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**LS-2-P-3109 Two strategies for zinc sequestration in the moss Pohlia drummondii and Physcomitrella patens**

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High resolution light and electron microscopy combined with specific detection techniques for metal ions is the key for novel findings on the cellular and subcellular level. All these methods, including various cryo-fixation techniques, are applied in the Core Facility at the University of Vienna, Austria, to address tricky questions and allow for its examination from different points of view.

One of our current research topics is focussed on growth analyses on zinc spiked media in the moss species *Pohlia drummondii* and *Physcomitrella patens*. X-ray microanalyses in the scanning electron microscope showed a clear uptake of the metal by the plantlets but the cellular distribution remained unclear. Fluorescence labelling with the zinc-specific dye FluoZin-3 shows the retention of the metal in the cell wall of *P. drummondii* which might enable this species to inhabit former mining sites. In *P. patens*, normally living at non-contaminated sites, the zinc-specific dye enters the cell and is apparently scavenged in the cytoplasm. Recent X-ray microanalyses confirm this phenomenon: mosses from metal habitats show less uptake than *P. patens*. To detect the influence of zinc on the photosynthetic pathway, the production of autochthone starch was measured in polarized light microscopy and by staining with Lugol's iodine. Transmission electron micrographs indicate the abundance of starch grains in control cells whereas zinc-treated cells of *P. patens* contain less autochthone starch.

Taken together, we propose an extracellular barrier to enable the colonization of metal contaminated sites (as for *P. drummondii*) and intracellular uptake in combination with detoxification mechanisms in *P. patens*.

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Fig. 1: Scanning electron micrograph of a young moss plantlet (Physcomitrella patens), grown on ZnCl₂ 1mM medium.

Fig. 2: The zinc specific dye FluoZin-3 is retained at the cell wall of Pohlia drummondi (a); it is taken up into the cytoplasm of Phycomitrella patens (b). Autochthone starch in a chloroplast of P. patens (c).