The nucleoporin ELYS/Mel28 regulates nuclear envelope subdomain formation in HeLa cells

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In open mitosis, the nuclear envelope (NE) reassembles at the end of each mitosis. This process involves the reformation of the nuclear pore complex (NPC), the inner and outer nuclear membranes, and the nuclear lamina. In human cells, cell cycle dependent NE subdomains exist (1), characterized as A-type lamin-rich/NPC-free or B-type lamin-rich/NPC-rich, which are initially formed as core or non-core regions on mitotic chromosomes, respectively. Our group is investigating a role of NE subdomain, and recently proposed that this structure is connected with interphase NPC assembly (2, 3). On the other hand, little is known about the coordination of NPC and NE assembly, which are tightly connected with NE subdomain formation.

In this study, we focused on a NPC component (also called nucleoporin), ELYS/Mel28, which is known to trigger NPC formation by binding to mitotic chromosomes after anaphase onset, and therefore crucial for postmitotic NPC formation. Using RNAi depletion, we showed that the ELYS/Mel28 is essential for recruitment of lamin B receptor (LBR) to the chromosomal non-core region (see Figure). ELYS/Mel28 was also found to be responsible for focusing of A-type lamin-binding proteins like emerin, Lap2a and the barrier-to-autointegration factor (BAF) at the chromosomal core region. Furthermore, ELYS/Mel28 biochemically interacts with the LBR in a phosphorylation-dependent manner. Recruitment of the LBR depends on the nucleoporin Nup107, which interacts with ELYS/Mel28, but not on nucleoporin Pom121, suggesting that the specific molecular interactions with ELYS/Mel28 (complex) are involved in the NE assembly at the non-core region. The depletion of the LBR affected neither the behavior of emerin nor Lap2a indicating that the recruitment of the LBR to mitotic chromosomes is not involved in formation of the core region. The depletion of ELYS/Mel28 also accelerates the entry into cytokinesis after recruitment of emerin to chromosomes.

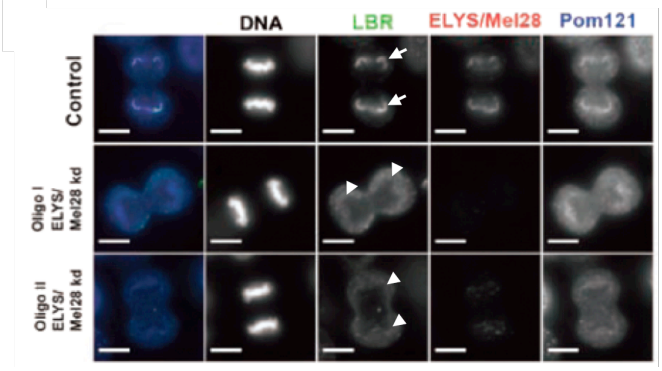

Figure Immunofluorescence staining of mitotic cells depleted ELYS/Mel28 by RNAi. ELYS/Mel28 depletion inhibits LBR recruitment to the chromosomal non-core region.

Our data show, that ELYS/Mel28 plays a role in NE subdomain formation in late mitosis besides NPC formation. These results were reported in the journal *Nucleus* (4).

References:

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