

# Solving the Structure of Needle-Shaped LolB Microcrystals from *Shigella* via MicroED

Bhavna Kumari, Johan unge, Karina Persson

Umea Univerity

The localization of lipoproteins in Gram-negative bacteria is mediated by the Lol (lipoprotein outer membrane localization) pathway, in which LolB functions as a key outer membrane receptor responsible for the final insertion of lipoproteins. Due to its essential role in bacterial viability and envelope biogenesis, LolB represents a promising target for the development of novel antibacterial strategies aimed at combating antibiotic resistance.

In this study, we investigated the structural characterization of LolB from *Shigella* species. Crystallization trials yielded needle-shaped microcrystals that were unsuitable for conventional X-ray diffraction methods. To overcome this limitation, we employed Microcrystal Electron Diffraction (MicroED), an emerging structural biology technique that enables high-resolution structure determination from nanocrystals that are otherwise intractable by traditional approaches.

Our work highlights the applicability of MicroED for studying challenging protein targets, that often fail to produce large, well-diffracting crystals. The successful use of MicroED in this context demonstrates its potential as a powerful complementary method to X-ray crystallography, expanding the structural toolkit for biologically and clinically relevant proteins.

These findings underscore both the importance of LolB as a therapeutic target in Gram-negative pathogens and the growing impact of MicroED in structural biology, especially for systems where only micro- or nano-sized crystals can be obtained.