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Platforms

The following platforms are used in project development. The developers of the specific platforms are partners in the SynBio4Flav project.

MODELLING & ENGINEERING

The Standard European Vector Architecture (SEVA) platform is a web-based resource and a material clone repository to assist the choice of optimal plasmid vectors for de-constructing and re-constructing complex prokaryotic phenotypes.

DOULIX is the first toolkit for synthetic biologists that provides an end-to-end solution to move from design to synthesis within one single cloud-base application using the SEVA Standard European Vector Architecture.

INSTRUMENTATION

LARA (Laboratory Automation Robotic Assistant) is a research platform allowing fully automated high-throughput protein screening and statistical evaluation of experimental data.

SOFTWARE

FLYCOP (FLexible sYnthetic Consortium OPtimization) is a framework that improves the understanding of the metabolic behaviour of microbial consortia by automating the modelling of those communities.

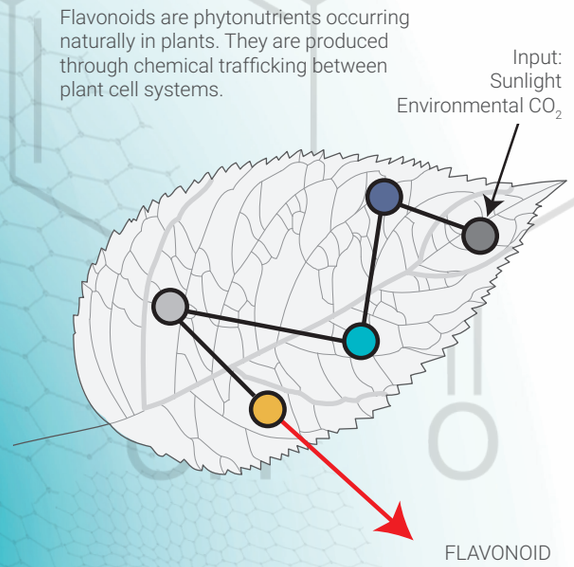
GECKO (Genome-scale model with Enzymatic Constraints using Kinetic and Omic data) is a toolbox that allows for reconstruction of enzyme-constrained models (ec-models) of metabolism.

SynBio4Flav

Providing a path for the standardized production of flavonoids using synthetic biology

The SynBio4Flav project aims to provide a cost-effective alternative to current flavonoid production. The scientific challenge is to produce flavonoids by breaking down their complex biosynthetic pathways into standardized specific parts, and transferring them to engineered microorganisms within Synthetic Microbial Consortia (SMC) to promote flavonoid assembly through distributed catalysis.

There are over 10,000 flavonoids that have been identified thus far, each with its unique set of health benefits. Depending on the chemical structure of a given flavonoid, they can exhibit anti-oxidative, anti-inflammatory, anti-mutagenic, and anti-carcinogenic properties. They also support our immune and cardiovascular systems and help to modulate key functions of enzymes in our cells. Flavonoids are used in numerous applications including functional food & beverages, dietary supplements, cosmetics, and pharmaceuticals.



Synthetic biology is an emerging area of research that can broadly be described as the design and construction of novel artificial biological pathways, organisms or devices, or the redesign of existing natural biological systems. (Source: UK Royal Society)

@SynBio4Flav

http://synbio4flav.eu

Research & Development areas

Design, assembly, and optimization of synthetic pathways for flavonoid production; multi-step process analyzing, i) precursor molecules, ii) synthesis of the flavonoid and, iii) functionalization/glycosylation of the flavonoid

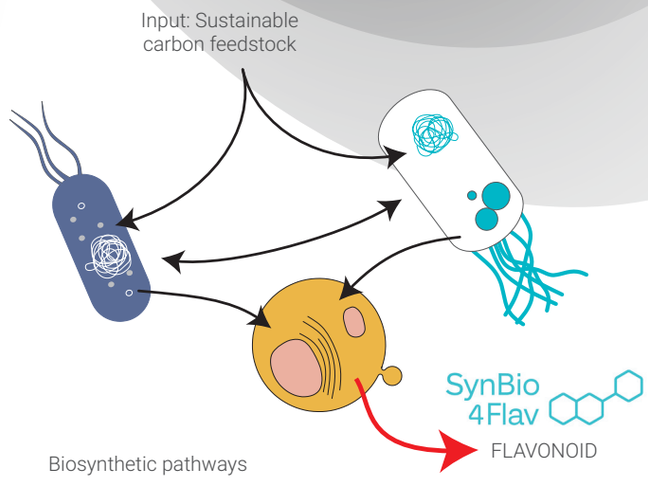
Microbial chassis systems – Optimization and consolidation; metabolism refactoring

Synthetic microbial consortia design, construction and optimization; chemicals trafficking optimization

Validation and demonstration of microbial synthetic platform; bottlenecks removal, fermentation optimization

Standardization on synthetic biology; providing standardization along the hierarchy abstraction using SynBioTools for constructing efficient synthetic pathways and SMC assembling

Systems biology and analysis; functional states, simulation and evaluation of the metabolic networks, and characteristics and behaviours of all organisms



Biosynthetic pathways for the production of flavonoids are distributed among host organisms, optimized for maximum flavonoid output.