

Fakultät für Chemie und Chemische Biologie	Kolloquium der Physikalischen Chemie
Thema:	Studying the structure and function of sialic acid TRAP transporters using integrative structural biology and Al-based protein design
Vortragender:	Dr. Gregor Hagelüken Biomedical Center (BMZ) Universität Bonn
Ort:	Seminarraum CB CP-02-182
Zeit:	Montag, 16.06.2025 – 10:30 Uhr
Inhaltsangabe:	Tripartite ATP-independent periplasmic (TRAP) transporters are found widely in bacteria and archaea and consist of three structural domains, a soluble substrate-binding protein (P-domain), and two transmembrane domains (Q- and M-domains). HiSiaPQM and its homologs are TRAP transporters for sialic acid and are essential for host colonization by pathogenic bacteria. Using EPR and FRET techniques, we studied the conformational changes of the P-domain in detail, revealing important clues for the transport mechanism. We reconstituted HiSiaQM into lipid nanodiscs and used cryo-EM to reveal the structure of a TRAP transporter. It is composed of 16 transmembrane helices that are unexpectedly structurally related to multimeric elevator-type transporters. The idiosyncratic Q-domain of TRAP transporters enables the formation of a monomeric elevator
Die Dozenten der Physikalischen Chemie	architecture. A model of the tripartite PQM complex was experi- mentally validated and revealed the coupling of the substrate- binding protein to the transporter domains. We used single melocula
im Auftrag Prof. Dr. Thorben Cordes	total internal reflection fluorescence (TIRF) microscopy in solid- supported lipid bilayers to visualize the interplay between HiSiaQM and its substrate binding protein and to study the transport mecha- nism of TRAP transporters. In addition, we are currently studying

the potential of nanobodies and small AI-designed proteins to con-

vert the P-domain into powerful biosensors.

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