9

The potential of use of the mesoporous materials in medicine.

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The development of porous materials is strongly correlated with the development of the type MCM-41 mesoporous materials and firstly reported in 1992. As a consequence of the porous nature, of the very large specific surface area, the chemical properties are strongly changed, the materials based on mesoporous silica becoming active and reactive (at least if we compare them to other non-porous silica-based materials). The increase in activity and the storage potential of these materials in the pores, made these materials to be tested as systems with controlled release, including for medical applications. Additionally, mesoporous silica is sufficiently reactive and transforms into wollastonite and later into apatite, if introduced into bone tissue. The properties of these materials are controlled by the characteristics of the pores (size and arrangement) but also by the chemistry of the surface, by chemical modification of the surface, especially by silanization with appropriate functional groups, with an adequate hydrophilic:hydrophobic ratio can ensure release kinetics suitable for the intended applications. Thus, the analysis of the literature shows that there are numerous mesoporous materials, with varied morpho-structural characteristics and surface chemistry adapted for the release of a wide range of biologically active substances such as cytostatics, antibiotics, vitamins, polyphenols, ions, etc. Mesoporous materials have been tested as regenerative or medicinal supports in hard tissue engineering, in the treatment of infections, cancer, osteoporosis, but also as food supplement having the ability to additionally protect medicinal substances, including the extreme conditions from the stomach.

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