SFB 1286 Quantitative Synaptology

UNIVERSITÄTSMEDIZIN GÖTTINGEN UMG

"Adhesion energy controls lipid binding-mediated endocytosis"

Speaker

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2 PM

Location

Center for Biostructural Imaging of Neurodegeneration (BIN)
Von-Siebold-Straße 3a, 37075 Göttingen
Seminar Room

Abstract
Several bacterial toxins and viruses can deform membranes through multivalent binding to lipids for clathrin-independent endocytosis. However, how membrane deformation and endocytic internalization are mechanistically linked is unclear. To ask, whether multivalent lipid binding alone could lead to productive endocytosis, we created an artificial endocytic system. This system consisted of GPI-anchored anti-GFP nanobodies as receptors and a multivalent globular binder exposing 180 GFP molecules on its surface. These binders deform the plasma membrane upon adhesion and become endocytosed independently of clathrin. Changing the affinity of the nanobody receptor over 7 orders of magnitude reveals that once a threshold in adhesion energy is overcome, both membrane deformation and endocytosis occur. Multivalent, binding-induced membrane deformation by globular binders thus suffices for internalization to occur and we suggest it is a common, purely biophysical mechanism for lipid-binding mediated endocytosis of toxins and pathogens.

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