Engineering of AceTR membrane transporters to improve organic acid production in yeast

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Organic acids are industrially relevant chemicals obtainable from renewable feedstocks via microbial cell factories. Microbially produced organic acids have a wide variety of applications, including bioplastic synthesis. Thus, they possess the potential to replace petroleum-derived commodity chemicals that are obtained through unsustainable production processes. Yeasts commonly represent the organisms of choice for microbial production of organic acids, namely due to their tolerance of low pH environments. Such production conditions allow for direct formation of the desired protonated form of the acid and thus cut downstream processing costs. Efficient product export over the plasma membrane in low pH conditions is particularly demanding, therefore expression of membrane transporters with adequate substrate specificity and transport mechanism is often the determining factor at acquiring competitive product titres. Our current objective is to deepen the knowledge on organic acid transporters from the AceTR family (1,2,3). We performed functional characterization by studying transporter kinetics, energetics and specificity as well as site-directed mutagenesis to acquire insight into the structural features of transporters. Finally, we aim to improve organic acid production in *S. cerevisiae* cell factories via expression of engineered AceTR transporters with altered activity and substrate specificity.

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