



Designing Nature



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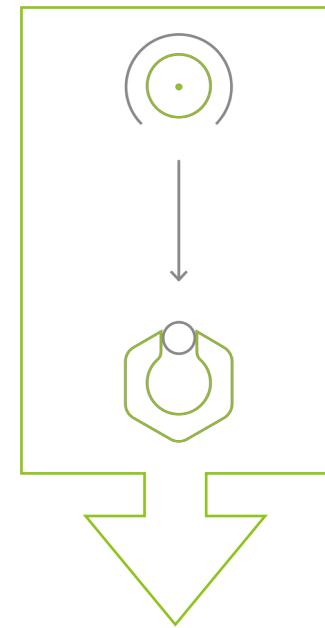
AI + Biology for the sustainable production of chemicals

- **Founded in 2010** and 100% owned by its founders
- **Design and implementation** of the synthetic biology solutions for **optimized microbial strains** and **novel pathways**
- Working with **leading chemical, agriculture, materials and synthetic biology companies**

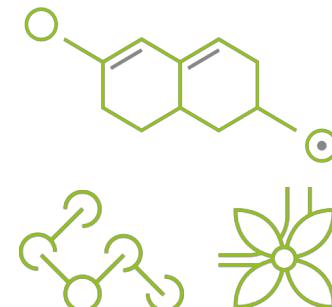
Renewable feedstocks



Industrial Bioprocesses



Production of chemicals



Industrial Biotechnology

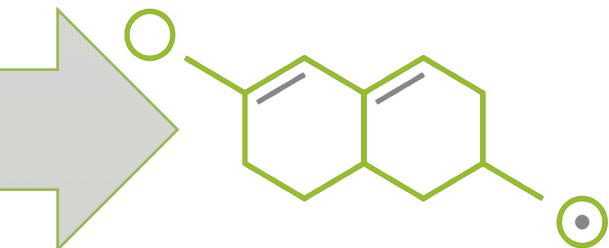
Renewable
feedstocks



Cell
Factory



Production of
chemicals

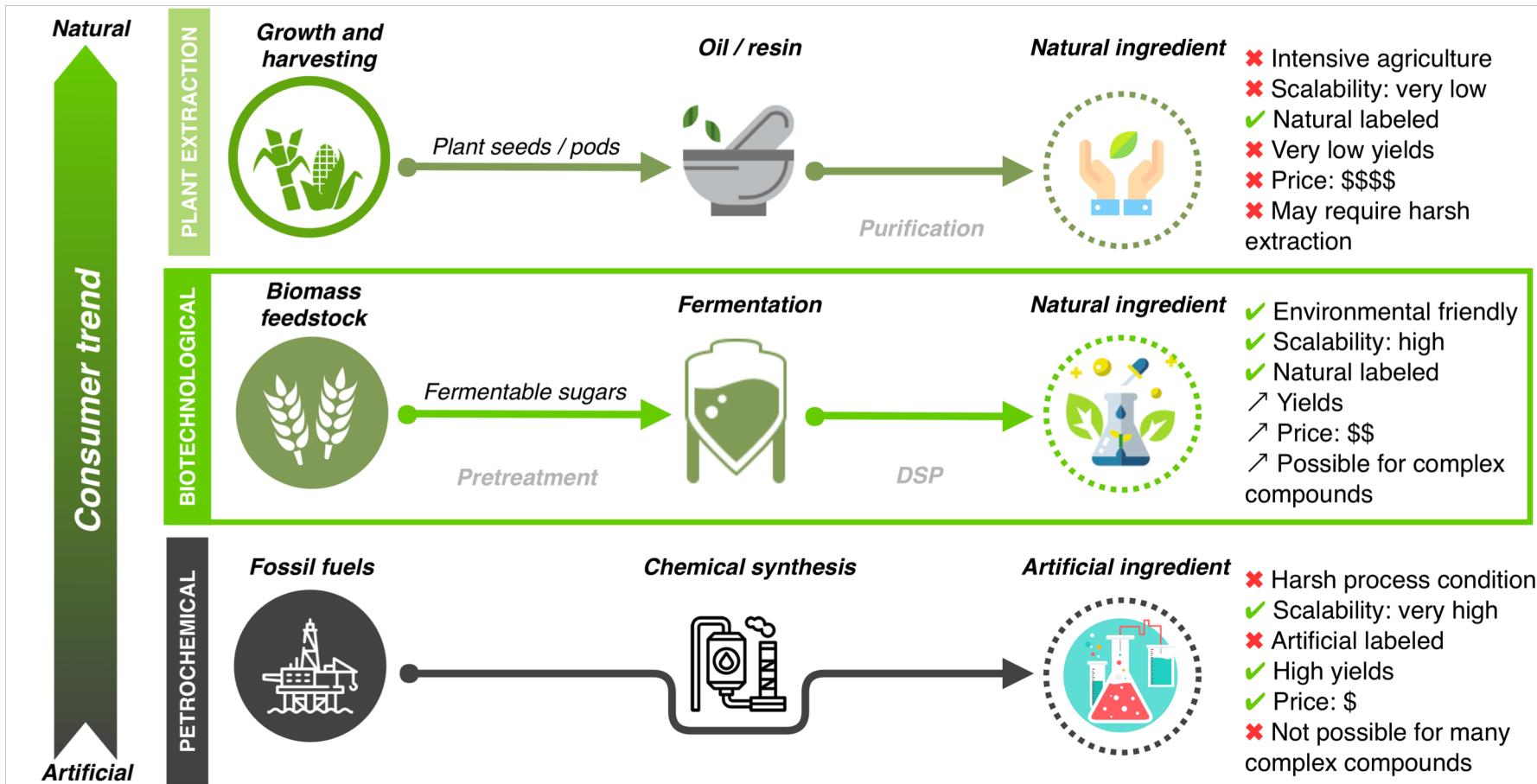


Evaluate the
environment where
the microorganism
will grow.
(e.g. waste stream)

Organism capable of
producing the desired
compound.
(e.g. yeast)

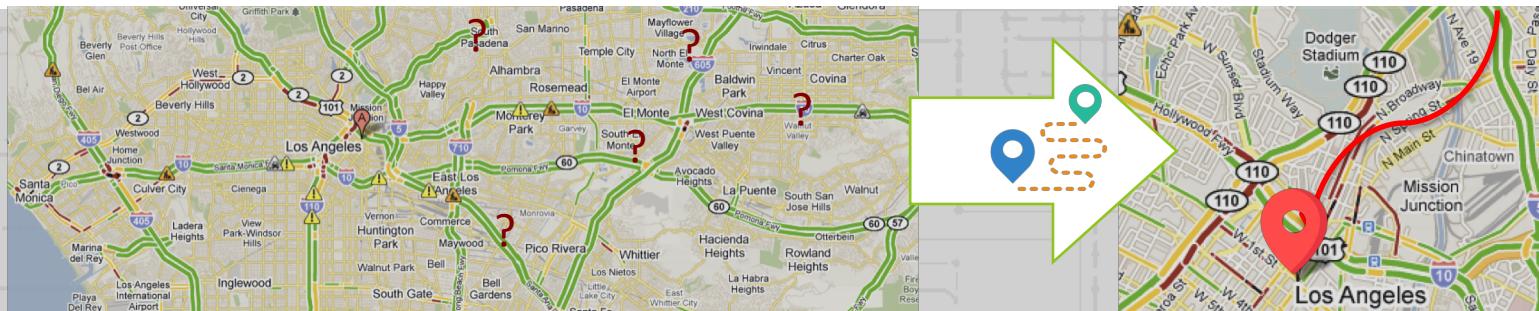
Characterize the
production on the
desired compound.
(e.g. insulin)

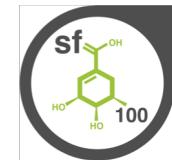
Biotechnology benefits





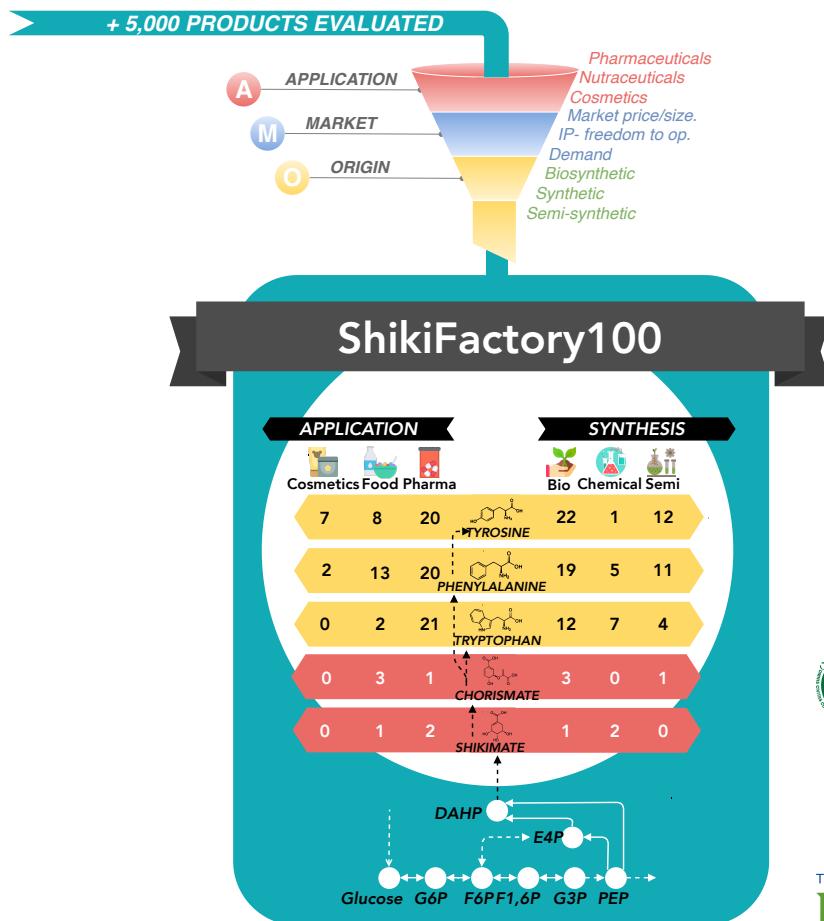
Cell factory design a GPS to improve the microbe





SHIKIFACTORY100

Biology + Computational design + Rapid prototyping



+100 compounds

Novel routes for the production of high-added value compounds from the shikimate pathway, a hub in cell metabolism

- 4 years starting in January 2019
- 8M euros of funding
- 11 partners
(6 research partners, 4 biotech SMEs, 1 industrial company)



UNIVERSIDADE
NOVA
DE LISBOA

EPFL

qfb DTU
The Novo Nordisk Foundation
Center for Biosustainability

Universidade do Minho
CENTRE OF BIOLOGICAL ENGINEERING



The Bioeconomy Consultants
NNFCC

c-Lecta
for tomorrow's industry

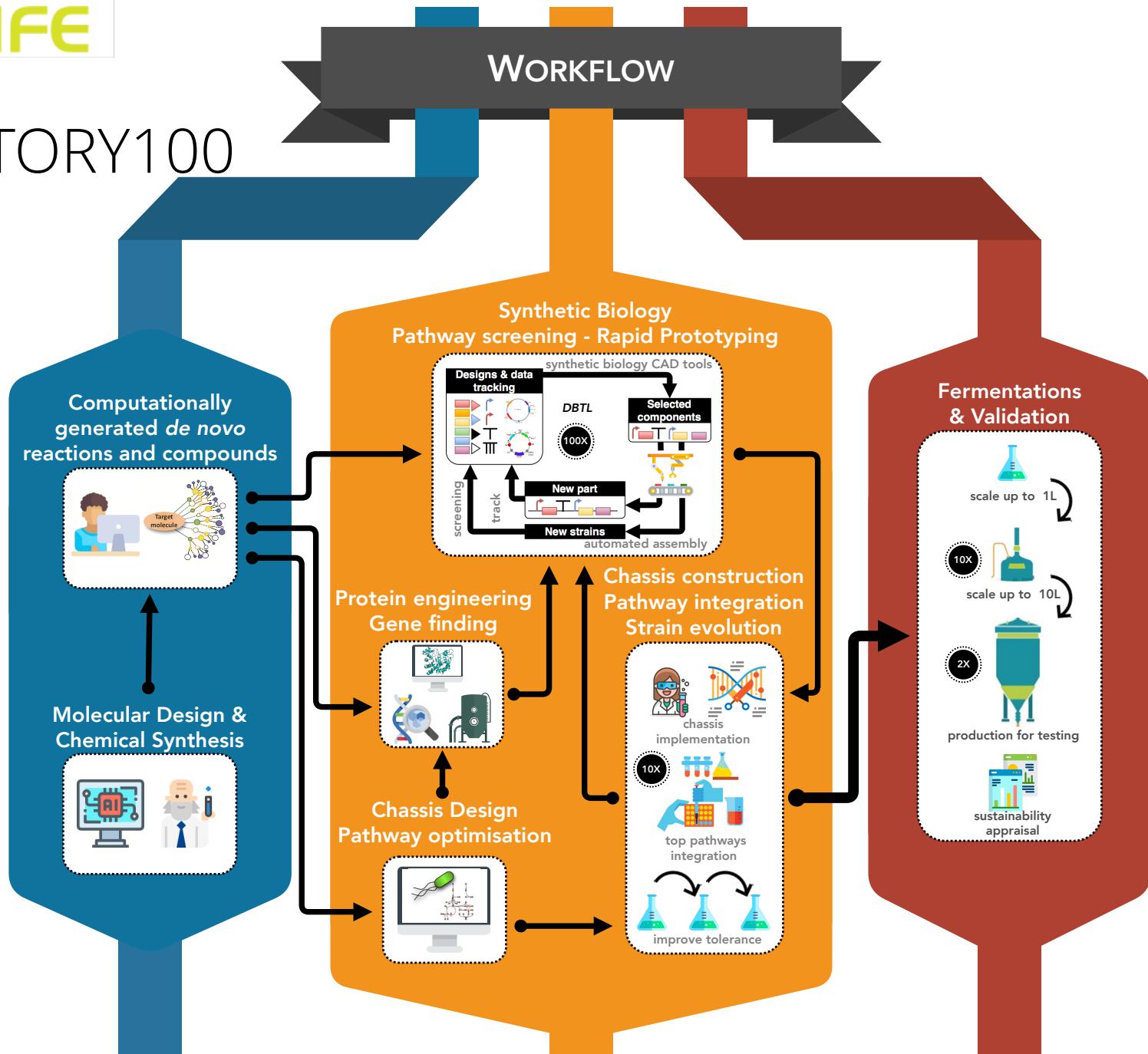
GalChimia

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.

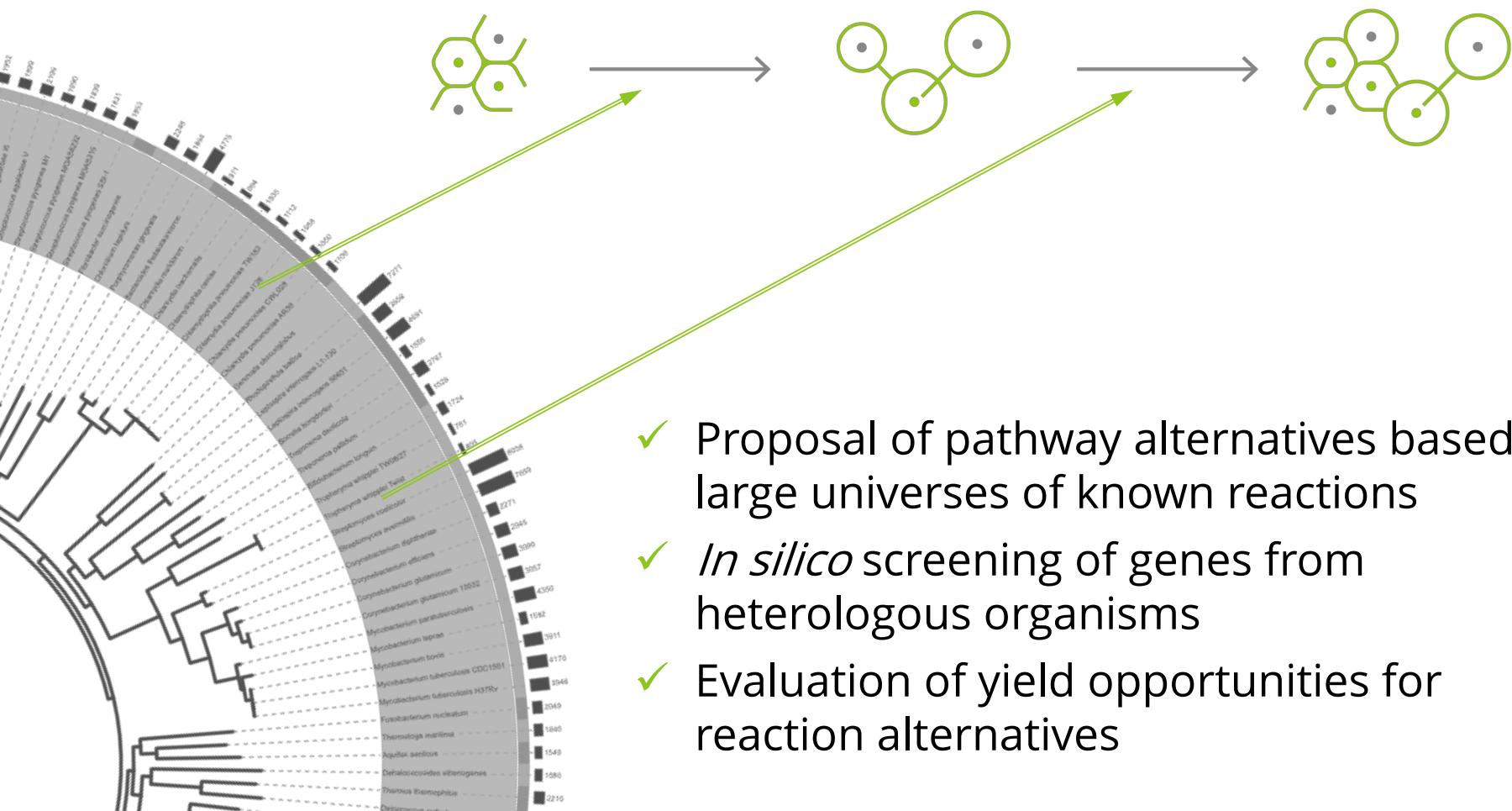
MANCHESTER
1824
The University of Manchester

WORKFLOW

SHIKIFACTORY100



Enumeration of nature diversity



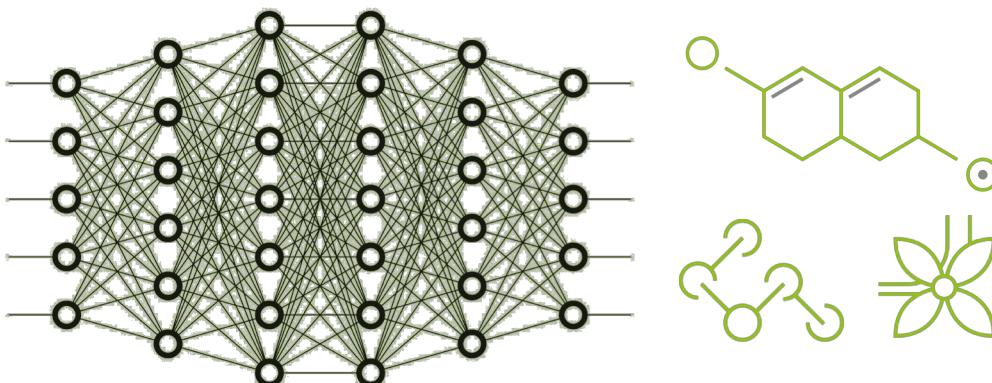
- ✓ Proposal of pathway alternatives based on large universes of known reactions
 - ✓ *In silico* screening of genes from heterologous organisms
 - ✓ Evaluation of yield opportunities for reaction alternatives



DeepBio

Deep and machine learning
for Industrial Biotechnology

Deep learning + Biology to expand nature's diversity



Design of new-to-nature molecules
and biological routes for their
production

- Generation of new chemical structures, reactions and metabolic pathways
- Boosted by machine learning and deep learning approaches

DeepBIO

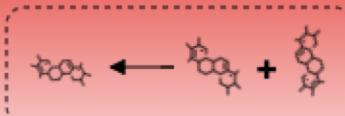
**classification
models**



**generative
models**



NEW
REACTIONS



NEW
ENZYMES



Artificial intelligence



Biological knowledge

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