

Biocompatibility of new SiO₂ anti-bacterial material synthesized by sol-gel route

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Abstract

Silica material was prepared through sol-gel route using tetramethylorthosilicate as alkoxide precursor. The material was characterized by FT-IR spectroscopy, and its amorphous state was ascertained by X-ray powder diffraction (XRD). The SiO₂ sol-gel bio-glass showed antibacterial activity towards the Gram-negative *Escherichia coli* with a clear halo zone diameter. Furthermore, in order to assess biocompatibility, a primary fibroblast cell line was seeded on biomaterial fragments, sterilized and directly introduced inside the culture dishes. To show the relations biomaterial-cultured cells, a morphological study was performed by light microscopy during all the incubation time and finally the cultures were stopped after 7, 14 and 21 days of incubation. A suitable biocompatibility of the SiO₂ sol-gel bio-glass was observed. In fact, cells maintained their conventional star shape and the monolayer stratified at the dish bottom showed only minimal disruption in the biomaterial-rubbing points, without any other morphological alteration.