

Heme, Chlorophyll, and Bilins

Methods and Protocols

Edited by

Alison G. Smith

Department of Plant Sciences, University of Cambridge, UK

Michael Witty

Department of Biochemistry, University of Cambridge, UK

Although researchers can profitably investigate heme, chlorophyll, and related tetrapyrroles in a wide range of academic and medical research programs, the handling and manipulation of these delicate compounds requires considerable skill and cross-boundary knowledge. In *Heme, Chlorophyll, and Bilins: Methods and Protocols*, an interdisciplinary panel of hands-on investigators overcomes these limitations by describing in detail how to work successfully with chlorophyll, heme, and bilins in biological, medical, chemical, and biochemical research. Each method is presented by a researcher who actually uses it on a daily basis and includes step-by-step instructions and pertinent tricks-of-the-trade that often make the difference between laboratory success and failure. Topics range from methods for the analysis of tetrapyrroles, heme, and hemoproteins, to the biosynthesis and the analysis of chlorophyll and bilins.

Timely and highly practical, *Heme, Chlorophyll, and Bilins: Methods and Protocols* is a gold-standard collection of readily reproducible techniques suitable for a wide range of researchers, whether it be a clinician studying photodynamic therapy, an ecologist studying the chlorophyll composition of leaves in a tropical forest, or a cell biologist investigating the function of specific hemoproteins.

Features

- Detailed step-by-step protocols that have been optimized for robust results
- Numerous tricks-of-the-trade that often make the difference between success and failure
- Time-saving techniques that even a highly skilled researcher will find helpful
- Troubleshooting tips, alternative ways of doing things, and informative explanations

Contents

Laboratory Methods for the Study of Tetrapyrroles. Syntheses of Tetrapyrroles. General Laboratory Methods for Tetrapyrroles. Enzymatic Preparation of Tetrapyrrole Intermediates. Analysis of Biosynthetic Intermediates, 5-Aminolevulinic Acid to Heme. Analysis of Intermediates and End Products of the Chlorophyll Biosynthetic Pathway. Analysis of Heme and Hemoproteins. Hemoproteins Purification and Characterization by Using Aqueous Two-

Phase Systems. Structural Study of Heme Proteins by Electron Microscopy of 2-Dimensional Crystals. Analysis and Reconstitution of Chlorophyll-Proteins. Two-Dimensional Crystallization of Chlorophyll Proteins. Biosynthesis and Analysis of Bilins. Analysis and Reconstitution of Phytochromes. Analysis and Reconstitution of Phycobiliproteins: *Methods for the Characterization of Bilin Attachment Reactions*. Index.

