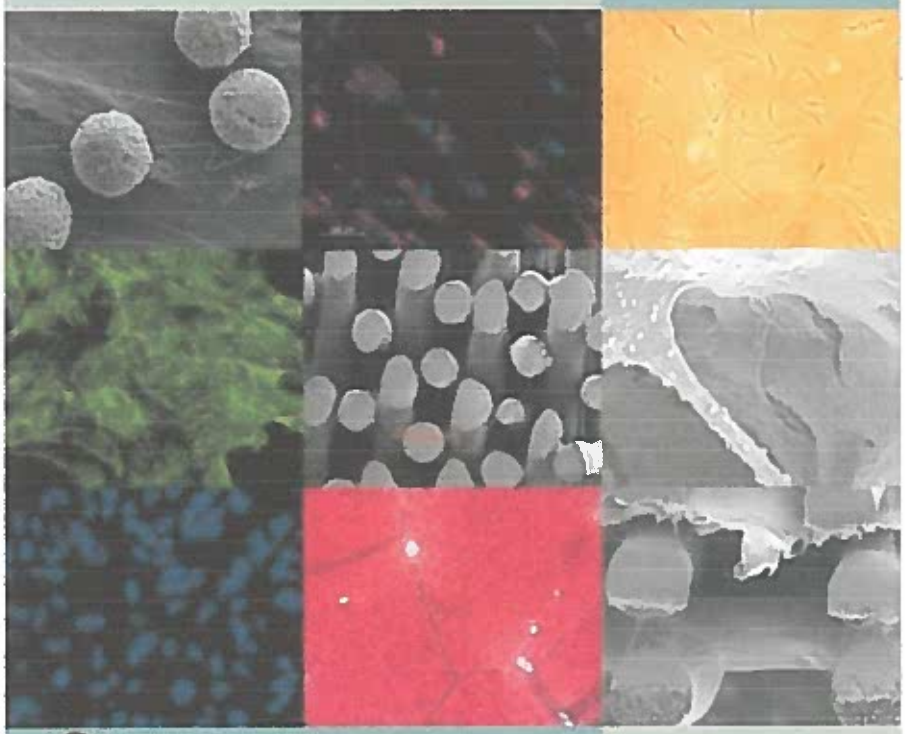
BIOMATERIALS FROM NATURE FOR ADVANCED DEVICES AND THERAPIES

EDITED BY **NUNO M. NEVES AND RUI L. REIS**



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CHEMICAL MODIFICATION OF BIOMATERIALS FROM NATURE

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24.1 PROTEIN MODIFICATION

Protein modification is an area of an intense research and many methods have been developed over the last 20 years (Carrico 2008,[1] Francis 2008,[2] Sletten and Bertozzi 2009),[3] with applications in fields including biology, chemistry and medicine, as they are powerful tools for studying protein expression and localization, and engineering the functions of protein both *in vitro* and in live cells or *in vivo* to create new biocatalysts and bioanalytical tools. These enable improvement in bioavailability and pharmacokinetics of protein-based drugs and even the development of different biosensors. Nature uses covalent modification of proteins (phosphorylation, farnesylation, ubiquination) to modulate their function and many natural products have adapted their structure for covalent binding to proteins (Drahl, et al. 2005,[4] Pucheault 2008).[5]

It is clear that if we want to elucidate the functions of proteins and modulate their activities in a biological process, or if we want to introduce different molecules or synthetic probes onto protein structure to develop biomedical and biotechnological applications, it is necessary to develop high-precision protein modification methods in order to obtain well-characterized homogeneous products.

Thanks to site-specific modification of protein, structurally defined covalent linkages between proteins and surfaces, materials, or biomolecules may be created

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