Chemistry IV (Organic): Biosynthesis & Biomimetic Total Synthesis

Overview

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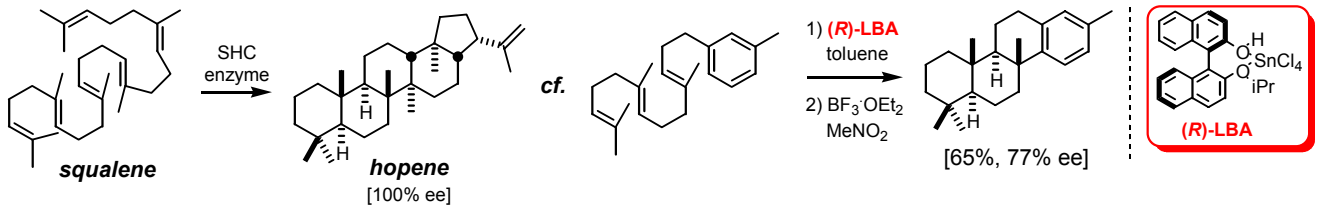
Aims:
To briefly review primary metabolism and enzyme co-factor chemistry. To examine the formation of the major classes of secondary metabolites: shikimate derivatives, alkaloids, fatty acids, polyketides and isoprenoids. To present the chemical mechanisms of many of these transformations, and to demonstrate how these natural processes can provide inspiration for the total synthesis of natural products and un-natural analogues.



Summary:
A tour of natural product biosynthesis and biomimetic total synthesis.

Objectives:
On completion of this course you will be able to:

- recognise the structural affinities of major classes of natural products;
- appreciate the biological and chemical origins of these compounds;
- offer rational mechanistic explanations of many of the transformations;
- understand the challenges involved in biomimetic synthesis.

Course delivery (7 lectures)

Lecture 1:	Primary metabolism, enzyme cofactor chemistry and Shikimate metabolites.
Lectures 2-3:	Biosynthesis and biomimetic synthesis of alkaloids.
Lectures 4-5:	Biosynthesis and biomimetic synthesis of fatty acids and polyketides.
Lectures 6-7:	Biosynthesis and biomimetic synthesis of isoprenoids.

Reference material
The following texts contain information pertinent to the course content.

1. D. Voet, J.G. Voet *Biochemistry* Wiley, 2nd ed, **1995**
2. J. Mann *Chemical Aspects of Biosynthesis* Oxford Chemistry Primer No. 20, **1994**.
3. E. Haslam *Shikimic Acid – Metabolism and Metabolites* Wiley, **1993**.
4. R.B. Herbert *Biosynthesis of Secondary Metabolites* Chapman & Hall, 2nd ed. **1989**.
5. L. Stryer *Biochemistry* Freeman, 3rd ed, **1988**.
6. M. Luckner *Secondary Metabolism in Microorganisms, Plants & Animals*, Springer Verlag, **1984**.
7. J. Mann, *Secondary Metabolism* OUP, 2nd ed. **1987**.
8. D.H.R. Barton, K. Nakanishi, O. Meth-Cohn (Eds), *Comprehensive Natural Products Chemistry*, (9 volumes) Pergamon, **1999**.

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