

**ASSESSMENT OF INTERCELLULAR RELATIONSHIPS IN YEAST COLONY**

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Yeast population is characterized by the cellular heterogeneity with the formation of multicellular structures such as colonies, biofilms, filaments and others. It is considered as well-organized community of several cell groups with different molecular-biological properties. Growing on the solid surface yeast cells undergo specialization and form colonies. Differentiation of cells in the yeast colony begins on 7<sup>th</sup> day of development and leads to the formation of cell groups with a different specialization: some of them produce nutrients, while others consume those (Váchová L. et al., 2009a). Besides the heterogeneity of phenotypes, cells in the colony are differed by physiological, metabolic and biochemical heterogeneity. Relationships between cell groups in the colony are aimed at maintaining of multicellular structure, adapting to various environments and comprised of cooperation, interaction and reciprocity between cells of different localization. It is suggested that Ato proteins have influence on various aspects of colony biology and metabolic reprogramming (Váchová L. et al., 2009b) and Flo1 protein drives cooperation between yeast cells (Smukalla S. et al., 2008).

The aim of the present study was to analyze some cytological and genetic characteristics of cells with different localization in *Saccharomyces cerevisiae* colony at the 2<sup>nd</sup> acidic phase of development. For this purpose, cytological and gene expression analysis were carried out.

Results of cytological analysis using fluorescent dyes showed well-defined differentiation between central and outer cell layers of yeast colony. The central zone consisted of morphologically heterogeneous cells and up to 40% were apoptotic ones while cells of outer zone were more homogeneous and percent of apoptotic cells was lower, about 4-8%. Comparative analysis of *ato1* gene expression in cells of central and margin layers revealed decreasing of *ato1* gene activity in central zone by 2 times. There were no changes in *flo1* expression between cells of different localization in *S. cerevisiae* colony at the 2<sup>nd</sup> acidic phase of development although small alterations were detected at the 2<sup>nd</sup> alkali phase. Thus, results obtained in the study suppose that *flo1* expression might maintain the multicellular structure of yeast colony whereas cell differentiation could be defined cytologically and by *ato1* gene activity.

Váchová L. et al. Environ. Microbiol. 2009a, 11:494-504.

Váchová L. et al. Environ. Microbiol. 2009b, 11:1866-1877

Smukalla S. et al. Cell, 2008, 135(4):726-737.