Nuclear Lamins and Human Disease

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In the cell nucleus, the nuclear membrane and peripheral heterochromatin are separated by a fibrous layer of proteins called the nuclear lamina. The major determinants of the lamina are the lamins that are type V intermediate filament proteins. The lamina determines nuclear size and shape and the lamins are involved in many essential nuclear functions such as regulation of gene expression. Mutations in the genes encoding nuclear lamins or lamin associated proteins cause a heterogenous group of hereditary diseases commonly known as “the laminopathies”. These include dilated cardiomyopathy, skeletal muscular dystrophies, lipodystrophies, and premature aging disease (progeria). How various mutations in lamins lead to different tissue-specific phenotypes is still largely unknown. Interestingly, there is also evidence that the lamins play a role in the malignant progression and could serve as biomarkers in certain cancers.

The aim of the project is to identify cellular and molecular mechanisms by which mutations in lamins cause human disease, especially progressive heart failure seen in dilated cardiomyopathy. For this purpose, we use cultured primary cells and tissue samples from Finnish patients carrying the known lamin mutations. Transfection studies, gene expression analysis and biochemical assays are further used to identify cellular phenotypes and gene expression profiles related to mutant lamin. The role of lamins in cancer progression and their prognostic value in malignancies is studied using tissue micro arrays and cell culture models. We are part of the Turku Prostate Cancer Consortium which serves a large selection of patient derived sample material and an excellent network of collaborators for this and other cancer related studies.
**Selected publications:**


**Personnel:**

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