

1. Record Nr.	UNINA9910253944703321
Titolo	Peptides and Peptide-based Biomaterials and their Biomedical Applications // edited by Anwar Sunna, Andrew Care, Peter L. Bergquist
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017
ISBN	3-319-66095-0
Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (XIII, 300 p. 111 illus., 74 illus. in color.)
Collana	Advances in Experimental Medicine and Biology, , 0065-2598 ; ; 1030
Disciplina	547.756
Soggetti	Molecular biology Proteins Biomaterials Molecular Medicine Protein-Ligand Interactions
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Sommario/riassunto	This edited volume is composed of chapters written by experts in the field describing fundamental research on small peptide fragments in relation to their biological action and potential roles in biomedical applications from diagnosis to implant protection. It provides a review of the wide scope and significance of these relatively simple arrays of amino acids that have the ability to bind to surfaces of all kinds and can facilitate the autonomous assembly of structures in nanotechnology as well as penetrating cell membranes and delivering therapeutic drugs. Readers will learn of some of the impediments to a wider and more comprehensive catalog of these molecules and of some of the attributes of rationally-designed and chemically synthesised peptides as anticancer agents. An overview is provided of the expansive variety of biological leads for biomedically relevant peptides as well as the wide array of tissues and biological, bioactive scaffolds that are dependent on these short peptide sequences addressing topics such as

cartilage and hard tissue initiation and regeneration and the transition of active reagents from molluscs to drug leads for the treatment of chronic pain. Peptides can possess surface-specific non-covalent adsorption properties that can be exploited to enhance the functionality of medical implant materials but their implementation is largely on a trial-and-error basis because an understanding of general structure/function relationships is lacking. Molecular simulation approaches can provide relevant details at the atomic scale and prospects for advancing peptide-mediated medical implant surface treatments via molecular simulation are summarized. The literature has papers emphasizing the role of peptides in the design of biohybrid functional surfaces and there has been a growing interest in applying peptides as materials-selective assemblers and self-organizers, but applications are based largely on an empirical understanding of solid surface binding characteristics, as reviewed here. The present work is written for researchers who may be considering entering this field and are exposed to a mass of fundamental research information on individual applications. It has been our intention to trace how and where the research has emerged and to outline the opportunities we see to develop novel and well-grounded tools for specific therapeutic scenarios.

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