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**LT 2-1 The *Hebeloma cylindrosporum* phosphate transporter HcPT2 was involved in phosphate efflux at the fungus-plant interface**

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**Abstract:** Ectomycorrhizal (ECM) symbiosis is defined as a mutual association between fungal symbionts and roots of woody plants. This symbiosis is strongly represented in temperate and boreal forests and is considered to be the most widespread means of increasing P acquisition by trees. Despite the importance of the ECM association, current knowledge about molecular mechanisms involved in membrane transport between the two partners is still limited. Therefore, the identification of the mechanisms essential for the symbiosis is a major issue. To better understand these mechanisms, we used a model association between the ECM basidiomycete *Hebeloma cylindrosporum* and the maritime pine *Pinus pinaster*. The fungal genome contains three transporters of Pi (*HcPT1.1*, *HcPT1.2*, and *HcPT2*), which have been already characterized as H<sup>+</sup> Pi carriers. We hypothesized that one of these carriers could be responsible for both influx and efflux of Pi from the soil to the fungus and from the fungus to the plant. Our results suggest that HcPT2 would be the best candidate to fill both roles. An *in vitro* ectomycorrhizal system was used to investigate phosphate flux from *H. cylindrosporum* toward a liquid compartment containing pine roots. Interestingly, the expression pattern of *HcPT2* was correlated to fungal phosphate efflux. Moreover, immunolocalization experiments showed that the protein is located (i) in the extraradical hyphae and the fungal sheath, compatible with Pi uptake, and (ii) within the Hartig net, which is the place of exchange between fungal and host cells. In order to study more specifically the role of HcPT2 at the fungus-plant interface, overexpressing and knock-down transgenic *H. cylindrosporum* strains were produced. Fungal strains with up regulated expression of *HcPT2* increased phosphate efflux within the interaction medium, supporting a role of HcPT2 in phosphate transfer to the plant. In addition, the modification of *HcPT2* expression strongly affects Pi nutrition of *P. pinaster*.