Abstract

The Erv14 protein works as a cargo receptor in the COPII vesicles. Many proteins, including Na^+, K^+/H^+ antiporter Nha1, which participates in the maintenance of cell alkali-metal-cation homeostasis, need Erv14 for their trafficking from the ER. When Erv14 is missing, the Nha1 antiporter is partially retained in the ER and its overall transport activity is affected. Although Erv14 interacts with the antiporter through Nha1´s transmembrane domains, a shortened version of Nha1 lacking its long hydrophilic C-terminus does not require Erv14 for its efficient trafficking to plasma membrane.

This thesis contributes to the understanding of the role of the Erv14 protein in the maintenance of alkali-metal-cation homeostasis in *S. cerevisiae* cells. Two *S. cerevisiae* strains lacking *ERV14* gene were prepared and the effect of this deletion on the growth and salt tolerance of cells was studied. Using heterologous expression of NHA antiporters from various yeast species with variable lengths of their hydrophilic C-termini we studied localisation and function of these antiporters in *S. cerevisiae* cells in the presence and in the absence of Erv14 protein. Our results suggested that the length of the antiporter´s C-terminus might play a role in its requirement of Erv14 presence for its trafficking through the secretory pathway. Thus three new plasmids containing sequences coding truncated versions of the Nha1 protein differing in the lengths of their hydrophilic C-terminus were constructed and localisation, function and activity of the shortened versions were studied in the presence and in the absence of Erv14. We confirmed that the length of the antiporter´s C-terminal part is linked to its requirement of Erv14 for efficient transport to the plasma membrane. The effect of presence and absence of Erv14 on localisation, function and activity of another exporter of alkali metal cations, Ena1 ATPase, was also studied, but used different approaches did not reveal any dependence of Ena1 biogenesis on the presence of Erv14.

Keywords: cation homeostasis, *NHA1*, *ENA1*, *ERV14*, *Saccharomyces cerevisiae*