

### Webinar « Cell biology & signal transduction »

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#### Phosphate starvation induces ER degradation via selective autophagy

##### Abstract

Phosphate (Pi) is one of the essential nutrients for plant growth. However, Pi is often limited in soils, thus, plants have several mechanisms of response to Pi starvation. These mechanisms can be divided into “Enhance Pi uptake” and “Pi recycle” broadly. Here, we focused on the later.

Autophagy is one of the intracellular degradation systems. The study of Naumann et al. (2019) showed that autophagy is induced by ER stress under Pi starvation in roots. However, the relationship between autophagy and Pi recycle is still unclear.

Recently, we discovered that autophagy deficient mutants showed severe growth phenotype under Pi starvation. Interestingly, autophagy is important for not long-term Pi-depleted conditions but early Pi-depleted conditions and ER-phagy, a type of selective autophagy which selectively degrades ER, was induced under the early Pi-depleted conditions. This ER-phagy was induced by iron mediated ER stress and contributed to the Pi recycle under early Pi-depleted conditions. The mechanism of response to early Pi starvation might delay the triggering of response to long-term Pi starvation. Thus, plants must be cleverly utilizing two different phase of response to Pi starvation to survive under non-uniform Pi concentration conditions.

