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Responses in *Escherichia coli*; 8 Synthetic Life: Ethobricks for a New Biology; 9 Yeast as a Prototype for Systems Biology; 10 Construction and Applications of Genome-Scale in silico Metabolic Models for Strain Improvement; 11 Synthetic Biology: Putting Engineering into Bioengineering; 12 Rationales of Gene Design and *de novo* Gene Construction; 13 Self-Replication in Chemistry and Biology; 14 The Synthetic Approach for Regulatory and Metabolic Circuits; 15 Synthetic Gene Networks  
16 The Theory of Biological Robustness and its Implication to Cancer; 17 Nucleic Acid Engineering; 18 Potential Applications of Synthetic Biology in Marine Microbial Functional Ecology and Biotechnology; 19 On Fundamental Implications of Systems and Synthetic Biology; 20 Outstanding Issues in Systems and Synthetic Biology; Index

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**Sommario/riassunto**

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The genomic revolution has opened up systematic investigations and engineering designs for various life forms. Systems biology and synthetic biology are emerging as two complementary approaches, which embody the breakthrough in biology and invite application of engineering principles. Systems Biology and Synthetic Biology emphasizes the similarity between biology and engineering at the system level, which is important for applying systems and engineering theories to biology problems. This book demonstrates to students, researchers, and industry that systems biology relies on synthetic biology

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