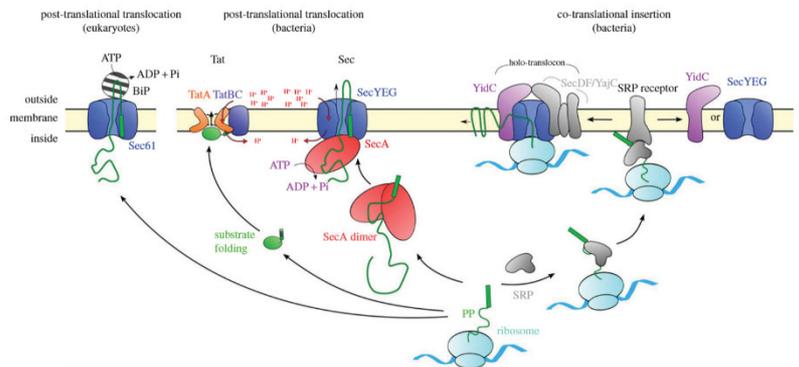


## Transport-Machinery

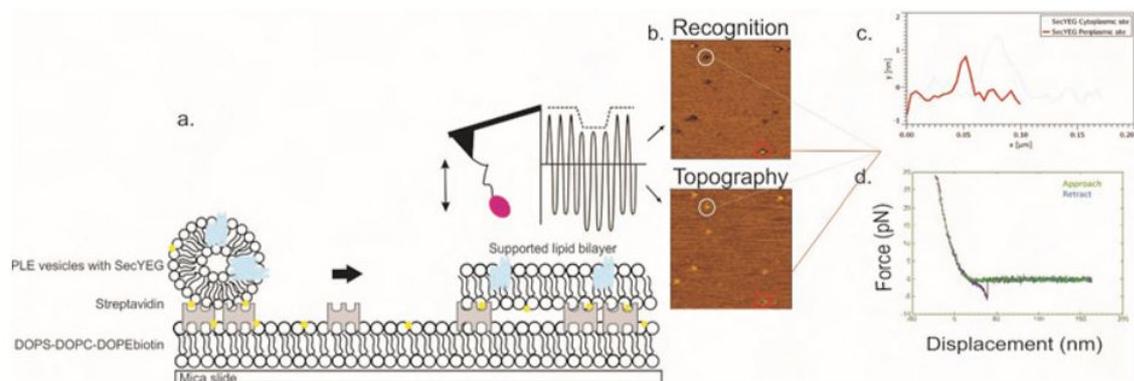
### *Forces and Dynamics through the bacterial translocon SecYEG*

Roughly one third of all cell proteins either cross or are inserted into a biological membrane. This process is facilitated by transmembrane proteins called translocons. In our research we focus on the Sec machinery, which is present in both eukaryotes and prokaryotes. Controversial hypotheses have been reported in the field on how exactly this complicated nano-machinery works. Our aim is to study this mechanism using atomic force microscopy (AFM).



*Figure 1: Pathways for protein insertion and translocation.*

AFM is our method of choice for biological samples, as it can be conducted under physiological conditions by measuring in aqueous solutions, while still achieving nm resolution. Similar to a gramophone record player a very small tip (in nm range) gently touches the surface and records the forces between the probe and the surface. Moving the tip over the sample generates a topographical map. Furthermore, interaction forces between molecules can be studied by immobilising one interaction partner to the tip and the counterpart to a surface.



*Figure 2: Experimental setup for combined TREC and SMFS experiments.*

We are searching for motivated bachelor and master students interested in biophysical methods to support our research group. You will get intensive training in AFM measurements, including methods like simultaneous topography and recognition imaging (TREC), combined with single molecule force spectroscopy (SMFS), as well as basic imaging. Furthermore, you will learn how to immobilize interaction partners onto the tip and the surface by established tip-chemistry and sample preparation protocols. Insight into protein expression and purification will be provided as well.

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