

METABOLIC ENGINEERING

Principles and Methodologies

Gregory N. Stephanopoulos

Aristos A. Aristidou

Jens Nielsen

A c a d e m i c P r e s s

Metabolic Engineering Principles And Methodologies

Arul Jayaraman, Juergen Hahn



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Metabolic Engineering George Stephanopoulos, Aristos A. Aristidou, Jens Nielsen, 1998-10-17 Metabolic engineering is a new field with applications in the production of chemicals fuels materials pharmaceuticals and medicine at the genetic level The field s novelty is in the synthesis of molecular biology techniques and the tools of mathematical analysis which allow rational selection of targets for genetic modification through measurements and control of metabolic fluxes The objective is to identify specific genetics or environmental manipulations that result in improvements in yield and productivities of biotechnological processes Key features of the book are pathway integration and the focus on metabolic flux as a fundamental determinant of cell physiology The book keeps mathematical complexity to a minimum and provides a glossary of biological terms to facilitate use of the book by a broader spectrum of readers A web page exists to communicate updates of the codes and homework problems Demonstrates metabolic engineering in action with numerous examples of pathway modification Includes methods for identifying key enzymes in metabolic networks Contains a comprehensive review of metabolic biochemistry Discusses metabolic regulation at the gene enzyme operon and cell levels Explains concepts of stoichiometry kinetics and thermodynamics of metabolic pathways Minimizes mathematical complexity Links to a Web page to communicate updates of the software code and homework problems

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Sang Yup Lee, E. Terry Papoutsakis, 1999-09-29 This unique reference text presents the basic theory and practical applications of metabolic engineering ME It offers systematic analysis of complex metabolic pathways and ways of employing recombinant DNA techniques to alter cell behavior metabolic patterns and product formation Treating ME as a distinct subfield of genetic engineering the book demonstrates new means of enabling cells to produce valuable proteins polypeptides and primary and secondary metabolites Written by more than 35 leading international experts in the field this book discusses metabolic engineering in plant and mammalian cells bacteria and yeasts and assesses metabolic engineering applications in agriculture pharmaceuticals and environmental systems It illuminates the potential of the cell factory model for production of chemicals and therapeutics and examines methods for developing new antiviral and antibacterial molecules and effective gene and somatic cell therapies Metabolic Engineering also addresses the use of metabolic flux analysis metabolic control analysis and online metabolic flux analysis Basic Biotechnology Colin Ratledge, Bjorn Kristiansen, 2006-05-25

Biotechnology is one of the major technologies of the twenty first century Its wide ranging multi disciplinary activities include recombinant DNA techniques cloning and the application of microbiology to the production of goods from bread to antibiotics In this new edition of the textbook Basic Biotechnology biology and bioprocessing topics are uniquely combined to provide a complete overview of biotechnology The fundamental principles that underpin all biotechnology are explained and a full range of examples are discussed to show how these principles are applied from starting substrate to final product A distinctive feature of this text are the discussions of the public perception of biotechnology and the business of biotechnology which set the science in a broader context This comprehensive textbook is essential reading for all students of biotechnology and applied microbiology and for researchers in biotechnology industries *Metabolic Engineering for Bioprocess*

Commercialization Stephen Van Dien, 2016-07-16 This volume reviews the current metabolic engineering tools and technologies from a practical point of view and guides researchers as they overcome challenges at various stages of organism and bioprocess development Microbes have been engineered to produce a variety of industrial products such as fuels basic chemicals fine chemicals nutritional supplements and pharmaceutical intermediates and new tools such as gene synthesis advanced cloning techniques omics analysis and mathematical modeling have greatly accelerated the pace of innovation in the field Written by leading experts in the field from both academia and industry key topics include synthetic biology pathway engineering metabolic flux manipulation adaptive evolution and fermentation process scale up It is suitable for non specialists and is a valuable resource for anyone embarking on the exciting path to harnessing the metabolic potential of microorganisms **Genetic Engineering: Principles and Methods** Jane K. Setlow, 2012-11-07 **Microbial**

Metabolism and Disease Elena L. Paley, 2021-03-13 Microbiome Metabolic Pathways and Disease provides insight into the interaction of microbial metabolic pathways in the human body and the impact these can have on a variety of diseases By

analyzing these pathways the book seeks to investigate how these metabolic processes can be targeted and manipulated in order to treat various disorders and diseases Topics covered in the book include microbial shikimate pathways protein biosynthesis tryptophan metabolites microbiome metabolic engineering fecal microbiota transplantation and virulence factors Additionally a variety of conditions are covered such as disorders associated with metabolic syndromes serotonin syndromes Alzheimer s disease and Covid 19 providing a detailed overview of how metabolic pathways of microbiome can impact health and disease in the human body Explores microbial metabolic pathways in the human body and implications for disease Investigates specific steps involved in metabolic reactions in the human microbiome including shikimate pathways and tryptophan pathways Considers a variety of diseases and disorders such as Alzheimer s disease metabolic syndromes Crohn s disease and Covid 19 Includes analysis of various amino acids and enzymes in microbial and human cells and how these can impact health

Methods in Bioengineering Arul Jayaraman, Juergen Hahn, 2009 This cutting edge volume provides a detailed look at the two main aspects of systems biology the design of sophisticated experimental methods and the development of complex models to analyze the data Focusing on methods that are being used to solve current problems in biomedical science and engineering this comprehensive richly illustrated resource shows you how to design of state of the art methods for analyzing biological systems Implement experimental approaches for investigating cellular behavior in health and disease use algorithms and modeling techniques for quantitatively describing biomedical problems and integrate experimental and computational approaches for a more complete view of biological systems Book Jacket

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