

Exploiting Fungi in Synthetic Biology: Commentary

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Abstract

Fungi are ubiquitous eukaryotic organisms, indispensably interlinked with other life-forms within our biosphere. We have been affected by this lifeform both positively and negatively. Efforts to nurture the benefits in the form of traditional knowledge have been done since time-immemorial. Technological advancements have ushered impetuses for the benefit of mankind. Amalgamation of microbial systems with Synthetic Biology has helped to reap the benefits for the betterment of mankind.

Introduction

Fungi are organisms with diverse importance, they are indispensable parts of our ecosystem. They are commercially valuable and have been exploited since ancient times in different ways. Fungi being eukaryotic form a class of simple organisms, yet performing biological activities closely related to higher eukaryotic organisms. Diverse array of chemicals is produced by fungi which are being exploited commercially and far innumerable amounts are yet to be discovered [1-3]. Synthetic biology is a promising field which integrates genetic engineering principles in life sciences to create novel products and combinations.

The metabolite profiling of filamentous fungi and yeast to fully exploit the fungal chemo-diversity will be very beneficial in the long run. Apart from the advent of new novel drugs, such new chemical entities will help in vaccine designing, discovery of new anti-viral, anti-bacterial, herbicidal and anti-fungal agents. The screening of these novel chemicals would also help in designing biocontrol agents, eradication of many crop and animal diseases [4-6]. Yeast like *Saccharomyces cerevisiae* in the near future could also play a pivotal role in solving the energy crisis by providing biofuel [7].

Technological advancements have made possible the metabolic engineering of many important yeasts and to generate a vast array of novel chemical entities of diverse utility. Utilization of microbes and synthetic biology will help design, efficient systems decipher the intricacies of industrial and medical biotechnology. Enormous research has been done in microbial systems and synthetic biology, especially in context to filamentous fungi, yet novel chemical entities in yeast could prove beneficial. A lot of help has been rendered by fungal genomics in this preview. Fungi are imminent organisms which can be re-programmed and products can be scaled up according to requirements [8-10](Figure 1).

Conclusion

Fungi are themselves established cell factories in industrial biotechnology. The versatile chemical entities secreted by this organism have tremendous benefits. The need of the hour is to club synthetic biology and mycology to maximize results.

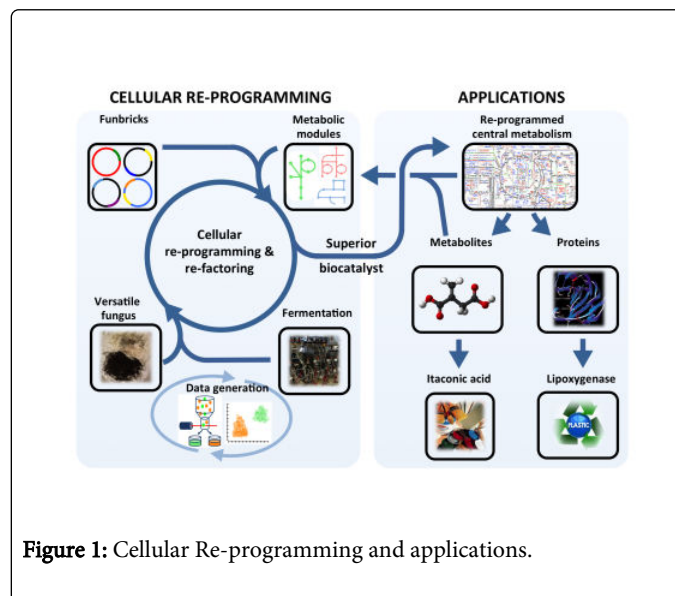


Figure 1: Cellular Re-programming and applications.

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