# Experimental report

19/07/2024

**Proposal:** CRG-2644 **Council:** 4/2019

**Title:** Utilizing neutron reflectivity to understand the biological function of the intrinsically disordered N-terminus of Magnesium transporter A

**Research area:** Chemistry

**This proposal is a new proposal**


**Main proposer:** Marie SKEPO

**Experimental team:** Amanda ERIKSSON SKOG
Yuri GERELLI

**Local contacts:** Alexey KLECHIKOV


**Samples:** KEIF
POPC and POPS lipids

| Instrument | Requested days | Allocated days | From | To |
|---|---|---|---|---|
| SUPERADAM | 5 | 5 | 06/09/2019 | 11/09/2019 |


## Abstract:

Knowing your enemy is essential in war, and this also applies in the war against bacterial infections. In order to develop new antibiotics, it is necessary to not only understand the antibacterial agents, but also the bacteria it is supposed to work against. Magnesium transporter A (MgtA) is a protein found in the cell membrane of S. typhimurium and E. coli. Recent studies have discovered that the N-terminus of MgtA (amino acid 1-33, from hereon called Keif) is intrinsically disordered, but the benefit of this unstructured part is not yet clear. Thus, the aim of this study is to figure out how the intrinsic disorder of Keif contributes to the biological function of MgtA. Bulk studies of Keif have been performed using two simulation techniques (MC and MD), in combination with CD and SAXS experiments. Investigation of surface interactions have also been done using QCM-D. To continue studying the membrane interactions of Keif we would like to expand our research to include neutron reflectivity (NR). By combining all these different methods, we hope to gain a holistic understanding of the biological function of Keif in MgtA, which in the future might lead to new effective antibiotics

# Experimental report for CRG-2644 on SuperADAM

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Local contact: Alexey Klechikov
06-09-2019 to 11-09-2019

During the experiment CRG-2644 performed on SuperADAM we measured the adsorption of intrinsically disordered N-terminus of Magnesium transporter A, which is hereafter called KEIF, to a hydrphilic silica surface. As is shown in Figure 1, the thickness of the adsorbed KEIF layer decreases in each rinse. The SLD-value of the layer also increases for each rinse due to a non-perfect exchange of buffer solution. The shape of the SLD profiles, with the smooth transitions could indicate that KEIF is not lying flat on the surface, rather "standing up" in solution, giving a high roughness. We have a paper in preparation, to be submitted Autumn 2024.

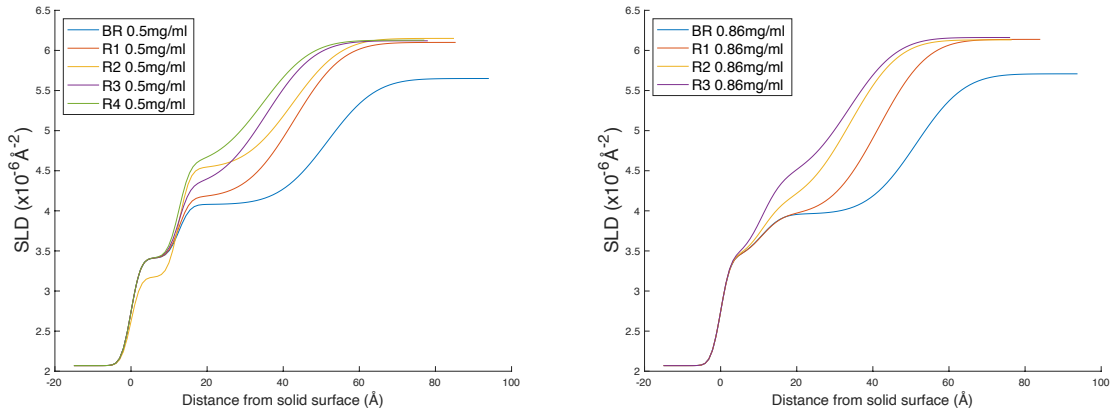


*Figure 1. SLD profiles of KEIF adsorbed to a hydrophilic silica surface at two different peptide concentrations in D-buffer.*