

## INTRODUCTION

# THE SHIKIMIC ACID PATHWAY

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The Shikimic Acid Pathway is a major biosynthetic pathway in plants and microorganisms and is responsible for the production of a range of important metabolites including the aromatic amino acids. Since it was first investigated in the 1950's, the pathway has been the subject of considerable research interest.

The interest has partly stemmed from the commercial significance of the pathway. The products of the pathway are nutritionally essential and so in plants at least 20% of the carbon flux is routed through the Shikimic Acid Pathway. However, because it is not found in animals, specific inhibitors of the pathway are potential herbicides or antimicrobial agents. This potential has indeed been borne out and one of the world's leading weedkillers contains as its active ingredient, glyphosate, which is an inhibitor of the enzyme EPSP synthase.

Just as importantly however, the Shikimic Acid Pathway has attracted attention because of the intellectual challenges that it presents. Some fascinating chemistry is utilised by the pathway and the enzymes responsible for its catalysis have been shown to employ some very interesting mechanisms. Particular examples are the 3,3-sigmatropic rearrangement catalysed by chorismate mutase, a reaction unique in primary metabolism, and the intriguing chemical mechanism of the dehydroquinate synthase reaction. The genetics of the pathway have been extensively studied and indeed many enzymes have now been cloned and overexpressed. However, there are still interesting organisational questions at both the genetic and protein level. These are exemplified by the arom multi-enzyme complex found in some organisms, which contains the five enzyme activities from dehydroquinate synthase to EPSP synthase, in a single protein. There are also the synthetic challenges presented by the Shikimic acid metabolites, and isotopically labelled variants thereof, which have led to some very elegant synthetic chemistry.

Overall, the Shikimic Acid Pathway provides an excellent example of a biological system that has been, and indeed is still being, investigated by the whole range of techniques available to Bioorganic chemists and Biochemists. The aim of this Symposium-in-print is to bring together some of the excellent work being carried out in this exciting area today.

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