Cambrex

Enzyme experience
Energetic delivery

The biocatalysis experts you'll enjoy working with

Maria Bohlin
Analytical Chemist
R&D

We're big on biocatalysis

Cambrex has developed and commercially manufactured APIs, intermediates and bulk chemicals using biocatalysis for over 15 years. As a result, our enzymes and processes are improving cost and the efficiency of manufacturing small molecules at multi-ton scale. Not just in pharmaceuticals and generics, but in everyday life – from cosmetics and fragrances to food flavorings.

Innovation

Clients from all sectors challenge us to identify enzymes suitable for the requested chemical conversions and develop the reaction ready for the integration into the complete production workflow. We respond by creating patentable know-how they can own, whilst we can operate as their reliable bulk supplier.

Adopting our technology requires no specialist equipment or knowledge, which keeps our clients' processes simple and their costs down.

Experience

Since 1999, we've grown to specialize in developing processes, designing and optimizing routes and providing R&D screening services using our proprietary library of >600 enzymes.

Our services in this area include:

- Enzyme screening
- Enzyme development
  - Cloning and gene discovery
  - Characterization and description of genes for different enzymes and functions
  - Using different expression systems
- Process development and enzyme manufacturing
  - Ability to work with different organisms and enzymes
  - Process know-how for industrial enzyme production
  - Process optimization and technology transfer available
- Synthetic route development and consulting
- Analytical method development

Performance

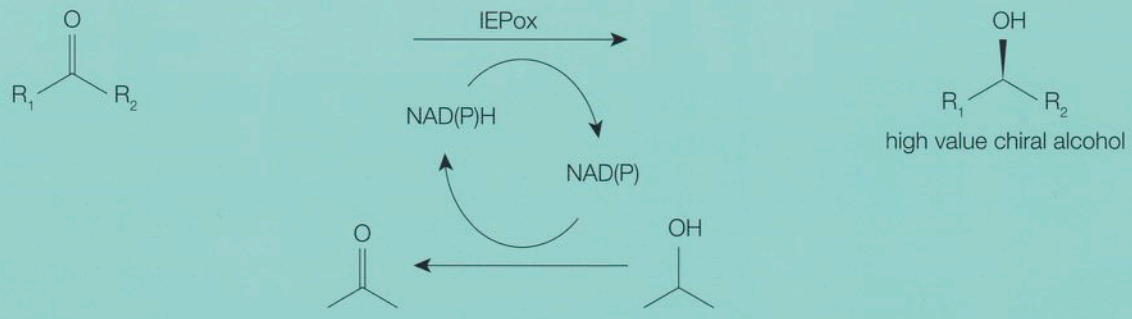
From bulk production to industrialization, our specialists offer your business more benefits:

- Shorter synthetic and alternate routes
- Reagents and solvents are biodegradable
- Typical side reactions are avoided, meaning few by-products and impurities
- High conversion, yield and enantiomeric excess
- Low enzyme and negligible cofactor costs
- Biocatalyst experts you'll enjoy working with

Read on to learn more about the conversions and reaction parameters Cambrex can achieve for you...

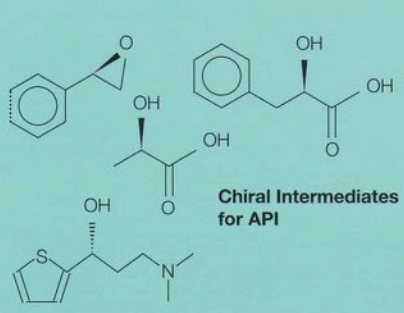
Core Technology
Ketoreductases (>230 enzymes)

- Substrate load 100-400g/l
- Simple technology and equipment/ standard batch reaction
- Inexpensive enzymes for R and S alcohols available in any scale
- Excellent enantio purity (>99.8%)
- Complete and quick conversion in 6-12 hours
- Cost contribution of coenzyme NAD(P) <1€/kg product
- No expensive ingredients or solvents
- Easy work up and removal of enzyme
- Environmentally friendly



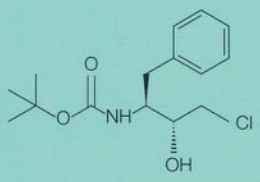
Adam Lanebjer
Analytical Chemist, QC Quality

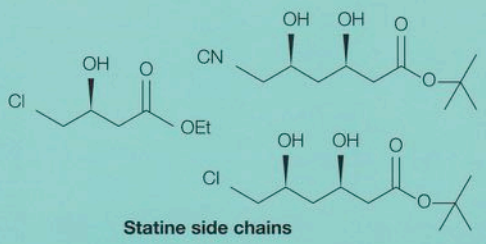
Core Technology
Ketoreductases for multiple applications



Chiral Intermediates for API

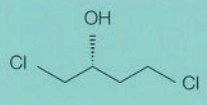
Complex and bulky compounds



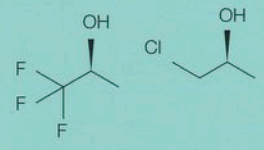


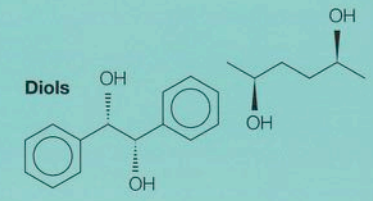
Statine side chains

IEPox Toolbox
>230 enzymes

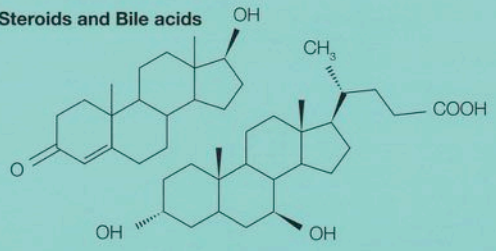


Small and halogenated compounds

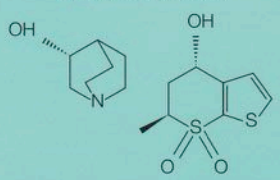




Steroids and Bile acids

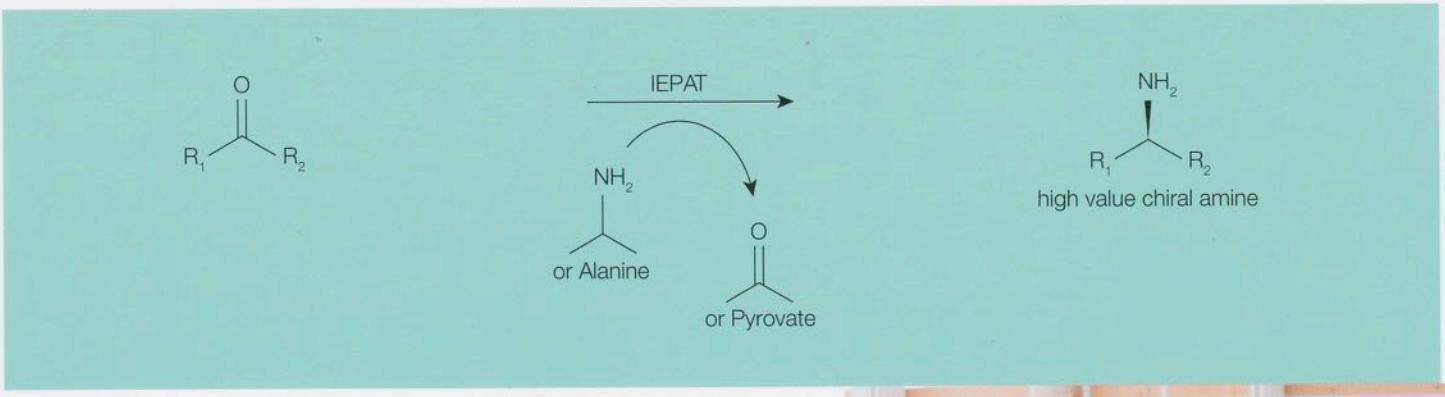


Cyclic compounds



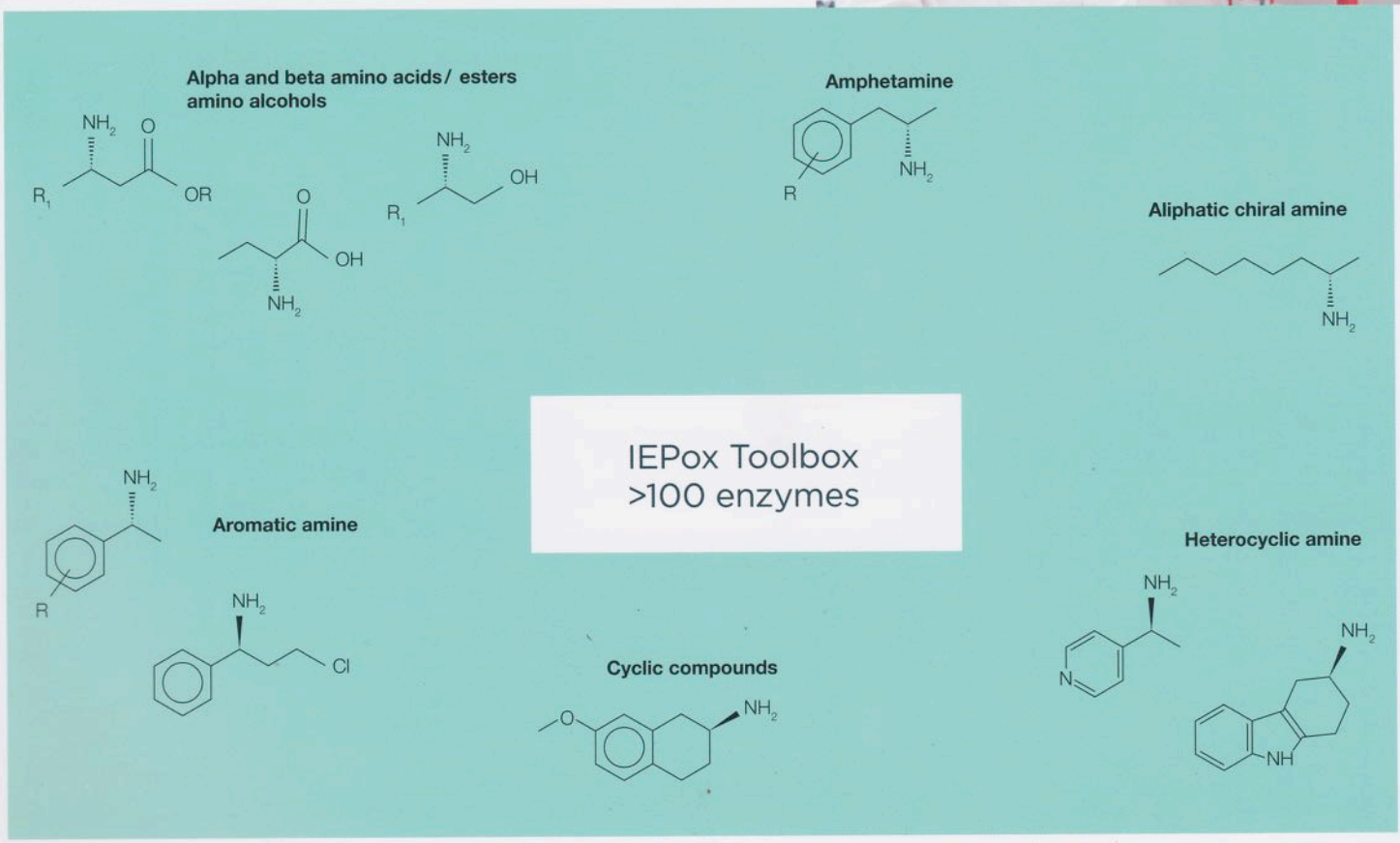
Core Technology
Transaminases (>100 enzymes)

- Substrate load 50-150g/l
- Simple technology and equipment/ standard batch reaction
- Inexpensive enzymes for R and S amines available in any scale
- Excellent enantio purity (>99.8%)
- >90% conversion in 6-12 hours
- No expensive ingredients or solvents
- Easy work up and removal of enzyme
- Environmentally friendly



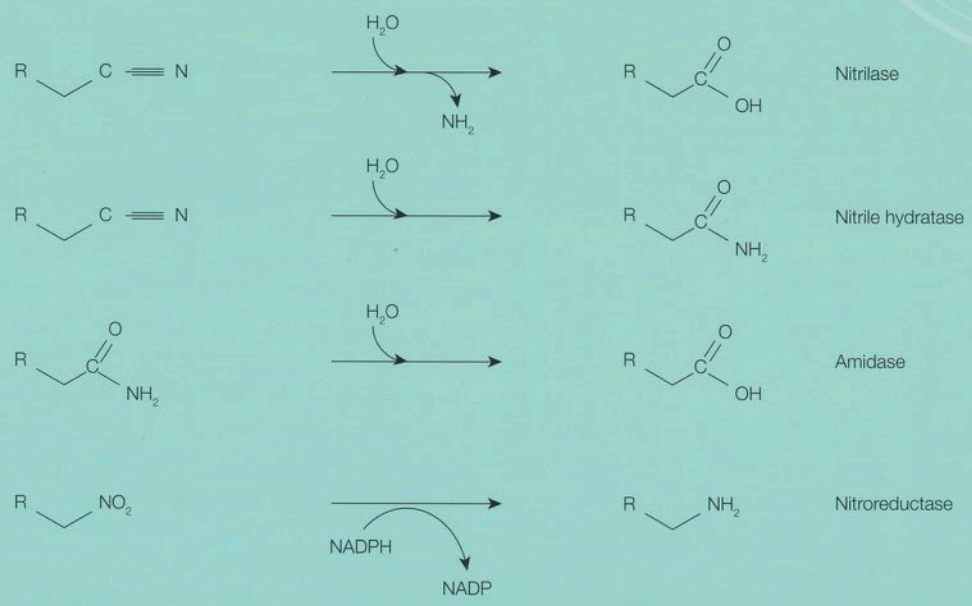
Anna Granberg
Analytical Chemist, QC
Quality

Core Technology
Transaminases for multiple applications



Special Biotransformations

Nitrilases/Nitrile hydratases/Amidases/Nitroreductases

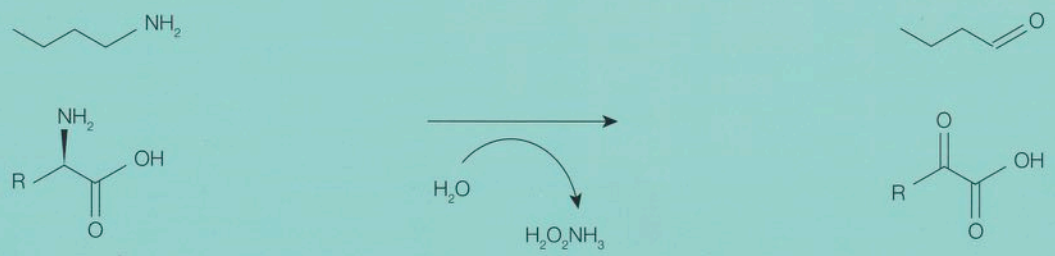


Monoamine - or amino acid oxidases

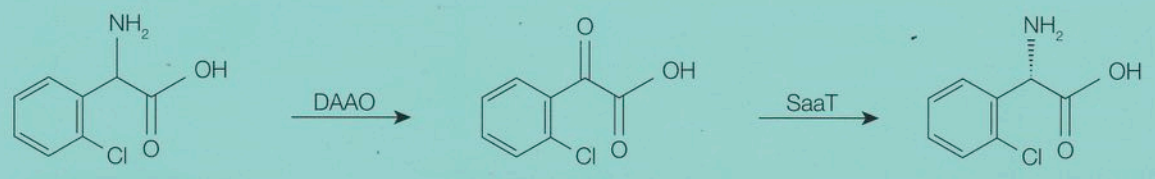
- For conversion of racemic amines to chiral amines or access to keto compounds

Johan Mattsson
Analytical Chemist
R&D

Amino acid oxidase/Monoamine oxidase



Example

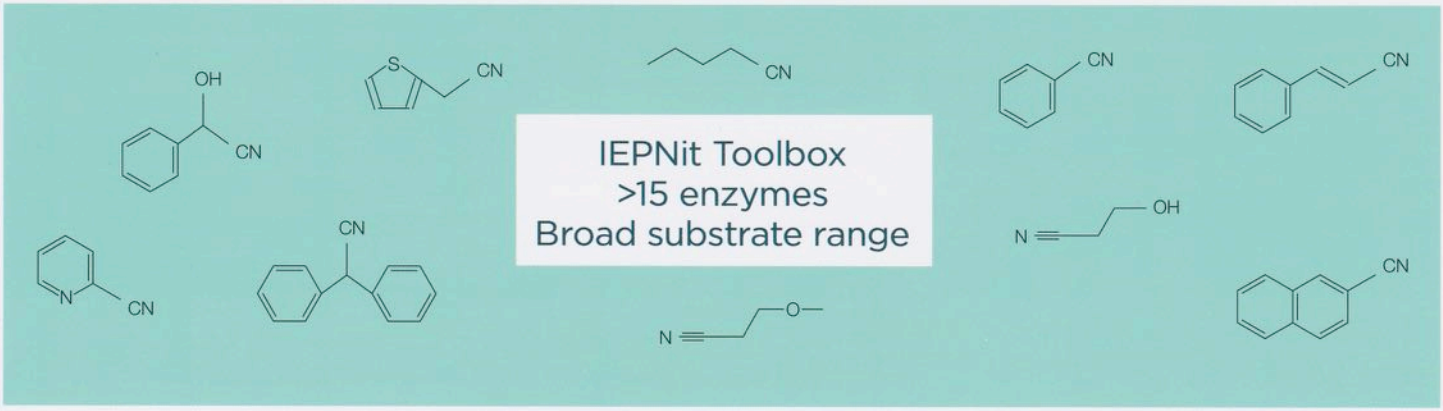


DL-2-chlorophenylglycine

2-(chlorophenyl)acetic acid

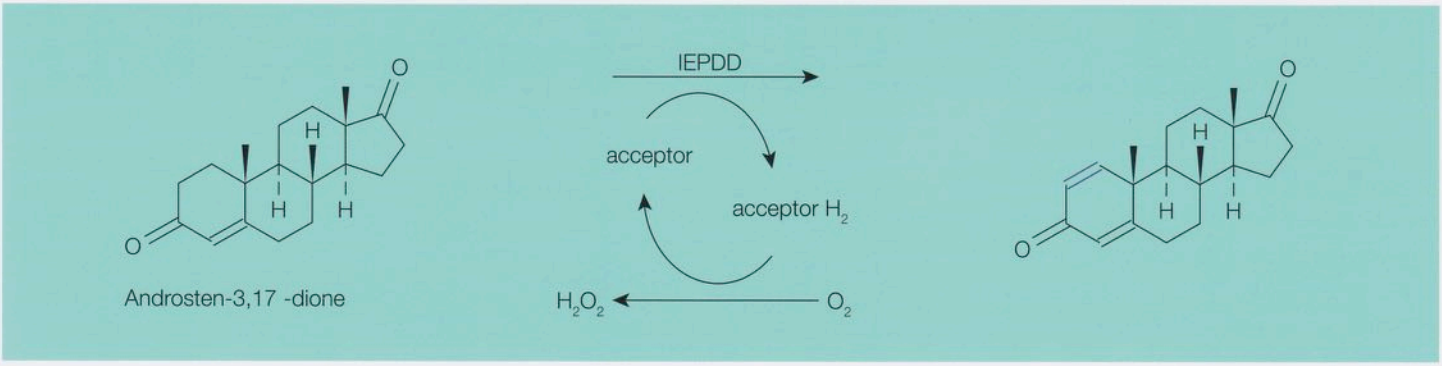
L-2-chlorophenylglycine

Nitrilases



Delta1/Delta4 Dehydrogenation

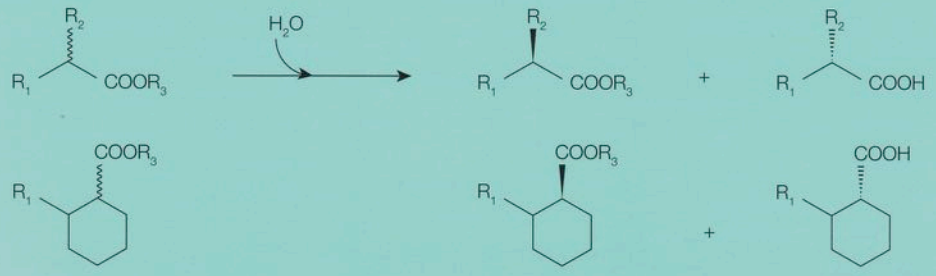
- Substrate concentration 50 up to 120g/l
- Simple technology and equipment
- Inexpensive enzyme, recombinant over-expressed (<10€/kg product)
- >95% conversion in 24 hours
- Cost contribution of co-enzyme <5€/kg product
- No expensive ingredients or solvents
- Easy work up and removal of enzyme
- Environmentally friendly



Androsten-3,17 -dione

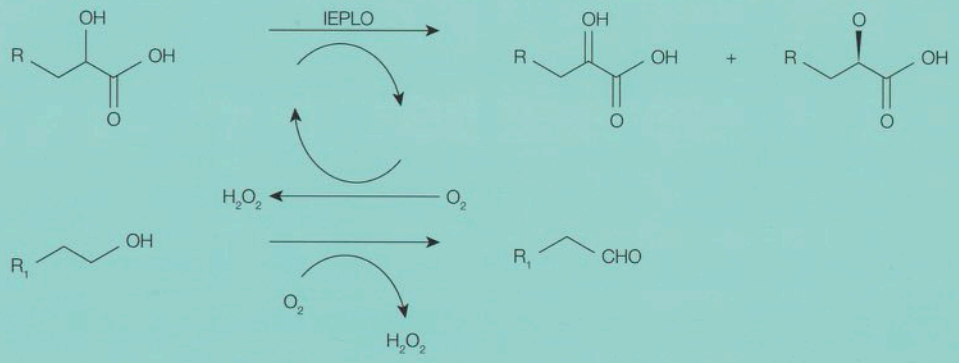
Esterases/Lipases and Hydrolases

25 enzymes



Oxidases

- Substrate concentration 100g/l
- Simple technology and equipment
- Inexpensive enzymes, recombinant over-expressed
- More than 95% conversion in 24 hours
- No additional acceptor required
- No expensive ingredients or solvents
- Easy work up and removal of enzyme
- Environmentally friendly



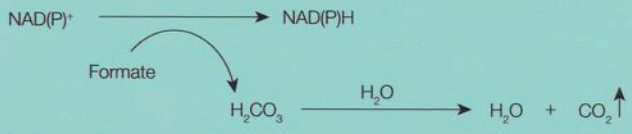
And many others

- Lactate oxidases
- Glycolate oxidases
- Azoreductases
- Halohydrin dehalogenases
- Aldolases (N-Acetylneuraminic acid lyase)
- ENE-Reductases

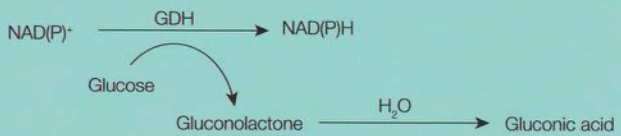
Sibel Aslan
Analytical Development Manager, R&D
Analytical Development

Peroxidases/Catalases

NAD and NADP dependent Formate dehydrogenases (cofactor regeneration NADH and NADPH)



NADP and NAD dependent Glucose dehydrogenases (cofactor regeneration NADH and NADPH)



NADH oxidase

Contact Cambrex

Experts you'll enjoy working with
www.cambrex.com