FATTY ACID FUNCTIONALIZATION STRONTIUM HYDROXYAPATITE NANOROD AND APPLICATION

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Nano strontium hydroxyapatite promotes better osteointegration than micron size counterpart. Rapid strontium release can suppress the growth of fibroblast; in addition, the incompatibility of Polymethyl methacrylate (PMMA) matrix and nano strontium hydroxyapatite (Sr-HA) weakens the cement mantle strength. Fatty acid plays an important role in biological processes. Due to its hydrophobic nature, the functionalized filler is compatible to PMMA matrix. In this study C-18 fatty acids with different degree of un-saturation on strontium hydroxyapatite nanoparticle morphology were investigated, which includes stearic (n=0), oleic (n=1), linoleic (n=2), and linolenic acid (n=3). The functionalized strontium hydroxyapatite nanoparticle was synthesized by Liquid Solid Solution Method. From transmission electron microscopy image, the aspect ratio of linoleic (22.00±11.86) and oleic acid (22.47±6.20) were larger than linolenic (4.76±1.73) and stearic acid (6.14±2.57). From FTIR spectrum, Stearic acid functionalized Sr-HA showed hydrophilic nanorod pattern. Alternatively, linolenic, linoleic and oleic acid showed hydrophobic nanorod pattern. Oleic acid functionalized Sr-HA can be easily dispersed both aqueous and organic solvents. While other functionalized counterpart tended to aggregate in aqueous medium. Oleic acid on the strontium hydroxyapatite surface can be thermal polymerized under hydrothermal condition to form a single layer polymer layer. Based on MTT and BrdU assay on mouse fibroblast (L929), stearic acid functionalized Sr-HA relative growth rate (70.54±15.68) and proliferation rate is slightly lower than nano calcium hydroxyapatite counterpart (79.93±6.10).