

Title: Study of membrane transport processes in yeast using potentiometric fluorescent probe diS-C₃(3)

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Abstract: Yeast membranes contain a number of transporters. Some are responsible for flow of nutrients to the inside of the cell, others for disposing of waste and foreign substances and some for transport of small ions or protons across the membrane. The focus of this work is on the activity of specific transport membrane proteins, so-called MDR pumps, which are responsible for transport of foreign substances or drugs, out of the cell. Using the series of mutant strains of the yeast *Saccharomyces cerevisiae* (AD1-3, AD1-8 and AD12) differentiated in the presence of specific MDR pumps in their membrane, an influence of various chemical substances on the intracellular concentration of the potentiometric fluorescent probe diS-C₃(3), which is actively being transported out of the cell by some of the MDR pumps, was observed. By the examination of the effect of 2-deoxyglucose we proved the active contribution of not only the main MDR pump, Pdr5p, but also of some other pumps, in lowering the intracellular probe concentration. It was observed that whereas glucose is raising the activity of said pumps in removing the probe from cytosol, the addition of 2-deoxyglucose leads to their inhibition. The inhibition was also caused by the addition of hexanol and CCCP protonophor. Results were accompanied by the measurement of the influence of the examined chemicals on the intracellular pH.

Keywords: yeast, diS-C₃(3) probe, pHluorin, MDR pumps