

Abstract- Yeast as a tool of synthetic biology

Synthetic biology is a multidisciplinary field using elements of molecular biology, genetic engineering and bioinformatics. Its main objectives include, but are not limited to, the design of new, naturally occurring living systems with novel properties, such as the production of pharmaceuticals or other industrially important molecules, and the design and standardization of biological system components and toolkits.

Yeasts, and *Saccharomyces cerevisiae* in particular, are an attractive subject for this field because of their efficient homologous recombination system capable of easily incorporating exogenous DNA based on regions of homology and a flexible genome that allows large-scale modifications without major fitness impacts. As a eukaryotic organism, it is also convenient to use yeast expression systems as a cellular factory because it naturally performs post-translational modifications on proteins, opening up the possibility of producing heterologous mammalian and other eukaryotic proteins. These properties make *Saccharomyces cerevisiae* an ideal candidate for basic research on gene interactions through libraries of specifically modified strains, industrial production of organic molecules, and the design and application of novel genome modification tools.

Key words: *Saccharomyces cerevisiae*, yeast biology, synthetic biology, expression system, synthetic genomics, homologous recombination, synthetic genome, Sc 2.0