state-of-the-art cell biological and biochemical techniques (i.e confocal microscopy, live cell imaging, FRET/FRAP, high-resolution microscopy (SIM, STED), 3D-invasion and metastasis assays, CRISPR/Cas) Our findings will contribute to assess the patient's prognosis and improve cancer therapy.



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