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| Sommario/riassunto | <p>The discipline of Synthetic Biology has recently emerged at the interface of biology and engineering. The definition of Synthetic Biology has been dynamic over time ever since, which exemplifies that the field is rapidly moving and comprises a broad range of research areas. In the frame of this Research Topic, we focus on Synthetic Biology approaches that aim at rearranging biological parts/ entities in order to generate novel biochemical functions with inherent metabolic activity. This Research Topic encompasses Pathway Engineering in living systems as well as the in vitro assembly of biomolecules into nano- and microscale bioreactors. Both, the engineering of metabolic pathways in vivo, as well as the conceptualization of bioreactors in vitro, require rational design of assembled synthetic pathways and depend on careful selection of individual biological functions and their optimization. Mathematical modelling has proven to be a powerful tool in predicting metabolic flux in living and artificial systems, although modelling approaches have to cope with a limitation in experimentally verified, reliable input variables. This Research Topic puts special emphasis on the vital role of modelling approaches for Synthetic Biology, i.e. the predictive power of mathematical simulations for (i) the manipulation of existing pathways and (ii) the establishment of novel pathways in vivo as well as (iii) the translation of model predictions into the design of synthetic assemblies.</p> |

