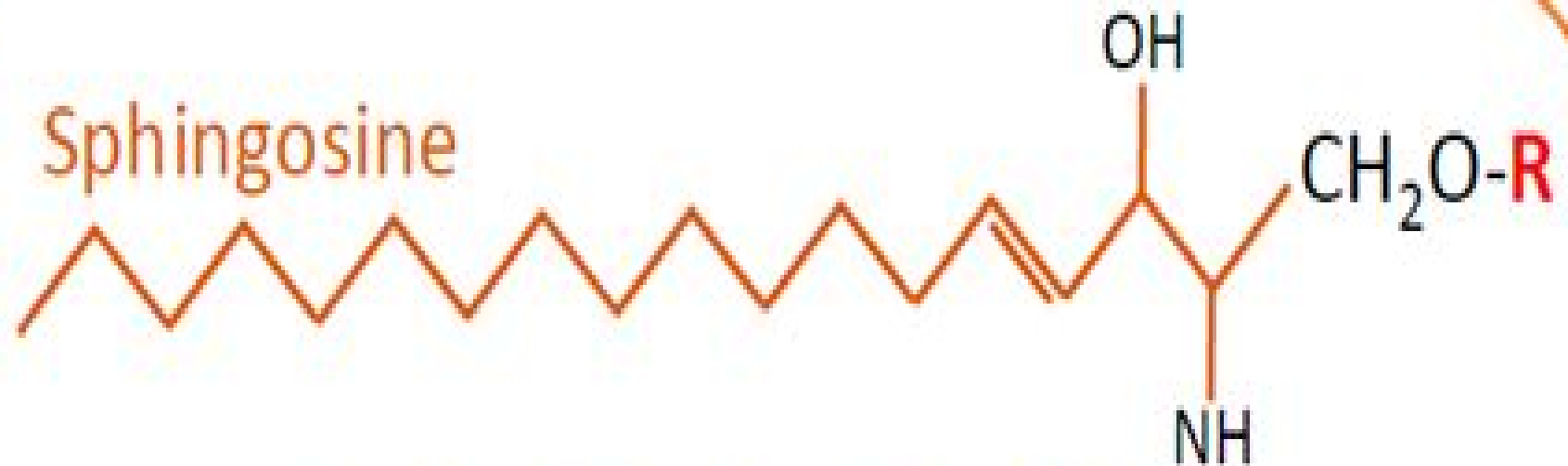


Sphingosine



Fatty acid

**R** can be

H = Ceramides

P = Ceramide-1-phosphate

Phosphocholine = Sphingomyelins

Sugars = Glycosphingolipids

# Sphingolipid Biochemistry

**Peter Quinn, Xiaoyuan Wang**



## **Sphingolipid Biochemistry:**

**Sphingolipid Biochemistry** Julian N. Kanfer, Sen-itiroh Hakomori, 2012-12-06 *Biochemistry of Lipids, Lipoproteins and Membranes* Neale Ridgway, Roger McLeod, 2008-03-14 Research on the biochemistry and molecular biology of lipids and lipoproteins has experienced remarkable growth in the past 20 years particularly with the realization that many different classes of lipids play fundamental roles in diseases such as heart disease obesity diabetes cancer and neurodegenerative disorders The 5th edition of this book has been written with two major objectives The first objective is to provide students and teachers with an advanced up to date textbook covering the major areas of current interest in the lipid field The chapters are written for students and researchers familiar with the general concepts of lipid metabolism but who wish to expand their knowledge in this area The second objective is to provide a text for scientists who are about to enter the field of lipids lipoproteins and membranes and who wish to learn more about this area of research All of the chapters have been extensively updated since the 4th edition appeared in 2002 Represents a bridge between the superficial coverage of the lipid field found in basic biochemistry text books and the highly specialized material contained in scientific review articles and monographs Allows scientists to become familiar with recent developments related to their own research interests and will help clinical researchers and medical students keep abreast of developments in basic science that are important for subsequent clinical advances Serves as a general reference book for scientists studying lipids lipoproteins and membranes and as an advanced and up to date textbook for teachers and students who are familiar with the basic concepts of lipid biochemistry *Biochemistry of Lipids, Lipoproteins and Membranes* Dennis E. Vance, J.E. Vance, 2002-12-06 The first edition of this book was published in 1985 The content of the 4th edition reflects the enormous advances that have occurred since that time in the field of lipid biochemistry This publication is unique in that it represents a bridge between the superficial coverage of the lipid field found in basic biochemistry text books and the highly specialized material contained in scientific review articles and monographs The book is not a collection of exhaustive reviews but a current and readable summary of diverse aspects of lipids It is intended as an advanced and up to date textbook for teachers and students who are familiar with the basic concepts of lipid biochemistry and will also serve as a general reference book for scientists studying lipids lipoproteins and membranes Sphingolipid Biology Y. Hirabayashi, Y. Igarashi, A.H. Jr. Merrill, 2007-12-31 Sphingolipids are fundamental to the structures of cell membranes lipoproteins and the stratum corneum of the skin Many complex sphingolipids as well as simpler sphingoid bases and derivatives are highly bioactive as extra and intracellular regulators of growth differentiation migration survival senescence and numerous cellular responses to stress This book provides many examples of exciting new developments in sphingolipid biology sphingolipidology that are changing our understanding of how multicellular organisms grow develop function age and die Key areas addressed include sphingolipid biosynthesis transport and membrane organization lipid rafts genetic approaches to understanding the roles of membrane

sphingolipid biosynthesis sphingolipid metabolism specific G protein coupled receptors GPCRs and signal transduction and sphingolipid associated disease and drug development      **Sphingolipids** Angel Catalá, 2015 This book presents an overview of sphingolipids biology synthesis and functions The topics analysed in this book cover a broad spectrum of functions played by sphingolipids including the role of sphingomyelin in the regulation of membrane physical state tricyclic antidepressants as modulators of sphingolipid turnover and cell sensitivity to insulin action sphingolipid diversity biosynthesis and regulation metabolism of glycolipids at the cell's surface modulation and functional implications the specific role of sphingomyelins in cell physiology the role of sphingosine based lipids using sphingolipidomics sphingolipids and ceramides of aqueous humor and trabecular meshwork the effect of membrane microdomains containing sphingolipids on lipid peroxidation and roles of sphingolipids in skeletal development and homeostasis      *Fungal Lipid Biochemistry* Yuanda Song, 2023-07-26 *Fungal Lipid Biochemistry* explores the intricate biochemistry of fungal and microbial lipids The book focuses on recent advances in our knowledge about the distribution classification and biochemistry of fungal lipids The book is divided into four sections starting with an introduction to fungal lipids which includes definition classification nomenclature and some historical aspects of fungal lipid research This is followed by an overview of fungal lipids and environmental and nutritional cultural conditions affecting lipid production The second section contains four chapters that explain the metabolism of fatty acids their biosynthetic pathways together with their storage mainly in the form of triacylglycerols The latter includes a key description of the recently discovered lipid droplet acting as a highly specific cellular compartment for the storage of neutral lipids The third section contains five chapters concerned with the relatively recent interpretation of other major lipid classes which include glycerophospholipids sphingolipids aliphatic hydrocarbons sterols carotenoids and polyprenols and their occurrence and biosynthesis The final section covers lipid metabolism during fungal development and sporulation Key features Extensive coverage of fungal lipid biochemistry with a focus on recent knowledge Includes chapters for specific lipid classes with notes on their metabolism Gives knowledge about the role of lipids in fungal growth and development Provides references for further reading This book is a comprehensive reference for academics scientific researchers and industrial scientists in biotechnology food science and nutritional health who require information about fungal lipid composition and biochemistry      **Biochemistry of Lipids, Lipoproteins and Membranes** J.E. Vance, Dennis E. Vance, 1991-12-17 The second edition of this book on lipids lipoprotein and membrane biochemistry has two major objectives to provide an advanced textbook for students in these areas of biochemistry and to summarise the field for scientists pursuing research in these and related fields Since the first edition of this book was published in 1985 the emphasis on research in the area of lipid and membrane biochemistry has evolved in new directions Consequently this second edition has been modified to include four chapters on lipoproteins Moreover the other chapters have been extensively updated and revised so that additional material covering the areas of cell signalling by lipids the assembly of lipids and proteins into membranes and the increasing use of

molecular biological techniques for research in the areas of lipid lipoprotein and membrane biochemistry have been included Each chapter of the textbook is written by an expert in the field but the chapters are not simply reviews of current literature Rather they are written as current readable summaries of these areas of research which should be readily understandable to students and researchers who have a basic knowledge of general biochemistry The authors were selected for their abilities both as researchers and as communicators In addition the editors have carefully coordinated the chapters so that there is little overlap yet extensive cross referencing among chapters

*Sphingolipid Metabolism and Cell Signaling* Alfred Harrison Merrill, Yusuf A. Hannun, 2000 This volume contains information on analyzing sphingolipids sphingolipid transport and trafficking and sphingolipid protein interactions and cellular targets Its companion Volume 311 presents methods used in studying enzymes of sphingolipid biosynthesis and turnover including inhibitors of some of these enzymes genetic approaches and organic and enzymatic syntheses of sphingolipids and analogs The critically acclaimed laboratory standard for more than forty years *Methods in Enzymology* is one of the most highly respected publications in the field of biochemistry Since 1955 each volume has been eagerly awaited frequently consulted and praised by researchers and reviewers alike Now with more than 300 volumes all of them still in print the series contains much material still relevant today truly an essential publication for researchers in all fields of life sciences

*Sphingolipids: Basic Science and Drug Development* Erich Gulbins, Irina Petrache, 2013-04-11 Sphingolipids are lipid components of the plasma membrane in eukaryotic cells They have an important function in signaling mechanisms in the cell This book on sphingolipids provides insights into the basics of sphingolipid biology and drug development with a particular emphasis on the sphingolipid derivative ceramide In the first part basic functions of sphingolipids are described as well as the genetics of important enzymes sphingolipid metabolism and synthesis The second part of this first volume focuses on drug development and pharmacology The book is intended for scientists in pharmacology biochemistry and cell biology with a focus on biomedical research as well as for clinicians working in pharmacology oncology cardiology neurology and infectious disease Together with Volume 216 by the same editors the collection represents a unique comprehensive work on sphingolipids providing information on both sphingolipids basic biology including synthesis metabolism and cell biology and their important function in a pathophysiological context

**Sphingolipid Metabolism and Cell Signaling** Alfred H. Merrill, Alfred Harrison Merrill, Yusuf A. Hannun, 2000 Sphingolipids are found in all eukaryotic and in some prokaryotic organisms and provide structure for cell membranes lipoproteins and other biological materials as well as participate in the regulation of cell growth differentiation and diverse cell functions including cell cell communication cell substratum interactions and intracellular signal transduction This volume presents methods used in studying enzymes of sphingolipid biosynthesis and turnover including inhibitors of some of these enzymes genetic approaches and organic and enzymatic syntheses of sphingolipids and analogs Its companion Volume 312 will contain information on analyzing sphingolipids sphingolipid transport and trafficking and sphingolipid protein

interactions and cellular targets The critically acclaimed laboratory standard for more than forty years Methods in Enzymology is one of the most highly respected publications in the field of biochemistry Since 1955 each volume has been eagerly awaited frequently consulted and praised by researchers and reviewers alike Now with more than 300 volumes all of them still in print the series contains much material still relevant today truly an essential publication for researchers in all fields of life sciences

**Sphingolipid Metabolism and Cell Signaling, Part A**, 1999-11-01 Sphingolipids are found in all eukaryotic and in some prokaryotic organisms and provide structure for cell membranes lipoproteins and other biological materials as well as participate in the regulation of cell growth differentiation and diverse cell functions including cell cell communication cell substratum interactions and intracellular signal transduction This volume presents methods used in studying enzymes of sphingolipid biosynthesis and turnover including inhibitors of some of these enzymes genetic approaches and organic and enzymatic syntheses of sphingolipids and analogs Its companion Volume 312 will contain information on analyzing sphingolipids sphingolipid transport and trafficking and sphingolipid protein interactions and cellular targets The critically acclaimed laboratory standard for more than forty years Methods in Enzymology is one of the most highly respected publications in the field of biochemistry Since 1955 each volume has been eagerly awaited frequently consulted and praised by researchers and reviewers alike Now with more than 300 volumes all of them still in print the series contains much material still relevant today truly an essential publication for researchers in all fields of life sciences

**Nutrition and Biochemistry of Phospholipids** Bernard F. Szuchaj, Willem van Nieuwenhuyzen, 2003-05-30 Phospholipids are involved in many intrinsic applications within the cell and are part of all major tissue and concentrated in vital organs that require neuronal interactions This book contains the program presented at the 8th International Congress of ILPS and includes sessions covering phospholipids metabolism in brain function choline and galactosphingolipids in health and disease phospholipids in cardiovascular liver and muscle health and finally phospholipids in infant nutrition This book which contains these current research activities and updates should stimulate the scientific community to continue working on phospholipids in biochemistry and nutrition

*Sphingolipids as Signaling and Regulatory Molecules* Charles Chalfant, Maurizio Del Poeta, 2011-01-12 This book attempts to analyze the latest discoveries in sphingolipid biology and how the alteration of their metabolism leads to altered signaling events and to the development of pathobiological disorders such as cancer cardiovascular diseases asthma diabetes inflammation and infectious diseases

*Lipid Biochemistry* J.L. Harwood, M.I. Gurr, 2013-04-17 Lipids can usually be extracted easily from tissues by making use of their hydrophobic characteristics However such extractions yield a complex mixture of different lipid classes which have to be purified further for quantitative analysis Moreover the crude lipid extract will be contaminated by other hydrophobic molecules e.g. by intrinsic membrane proteins Of the various types of separation processes thin layer and column chromatography are most useful for intact lipids High performance liquid chromatography HPLC is also rapidly becoming more popular especially for

the fractionation of molecular species of a given lipid class The most powerful tool for quantitation of the majority of lipids is gas liquid chromatography GLC The method is very sensitive and if adapted with capillary columns can provide information with regard to such subtle features as the position or configuration of substitutions along acyl chains By coupling GLC or HPLC to a radioactivity detector then the techniques are also very useful for metabolic measurements Although research laboratories use generally sophisticated analytical methods such as GLC to analyse and quantify lipid samples chemical derivatizations are often used in hospitals For these methods the lipid samples are derivatized to yield a product which can be measured simply and accurately usually by colour Thus total triacylglycerol cholesterol or phospholipid phosphorus can be quantitated conveniently without bothering with the extra information of molecular species etc which might be determined by more thorough analyses REFERENCES Christie w w 1982 Lipid Analysis 2nd edn Pergamon Press Oxford

Sphingolipids in Disease Erich Gulbins,Irina Petrache,2013-04-06 Sphingolipids are lipid components of the plasma membrane of eukaryotic cells with an important function in signaling mechanisms in the cell This book provides insight into the physiological and pathophysiological role of sphingolipids and in particular its derivative ceramide The function of Sphingolipids in cell signaling with regard to infectious and lung diseases cancer cardiovascular diseases and neuropsychiatric disorders are described and treated in distinct parts Together with Volume 215 from the same Editors the collection represents a unique comprehensive work on Sphingolipids providing information on both Sphingolipid basic biology as well as its important function in a patho physiological context The book is written for scientists in pharmacology biochemistry and cell biology with a focus on biomedical research as well as for clinicians in pharmacology oncology cardiology neurology and infectious disease **Biochemistry of Cell Membranes** S. Papa,J.M. Tager,2012-12-06 This book consists of a series of reviews on selected topics within the rapidly and vastly expanding field of membrane biology Its aim is to highlight the most significant and important advances that have been made in recent years in understanding the structure dynamics and functions of cell membranes Areas covered in this monograph include Signal Transduction Membrane Traffic Protein and Lipids Bioenergetics Energy Transfer and Membrane Transport Cellular Ion Homeostasis Growth Factors and Adhesion Molecules Structural Analysis of Membrane Proteins Membranes and Disease Biochemistry of Cell Membranes should serve as a benchmark for indicating the most important lines for future research in these areas **Sphingolipid Metabolism and Cell Signaling, Part B** ,2000-10-25 This volume contains information on analyzing sphingolipids sphingolipid transport and trafficking and sphingolipid protein interactions and cellular targets Its companion Volume 311 presents methods used in studying enzymes of sphingolipid biosynthesis and turnover including inhibitors of some of these enzymes genetic approaches and organic and enzymatic syntheses of sphingolipids and analogs The critically acclaimed laboratory standard for more than forty years Methods in Enzymology is one of the most highly respected publications in the field of biochemistry Since 1955 each volume has been eagerly awaited frequently consulted and praised by researchers and

reviewers alike Now with more than 300 volumes all of them still in print the series contains much material still relevant today truly an essential publication for researchers in all fields of life sciences     Lipid Biochemistry Michael I. Gurr, John L. Harwood, Keith N. Frayn, 2008-04-15 Since the publication of the first edition of this successful and popular book in 1970 the subject of lipid biochemistry has evolved greatly and this fifth up to date and comprehensive edition includes much new and exciting information Lipid Biochemistry fifth edition has been largely re written in a user friendly way with chapters containing special interest topic boxes summary points and lists of suggested reading further enhancing the accessibility and readability of this excellent text Contents include abbreviations and definitions used in the study of lipids routine analytical methods fatty acid structure and metabolism dietary lipids and lipids as energy stores lipid transport lipids in cellular structures and the metabolism of structural lipids The book provides a most comprehensive treatment of the subject making it essential reading for all those working with or studying lipids Upper level students of biochemistry biology clinical subjects nutrition and food science will find the contents of this book invaluable as a study aid as will postgraduates specializing in the topics covered in the book Professionals working in research in academia and industry including personnel involved in food and nutrition research new product formulation special diet formulation including nutraceuticals and functional foods and other clinical aspects will find a vast wealth of information within the book's pages Michael Gurr was a Visiting Professor in Human Nutrition at the University of Reading UK and at Oxford Brookes University UK John Harwood is a Professor of Biochemistry at the School of Biosciences Cardiff University UK Keith Frayn is a Professor of Human Metabolism at the Oxford Centre for Diabetes Endocrinology and Metabolism University of Oxford UK     *Fungal Lipid Biochemistry* John Weete, 2012-12-06 With the development of highly sophisticated analytical techniques and instrumentation during the past 15 20 years progress in the field of lipid biochemistry has been greatly accelerated Within this period there has been an increasing volume of information concerning the distribution and metabolism of lipids in animals and more recently in plants The fungi have played an important role in studies concerning the biochemistry of lipids and in this text they are treated separately from the photosynthetic plants This book is concerned with distribution and bio chemistry of lipids in fungi The text is divided into three sections beginning with an introduction to fungallipids which includes total lipid abundances in fungal cells and cell fractions and cultural conditions influencing lipid production In the second section each chapter deals with the distribution and/or metabolism of a single lipid class as it occurs in fungi Comparisons with plants and animals are also included Six major lipid classes are covered which include the aliphatic hydrocarbons fatty acids sterols triacylglycerols glycerophosphatides and sphingolipids The third section contains two chapters concerned with the physiology and ultrastructure of fungal spore formation and germination with particular emphasis on lipids Although this book is not intended to be a comprehensive review of the literature the information presented is compiled from over 1000 articles most of which were published during the past 10 12 years     Lipids in Health and Disease Peter Quinn, Xiaoyuan



Wang, 2008-08-27 Lipids are functionally versatile molecules. They have evolved from relatively simple hydrocarbons that serve as depot storages of metabolites and barriers to the permeation of solutes into complex compounds that perform a variety of signalling functions in higher organisms. This volume is devoted to the polar lipids and their constituents. We have omitted the neutral lipids like fats and oils because their function is generally to act as deposits of metabolizable substrates. The sterols are also outside the scope of the present volume and the reader is referred to volume 28 of this series which is the subject of cholesterol. The polar lipids are comprised of fatty acids attached to either glycerol or sphingosine. The fatty acids themselves constitute an important reservoir of substrates for conversion into families of signalling and modulating molecules including the eicosanoids amongst which are the prostaglandins, thromboxanes and leucotrienes. The way fatty acid metabolism is regulated in the liver and how fatty acids are desaturated are subjects considered in the first part of this volume. This section also deals with the modulation of protein function and inflammation by unsaturated fatty acids and their derivatives. New insights into the role of fatty acid synthesis and eicosenoid function in tumour progression and metastasis are presented.

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