



Katedry biochémie a genetiky PriF UK  
a občianske združenie *NATURA*



Vás pozývajú na 139. prednášku v rámci Kuželových seminárov:

**prof. Markus Seeger**

Institute of Medical Microbiology, University of Zürich

**MYCOBACTERIAL MEMBRANE TRANSPORTERS –  
A TREASURE TROVE FOR STRUCTURAL  
BIOLOGISTS AND PROTEIN BIOCHEMISTS**

ktorá sa uskutoční **11. mája 2026** (pondelok) o **15:00**  
v miestnosti **CH1-222** Prírodovedeckej fakulty UK

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## Markus A. Seeger, PhD

### Curriculum Vitae

2020–present Full Professor ad personam for Biochemical Microbiology, University of Zurich  
2020–2025 Associate Professor ad personam for Biochemical Microbiology, University of Zurich  
2019–2020 Assistant Professor (ERC Consolidator Grant), University of Zurich  
2013–2019 SNSF Professor, University of Zurich  
2009–2013 SNSF Ambizione Fellow, University of Zurich  
2006–2009 Postdoctoral Fellow, University of Cambridge (H. van Veen)  
2003–2006 PhD, ETH Zurich / University of Zurich (K.M. Pos)  
1997–2002 Biology studies (Biotechnology), ETH Zurich



Research focus: Structural and mechanistic analysis of membrane transport proteins with emphasis on multidrug efflux systems and mycobacterial transporters using cryo-EM, biophysics, and functional assays.

### Synopsis of the talk

Mycobacteria possess a complex cell envelope that is essential for survival and drug resistance. This talk will present our recent structural and functional work on mycobacterial ABC transporters. I will focus on Wzm–Wzt, which exports lipid-linked galactan required for arabinogalactan biosynthesis, and IrtAB, an ABC transporter that imports siderophores despite an exporter fold. Using cryo-EM and complementary assays, we reveal distinct transport mechanisms, including ATP-driven polysaccharide translocation and a “credit-card” mode of siderophore uptake. These findings highlight the mechanistic diversity of mycobacterial transporters and their potential as targets for anti-tubercular drug development.

### Selected publications

Garaeva, A.A., Fabianová, V., Savková, K., Huszár, S., Xue, X., Lowary, T.L., Mikušová, K., Seeger, M.A.

Structural basis of lipid-linked galactan export by the mycobacterial ABC transporter Wzm–Wzt. *Nat Commun.* 2026;17(1):2745. doi:10.1038/s41467-026-70429-9.

Earp, J.C., Garaeva, A.A., Meikle, V., Niederweis, M., Seeger, M.A.

Structural basis of siderophore export and drug efflux by *Mycobacterium tuberculosis*. *Nat Commun.* 2025;16(1):1934. doi:10.1038/s41467-025-56888-6.

Gonda, I., Sorrentino, S., Galazzo, L., Lichti, N.P., Arnold, F.M., Mehdipour, A.R., Bordignon, E., Seeger, M.A.

The mycobacterial ABC transporter IrtAB employs a membrane-facing crevice for siderophore-mediated iron uptake. *Nat Commun.* 2025;16(1):1133. doi:10.1038/s41467-024-55136-7.

Remm, S., De Vecchis, D., Schoppe, J., Hutter, C.A.J., Gonda, I., Hohl, M., Newstead, S., Schafer, L.V., Seeger, M.A.

Structural basis for triacylglyceride extraction from mycobacterial inner membrane by MFS transporter Rv1410. *Nat Commun.* 2023;14:6449.

Arnold, F.M., Weber, M.S., Gonda, I., Gallenito, M.J., Adenau, S., Egloff, P., Zimmermann, I., Hutter, C.A.J., Hurlimann, L.M., Peters, E.E., Piel, J., Meloni, G., Medalia, O., Seeger, M.A.

The ABC exporter IrtAB imports and reduces mycobacterial siderophores. *Nature.* 2020;580:413–417.