Changes in lamin-associated protein complexes under stress conditions in the Drosophila melanogaster model system.

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Lamins are nuclear proteins classified as type V intermediate filaments. There are many functions assigned to them so far, including those responsible for maintaining the normal structure of the cell nucleus, regulation of transcription, and the organization of chromatin. Mutations in lamins can cause diseases generally called laminopathies. To date, over 350 mutations in lamin have been identified that results in at least 30 types of diseases. Laminopathies due to very diverse symptoms are an extremely heterogeneous group of diseases. Clinical phenotypes allow laminopathy to be divided into the following groups such as muscular dystrophy, lipodystrophy, neuropathies. In mammalian, we distinguished two types of lamins: A/C- and B-type. A- and C- isoforms can be created from one gene (*LMNA*) via alternative splicing and the protein product is observed during later stages of embryonic development. B-type lamins are constantly expressed in every cell. There are few isoforms od B-type lamin (the most common are B1 and B2).

To examine the connection between lamins and disorders mentioned above the heat shock induction of stress condition in the *Drosophila melanogaster* model system was performed. The presence of only two genes coding for lamins (and its high homology to human genes), combined with the simplicity of maintenance and manipulation of *Drosophila* makes it an excellent candidate for research on laminopathies. The working hypothesis is based on assumption that lamin together with a number of interacting proteins forms complexes, which may change after stress induction. The major aim of this work is to identified potential protein components associated with lamin in normal condition and after heat shock induction and moreover to investigate changes in lamin itself (such as post-translational modifications eg. phosphorylation).

Up to now, preliminary experiments have been carried out to identify protein complexes interacting with lamin. For this purpose, a native immunoprecipitation (IP) of lamin Dm (B-type) was made and the mass spectrometry analysis was performed (LC-MS/MS). Analysis showed that there might be a difference in protein complexes, especially those which functions are connected with protein metabolism, RNA binding or ATP activity. To confirm there results further research is required. Analysis with cross-linked proteins will be performed to determine the exact composition of protein complexes in normal conditions of *Drosophila* maintenance and after stress condition induction.

Keywords: Drosophila melanogaster, immunoprecypitation, lamin, laminopathies, mass spectrometry

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