

Herbgenomics: Decipher molecular genetics of medicinal plants

Wei Sun,^{1,2,4} Zhichao Xu,^{1,4} Chi Song,³ and Shilin Chen^{1,2,4}

¹Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, Beijing 100070, China

²Institute of Herbgenomics, Chengdu University of Traditional Chinese Medicine, Chengdu 611137, China

³College of Life Science, Northeast Forestry University, Harbin 150040, China

⁴These authors contributed equally

*Correspondence: slchen@ccmm.ac.cn

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Medicinal plants synthesize a huge repertoire of specialized compounds as protective metabolites when they are confronted with complex abiotic and biotic conditions. Humans have used medicinal plants to treat ailments and maintain health throughout civilization. Paleontological studies have shown

that the application of medicinal plants, such as *Ephedra altissima* and *Centaurus solstitialis*, could be dated back to 60,000 years ago, since their fossils were found in the tomb of prehistoric Neanderthals. Historically, traditional herbal medicine systems, such as traditional Chinese medicine, Ayurveda,

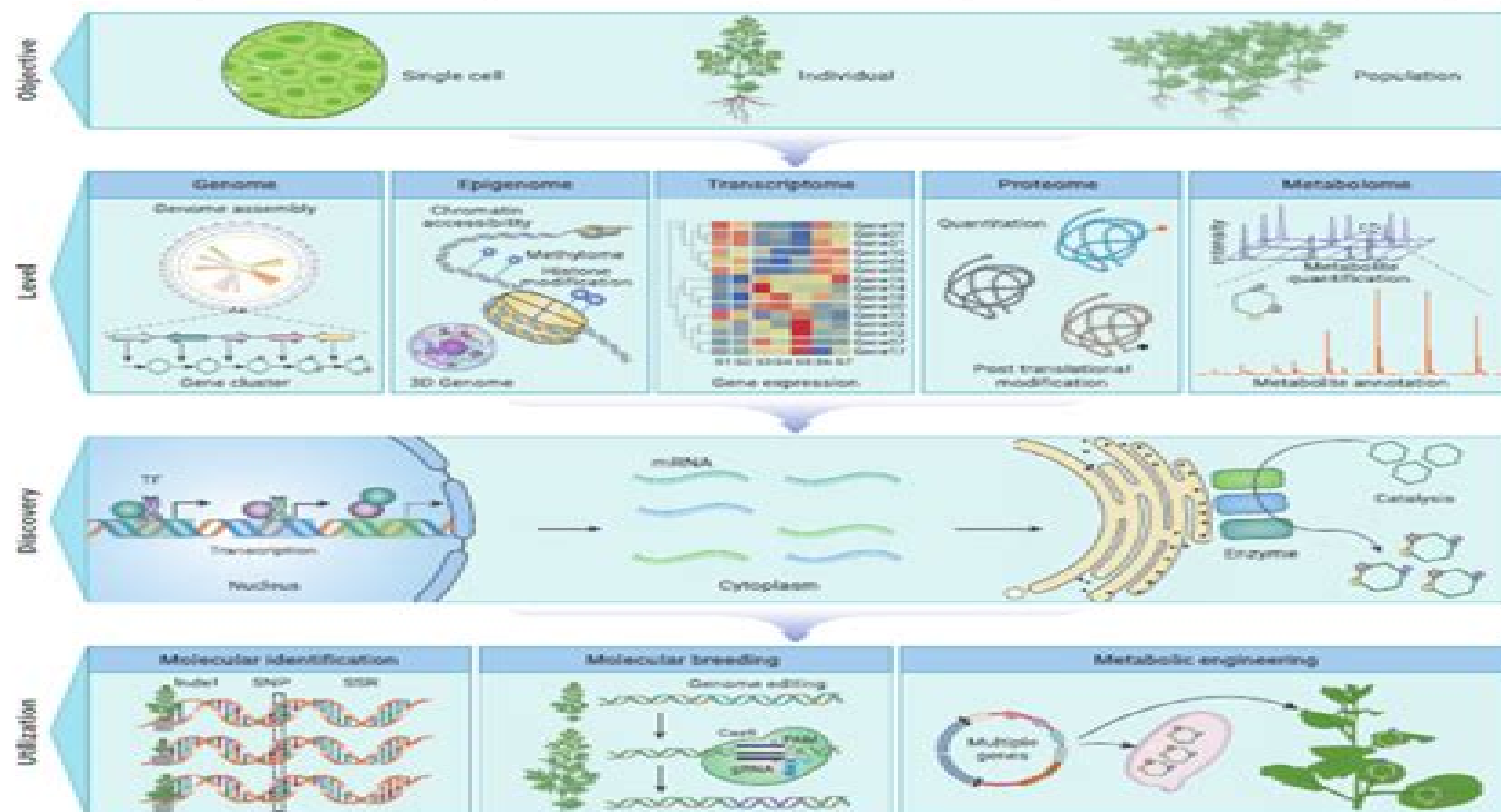


Figure 1. Systematic approaches of herbgenomics to investigate the molecular genetics of medicinal plants (A) Molecular genetics studies on medicinal plants focus primarily on single cells, individuals, and populations. (B) Integration of omics data, including genomic, transcriptomic, proteomic, metabolomic, and epigenomic data, may accelerate the discovery of the molecular genetic basis determining beneficial traits in medicinal plants. (C) Discovery of the molecular mechanism related to beneficial traits in medicinal plants, particularly the synthesis and regulation of phytopharmaceutical compounds. (D) Application of molecular genetic data on molecular identification, molecular breeding, and metabolic engineering.

Molecular Plant Development From Gene To Plant

F.V. Meyer



Molecular Plant Development From Gene To Plant:

Molecular Plant Development Peter Westhoff, 1998 Interest in developmental biology has exploded in recent years with the use of molecular techniques There are some excellent textbooks on animal systems but they make only a token gesture towards plants For this book Peter Westhoff and his strong team of co authors have taken great pains to prepare a clear integrated textbook for undergraduate and graduate students studying the molecular and developmental biology of plants Pedagogical features include boxes and definitions two colour text and illustrations throughout and an extensive glossary A short format has been chosen deliberately to keep the information concise while building on basic knowledge which is treated in more elementary textbooks and referring to additional work in a commented bibliography

Molecular Genetics of Plant Development Stephen H. Howell, 1998-07-13 The purpose of this book is to present classical plant development in modern molecular genetic terms The study of plant development is rapidly changing as plant genome projects uncover a multitude of new genes This book provides a framework for integrating gene discovery and genome analysis into the context of plant development Molecular Genetics of Plant Development is designed to be used as a text book for upper division or graduate courses in plant development The book will also serve as a reference book for scientists in the field of plant molecular biology or plant molecular genetics The book is also useful for general development courses in which both animal and plant development are presented

Plant Molecular Biology Gloria Coruzzi, Pere Puigdomenech, 2013-06-29 Presented here is an analysis of plant development and plant metabolism using the tools of genetics and molecular biology such as mutant analysis mutation tagging mapping using polymorphic characters and basic molecular biology techniques Studies with a range of model genetic organisms most notably maize and Arabidopsis are included The reader gains a comprehensive view of the subject which is more and more of both scientific and industrial interest The value of basic research in plants is highlighted and examples where basic studies have led to applications in agricultural biotechnology are given

Plant Growth and Development Donald E. Fosket, 2012-12-02 Plant Growth and Development A Molecular Approach presents the field of plant development from both molecular and genetic perspectives This field has evolved at a rapid rate over the past five years through the increasing exploitation of the remarkable plant Arabidopsis The small genome rapid life cycle and ease of transformation of Arabidopsis as well as the relatively large number of laboratories that are using this plant for their research have led to an exponential increase in information about plant development mechanisms In Plant Growth and Development A Molecular Approach Professor Fosket synthesizes this flood of new information in a way that conveys to students the excitement of this still growing field His textbook is based on notes developed over more than ten years of teaching a course on the molecular analysis of plant growth and development and assumes no special knowledge of plant biology It is intended for advanced undergraduates in plant development as well as those in plant molecular biology Graduate students and researchers who are just beginning to work in the field will also

find much valuable information in this book Each chapter concludes with questions for study and review as well as suggestions for further reading Illustrated with two color drawings and graphs throughout and containing up to date and comprehensive coverage Plant Growth and Development A Molecular Approach will excite and inform students as it increases their understanding of plant science Presents plant development from a molecular and cellular perspective Illustrates concepts with two colour diagrams throughout Offers key study questions and guides to further reading within each chapter Gives an up to date and thorough treatment of this increasingly important subject area Derived from the author's many years of teaching plant developmental biology

Molecular Plant Abiotic Stress Aryadeep

Roychoudhury, Durgesh Kumar Tripathi, 2019-07-22 A close examination of current research on abiotic stresses in various plant species The unpredictable environmental stress conditions associated with climate change are significant challenges to global food security crop productivity and agricultural sustainability Rapid population growth and diminishing resources necessitate the development of crops that can adapt to environmental extremities Although significant advancements have been made in developing plants through improved crop breeding practices and genetic manipulation further research is necessary to understand how genes and metabolites for stress tolerance are modulated and how cross talk and regulators can be tuned to achieve stress tolerance Molecular Plant Abiotic Stress Biology and Biotechnology is an extensive investigation of the various forms of abiotic stresses encountered in plants and susceptibility or tolerance mechanisms found in different plant species In depth examination of morphological anatomical biochemical molecular and gene expression levels enables plant scientists to identify the different pathways and signaling cascades involved in stress response This timely book Covers a wide range of abiotic stresses in multiple plant species Provides researchers and scientists with transgenic strategies to overcome stress tolerances in several plant species Compiles the most recent research and up to date data on stress tolerance Examines both selective breeding and genetic engineering approaches to improving plant stress tolerances Written and edited by prominent scientists and researchers from across the globe Molecular Plant Abiotic Stress Biology and Biotechnology is a valuable source of information for students academics scientists researchers and industry professionals in fields including agriculture botany molecular biology biochemistry and biotechnology and plant physiology

Plant Development and Evolution, 2019-01-04 Plant Development and Evolution the latest release in the Current Topics in Developmental Biology series highlights new advances in the field with this new volume presenting interesting chapters on the Evolution of the plant body plan Lateral root development and its role in evolutionary adaptation the Development of the vascular system the Development of the shoot apical meristem and phyllotaxis the Evolution of leaf diversity the Evolution of regulatory networks in land plants The role of programmed cell death in plant development the Development and evolution of inflorescence architecture the Molecular regulation of flower development the Pre meiotic another development and much more Provides the authority and expertise of leading contributors from an international board of authors Presents the latest

release in the Current Topics in Developmental Biology series Updated release includes the latest information on Plant Development and Evolution

Plant Molecular Evolution J.J. Doyle, Brandon S. Gaut, 2012-12-06 Plant molecular biology has produced an ever increasing flood of data about genes and genomes Evolutionary biology and systematics provides the context for synthesizing this information This book brings together contributions from evolutionary biologists systematists developmental geneticists biochemists and others working on diverse aspects of plant biology whose work touches to varying degrees on plant molecular evolution The book is organized in three parts the first of which introduces broad topics in evolutionary biology and summarizes advances in plant molecular phylogenetics with emphasis on model plant systems The second segment presents a series of case studies of gene family evolution while the third gives overviews of the evolution of important plant processes such as disease resistance nodulation hybridization transposable elements and genome evolution and polyploidy

Developmental Biology of Flowering Plants V. Raghavan, 2012-12-06 The study of the development of flowering plants may be said to be in the throes of a revolution The literature on the subject is extensive and continues to grow rapidly as new discoveries pile one on top of the other moreover these striking advances in our knowledge have put plant developmental biology well ahead of other aspects of the study of plants This has come about after a period of neglect and stagnation in the field and has been triggered by the power of recombinant DNA technology to analyze genetic information and by a fruitful cross fertilization between physiology genetics and molecular biology Whereas considerations of developmental phenomena were at one time largely restricted to the structure and physiology of a wide selection of plants recent molecular and genetic approaches are focused on one or two model systems Notwithstanding the difficulty of having to relate developmental mechanisms in a few experimentally attractive models to the enormous range of plants the use of model systems has gained wide acceptance This book is intended to meet the need for a unified account of the general principles of development of flowering plants representing structural physiological biochemical genetic and molecular perspectives It arose out of the revision and upgrading of an undergraduate course in plant development that I have taught here at The Ohio State University for more than 20 years

Molecular Systematics and Plant Evolution Peter M. Hollingsworth, Richard M. Bateman, Richard J. Gornall, 1999-08-19 Molecular Systematics and Plant Evolution discusses the diversity and evolution of plants with a molecular approach It looks at population genetics phylogeny history of evolution and developmental genetics to provide a framework from which to understand evolutionary patterns and relationships amongst plants The international panel of contributors are all respected systematists and evolutionary biologists who have brought together a wide range of topics from the forefront of research while keeping the text accessible to students It has been written for senior undergraduates postgraduates and researchers in the fields of botany systematics population conservation genetics phylogenetics and evolutionary biology

Evolution of Gene Regulatory Networks in Plant Development Federico Valverde, Andrew Groover, José M. Romero, 2018-02-15 During their life cycle plants undergo a wide variety of

morphological and developmental changes Impinging these developmental processes there is a layer of gene protein and metabolic networks that are responsible for the initiation of the correct developmental transitions at the right time of the year to ensure plant life success New omic technologies are allowing the acquisition of massive amount of data to develop holistic and integrative analysis to understand complex processes Among them Microarray Next generation Sequencing NGS and Proteomics are providing enormous amount of data from different plant species and developmental stages thus allowing the analysis of gene networks globally Besides the comparison of molecular networks from different species is providing information on their evolutionary history shedding light on the origin of many key genes proteins Moreover developmental processes are not only genetically programmed but are also affected by internal and external signals Metabolism light hormone action temperature biotic and abiotic stresses etc have a deep effect on developmental programs The interface and interplay between these internal and external circuits with developmental programs can be unraveled through the integration of systematic experimentation with the computational analysis of the generated omics data Molecular Systems Biology This Research Topic intends to deepen in the different plant developmental pathways and how the corresponding gene networks evolved from a Molecular Systems Biology perspective Global approaches for photoperiod circadian clock and hormone regulated processes pattern formation phase transitions organ development etc will provide new insights on how plant complexity was built during evolution Understanding the interface and interplay between different regulatory networks will also provide fundamental information on plant biology and focus on those traits that may be important for next generation agriculture

Transgenic Plant Research Alan R. Lindsey, 2022-01-26 This text is split into four main sections gene transfer techniques transgenic approaches to gene isolation manipulation of plant development biochemistry and physiology and predictability of transgene expression

Molecular Plant-microbe Interactions Kamal Bouarab, Normand Brisson, Fouad Daayf, 2009 This book divided into 13 chapters explores recent discoveries in the area of molecular plant microbe interactions It focuses mainly on the mechanisms controlling plant disease resistance and the cross talk among the signalling pathways involved and the strategies used by fungi and viruses to suppress these defences Two chapters deal with the role of symbionts such as the symbiotic actinobacteria and vesicular arbuscular mycorrhizal fungi during their interactions with plants

Molecular Plant Development Terence M. Murphy, William Francis Thompson, 1988 A graduate level textbook reference on recent studies in which the techniques of molecular biology have been applied to classical problems in plant development

The Functions of Sterling F.V. Meyer, 2021-10-29 Why is sterling under pressure Why was the devaluation in 1967 followed by stagnation of British economy What do the 1971 monetary reforms mean for sterling in the 1970s First published in 1973 The Functions of Sterling discusses these vital questions and challenges the received wisdom of those who tells us it is beneficial that our money should be worth less It also examines critically the internal and external performance of sterling throughout the twentieth century The book argues that the credit control policy offers a real possibility of

improved economic growth and encourage the revaluation of sterling To a large extent the book is in line with Sir Ralph Hawtrey's reasoning and also integrates monetary economics with real problems of comparative costs innovations and growth This book is an essential read for scholars of British economy public policy political economy and economics in general

Plant Molecular Biology Donald Grierson, S.N. Covey, 2012-12-06 In the preface to the first edition of this book we expressed a conviction that there was a need for a short book that highlighted important advances in the new discipline of plant molecular biology The rapid development of this topic has been brought about by the recognition of the unique properties of plants in the study of growth and development together with the application of recombinant DNA techniques to tackle these problems Plant cells contain DNA in nuclei plastids and mitochondria and so offer the unique challenge of studying the interaction of three separate genetic systems in a single organism The molecular approach has provided in recent years a wealth of important information about how plants function and how they interact with bacteria fungi and viruses Furthermore plant development involves the regulation of gene expression in response to internal and external signals and plant molecular biology has provided a fundamental insight into how this development is regulated This is not only of considerable scientific interest but also has important implications for the production of plants and plant products in agriculture horticulture and the food industries

Handbook of Plant Science, 2 Volume Set Keith Roberts, 2007-12-10 Plant Science like the biological sciences in general has undergone seismic shifts in the last thirty or so years Of course science is always changing and metamorphosing but these shifts have meant that modern plant science has moved away from its previous more agricultural and botanical context to become a core biological discipline in its own right However the sheer amount of information that is accumulating about plant science and the difficulty of grasping it all understanding it and evaluating it intelligently has never been harder for the new generation of plant scientists or for that matter established scientists And that is precisely why this Handbook of Plant Science has been put together Discover modern molecular plant sciences as they link traditional disciplines Derived from the acclaimed Encyclopedia of Life Sciences Thorough reference of up to the minute reliable self contained peer reviewed articles cross referenced throughout Contains 255 articles and 48 full colour pages written by top scientists in each field The Handbook of Plant Science is an authoritative source of up to date practical information for all teachers students and researchers working in the field of plant science botany plant biotechnology agriculture and horticulture

Gene Expression in Oilseed, Fiber, and Forage Crops Raymond Dobert, 1994 *Gene Expression in Oilseed, Fiber and Forage Crops. Bibliography, Jan. '92-May '94* DIANE Publishing Company, 175 annotated citations on gene expressions in oilseed fiber forage crops soybeans canola cotton rape sunflowers crambe peanuts safflowers alfalfa clover lupines brome grass etc Author subject indexes

Advanced Molecular Plant Breeding D.N. Bharadwaj, 2018-10-29 This new volume provides a better understanding of molecular plant breeding in order to boost the quality of agriculture produce to increase crop yields and to provide nutritious food for everyone by 2050 Scientists believe

the challenge can be met by implementing new and improved techniques of quantitative trait inheritance in plant breeding Integrating genomics and molecular biology into appropriate tools and methodologies can help to create genetically engineered plants such as by using biotic and abiotic stress tolerance molecular markers omics technology and genome editing

Transgenic Plants and Beyond ,2018-02-14 Transgenic Plants Volume 86 the latest release in the series Advances in Botanical Research brings together information needed by many teachers researchers and managers who have to consider biotechnology from a scientific or legal point of view It presents authors who bring their long personal experience on a given subject Although the subjects are technical in nature the take home message of each chapter is understandable by non specialists Encompasses various aspects of the GMO debate its historical background current status recent research outcomes potential future developments Written by highly competent authors from all continents Based on facts and written in a dispassionate and non polemical tone

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