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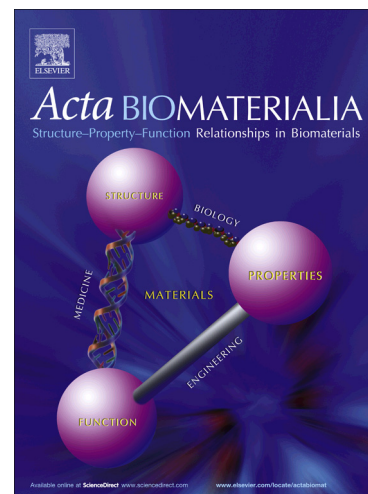
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Artificial inorganic Biohybrids: the functional combination of microorganisms and cells with inorganic materials

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Abstract

Biohybrids can be defined as the functional combination of proteins, viable cells or microorganisms with non-biological materials. This article reviews recent findings on the encapsulation of microorganisms and eukaryotic cells in inorganic matrices such as silica gels or cements. The entrapment of biological entities into a support material is of great benefit for processing since the encapsulation matrix protects sensitive cells from shear forces, unfavourable pH changes, or cytotoxic solvents, avoids culture-washout, and simplifies the separation of formed products. After reflecting general aspects of such an immobilization as well as the chemistry of the inorganic matrices, we focused on manufacturing aspects and the application of such biohybrids in biotechnology, medicine as well as in environmental science and for civil engineering purpose.

Keywords: microorganisms, encapsulation, silica, Biosil, immobilization, biohybrids, cement, microbial concrete, bioartificial organs, bioreactor, biosensor, microbial fuel cell

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