



**SCIENTIFIC  
UPDATE**

*We've got chemistry*

**2** day  
Course

2020

# BIOCATALYSIS AS A TOOL FOR THE SYNTHETIC CHEMIST

"The course was for me the best starting point to dive into the field of Biocatalysis. I can recommend it to everyone who wants to start or to further develop in this field."

**MSD Animal Health  
Manufacturing Delegate**

**30**

Celebrating 30 years serving  
the global chemistry industry

1989 - 2019

# BIOCATALYSIS AS A TOOL FOR THE SYNTHETIC CHEMIST

A 2 day course



## INTRODUCTION

**The aim of the course is to give organic chemists an understanding and an overview of the subject of biotransformations.**

Attendees will learn about the main classes of enzymes and the transformations these enzymes carry out.

Each transformation type will be illustrated with examples and case studies and the course will also include problem sessions where attendees will work on real examples applying biotransformations to organic synthesis.

Recent developments in the field will be covered as well as an overview of the sort of equipment and resources required for research and scaling up biocatalytic reactions. Several industrial examples of biocatalysis will be discussed. The Course will conclude with a comparison of biocatalysis and chemocatalysis.

Very good course for chemists to discover the world of enzymes.

**Firmenich SA Delegate**

## COURSE OUTLINE

### Introduction to Biocatalysis

- > Literature sources for biocatalysis (books and review articles)
- > Myths about biocatalysis
- > Enzyme / protein basics, basic microbiology
- > Sources of biocatalysts
- > Equipment requirements
- > Enzyme types

### Hydrolytic Enzymes (Lipases, esterases, amidases, proteases)

- > Mechanism of hydrolysis by enzymes
- > Kinetic resolution
- > Use of organic solvents
- > Dynamic kinetic resolution (DKR)
- > Deracemisation
- > Ester, amide, nitrile and epoxide hydrolysis concentration

### Oxidations

- > Alcohol oxidation
- > Amine oxidation, deracemisation of amines and amino acids
- > Bio-oxygenation, bio-hydroxylation
- > Demethylation
- > Epoxidation
- > Bayer-Villiger oxidation
- > Sulphoxidation

### Reduction

- > Ketone reduction, Prelog rules
- > Co-factors
- > Deracemisation of secondary alcohols
- > Enantioselective reduction / DKR
- > Keto-ester reduction
- > C=C reduction

### C-C and C-X bond formation

- > Aldol reactions
- > Transketolases
- > Cross benzoin reactions
- > Hydroxy-nitrile lyases
- > Michael reactions
- > Transamination
- > Fumarase and aspartase

### Scale Up of Biotransformations

- > Reactors
- > Scale up issues
- > Case studies

### New Developments including Directed Evolution

- > Polymerase Chain Reaction
- > Mutagenesis
- > Directed Evolution
- > Product isolation

### Pros and Cons of Biocatalysis

- > Summary
- > Q&A, discussion

## WHO SHOULD ATTEND?

- > Any Organic Chemist involved in synthesis, particularly those involved in designing novel, green synthetic routes.
- > Chemists who want to learn how biocatalysis can help them.
- > Those involved in the scale up of biocatalytic reactions.

## IN-HOUSE COURSE

For 8+ people contact us to discuss holding this event In-House - [sciup@scientificupdate.com](mailto:sciup@scientificupdate.com)



# SCIENTIFIC UPDATE

We've got chemistry

Registration 8.45

Course commences 9.00 Day 1

Course adjourns 3.30 on Day 2

Course fees include a comprehensive course manual, refreshments throughout each day, lunches and one course dinner on the first evening

For all prices and dates please refer to our website



IT'S EASY TO REGISTER ONLINE

## COURSE TUTORS



**Dr Will Watson**  
Technical Director,  
Scientific Update

### Dr Will Watson

Technical Director,  
Scientific Update

Will Watson gained his PhD in Organic Chemistry from the University of Leeds in 1980. He joined the BP Research Centre at Sunbury-on-Thames and spent five and a half years working as a research chemist on a variety of topics including catalytic dewaxing, residue upgrading, synthesis of novel oxygenates for use as gasoline supplements, surfactants for use as gasoline detergent additives and non-linear optical compounds.

In 1986 he joined Lancaster Synthesis and during the next 7 years he was responsible for laboratory scale production and process research and development to support Lancaster's catalogue, semi-bulk and custom synthesis businesses. In 1993 he was appointed to the position of Technical Director, responsible for all Production (Laboratory and Pilot Plant scale), Process Research and Development, Engineering and Quality Control.

He helped set up and run the Lancaster Laboratories near Chennai, India and had technical responsibility for the former PCR laboratories at Gainesville, Florida. He joined Scientific Update as Technical Director in May 2000. He is also involved in an advisory capacity in setting up conferences and in the running of the events. He is also active in the consultancy side of the business.

 [will@scientificupdate.com](mailto:will@scientificupdate.com)



**Dr Andrew Wells**

### Dr Andrew Wells

I am a specialist and expert in the field of chemical process R&D where, over the past 30 years, I have spent most of my professional career employed at three multi-national pharmaceutical companies, rising to the rank of Senior Principal Scientist (Director Level) at AstraZeneca. I have experience across all aspects of the pharmaceutical lifecycle, especially R&D, synthesis, green chemistry and material supply at all scales from discovery chemistry through to validation, manufacture and life cycle management. A major focus over the past 20 years has been the application of homo/hetero-metal catalysis, biotransformations /biotechnology and green chemistry solutions in the tactical and strategic manufacture of pharmaceuticals, agrochemicals and fine chemicals. My career has spanned across a broad range of scientific disciplines, and I am a keen exponent of working at the interface of the physical and biological sciences to champion the adoption of novel, more sustainable technologies across a range of business areas.

I currently work as a project partner in a number of consortia – both business-business and business academia, and as a consultant to a range of businesses including small biotech companies, fast moving consumer goods (FMCG), multi-national pharma companies and agrochemicals companies. I also work with universities looking at accessing grant funding and commercialisation of novel sustainable manufacturing technology. I have extensive networks in the pharmaceutical/synthesis/industrial biotechnology /biocatalysis communities and can work with a number of specialist technology companies and SME's to deliver projects for clients.

## REGISTRATION

Use our **fast online booking system by visiting**

**[www.scientificupdate.com](http://www.scientificupdate.com)**

Alternatively you can mail or fax the attached registration form to:  
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### How to Pay

When you register online, you can have the option to pay via credit card (Amex, MasterCard or Visa). A receipted invoice will be automatically generated once paid and sent via email. Should your company wish to pay by cheque or bank transfer, on booking, bank details will be supplied with an invoice.

### Group Discounts

Group discounts are available on two or more attendees - see registration form. This offer only applies if bookings are made simultaneously and from the same billing address.

### Confirmation of your registration

These will be sent via email.

### Late Applications

For late applications, please register online or fax the completed registration form, including credit card payment information.

### Cancellations/Refunds

Should you be unable to attend and cancel in writing no later than 1 month before the start of the course, Scientific Update will refund your registration less £300.00 (or equivalent in €/€) processing fee. Unfortunately refunds are not possible after that date. Substitutions can be made at any time.

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**Discounts**

Complete the details for either two or three delegates and your discount will automatically be applied. This offer only applies where all delegates are booked simultaneously and at the same billing address.

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