Cell cycle-specific sumoylation events regulate chromatin association with the nuclear envelope

Friday, August 10th, 2018
3: 00 pm, MSL theatre Rm 102
2185 East Mall

Host: Dr. Vivien Measday
In all eukaryotic cells, the genome is enclosed by the nuclear envelope (NE), whose prominent features include a double (inner and outer) membrane and macromolecular structures termed nuclear pore complexes (NPCs) that form channels across the NE. While the most established function of the NE is to segregate the metabolic activities of the cytoplasm and nucleoplasm from one another, it has long been proposed that NPCs and the NE membrane also facilitate organization of NE-associated chromatin and control the expression of associated genes. In my presentation, I will discuss studies performed in the yeast model system that establish a role for a subset of NPC proteins, sumoylation factors, and a NE membrane protein in establishing subtelomeric chromatin structure and its association with the NE. Key events in this process occur during mitosis when the Sumo ligase Siz2/Nfi1 is recruited to the NE through its interactions with the membrane protein Scs2. Scs2 is a member of a family of proteins termed VAPs, with known functions in interorganellar tethering and phospholipid metabolism. Binding of Siz2 to Scs2 at the NE is dependent on the NPC protein Nup170, and together these proteins facilitate a cascade of Siz2-mediated sumoylation events that are required for the proper assembly of subtelomeric chromatin and its association with the NE as cells progress through M-phase and into G1-phase of the cell cycle. In addition, I will discuss how Scs2 sumoylation appears to couple the processes of chromatin binding to the NE with the regulation of NE membrane expansion during mitosis.

Abstract

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