

Invited Talk:  
**Building the cell from one end –  
The polar growth organelle in streptomycetes**

Wednesday October 9<sup>th</sup> 2024 at 2 pm

Lecture hall 213, DTU building 220

Afterwards there will be an option for discussion in 219 (max. 20 people)



**Professor Klas Flärdh**  
Department of Biology, Lund University

**ABSTRACT:**

Streptomycetes are fascinating and important organisms for many reasons, not only as sources of immensely diverse and valuable specialised metabolites. I will discuss their life cycle, from growth as vegetative mycelial networks to formation of spores as vehicles of dispersal. Then, I will focus on how streptomycetes, in similarity to other members of the Actinomycetota, grow by building the cell wall at cell poles. In *Streptomyces*, this is essentially a unipolar growth where cell walls are assembled in restricted zones at the hyphal tips. Regulation of the processes associated with this polar growth, including formation of new cell poles by hyphal branching, is crucial for growth, morphology, and success of the vegetative mycelium in the environment. It is known that the coiled coil protein DivIVA is an essential cell polarity determinant that orchestrates growth at the cell poles in Actinomycetota. It forms a protein assembly at the cell poles that is essential for growth and viability, although its function is not well understood. In *Streptomyces*, two additional DivIVA-related coiled coil proteins are involved in growth at hyphal tips - Scy and FilP. They interact with DivIVA and contribute to forming the polar organelle that we refer to as the polarisome. We have recently identified another member of the polarisome - a histidine pseudokinase. The characterisation of these proteins and their effects on growth and cell shape now sheds new light on the nature of the polar organelle that directs growth and cell shape in streptomycetes.

**BIO:**

Klas has worked as a professor at Department of Biology at Lund University for the past 10 years following 10 years as a lecturer in Microbiology, also at Lund University, and an assistant professor position at Uppsala University.

Klas works to understand how molecules of a cell govern such essential and complex functions like cell division, cell polarity, determination of cell shape, and cell differentiation, with a focus on cell and developmental biology of bacteria. His group works primarily with model organisms of the genus *Streptomyces* – a large group of Gram-positive soil bacteria that are renowned for their prolific secondary metabolites, including a wide range of antibiotics and other products. Streptomycetes have also a complex developmental life cycle that involves intriguing mechanisms for regulation of growth, cell shape, cell division and cell differentiation. Klas group has recently focussed on the machinery that directs polar growth and cell shape in streptomycetes and other actinobacteria, and on developmentally regulated cell division and sporulation. Underlying these processes are fundamentally relevant cell biological mechanisms, and features of the streptomycetes provide unique openings to study them.