Synthetic life: How to create new organisms from the computer to its industrial scaling

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Escherichia coli are a very organism important at the biotechnological level due to its many relevant physiological characteristics In addition to its fermentative metabolism gives it a unique potential for industrial biocatalysis. The application of recombinant DNA methods for the expression of heterologous genes in *E. coli* can improve the production of Metabolites and proteins of industrial interest, allowing the introduction of native or non-native metabolic pathways, for the production of a wide range of chemical products. Metabolic engineering has been in recent years responsible for providing strains producers, however, in some cases; metabolic engineering fails to supply good production strains. In recent decades, systems biology and synthetic biology, have allowed us to model and design organisms (synthetic organism) whose phenotypes are evaluated from the computer and not through trial and error (experimentally speaking, as it comes doing with traditional techniques and methods) due to the conception of what is known as Genomic Scale Metabolic Models (Genome-scale metabolic models, GEMs), which is the in silico representation, of all the biochemical reactions that occur in an organism, coding detailed and global information (genomic) on an organism in a computational framework, with the objective of predicting the cellular behavior of a given genotype, under certain restrictions (rate of growth, production yield of the product, carbon source, etc.). Offering a more rational, systematic design. Modeling gen-protein in the computer and genotype-phenotype, you can design production strains in a more smart and efficient accelerating both the yield and the industrial scaling of the production of the metabolites synthesized by these synthetic organisms.

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