



Nuclear actin: a regulator of chromatin organization and nuclear envelope architecture



Actin localizes to and plays important, but poorly understood, roles in the nucleus. Nuclear actin regulates transcription, chromatin remodeling, DNA damage repair, and nuclear organization in cultured cells. However, the *in vivo* and development roles of nuclear actin, what its structures are, and how its structure impacts its functions remain largely unknown. We have made the novel finding that multiple types of actin localize to the nuclei of cells in a developmentally regulated manner during *Drosophila* oogenesis (follicle development). Correlation of developmental events with the presence of nuclear actin suggests nuclear actin regulates stemness/differentiation, cell cycle, and transcription. To probe these and other functions of nuclear actin, we altered nuclear actin levels by loss or knockdown of Importin 9 and Exportin 6, nuclear import/export machinery thought to be specific to nuclear actin. Loss of Importin 9 results in lethality, indicating nuclear actin plays critical roles during development. RNAi knockdown of Imp9 in the germline results in stem cell issues, chromatin defects, and female sterility. Germline knockdown of Exportin 6 causes reduced fertility, distinct chromatin aberrations including alterations in heterochromatin, and nuclear envelope defects. These findings lead to the model that nuclear actin plays critical roles in chromatin organization and nuclear architecture, and these functions are essential for development.

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Host: Dr. Julie Claycomb

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Time: 11AM – 12PM

Place: Room 1522, MaRS2, 661
University Ave.