

## **Students' Annual Webinar**

### **Matrix stiffening promotes perinuclear mitochondrial localisation**

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Mechanical signals from the cellular microenvironment modulate various cell functions via cytoskeleton remodelling and actomyosin contractility. Although these processes consume energy and alter metabolism, it is unknown how the form and function of the main energy-producing organelle, mitochondria, adapt to meet such mechanical demands. Here, we show that the stiffness of the extracellular matrix alters mitochondrial morphology, localisation and dynamics. A stiff matrix causes an increase in fragmented and perinuclear mitochondrial populations whereas a soft matrix has elongated and homogeneously distributed mitochondria. We identify stiffness-sensitive perinuclear localisation of FilaminA as the key mechanosensor behind the observed mitochondrial morphology and subcellular localisation. Subsequently, we show that maintenance of the perinuclear mitochondria on a stiff matrix is crucial for priming human mesenchymal stem cells towards osteogenesis. Taken together, our results discover an unknown mitochondria-centric mechanism that enables a cell to adapt to its microenvironment.

***Friday, Apr 22<sup>nd</sup> 2022***

***4:00 PM***