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Sinopsis

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Christina Smolke, who recently developed a novel way to churn out large quantities of drugs from genetically modified brewer's yeast, is regarded as one of the most brilliant minds in biomedical engineering. In this handbook, she brings together pioneering scientists from dozens of disciplines to provide a complete record of accomplishment in metabolic pathway engineering. With a wealth of cutting edge research and analysis, this work also serves as an invaluable resource for those seeking to add their own contributions. Organized by topic, this 3000 page reference is available as two volumes that can be purchased individually or as a set.

Fundamentals

The first volume provides an overview of metabolic pathway engineering with a look towards the future. It discusses cellular metabolism, including transport processes inside the cell and energy generating reactions, as well as rare metabolic conversions. This volume also explores balances and reaction models, the regulation of metabolic pathways, and genome scale and multiscale modeling tools. It also covers developing appropriate hosts for metabolic engineering including the use of *Escherichia coli*, yeast, *Bacillus subtilis*, *Streptomyces*, filamentous fungi, and mammalian cells using cell culture.

Tool and Applications

The second volume delves into evolutionary tools, including those associated with gene expression for metabolic pathway engineering. It covers applications of emerging technologies, including research on genome-wide technologies, DNA and phenotypic microarrays, and proteomics tools for experimentally determining flux through pathways. It also evaluates emerging applications for producing fine chemicals, drugs, and alternative fuels.