Leibniz-Institut für Pflanzenbiochemie

Leibniz-Gemeinschaft

IPB Seminar Series in Plant Biochemistry

The Side Hustles of ATG Proteins: Clues to the Evolutionary Diversification of Autophagy

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Thursday 27th of November, 2025, at 4 p.m.

Kurt Mothes Hall, Leibniz Institute of Plant Biochemistry

Intracellular recycling via autophagy relies on a core set of highly conserved Autophagy-related proteins (ATGs), critical for cell longevity and function across all eukaryotes. To meet cellular demands, autophagy is tightly integrated with nutrient-sensing pathways and constantly monitors the functionality of virtually all cellular components. This level of coordination highlights the ingenuity and plasticity of a pathway that, despite its conservation, has been adapted to support a wide range of trophic strategies and cellular architectures across diverse eukaryotic lineages.

We show that this flexibility extends to the mechanistic core itself. Building on our recent findings, we demonstrate the evolutionary diversification of core autophagic steps in green plants. Furthermore, we reveal surprising "moonlighting" roles of key ATG proteins in functions seemingly entirely unrelated to their role in autophagy. We propose that these non-autophagic functions of ATGs might be instrumental to understanding the evolutionary pressure and mechanistic flexibility that drove the diversification of the autophagic pathway across diverse eukaryotic lineages.

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