

BDR SEMINAR in Osaka

"CDB SEMINAR" and "QBiC SEMINAR" have been renamed "BDR SEMINAR".

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Wednesday, September 19, 2018 15:40-16:20

1F Lounge, Quantitative Biology Bldg. A, Osaka

Sensing the matrix: transducing mechanical signals from integrins to the nucleus

Summary

Cell proliferation and differentiation, as well as key processes in development, tumorigenesis, and wound healing, are strongly determined by the properties of the extracellular matrix (ECM), including its mechanical rigidity and the density and distribution of its ligands. In this talk, I will explain how we combine molecular biology, biophysical measurements, and theoretical modelling to understand the mechanisms by which cells sense and respond to matrix properties. I will discuss how the properties under force of integrin-ECM bonds, and of the adaptor protein talin, drive and regulate matrix sensing. I will further discuss how this sensing can be understood through a computational molecular clutch model, which can quantitatively predict the role of integrins, talin, myosin, and ECM receptors, and their effect on cell response. Finally, I will analyze how signals triggered by rigidity at cell-ECM adhesions are transmitted to the nucleus, leading to the activation of the transcriptional regulator YAP.



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