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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	The Structure and Function of Living Organisms -- General physiochemical properties of biological structures -- Self-organization -- Hypothesis - Protein folding simulation hypothesis - late stage intermediate – role of water -- Energy in Biology – Demand and Use -- General principles of thermodynamics -- Biological energy sources – synthesis of water -- ATP synthesis -- Photosynthesis -- Direct and indirect exploitation of energy sources -- Energy conversion efficiency in biological processes -- Entropic effects -- Energy requirements of organisms -- Information – Its Role and Meaning in Organisms -- Information as a quantitative concept. - Reliability of information sources -- Types of information conveyed by DNA -- Information entropy and mechanisms assisting selection -- The role of information in interpreting pathological events -- Hypothesis - Protein folding early

stage intermediate -- Regulation in Biological Systems -- The cell and the organism -- The principle and mechanism of automatic intracellular regulation -- Regulatory coupling between cells and organisms – hierarchical properties of regulation -- Regulatory mechanisms on the organism level -- Basic principles of regulation in biology -- Regulation levels -- Hypothesis - Proteome construction hypothesis -- Interrelationships in Organized Biological Systems -- The need of mutual relations in biological systems -- Cooperation and coordination -- The characteristics of process coordination in individual cells and organisms -- Mutual relationship between cells and the organism – activation and inhibition of enzymes (rapid effects) -- Mutual support between cells and the organism – interdependence related to gene expression (slow effects) -- Specialization of cell interrelationships -- Hypothesis - The criteria of life.

Sommario/riassunto

The objective of this book is to present the strategies employed by living organisms on a molecular level and to help understand the basics of Systems Biology. Its content is organized in a way to meet the exponential growth in the volume of biological knowledge, and the need for a multidisciplinary approach in the practice of teaching modern biology. For this reason, the whole material is divided into five chapters, each devoted to a fundamental concept: Structure-Function, Energy, Information, Regulation and Interrelationships. The book describes generic mechanisms which occur in biology and promotes a simulation-based approach to the subject of Systems Biology. The use of basic knowledge as the background for presenting biological problems obligates the teachers to deal with generalized phenomena comprising the ever increasing volume of teaching materials. This book is intended for biologists and is informative for specialists in the areas of computer science, robotics and engineering.