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Molecular Mechanisms of Long-Distance Signaling in Plants

Friday 10 October 2025 13:00 (30 minutes)

The Molecular Plant Genetics group at the University of Hamburg focuses on understanding the molecular mechanisms that enable plants to exchange information between their tissues and organs and adapt to changing environmental conditions.

A central theme of the group's research is the study of long-distance signalling in plants, particularly the mobile macromolecules that serve as messengers under stress conditions. These signals are often transported through the vascular system, such as the phloem, allowing communication between distant parts of the plant to coordinate systemic responses to biotic and abiotic challenges. Several projects investigate the role of mobile RNAs and RNA-binding proteins in plant communication and also plant-pathogen interactions.

In this context, biomolecular RNA-protein condensates have emerged as new players regulating RNA stability, storage, and transport. The research explores the mechanisms of RNA movement within the plant and between organisms, the features that enable RNA mobility and stability during transport, and how these macromolecules contribute to regulating plant growth, development, and stress responses.

To achieve these goals, the group employs a wide range of molecular, genetic, and biochemical methods, including classical plant genetics, advanced molecular biology techniques, plant transformation, and analytical approaches such as mass spectrometry. The majority of the work is conducted in the model plant Arabidopsis thaliana and the important crop plant Brassica napus.

In addition to illuminating fundamental aspects of plant biology, this research has potential applications in agriculture and biotechnology, aiming to develop more resilient crop varieties.

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