Web Alert

Chiral transformations by microbial enzymes

An annotated selection of World Wide Web sites relevant to the topics in *Microbial Biotechnology*

Microbial hydantoinases to make D-amino acids

<http://tejas.serc.iisc.ernet.in/currsci/jul10/articles20.htm>

This web paper describes the utility and production of D-amino acids using microbial hydantoinases. An extensive set of references are provided.

Microbial Baeyer-Villiger oxygenases

http://chimlum-186.univ-mrs.fr/Mes-sites-WEB-Anglais/bayer_villigerases.htm

This web page shows numerous target compounds, largely pharmaceuticals, which can be made via synthetic steps involving microbial Baeyer-Villiger monooxygenases.

Biodegradation of chiral pollutants

<http://www.epa.gov/nerl/research/1999/html/g8-4.html>

A significant number of pesticides are chiral. Different enantiomers can show marked differences in their biodegradation rates, as discussed on this web page.

Microbial biotransformations for drug precursors

<http://www.bioline.org.br/request?au01026>

This web report addresses microbial chiral transformations for generating synthetic intermediates for pharmaceutical compounds. There is a particular emphasis on fungal transformation of steroid compounds.

Microbial enantioselective sulfatases

<http://www.aseanbiotechnology.info/Abstract/21022648.pdf>

This article describes the use of microbial sulfatases for enantio-convergent transformations to generate single enantiomer products in high yield.

Chiral synthesis

<http://www.iccas.ac.cn/english/html/2004-8-20/2004820143856.htm>

This web page focuses on chiral synthesis with some examples of microbial enzymatic chiral resolutions.

Enantioselective microbial epoxide hydrolases

http://www.biocatalyse.univ-mrs.fr/Mes-sites-WEB-Anglais/epoxyde_hydrolases.htm

This web page shows numerous target compounds, largely pharmaceuticals, which can be made via synthetic steps involving microbial epoxide hydrolases.

Biotransformation of non-natural compounds

<http://borgc185.kfunigraz.ac.at/Sites/Biocat.htm>

This web page provides an excellent overview of enzymes in biocatalysis. Most of the enzymes derive from microbes and many of the transformations are desired because they produce chiral products.

Patent for microbial chiral sulfoxidation and amidation reactions

<http://www.wipo.int/pctdb/en/wo.jsp?IA=WO2007027328&wo=2007027328&DISPLAY=DESC>

This patent describes a microbial transformation process embodying a green chemical route to the pharmaceutical compound modafinil.

Biocatalysis and chiral resolution

<http://pubs.acs.org/cen/coverstory/84/8433chiralchem3.html>

This article in *Chemical and Engineering News* provides an excellent industrial perspective on the use of enzymes in chiral synthesis.

Cambrex: Chiral amines via transaminases

<http://www.cambrex.com/Content/pharma/article.asp?ClassId=106&ContentId=479>

Prochiral ketones can be converted to chiral amines. (R)- and (S)-specific microbial aminotransferases can be used to make whichever enantiomer is desired for a specific application.

Lipase database

<http://www.au-kbc.org/beta/bioprot2/index.html>

Lipases are perhaps the most widely used industrial enzymes in chiral resolutions. Lipases from the yeast *Candida* have been widely used, but bacterial enzymes have also proven useful.

Lipase engineering database

<http://www.led.uni-stuttgart.de/>

This web database deals with the α/β hydrolase fold enzymes, that include lipases and epoxide hydrolases.

Terpene cyclases structure/function

<http://sfld.rbvi.ucsf.edu/cgi-bin/SFLDvm.py?view=superfamily&id=5>

Terpene cyclases, or terpene synthases, control terpene carbon unit condensations, ultimately determining the stereochemistry of the products. This page in the Structure Function Linkage Database contains extensive information on this protein family.

Toluene dioxygenase reactions

<http://umbdd.msi.umn.edu/tol/tdo.html>

Toluene dioxygenase is a broad-specificity enzyme that produces chiral diols and alcohols, some of which have been used as chiral synthons. This page contains a table with the 109 known reactions, with links to further information.

Manufacturing chemist: Enzymes to the rescue

<http://www.manufacturing-chemist.info/story.asp?storycode=40034>

This page reviews some of the enzymatic chiral transformations that have proven to be most important industrially.

Dow: Industrial enzymes

http://pharma.dow.com/pharma/sm_molecules/capabilities/enzymeclasse.htm

On this page, the Dow Chemical Company highlights their collection of industrial enzymes and microorganisms.

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