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Special Seminar

From Salt Stress Signaling to Halophyte Adaptation: Molecular Mechanisms of Sodium Homeostasis in Plants

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Time: 11 AM, June 8, 2026
Location: Genomics Auditorium

Synopsis:

Soil salinity severely limits plant growth and agricultural productivity. To survive under saline conditions, plants have evolved sophisticated mechanisms to maintain sodium (Na^+) homeostasis through the regulation of Na^+ transport and stress signaling pathways. Our research has revealed that the calcium sensor SOS3 serves as a molecular switch controlling the two major Na^+ transport systems, SOS1-mediated Na^+ extrusion and HKT1;1-mediated Na^+ long-distance transport in Arabidopsis. SOS3 promotes SOS1 activation while triggering HKT1;1 degradation under severe salt stress, thereby balancing Na^+ distribution and enhancing salt tolerance. To further understand the evolution of salt tolerance, we have expanded our studies to halophytes, uncovering unique adaptive mechanisms that enable these plants to thrive under extreme salinity. Comparative studies between glycophytes and halophytes provide valuable insights into the evolution of sodium homeostasis and reveal potential avenues for improving crop salt tolerance. Together, these studies advance our understanding of how plants maintain ion homeostasis and adapt to saline environments.

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