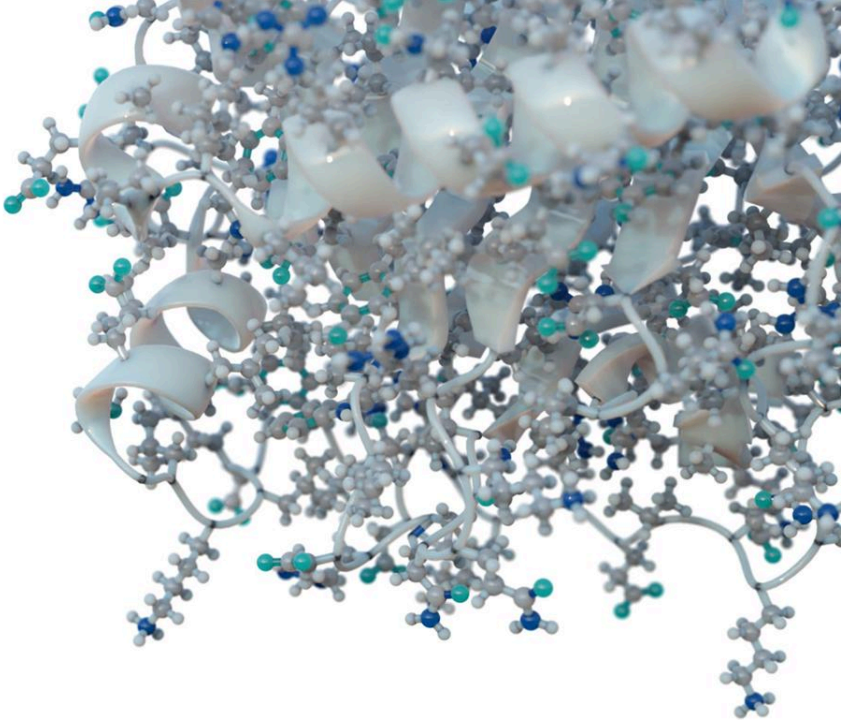
enzyan
BIOCATALYSIS



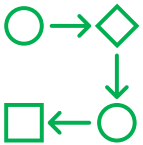
CHEMISTRY ON NATURE'S TERMS

We are rewriting chemistry with the language of nature—using enzymes for simpler, safer, and cost-effective access to small molecules.

BIOCATALYSIS HAS ADVANTAGES COMPARED TO TRADITIONAL CHEMICAL SYNTHESIS

SELECTIVITY

Skip synthetic steps
Avoid protection/deprotection
Avoid complicated workup/purification
Increase yield of desired product



EVOLVABILITY

Tailor the enzyme to the desired reaction

SUSTAINABILITY

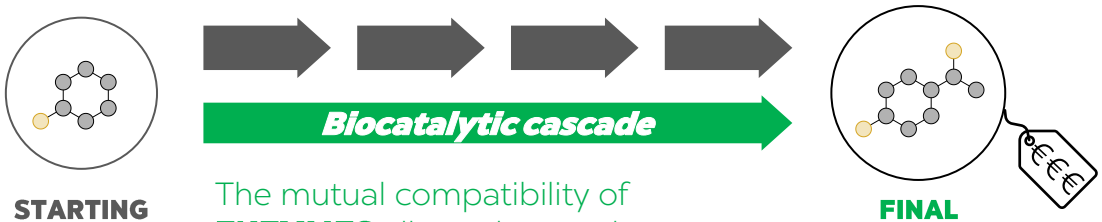
Less CO_2 generation
Less waste generation
Less energy consumption
Access renewable resources

SAFETY

Avoid hazardous reagents and harsh conditions

BIOCATALYSIS HAS THE POTENTIAL TO SAVE TIME AND MONEY AND MAKE PROCESSES GREENER

TRADITIONAL CHEMICAL SYNTHESIS
needs several steps to happen one after the other to deliver the final product and creates a lot of waste in between the steps.



STARTING MATERIAL
(Molecule A)

The mutual compatibility of **ENZYMES** allows them to be combined in one vessel. This means skipping the isolation of intermediates which reduces costs and waste generation.

FINAL PRODUCT
(Molecule Z)

ADVANTAGES:

SAVE
Time and money

REDUCE
CO_2 emissions and waste

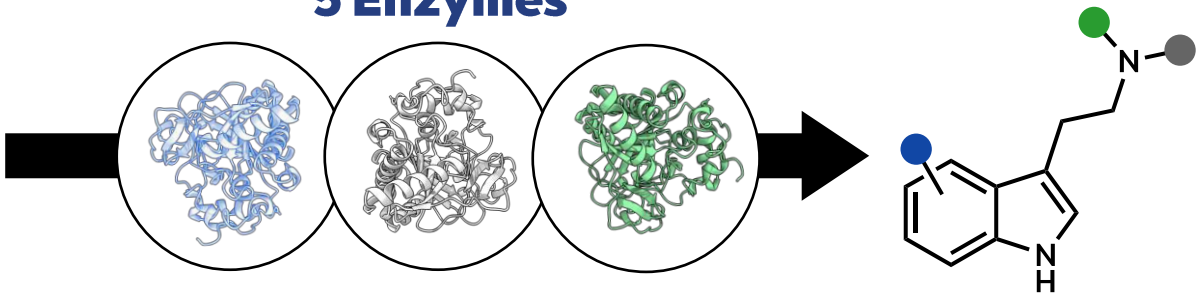
Example of product development - Tryptamine compounds

ENZYAN PATENTED CASCADE FOR TRYPTAMINE COMPOUNDS

75%

cheaper starting material

5 Enzymes



1

vs. 5 operations in synthetic route

88%

Less waste than synthetic route*

56%

Less solvent needed*

>10

similar compounds accessible with the same concept

*) ACS Omega 2020, 5, 16959–16966

Service offer

WE OFFER OUR EXPERTISE FOR BIOCATALYTIC PROCESS DEVELOPMENT

Early-Stage Ideation & Conceptualization

Enzyme Discovery

Enzyme engineering

Upscales

BIOPROCESS

Biocatalytic Route Scouting

Biocatalytic Cascade Design

AI driven optimization of Biocatalytic Reactions

Service offer

WE OFFER OUR EXPERTISE AS RESEARCH-AS-A-SERVICE (RAAS)

- Screening of in-house biocatalysts (>1000)
- Designing a panel of enzymes for reaction of interest
- Testing of protein overexpression
- Assay design and activity screening
- Development of biocatalytic cascades
- Protein engineering
- Biocatalytic route scouting
- Reaction engineering
- Production and shipping of enzymes

Why us?

BENEFITS OF COLLABORATING WITH ENZYAN

NEW IP
through creative and unique designs by an experienced team

FASTER DEVELOPMENT
with streamlined and automated workflows

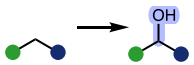
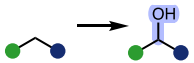
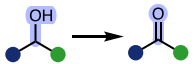
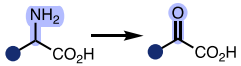
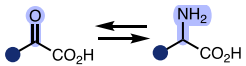
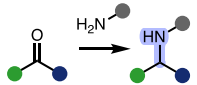
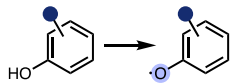
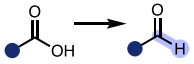
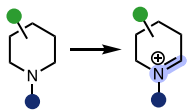
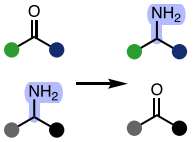
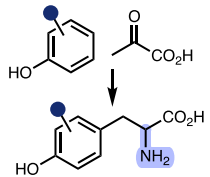
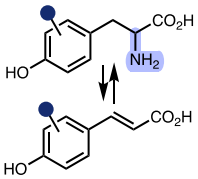
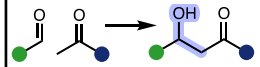
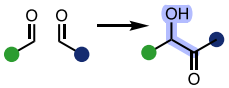
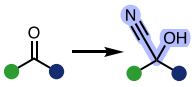
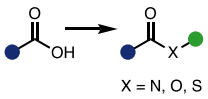
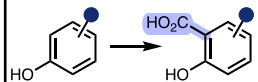
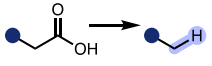
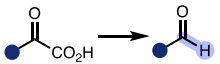
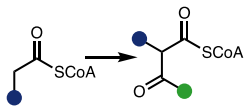
UNIVERSALLY APPLICABLE
for a variety of designs and target molecules

RELIABLE DATA QUALITY
due to independent wet lab infrastructure

HIGHER CASCADE PERFORMANCE
after global optimization of entire cascade with AI

FLEXIBLE PROJECT OPPORTUNITIES
without time limits and publication requirement

OUR TEAM HAS EXPERTISE WITH SEVERAL DIFFERENT ENZYME FAMILIES

 **P450s/ Peroxygenases**	 **α-Oxoglutarate dep dioxygenases (2OGDs)**	 **Alcohol oxidases**	 **Amino acid deaminases**	 **Amino acid dehydrogenases**	 **Reductive aminases (RedAm), Imine reductases (IRED)**	 **Laccases**
 **Carboxylic acid reductases (CARs)**	 **Monoamine oxidases (MAOs)**	 **Transaminases (TA)**	 **Tyrosine-phenol lyase (TPL)**	 **Tyrosine-ammonia lyase**	 **Hydratases**	 **Aldolases**
 **Carboligases**	 **Hydroxynitrile lyase (HNL)**	 **ATP-dependent ligases**	 **Phenol (De)carboxylases**	 **Fatty acid photo-decarboxylases**	 **Ketoacid decarboxylases**	 **Thiolases**

A list of our publications relevant for these enzyme classes can be found in the appendix of this slide deck.

Work with us now to make

CHEMICAL PRODUCTION GREENER!

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Appendix

Enzyme family	Literature examples
P450s/peroxygenases	https://pubs.rsc.org/en/content/articlelanding/2024/gc/d3gc04593e https://pubs.acs.org/doi/10.1021/acscatal.8b03733
Imine reductases (IREDs)	https://pubs.acs.org/doi/10.1021/acscatal.9b04611#
Decarboxylases	https://pubs.acs.org/doi/10.1021/acscatal.7b04293 https://onlinelibrary.wiley.com/doi/10.1002/anie.201708091
α-ketoglutarate dependent oxygenases	https://onlinelibrary.wiley.com/doi/10.1002/anie.201900926
Carboxylic acid reductases (CARs)	Confidential or unpublished data
Thiolases	Confidential or unpublished data
Alcohol oxidases	https://onlinelibrary.wiley.com/doi/10.1002/anie.202319457 https://onlinelibrary.wiley.com/doi/10.1002/anie.201713189 https://www.mdpi.com/1420-3049/22/12/2205
Aldolases	https://advanced.onlinelibrary.wiley.com/doi/10.1002/adsc.202300201
Photodecarboxylases	https://pubs.acs.org/doi/10.1021/acscatal.2c04444 https://chemistry-europe.onlinelibrary.wiley.com/doi/full/10.1002/cbic.202400631
Transaminases	https://chemistry-europe.onlinelibrary.wiley.com/doi/10.1002/cbic.202300170
Tyrosine-phenol lyase (TPL)	https://pubs.acs.org/doi/10.1021/acs.orglett.8b02058
Tyrosine-ammonia lyase	
Hydratases	
l-α-amino acid deaminase	https://advanced.onlinelibrary.wiley.com/doi/full/10.1002/adsc.202100145
Carboligases	
Hydroxynitrile lyase (HNL)	https://www.mdpi.com/2073-4344/10/8/899
ATP-dependent ligases	Confidential or unpublished data
Laccases	https://pubs.rsc.org/en/content/articlelanding/2020/nj/d0nj00758g
Reductive aminases (RedAms)	https://pubs.rsc.org/en/content/articlehtml/2023/sc/d3sc02304d
Keto-acid decarboxylases	Confidential or unpublished data
Amino acid dehydrogenases	Confidential or unpublished data

An expanded list of methodologies accessible to Enzyan through the partnership with the research group of Prof. Wolfgang Kroutil can be found in the publication list here.