



# CDB SEMINAR

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10:00~11:00 A7F Conference Room

## Nuclear transport as a regulator of cell differentiation

### Summary

In eukaryotic cells, functional molecules communicate between the cytoplasm and nucleus through nuclear pore complexes in the nuclear envelope. The selective nuclear import of karyophilic proteins is mediated by specific amino acid sequences known as nuclear localization signals (NLSs). NLS-mediated nuclear import requires transport factors, such as importins. We have recently shown that nuclear transport of several transcription factors is another critical regulatory step for cellular differentiation. That is, importin-alpha, a receptor of nuclear localization signal, undergoes subtype switch during neural differentiation of mouse ES cells, and this switching has a major impact on cell differentiation through the regulated nuclear import of a specific set of transcription factors such as Oct3/4, SOX2, Oct6 and Brn2. We further investigated the role of nuclear transport machinery on cellular differentiation, and found that a specific transport receptor acts as an inhibitory regulator of transcription factors to maintain undifferentiated state of ES cells. The nuclear import of Oct6 and Brn2 are inhibited by a subtype of importin in undifferentiated ES cells, suggesting a novel mechanism by which they are excluded from the nucleus by the existing nuclear import factor, until cells are ready to undergo neural differentiation.

Taken together, the coordinated regulation between transport receptors and their transcription factor cargos is an important step in cell differentiation.

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