NUS National University of Singapore | Department of Biological Sciences
Faculty of Science

ON-SITE BIOLOGY COLLOQUIUM

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Hosted by Asst. Prof Long Yuchen

Map to Block S1A

The molecular control of root stem cell homeostasis

By **Yvonne Stahl**

Professor, Heinrich-Heine University Düsseldorf, Germany,
Institute for Developmental Genetics &
Cluster of Excellence in Plant Sciences (CEPLAS)

The root system of higher plants originates from the activity of a root meristem comprising a group of highly specialized and long-lasting stem cells. Maintenance and homeostasis of the stem cell niche (SCN) in the root is essential for plant growth and development and is controlled by feedback signaling from differentiated cells involving intricate gene regulatory networks.

Although some plant transcription factors (TFs) are known as important regulators of root SCN maintenance, much of the necessary tight but also dynamic regulation of the transition from stem cell fate to differentiation still remains largely elusive.

We found that key TFs in root SCN regulation contain intrinsically disordered regions and prion-like domains (PrDs) which are necessary for complex formation with other TFs and their dynamic subcellular localization to nuclear bodies (NBs). Furthermore, we observed that the recruitment to these NBs is important for distal root stem cell homeostasis.

We propose that the observed partitioning of TF complexes to NBs, possibly by liquid-liquid phase separation, is important for the determination of distal stem cell fate. These dynamic translocations could act as another, dynamic layer of regulation, ensuring stem cell homeostasis, in response to differential internal and external cues.

About the Speaker

Yvonne Stahl holds a diploma degree in Biology from the University of Cologne in Germany. She finished her PhD under the supervision of Prof. Peter C. Morris at Heriot-Watt University, Edinburgh (UK) in 2003. Thereafter, she worked as a Research Fellow and as PI at the Institute for Developmental Genetics and the Cluster of Excellence on Plant Sciences (CEPLAS) at the University of Düsseldorf in Germany. She habilitated in developmental genetics in 2016 and was appointed adjunct professor in 2021. Her research focusses on root development and architecture in plants using fluorescence spectroscopic methods. She utilizes interdisciplinary approaches consisting of genetic and fluorescence spectroscopic methods to demonstrate that dynamic interactions and complexes of information molecules are important for plant root stem cell maintenance.