Hosting group information for applicants

Name of DKFZ research division/group:
Epigenetics (A130)

Contact person: **Frank Lyko (f.lyko@dkfz.de, 3800)**

Group homepage: **www.dkfz.de/epigenetics**

Please visit our website for further information on our research and recent publications.

RESEARCH PROFILE AND PROJECT TOPICS:

Epigenetic mechanisms regulate the interpretation of genetic information and adapt gene expression patterns to changing conditions. The Division of Epigenetics at DKFZ investigates the role of epigenetic mechanisms in cancer, as well as in cellular and environmental adaptation. Major recent achievements include the detection of novel epigenetic programs in cancer, the identification of novel mechanisms regulating cell-fate decisions, and the establishment of marbled crayfish as a novel species and model system for epigenetics research. In the context of cancer research, we have recently shown that cell-of-origin methylation signatures can be conserved through all stages of colon and skin cancer progression. These studies provided exciting novel opportunities for cancer subclassification and have resulted in the development of a strong platform for single-cell transcriptome, methylome and chromatin analysis.

We are looking for a candidate to strengthen our cancer epigenetics team. Potential projects should have strong focus on the use of single-cell technologies in the context of colon cancer cancer or skin cancer. One specific project idea is the analysis of cancer-associated fibroblasts (CAFs) in skin cancer. Using single-cell transcriptomics of healthy human skin, we have recently identified four main fibroblast subpopulations with distinct functional properties. We have termed the underlying process "fibroblast priming" and hypothesize that fibroblasts can also be primed towards a CAF fate during the very early stages of skin cancer formation. The project could use multi-modal single-cell technologies to analyze transcriptomes and methylomes during fibroblast activation and CAF priming. Candidate genes can be analyzed in cultured fibroblasts using CRISPR-mediated gene editing. The results from these experiments will identify novel targets for skin cancer prevention through the suppression of tumor-promoting cell fates. This project would be supported by the strong computational infrastructure of the group and by a close collaboration with the Department of Dermatology at the Heidelberg University Medical Center.