The effect of Polyamines on *Yarrowia lipolytica* Morphogenesis and H⁺ pumps


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**Introduction.** The ability to undergo the morphogenetic switch is perhaps the most conspicuous quality of several microorganisms, but also the most elusive. How cells generate, maintain, and reproduce their spatial organization is central to any understanding of the living state. The polyamines can modulate morphogenesis in several eukaryotes and their levels increase prior to differentiation in some fungal systems. **Material and Methods.** In this study, the effects of polyamines on morphogenesis were study in "non-conventional" yeast *Yarrowia lipolytica*, testing the hypothesis that polyamines can modulate the process by stimulation of the auxin-dependent signaling cascade which leads to the activation of the proton pumps and proton fluxes on plasma membrane. We also analyzed the vacuolar dynamics during polarized growth, as well as the colony formation on solid media. **Results and Discussion.** The results indicate that the polyamines spermidine and spermine stimulated morphogenetic switch (~1 mM), while spermidine synthase inhibitor (CHA) prevented filamentation by 80%. Furthermore, the inhibitors of auxin signaling (PCIB) and auxin transport (TIBA) interfere with the effects of polyamines, though the inhibition of CHA is reversed by auxin (10 pmol). Moreover, *Y. lipolytica* morphogenesis was accompanied by activation of P-type H⁺-ATPase. The H⁺ transport was stimulated by 2.5-fold by spermine at the beginning of yeast-to-hyphal transition, however it decreased (1.5-fold) when morphogenesis was established. The polyamines and auxin also intensify the alkalinization of extracellular pH, whereas inhibitors TIBA and PCIB prevent alkalinization and the polarized growth. Also, vacuolization and vacuolar segregation that support cell elongation was observed during the differentiation. The effect of polyamines was also accompanied by changes in colony morphology that range from smooth to wrinkled. **Conclusions.** This study suggest interdependency of polyamine and auxin signaling which targets morphogenesis in *Y. lipolytica* through the modulation of proton pumps.

Word Keys: *Yarrowia lipolytica*, polyamines, morphogenesis

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