Research profile for applicants

Name of DKFZ research division/group:	***Mechanisms of Genome Control / B460***
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Group homepage: *Visit this website for further information on current research and recent publications.*	***https://www.dkfz.de/en/mechanismen-der-genomkontrolle/index.php***

RESEARCH PROFILE AND PROJECT TOPICS

One of the most fascinating processes in biology is the development of a multicellular organism with >200 different cell types from one single cell. This means that most of these cell types have the same genetic content, despite being highly diverse in their appearance and function. Such diversity is only possible if genes are precisely regulated in space and time. To achieve this, gene promoters must integrate inputs from distal gene regulatory elements (DREs), such as enhancers. Often located hundreds of kilobases away, DREs are thought to come into close physical proximity to their target genes, which involves folding of the DNA. Interestingly, these interactions are frequently altered in cancer tissues. Whether and when such contacts are required for gene activation is one of the greatest mysteries in the field.

Our mission is to understand the precise mechanisms by which enhancers communicate with gene promoters during activation and maintenance of transcription, with a specific focus on the role of the 3D genome structure in this process.

Our lab combines state-of-the-art genomic, proteomic and computational biology approaches with high-throughput genetic engineering to dissect gene regulatory mechanisms in health and disease. We use embryonic stem cell differentiation and cancer cell lines, which are ideally suitable for genetic manipulation, as models for gene activation.

Possible projects center around the relationship between the temporality of genome folding and transcriptional activation observed in our recent datasets. While our broad goal is to determine the molecular events leading from enhancer activation to gene expression, the actual projects will be tailored to the particular interests, needs and abilities of the postdoctoral candidate. To complement the genomic techniques established in the lab, the successful candidate will receive training in computational methods and have the opportunity to develop local and international collaborations.

We are looking for a postdoctoral candidate who is ambitious, curious, has a good work ethic and possesses the ability to work both independently and in a small team. Existing experience with cell culture, bioinformatics or genomic techniques is desired.

We offer a multicultural environment, cutting-edge approaches and dedicated mentorship towards long-term career planning.