

T12: Mosses and metals

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Phyto-remediation, the use of plants to clean up pollutants in the environment, is a cheap and sustainable technology. Many plant species are known to be accumulators of heavy metals, including mosses and moss allies. Industrial pollutants or heavy metals, which are potentially toxic compounds and are released into the biosphere, can be bio-concentrated in the biomass. Remediation which minimizes the entry of these toxic elements into the food chain, must therefore be considered. The introduction of novel traits into high biomass plants using a transgenic approach, is a promising strategy for the development of effective phyto-remediation technologies. However, the underlying molecular mechanisms of the heavy-metal homeostasis in plants are not yet clearly understood.

Mosses have been used as bio-indicators of atmospheric and aquatic heavy metal pollution (Schilling and Lehman, 2002; Fernandez and Carballeira, 2001; Hongve *et al.*, 2002). Accumulation of heavy metals, such as Al, As, Co, Cr, Cu, Fe, Hg, Ni, Pb and Zn, has been reported in a number of moss species growing in various polluted geological sites.

As *Physcomitrella patens* genes are highly conserved in relation to those of higher plants and the frequency of homologous recombination has been shown to be high, this moss could be a potential candidate to elucidate the genes and clarify their function involved in the control of heavy-metal homeostasis, not only in mosses but also in higher plant species. Mosses and moss allies may therefore provide a promising route to effective phyto-remediation technology.

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