Contribution ID: **59** Type: **Poster**

Searching for new concepts of N-Degron Pathway Mediated Proteostasis

Monday 18 November 2024 21:50 (20 minutes)

The N-degron pathway may relate stability of proteins to the biochemical features of its amino (N)terminal stretch or even only the very first residue at this end and its posttranslational modifications (PTMs). Often, these apparently crucial modifications have actually not been shown. To spotlight on these decisive biochemical events, we attempt to demonstrate their existence in vitro and in vivo by enzymatic assays. On top, novel concepts of the possible role of these PTMs in neofunctionalization
of proteins and/or deciding for their fate in the cell appear in the literature. One of them is the connection between N-terminal arginylation and autophagy where the modification can be sensed by adaptor proteins. Our candidate RESISTANCE TO DESICCATION 21A (RD21A) accumulates in N-degron pathway mutants (prt6 and ate) but also autophagy mutants (atg5). It is therefore a novel putative degradation target for one or both pathway branches.
PRT1 is a wellknown player of the plant N-degron pathway with still obscure roles (what are the substrates?) and peculiar functions (why does it autoubiquitinate itself?). We set out in our team to investigate PRT1 on multiple levels including new tools for better assessing its ubiquitination activities.

In the end, we aim to understand molecular functions and biological roles of the N-degron pathway by characterizing enzymatic components and physiological substrates and develop biotechnological tools based on targeted proteolysis.

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Session Classification: Poster session

Track Classification: Molecular Basis of CPTMs