

THE PHYSICS COLLOQUIUM

Thursday, 24 November 2022, 4:00 p.m.
Nijenborgh 4, Lecture Hall 5115.0317 (Schröderzaal)

Flexible polymers at biological interfaces

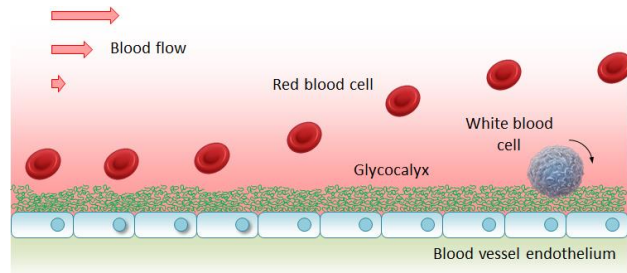
from cell adhesion at the blood vessel wall to nucleocytoplasmic transport

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Intrinsically disordered proteins and extracellular matrix polysaccharides (such as hyaluronan) belong to two distinct classes of biomacromolecules. Yet, from a physics perspective they are remarkably similar: both are flexible polymers, and generic concepts – old and new – from polymer physics theory

are powerful tools for understanding their behavior. Flexible polymers are ubiquitous in biological systems yet, compared to folded proteins, we know relatively little about how they perform their functions. The Richter Lab works at the crossroads of biochemistry and cell biology, surface engineering, biophysical characterization, and soft matter physics, to uncover the mechanisms of assembly and function of flexible polymers at biological interfaces. This Colloquium will cover selected examples of our work. The main biological questions that will be addressed are: (i) How do glycocalyxes, i.e. the soft glycan-rich coats that line all inner blood vessel walls and the surface of many cells in our body, prime cell adhesion and migration? These processes are important for our immune response and tissue repair, and to understand tumor metastasis, and I shall focus in particular on the effects of force on cell-glycocalyx adhesion. (ii) How does the nuclear pore permeability barrier, a nanoscale meshwork of intrinsically disordered proteins that fills the so-called nuclear pores, control the exchange of macromolecules between the cell's nucleus and cytoplasm? This question is important for the proper coordination of gene transcription and translation in our cells. Much of the work presented is based on molecularly defined model assemblies of biopolymers, as this enables experiments under well-defined conditions required for quantitative correlation with theoretical models.



Join us for coffee starting 3:30 p.m. Refreshments will be served after the lecture.

For more information contact the host: Wouter Roos (w.h.roos@rug.nl)

Website: <http://www.rug.nl/research/vsi/colloquia/>

