

Thomas Weikl

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TU Wien
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Life is rough for proteins in cell adhesion - *binding constants of membrane-anchored proteins in cell adhesion strongly depend on the nanoscale roughness of the membranes*

Cell adhesion and the adhesion of vesicles to the membranes of cells or organelles are pivotal for immune responses, tissue formation, and cell signaling. The adhesion processes depend sensitively on the binding constant of the membrane-anchored receptor and ligand proteins that mediate adhesion, but this constant is difficult to measure in experiments. We have investigated the binding of membrane-anchored receptor and ligand proteins with molecular dynamics and Monte Carlo simulations. Our simulations indicate that the binding constant of the anchored proteins strongly decreases with the membrane roughness caused by thermally excited membrane shape fluctuations on nanoscales. I will present a general theory that explains the roughness dependence of the binding constant for the anchored proteins, and that relates this constant to the binding constant of soluble proteins without membrane anchors. Since the binding constant of soluble proteins is readily accessible in experiments, our results provide a novel route to compute the binding constant of membrane-anchored receptor and ligand proteins.

Thomas Weikl earned his PhD degree in theoretical physics in 1999 at the Max Planck Institute of Colloids and Interfaces. After two years of postdoctoral work at the University of California, San Francisco, he returned to the Max Planck Institute of Colloids and Interfaces as a group leader in 2002. His research focuses on theoretical models and simulations of proteins and membranes.

All interested colleagues are welcome to this seminar lecture (45 min. presentation followed by discussion)

Friedrich Aumayr
(LVA-Leiter)

Gerhard Schütz
(Seminar Chair)