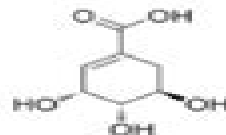


SHIKIMIC ACID PATHWAY

Shikimic acid



- Commonly known as its anionic form shikimate, is a cyclohexene, a cyclitol and a cyclohexanecarboxylic acid.
- It is an important biochemical metabolite in plants and microorganisms.
- Its name comes from the Japanese flower *shikimi* the Japanese star anise, *Illicium anisatum*), from which it was first isolated in 1885 by Johan Fredrik Eykman.
- The elucidation of its structure was made nearly 50 years later.
- Shikimic acid is also the glycoside part of some hydrolysable tannins.
- The shikimate pathway is a seven step metabolic route used by *bacteria, fungi, algae, parasites, and plants* for the biosynthesis of aromatic amino acids (*phenylalanine, tyrosine, and tryptophan*).
- This pathway is not found in animals; therefore, phenylalanine and tryptophan represent *essential amino acids* that must be obtained from the animal's diet
- Animals can synthesize tyrosine from phenylalanine, and therefore is not an essential amino acid except for *individuals unable to hydroxylate phenylalanine to tyrosine*).

KEY FEATURES

- The shikimate pathway is the only known pathway for biosynthesis of chorismate and the aromatic amino acids Phe, Tyr and Trp.

Shikimic Acid Pathway

Eric E. Conn

A red circular graphic with a gradient, appearing as a stylized arrow or a partial circle, located to the right of the author's name.

Shikimic Acid Pathway:

Shikimic Acid Edwin Haslam, 1993-11-30 Reflects extensive coverage of major synthetic developments over the last 20 years Discusses both primary and secondary metabolites in relation to how they are influenced by shikimic acid Includes such topics as synthetic organic chemistry enzymology of the common pathways in which shikimic acid plays a key role biosynthetic problems associated with secondary metabolism and molecular evolution The Shikimate Pathway Edwin Haslam, 2014-05-20 The Shikimate Pathway gives a bird s eye view of the shikimate pathway and its implications for the life of a range of organisms Topics covered in this book include the chemistry of intermediates in the shikimate pathway biosynthesis of aromatic amino acids in this pathway its metabolites and its role in higher plants This book is comprised of six chapters and begins by introducing the reader to shikimic acid a natural product derived from the plant *Illicium religiosum* along with the mechanistic and stereochemical aspects of the reactions of the shikimate pathway The biosynthesis of aromatic amino acids from chorismate is also described and then the discussion turns to the chemical properties and the detailed stereochemistry of intermediates and enzymes in the shikimate pathway The next chapter examines the biosynthesis of isoprenoid quinones involved in electron transport and the folic acid group of co enzymes in the shikimate pathway The metabolism of the aromatic amino acids in microorganisms and higher organisms is considered along with the biosynthesis and physiological functions of phenylpropanoid compounds and their derivatives in the shikimate pathway in higher plants This book will be of general value to practitioners in the many and varied areas of biochemical research associated with metabolism *The Shikimic Acid Pathway* Eric E. Conn, 2013-03-08 This volume contains the invited papers presented as a symposium of The Phytochemical Society of North America which met for its annual meeting at the Asilomar Conference Center Pacific Grove California on June 12 16 1985 The topic of the symposium The Shikimic Acid Pathway Recent Advances was especially appropriate for this the Silver Anniversary of the Society because of the many natural products derived from that pathway The organizers of the symposium recognized that it would not be possible to cover all groups of compounds derived from shikimic acid and therefore decided to omit any detailed discussion of flavonoid compounds and lignin Research in these two areas has been the subject of several recent symposiums and or published volumes By omitting these topics it was possible to devote more attention to other equally interesting products derived from the shikimate pathway Each chapter in the volume authoritat vely speaks for itself on an important topic However the reader is invited to enjoy the lead chapter by Ulrich Weiss who describes his role in the research on the shikimate pathway during 1952 53 We are grateful to Dr Weiss for this charming account of his work carried out in the laboratory of Dr B D Davis during that period Those who attended the Silver Anniversary Meeting were privileged to hear Dr Gestur Johnson reminisce about the founding of the Society initially called the Plant Phenolics Group of North America At the annual banquet R Horwitz also shared with us some recollections of Dr *The Shikimic Acid Pathway* Eric E. Conn, 2014-01-15 **Plant Secondary Metabolism** David S.

Seigler, 2012-12-06 Life has evolved as a unified system no organism exists similar role also has been suggested for fatty acids from alone but each is in intimate contact with other organisms cyanolipids Nonprotein amino acids cyanogenic glyco and its environment Historically it was easier for workers sides and the non fatty acid portion of cyanolipids also are in various disciplines to delimit artificially their respective incorporated into primary metabolites during germination areas of research rather than attempt to understand the entire Secondary metabolites of these structural types are accumu system of living organisms This was a pragmatic and neces lated in large quantities in the seeds of several plant groups sary way to develop an understanding for the various parts where they probably fulfill an additional function as deter We are now at a point however where we need to investi rents to general predation gate those things common to the parts and specifically those The second type of relationship involves interaction of things that unify the parts The fundamental aspects of many plants with other organisms and with their environment Bio of these interactions are chemical in nature Plants constitute logical interactions must be viewed in the light of evolution an essential part of all life systems phytochemistry provides ary change and the coadaptation or perhaps coevolution of a medium for linking several fields of study **Biosynthesis in Insects** E David Morgan, 2019-03-22 The chemical study of insects has been growing for four decades and with it an interest in how insects make their pheromones hormones defensive secretions venoms pigments and surface coverings By investigating the biosynthesis of insects one can gain a greater insight into the structure and function of insect compounds into ways of disrupting biosynthetic reactions in pest species and how these pathways evolved The first textbook of its kind Biosynthesis in Insects amalgamates previously fragmented information and recent exciting developments in the field to provide a unique concise chemical study of how insect substances are biosynthesised This book provides a comprehensive introduction to the ways that have been investigated by which a great variety of insects and some related arthropods make their so called secondary metabolites Simpler biosynthetic pathways are explored before considering the experimental methods by which these studies are conducted Consideration is also given to some of the plant substances which insects store or metabolize to their own use Abundantly illustrated with structures and reactions and some beautiful photographs Biosynthesis in Insects includes a series of problems and answers to facilitate and assess learning making this unique look at biosynthesis in insects and their near relations ideal for students with some chemical background starting out on a study of insect substances Researchers and academics will also welcome the amalgamation of previously scattered information Including an index of compounds and species and lists for further reading this book provides a truly unique source for those working in the field *The Structure and Function of Plastids* Robert R. Wise, J. Kenneth Hooper, 2007-09-13 This volume provides a comprehensive look at the biology of plastids the multifunctional biosynthetic factories that are unique to plants and algae Fifty six international experts have contributed 28 chapters that cover all aspects of this large and diverse family of plant and algal organelles The book is divided into five sections I Plastid Origin and Development II The Plastid Genome and

Its Interaction with the Nuclear Genome III Photosynthetic Metabolism in Plastids IV Non Photosynthetic Metabolism in Plastids V Plastid Differentiation and Response to Environmental Factors Each chapter includes an integrated view of plant biology from the standpoint of the plastid The book is intended for a wide audience but is specifically designed for advanced undergraduate and graduate students and scientists in the fields of photosynthesis biochemistry molecular biology physiology and plant biology

The Shikimic Acid Pathway Eric E. Conn, 1986-06-30 This volume contains the invited papers presented as a symposium of The Phytochemical Society of North America which met for its annual meeting at the Asilomar Conference Center Pacific Grove California on June 12-16 1985 The topic of the symposium The Shikimic Acid Pathway Recent Advances was especially appropriate for this the Silver Anniversary of the Society because of the many natural products derived from that pathway The organizers of the symposium recognized that it would not be possible to cover all groups of compounds derived from shikimic acid and therefore decided to omit any detailed discussion of flavonoid compounds and lignin Research in these two areas has been the subject of several recent symposiums and or published volumes By omitting these topics it was possible to devote more attention to other equally interesting products derived from the shikimate pathway Each chapter in the volume authoritatively speaks for itself on an important topic However the reader is invited to enjoy the lead chapter by Ulrich Weiss who describes his role in the research on the shikimate pathway during 1952-53 We are grateful to Dr Weiss for this charming account of his work carried out in the laboratory of Dr B D Davis during that period Those who attended the Silver Anniversary Meeting were privileged to hear Dr Gestur Johnson reminisce about the founding of the Society initially called the Plant Phenolics Group of North America At the annual banquet R Horwitz also shared with us some recollections of Dr

Fungal Physiology David H. Griffin, 1996-06-22 Thoroughly revised this edition summarizes the field of fungal physiology from a dynamic experimental perspective Integrates molecular genetics with biochemistry and development of fungi Reorganized into 14 chapters it describes the latest contemporary experimental approaches to fungal research as well as future developments

The Biosynthesis of Secondary Metabolites R.B. Herbert, 1989-03-31 The chief purpose of such new editions is to bring the text up to date This I have tried to do The danger with such endeavours is that the book becomes corpulent This I have tried to avoid In so doing I am evermore conscious of how much material has had to be omitted As before the references ca 770 of them which are cited are intended in part to provide the reader with access to material that has been omitted I am deeply grateful to Mrs Marjorie Romanowicz for preparing the typed manuscript for this edition with customary accuracy and efficiency to my wife Margaret for checking the references and to research students Karl Cable Lucy Hyatt Mashupye Kgaphola and Andrew Knaggs for helping with the checking of the manuscript Richard Herbert April 1988 Preface to the first edition This is a book about experiments and results of experiments The results described are the fruit of thirty years labour in the field of secondary metabolism Secondary metabolism more than any other part of the chemistry of life has been the special preserve of organic chemists

Investigation of secondary metabolism began with curiosity about the structures of compounds isolated from natural sources i.e secondary metabolites Coeval with structure determination there has been a curiosity about the origins and mechanism of formation of secondary metabolites or natural products as they have been called It is the experimental outcome of this curiosity that is described here

Plant Biochemistry Florence Gleason, Raymond Chollet, 2012 Photosynthesis the light reaction Carbon dioxide fixation Storage and utilization of fixed carbon Primary cell walls Nitrogen and sulfur metabolism Lipids Isoprenoid compounds terpenes Aromatic and phenolic compounds Alkaloids Plant peptides and proteins

Biosynthesis in Insects Eric David Morgan, 2004-07-13 This book provides a truly unique source for those working in the field amalgamating previously fragmented information and recent exciting developments *Biosynthesis* J. D. Bu'Lock, 1976-12-31 Specialist Periodical Reports provide systematic and detailed review coverage of progress in the major areas of chemical research Written by experts in their specialist fields the series creates a unique service for the active research chemist supplying regular critical in depth accounts of progress in particular areas of chemistry For over 80 years the Royal Society of Chemistry and its predecessor the Chemical Society have been publishing reports charting developments in chemistry which originally took the form of Annual Reports However by 1967 the whole spectrum of chemistry could no longer be contained within one volume and the series Specialist Periodical Reports was born The Annual Reports themselves still existed but were divided into two and subsequently three volumes covering Inorganic Organic and Physical Chemistry For more general coverage of the highlights in chemistry they remain a must Since that time the SPR series has altered according to the fluctuating degree of activity in various fields of chemistry Some titles have remained unchanged while others have altered their emphasis along with their titles some have been combined under a new name whereas others have had to be discontinued

Biotechnological Production of Bioactive Compounds Madan L. Verma, Anuj K.

Chandel, 2019-07-20 Biotechnological Production of Bioactive Compounds provides insights on the most recent innovations trends concerns solutions and practical challenges encountered in the fields of enzyme technology and nanobiotechnology for the production of bioactive materials with extra health benefits As nanobiotechnology has improved the bioactive extraction process significantly many bioactives including bioflavonoids omega 3 fatty acids biopigments and low calorie sugar substitutes are a pivotal part of the food industry The book highlights the production of extra health benefits bioactives from plants and microbes and explains how the extraction efficiency of bioactives molecules improves significantly with the recent advances in nanobiotechnology Researchers in the fields of biochemical engineering biotechnology bioremediation environmental sustainability and those in pharma industries will find the information in this book very helpful and illuminating Outlines technological advances in bioactives extraction Covers bioflavonoids biopigments omega 3 fatty acids and low sugar substitutes Explains the mechanisms of Green cargo biogenic nanoparticles for the delivery of bioactive molecules

Handbook of Nutraceuticals and Functional Foods Robert E.C. Wildman, Richard S. Bruno, 2019-11-19 The

field of functional foods along with their bioactive food components has grown tremendously over the past decades. Often guided by hypothesis generating epidemiological observations, discoveries from basic science studies and controlled trials in humans have provided critical evidence to help establish an optimal diet that alleviates chronic disease risk. These advances have also driven efforts by the food and nutraceutical industries to establish and market health claims, formulate extra value foods, and even generate new health foods for human benefit.

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Biosynthesis T. A. Geissman, 1975. Specialist Periodical Reports provide systematic and detailed review coverage of progress in the major areas of chemical research. Written by experts in their specialist fields, the series creates a unique service for the active research chemist, supplying regular, critical, in depth accounts of progress in particular areas of chemistry. For over 80 years, the Royal Society of Chemistry and its predecessor, the Chemical Society, have been publishing reports charting developments in chemistry, which originally took the form of Annual Reports. However, by 1967, the whole spectrum of chemistry could no longer be contained within one volume, and the series Specialist Periodical Reports was born. The Annual Reports themselves still existed but were divided into two, and subsequently three volumes covering Inorganic, Organic, and Physical Chemistry. For more general coverage of the highlights in chemistry, they remain a must. Since that time, the SPR series has altered according to the fluctuating degree of activity in various fields of chemistry. Some titles have remained unchanged, while others have altered their emphasis along with their titles; some have been combined under a new name, whereas others have had to be discontinued. The current list of Specialist Periodical Reports can be seen on the inside flap of this volume.

Fundamentals of Fragrance Chemistry Charles S. Sell, 2019-08-12. Comprehensively teaches all of the fundamentals of fragrance chemistry. Ernest Beaux, the perfumer who created Chanel No 5, said: "One has to rely on chemists to find new aroma chemicals, creating new original notes. In perfumery, the future lies primarily in the hands of chemists." This book provides chemists and chemists-to-be with everything they need to know in order to create welcome new fragrances for the world to enjoy. It offers a simplified introduction into organic

chemistry including separation techniques and analytical methodologies discusses the structure of perfume creation with respect to the many reactive ingredients in consumer products and shows how to formulate effective and long lasting scents Fundamentals of Fragrance Chemistry starts by covering the structure of matter in order to show how its building blocks are held together It continues with chapters that look at hydrocarbons and heteroatoms A description of the three states of matter and how each can be converted into another is offered next followed by coverage of separation and purification of materials Other chapters examine acid base reactions oxidation and reduction reactions perfume structure the mechanism of olfaction natural and synthetic fragrance ingredients and much more Concentrates on aspects of organic chemistry which are of particular importance to the fragrance industry Offers non chemists a simplified yet complete introduction to organic chemistry from separation techniques and analytical methodologies to the structure of perfume creation Provides innovative perfumers with a framework to formulate stable fragrances from the myriad of active ingredients available Looks at future trends in the industry and addresses concerns about sustainability and quality management Fundamentals of Fragrance Chemistry is an ideal resource for students who are new to the subject as well as for chemists and perfumers already working in this fragrant field of science

Phytochemicals as Lead Compounds for New Drug Discovery Chukwuebuka Egbuna, Shashank Kumar, Jonathan C. Ifemeje, Shahira M. Ezzat, Saravanan Kaliyaperumal, 2019-09-07 *Phytochemicals as Lead Compounds for New Drug Discovery* presents complete coverage of the recent advances in the discovery of phytochemicals from medicinal plants as models to the development of new drugs and chemical entities Functional bioactive compounds of plant origin have been an invaluable source for many human therapeutic drugs and have played a major role in the treatment of diseases around the world These compounds possess enormous structural and chemical diversity and have led to many important discoveries This book presents fundamental concepts and factors affecting the choice for plant based products as well as recent advances in computer aided drug discovery and FDA drug candidacy acceptance criteria It also details the various bioactive lead compounds and molecular targets for a range of life threatening diseases including cancer diabetes and neurodegenerative diseases Written by a global team of experts *Phytochemicals as Lead Compounds for New Drug Discovery* is an ideal resource for drug developers phytochemists plant biochemists food and medicinal chemists nutritionists and toxicologists chemical ecologists taxonomists analytical chemists and other researchers in those fields It will also be very valuable to professors students and researchers in this domain Presents fundamental concepts and factors affecting choice for plant based products Details the FDA drug candidacy acceptance criteria including bottlenecks and way forward Highlights recent advances in computational based drug discovery Focuses on the discovery of new drugs and potential druggable targets for the treatment of chronic diseases of world importance **Comprehensive Chirality**

, 2012-12-31 Although many books exist on the subject of chiral chemistry they only briefly cover chiral synthesis and analysis as a minor part of a larger work to date there are none that pull together the background information and latest advances in

one comprehensive reference work Comprehensive Chirality provides a complete overview of the field and includes chiral research relevant to synthesis analytic chemistry catalysis and pharmaceuticals The individual chapters in each of the 9 volumes provide an in depth review and collection of references on definition technology applications and a guide links to the related literature Whether in an Academic or Corporate setting these chapters will form an invaluable resource for advanced students researchers new to an area and those who need further background or answers to a particular problem particularly in the development of drugs Chirality research today is a central theme in chemistry and biology and is growing in importance across a number of disciplinary boundaries These studies do not always share a unique identifying factor or subject themselves to clear and concise definitions This work unites the different areas of research and allows anyone working or researching in chiral chemistry to navigate through the most essential concepts with ease saving them time and vastly improving their understanding The field of chirality counts several journals that are directly and indirectly concerned with the field There is no reference work that encompasses the entire field and unites the different areas of research through deep foundational reviews Comprehensive Chirality fills this vacuum and can be considered the definitive work It will help users apply context to the diverse journal literature offering and aid them in identifying areas for further research and or for solving problems Chief Editors Hisashi Yamamoto University of Chicago and Erick Carreira ETH Zurich have assembled an impressive world class team of Volume Editors and Contributing Authors Each chapter has been painstakingly reviewed and checked for consistent high quality The result is an authoritative overview which ties the literature together and provides the user with a reliable background information and citation resource

PHARMACOGNOSY & PHYTOCHEMISTRY-II

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