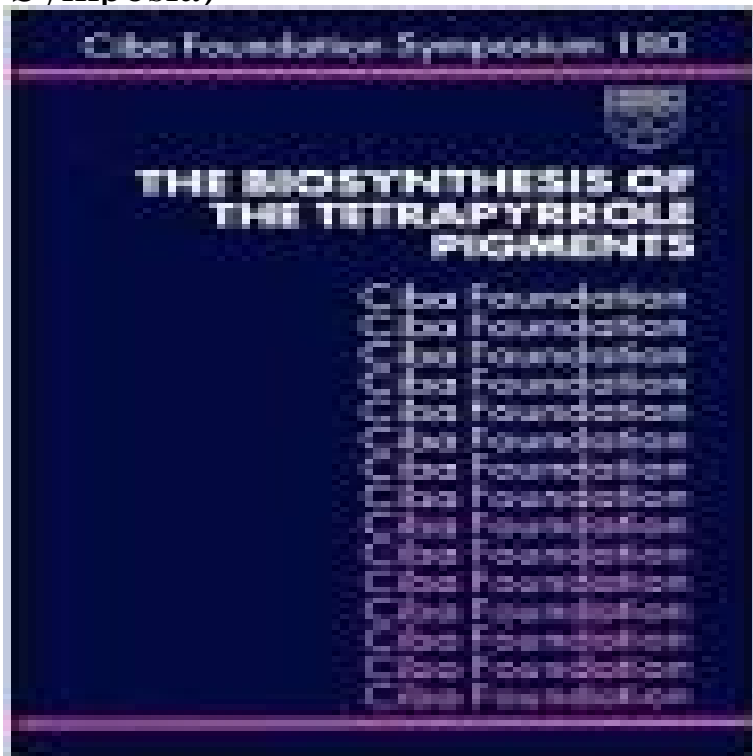


The Biosynthesis of the Tetrapyrrole Pigments (Novartis Foundation Symposia)



The Biosynthesis of the Tetrapyrrole Pigments Chairman: Duilio Arigoni 1994

Arguably the most important pigments of life are the chlorophylls, the light energy-harvesting green pigments of plants and algae, and haem, which forms the non-protein part of haemoglobin, myoglobin and cytochrome c. These, and related crucial molecules such as vitamin B12 and the protoporphyrin IX unit of the cytochromes, are all members of the family of tetrapyrrole pigments sharing many biosynthetic steps and owing their origin to the amino acid pool. Since the pioneering work of the 1940s and 1950s showing glycine to be an amino acid precursor of the porphyrins (at least in mammals) via the ubiquitous trisubstituted pyrrolic intermediate porphobilinogen, chemists, and, more recently, biochemists, have been fascinated by the challenge of unravelling the intricate details of the natural synthesis of these architecturally beautiful and chemically complex molecules. In this book, a distinguished international group of chemists and biochemists review the progress being made in our understanding of the biosynthesis of the tetrapyrrole pigments. Topics covered include the early biosynthetic steps to 5-aminolaevulinic acid, the subsequent transformations leading to uroporphyrinogen III, and the elaboration of the side chains. Studies of chlorophyll biosynthesis, of recently identified novel haems from bacteria and of coenzyme F430, a nickel-containing porphinoid involved in methanogenesis, are described. The biosynthesis of open-chain tetrapyrroles in plants, algae and cyanobacteria is also outlined. The book ends with a detailed exploration of current knowledge of the genetics and enzymology of the biosynthetic pathway leading to vitamin B12, and of the synthesis, isolation and structural determination of intermediates along this pathway. Related Ciba Foundation

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