Seminar/Talk

From exploring liver organogenesis to chromosome architecture in neuronal stem cells

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High fidelity orchestration of gene expression during development requires precise temporal and spatial control mechanisms. In the first part of this talk this phenomenon will be explored in the light of liver development. The generation of a hepatoblast specific transgenic zebrafish line, which enables specific mis expression in hepatoblasts will be elucidated. Downstream applications for this transgenic line, which lead to better understanding of livermorphogenesis will be introduced. In the second part possible mechanisms of transcriptional regulation of gene expression at a particularly interesting class of developmental gene loci, which are rich in conserved non - coding elements (CNEs). Currently their role in gene regulation remains unknown. So far 35 CNE clusters have been identified, where two or more developmental genes are embedded within the cluster, which are divided via a Topologically Associated Domain (TAD) boundary. There I hypothesized that this observation could be (1) coincidence, (2) sharing functional parts of the non coding genome and (3) co-regulation. In order to test whether the genes are co-expressed I performed a gene expression analysis in three different neuronal progenitor populations of 9 candidate loci. I observed that EphA4 and Pax3 showed evidence of co-expression in dorsal forebrain progenitors using qPCR analysis, which is a form of co-regulation. In the other candidate loci and other neuronal progenitor cell types no co-expression could be detected, however we cannot exclude that there is co-repression. Subsequently I studied the role of CNEs in gene regulation using a chromosome conformation capture approach. I used neuronal stem cells as a model. I hypothesized that either the CNEs interact to form the higher order chromatin structures, or that a single CNE preferentially interact in proximity with the promoter region to regulate gene expression. Eventually, I identified candidate CNEs, which could be regulatory elements to regulate gene expression in neuronal stem cells. All together these findings may contribute to a better understanding of the orchestration of gene expression during development.

Wednesday, November 27, 2019 11:00am - 12:00pm
Seminar Room, Lab Building East

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