

Structural Biological Materials

M. Elices (Ed.); Elsevier, Oxford, 2000, 376 pages, ISBN 0-08-043416-9 (\$146.00)

Throughout evolution, nature has produced materials that are perfectly adapted to fulfil specific functional roles, with properties of durability, strength, mechanisms of programmed self-assembly and biodegradability. Because processing and recycling are subjects of major concern, natural biological materials provide material scientists with inspiration and ingenuity, as biological compounds are biosynthesised under benign processing conditions and are biodegradable; excellent models for the production of advanced novel materials. The scopes of structural biological materials, which are characterised by hierarchical architectural design with lengths scales ranging from the molecular to macroscopic, are vast and impressive.

Structural Biological Materials is part of the Pergamon Materials Series, and adopts a multidisciplinary approach, focussing on recent advances in physics, chemistry and molecular biology. The book aims to show some examples of the relationships between the structures, properties and functions of biological materials: features that represent desirable objectives in the design and manufacture of synthetic structural materials. In the text, new areas are covered and updates on some topics are given. Themes not mentioned in earlier publications are also dealt with.

The book starts with an introduction followed by a section covering general concepts on the nature of natural materials and principles of structure–property relationships. Subsequent sections explore three sub groups of structural biological materials. The fundamental relationship between structure, property and aspects of design and engineering are explored in each sub group. The importance placed on the properties and specific functions of these materials are illustrated in relevant examples.

The section on hard tissue engineering, focussing on cortical bone, describes the main structural features of bone with details of its histology and mechanical properties, especially elastic constants and fracture and fatigue properties. The section on soft tissue engineering covers more ground, concentrating on characteristics and mechanical properties of cartilage and tendon, in addition to information on bioartificial implants and biomimicry. The engineering characteristics of fibre are covered in the final section, with information given on several fibrous biological systems, as well as silk fibres. A chapter on computer models for mechanical properties of fibres in general, and another chapter on the modelling of stress–strain behaviour of spider dragline is also included.

Structural Biological Materials contains numerous diagrams and illustrations and a glossary. It is an important reference book for graduates, academic researchers and scientists involved in the biological materials field.

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Handbook of Nutrition and Diet (Food Science and Technology Series, Vol. 104)

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Nutrition and diet are concerned with the intake of food, digestive processes, the liberation of energy and the elimination of wastes, and all of the processes that are essential for maintenance, growth and reproduction. Nutrients are necessary for the normal functioning of organisms. A lack of adequate quantities of essential nutrients results in clinical manifestation of several physical and mental disorders in humans. Clinical malnutrition can result from a variety of factors, such as an imbalance of nutrients, inability to eat, malabsorption, loss of endogenous nutrients, or multisystem dysfunction producing clinical complications that may lead to morbidity and mortality.

The aim of this handbook is to present comprehensive principles of nutrition, food science and technology, and diet and human health in a lucid and simple manner and show how this information can be utilised to maintain a normal healthy body. The handbook is divided into four parts, the first of which emphasises various food nutrients (namely, carbohydrates, lipids, proteins, vitamins, minerals, and water), and their functions in the human body. Body composition, energy needs, and recommended daily allowances (RDAs) are also discussed. The second part of the handbook describes various food sources and their acceptability. Topics discussed in this section include health and dietetic foods, foods of plant and animal origin, potential protein, fat and oil sources, food processing and preservation methods, food additives and nutrification, food labelling, quality assurance and food safety, and food transportation, distribution and marketing.

The third part of this volume deals with food consumption and utilisation, describing adequacy of diet, food digestion, absorption, metabolism, and excretion of wastes, endocrine systems and regulation of food intake, evaluation