

המעבדה לכימיה אורגנית ואי-אורגנית

סמינר

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בנושא:

Unveiling membrane remodelling processes using
single-molecule mechanical methods

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Abstract: Migrasomes are a recently discovered type of extra-cellular vesicles generated from retraction fibers during cell migration on extra-cellular substrates. These vesicles, of several microns in size, allow cells to release contents at specific locations, which can be taken up by other cells which travel to that site. Evidence recently emerged showing that migrasomes play essential roles in fundamental cellular processes such as lateral transfer of mRNA and proteins and transport of damaged mitochondria, and it was demonstrated that they coordinate organ morphogenesis in zebrafish. Thus, it is of great interest to understand the mechanism underlying migrasome biogenesis. I will show how we combine micropipette aspiration, dual trap optical tweezers and confocal fluorescence microscopy to reveal the physico-chemical foundations of migrasome formation, by recreating the conditions leading to migrasome-like vesicle generation in our in-vitro model system, and validating our findings in cell cultures. We show that tetraspanin proteins involved in migrasome formation strongly partition into curved membrane tethers, and we reveal a novel, two-step migrasome formation process where the first stage of migrasome formation is tetraspanin independent and the second stage that leads to its stabilization is driven by tetraspanin. Overall, our findings illuminate the process of migrasome formation and provide insight into the role of tetraspanin proteins in membrane remodelling processes.

