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Colin Masters and Denis Crane  
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Over the last decade, a series of dramatic research findings have served to emphasize the vital role of the peroxisome. These findings have included major advances in our understanding of its metabolic roles, the genetic specification of peroxisomal components, the complex processes of protein targeting and peroxisomal biogenesis, and the broad involvements of peroxisomal diseases.

This book, by its format, provides both a basic introduction to the peroxisome and its relationship to other components of eukaryotic cells, and a detailed and comprehensive discussion of recent advances. In addition to the topics referred to above, current understanding of the morphology, phylogeny, enzymology and ontogeny of the peroxisome are also reviewed, as are its extraordinary proliferation induced by a variety of drugs and xenobiotics, and its role in hepatocarcinogenesis.

The authors are well respected researchers in this field and have produced an authoritative and readable text, with numerous illustrations and chapter summaries. In this form the text will appeal to advanced undergraduates, postgraduates and researchers in biochemistry, cell biology and biomedical sciences who wish to keep abreast of the many important biological correlations of this organelle.

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To Christian de Duve, whose pioneering investigations established the presence and broad significance of the peroxisome, and served as motivation for much of the current research activity in this field.

## Contents

<i>Preface</i>	<i>page</i> xv
<b>1 Introduction</b>	1
Outline of the metabolic role	1
Biochemical definition	2
Morphology	8
Microperoxisomes, hydrogenosomes and glycosomes	13
Phylogenetic distribution	15
Summary	21
Further reading	22
<b>2 Enzymology</b>	23
Introduction	23
Catalase	23
L- $\alpha$ -Hydroxyacid oxidase	27
D-Amino acid oxidase	29
Urate oxidase	31
$\beta$ -Oxidation enzymes	32
Acyl-CoA oxidases	33
Enoyl-CoA hydratase and 3-hydroxyacyl-CoA dehydrogenase	35
3-Ketoacyl-CoA thiolase	37
Oxidation of unsaturated fatty acids	38
Palmitoyl-CoA and lignoceroyl-CoA ligase	38
Carnitine octanoyltransferase	39
Isocitrate dehydrogenase	39
Alanine: glyoxylate aminotransferase	41
Glycerol 3-phosphate dehydrogenase	42
Aldehyde dehydrogenase	42

x	<i>Contents</i>	
	Pipecolic acid oxidase	43
	Polyamine oxidase	44
	Other peroxisomal enzymes	44
	Summary	44
	Further reading	46
<b>3</b>	<b>Intraparticulate organization of peroxisomal proteins – methodology and topology</b>	47
	Introduction	47
	Centrifugal fractionation	47
	Use of detergents	50
	Electron immunocytochemistry	53
	Enzymes of glycerolipid synthesis	55
	Perturbations of enzyme localization	58
	Peroxisomal enzymes in the cytoplasm	61
	The peroxisomal membrane	63
	Summary	68
	Further reading	70
<b>4</b>	<b>The phenotypic characteristics, genetics and ontogeny of peroxisomal proteins</b>	71
	Introduction	71
	Catalase – the genetics of turnover and multiplicity	71
	Chromosomal mapping of peroxisomal genes	77
	Cloning and structural analysis of peroxisomal genes	79
	Peroxisomal ontogeny in mammals	84
	The involvement of the peroxisome in the ageing process	88
	Catalase development in plants	89
	Peroxisome–glyoxysome transitions in plants	90
	Concluding comments	93
	Summary	93
	Further reading	95
<b>5</b>	<b>Peroxisomal metabolism – lipids</b>	96
	Scope of metabolism	96
	$\beta$ -Oxidation of long chain fatty acids	97
	The $\beta$ -oxidation cycle	99
	$\beta$ -Oxidation of common fatty acids in the peroxisome	101
	$\beta$ -Oxidation of unsaturated fatty acids	101
	$\beta$ -Oxidation of very long chain fatty acids	106

	<i>Contents</i>	xi
	Branched chain fatty acids	108
	Peroxisomal oxidation of dicarboxylic acids	108
	Metabolism of bile acids	111
	Prostaglandins and related compounds	113
	Metabolism of xenobiotics	116
	Fatty acid binding proteins	117
	Anabolic roles in lipid metabolism	117
	Synthesis of ether lipids	118
	Synthesis of cholesterol	120
	Dolichol metabolism	124
	Summary	125
	Further reading	126
<b>6</b>	<b>Further metabolic involvements of the peroxisome</b>	127
	Introduction	127
	The metabolism of amino acids and related compounds	127
	Gluconeogenesis	130
	Glyoxylate metabolism	131
	Glyoxylate adducts	133
	Hydroxyacid metabolism	136
	Purine metabolism	136
	Further oxidations	138
	Respiration	138
	The subcellular disposal of hydrogen peroxide and superoxide radicals	140
	Peroxisomal metabolism in protozoa, yeasts and plants	143
	Summary	148
	Further reading	149
<b>7</b>	<b>Regulatory factors in peroxisomal metabolism</b>	150
	Introduction	150
	Energetics	150
	Factors influencing peroxisomal metabolism	153
	The diversity of metabolism within the peroxisome	155
	Regulatory shuttles	157
	Metabolic interactions between peroxisomes and other organelles	161
	Metabolic flux and its implications in regulation	165
	Substrate turnover <i>in vivo</i>	168
	Intertissue communication	170



xii	<i>Contents</i>	
	Concluding comments	172
	Summary	172
	Further reading	173
<b>8</b>	<b>Peroxisomal biogenesis and turnover</b>	<b>174</b>
	Overview	174
	Biogenesis of individual peroxisomal proteins	177
	Catalase	178
	Thiolase	179
	Topogenic signals	180
	Universality of the topogenic signal?	181
	Membrane translocation of peroxisomal proteins	183
	Biogenesis of peroxisomal membranes	185
	Ultrastructural aspects of peroxisomal biogenesis	186
	Peroxisome assembly in yeasts and Chinese hamster ovary cells	187
	Summarizing model	189
	Elements in the turnover of peroxisomal proteins	191
	Synthesis and degradation of peroxisomal proteins	193
	Organelle turnover	196
	Summary	199
	Further reading	201
<b>9</b>	<b>Peroxisome proliferators</b>	<b>202</b>
	Introduction	202
	Induction of peroxisomal enzymes	205
	Induction in other cellular compartments	207
	Mechanisms of peroxisome proliferation	208
	Enzyme activities, membrane permeability and metabolic shifts	209
	Substrate overload	212
	Receptor mechanisms	213
	Commentary on mechanistic models	219
	Peroxisome proliferators and carcinogenesis	220
	Summary	223
	Further reading	224
<b>10</b>	<b>Peroxisomes and human disease</b>	<b>225</b>
	Introduction	225
	Categories of peroxisomal disorders	225

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978-0-521-03683-2 - The Peroxisome: A Vital Organelle  
Colin Masters and Denis Crane  
Frontmatter  
[More information](#)

---

	<i>Contents</i>	xiii
	Clinical and biochemical features of peroxisomal disorders	227
	Molecular mechanisms of peroxisomal pathology	234
	Nature of the molecular defects in the Zellweger syndrome and in other generalized peroxisomal disorders	235
	Turnover of peroxisomes	242
	Genetic relationships between peroxisomal disorders	242
	Summary	244
	Further reading	245
<b>11</b>	<b>Concluding comments</b>	246
	Recent developments	246
	Prospectives in education and science	248
	Peroxisomal diseases and community interactions	250
	Lorenzo's oil – a journalistic account	252
	<i>Bibliography</i>	255
	<i>Index</i>	284

## Preface

Over the last decade, the peroxisome has moved from the wings of the cellular biology stage to a far more central position – one of evident involvement with many other areas of topical biological interest. A series of dramatic findings have served to establish the essential role of this organelle in the cellular and organismal context, and elevated its ranking in the day-to-day considerations of biomedical scientists.

These findings have included major expansions in the understanding of the metabolic role of this organelle, advances in the genetic analyses of peroxisomal components, insights into the complex processes involved in peroxisomal biogenesis and proliferation, and advances in the broad inter-relationships of peroxisomal disease.

While it is largely through this last aspect (and the film *Lorenzo's Oil*, in particular) that the peroxisome has impacted on the consciousness of the general public, all of these aspects have fostered increasing mutual interest and interaction with other areas of cell biology, and stimulated a broadening interest in the structure and function of the peroxisome.

Despite all these significant advances, though, and the incorporation of peroxisomal involvements into many other diverse areas of topical biological study, an up-to-date, comprehensive reference text has not been available. This book is aimed at meeting this deficiency and providing a contemporary compilation of discoveries and achievements in this field. It includes a brief description of the historical background and perspectives, followed by full accounts of the enzymology of this organelle, the intraparticulate organization of these enzymes, and their genetic and ontogenic analyses. Following on from this, a comprehensive coverage of peroxisomal metabolism has been included, detailing the many roles in the catabolism and anabolism of lipid, carbohydrate and nitrogenous compounds, as well as the extensive involvements in metabolic control. There

are also chapters on peroxisomal biogenesis, peroxisomal proliferation and peroxisomal diseases – all areas of widespread, active interest at the moment.

In compiling this treatment, the authors have been conscious of the rapid expansion and broadening of the peroxisomal audience, and the necessity for comfortable access to the relevant peroxisomal information by readers from many and varied backgrounds. For this reason the more detailed discussions in this book have been supplemented by numerous diagrams and illustrations, fully titled references, and summaries and suggestions for further reading at the end of each chapter. These suggestions for further reading have been designed not only to include recent reviews, but also to provide a chronological commentary of major advances in the chapter topics.

In relation to the many experimental procedures that have been described in the literature for the separation of peroxisomal fractions and their biochemical or cytochemical characterization, it may be noted that we have adopted the approach in this text of a general, *in principio* treatment, accompanied by liberal references to the literature on specific methodologies. It was considered that this approach was more appropriate to a general text of this type, rather than the inclusion of a series of lengthy step-by-step descriptions of individual procedures.

It is hoped that in this form the text will be of interest not only to the peroxisomal specialist and to postgraduates in the biomedical sciences who wish to keep abreast of the many significant advances in this important area of cell biology, but also as an optimal item in the reference curriculum of most undergraduate students in biology and medicine.

As another comment on format, it may also be noted that, while many texts in the past have commonly used bidirectional arrows to emphasize the reversible nature of enzyme-catalysed reactions, we have on occasion used single directional arrows in this text. This has been done, not only for purposes of clarity and simplicity, but also in recognition of the trend towards such usage in modern texts.

When a field advances as rapidly as peroxisomal biology, of course, it presents the authors not only with the problem of providing the data in readily accessible form, but also a question (to pursue the initial analogy) of when to ring down the curtain on coverage. In the present instance, it was decided that March 1994 was an appropriate time to terminate our literature references, and readers seeking information published after this date should note that they will need to refer to the original literature.

No book of this nature can be developed without significant interactions

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Frontmatter  
[More information](#)

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*Preface*

xvii

with other experts in the field, and we would like to take this opportunity of expressing our gratitude to the many colleagues who have assisted in this undertaking with discussions and encouragement. Several illustrations in the text have originated from the work of fellow researchers, and we have endeavoured to ensure that all these sources have been acknowledged appropriately.

Finally, we wish to thank our respective wives and families, without whose patience, understanding and forbearance, this book would never have been completed.

*Colin Masters  
Denis Crane*