Nanomaterials for bone repair and regeneration

Lubna Sheik
Council of Scientific and Industrial Research-NML/IICB, India

Bioactive materials are currently at the cutting edge of regenerative medicine due to the foreseeable need for bone tissue regeneration as an effective way to improve the current medical practice of bone replacement. Alliance of Nanotechnology to stimulate coordinate research in biology, engineering and materials science to push medical science forward is of demand. Bone is a nanocomposite composed of organic and inorganic components with hierarchial structure ranging from nano to macroscale. Generally clinical repair and reconstruction of bone defects can be conducted using autologous and allogenic tissues and alloplastic materials but these have their own functional limitations. And therefore designing and developing of biomaterial for bone repair and regeneration without necrosis is a challenging area of research and demanding too. We report a room temperature, cost effective, one pot process to fabricate hydroxyapatite particles ranging between 10-15 nm. This is possible by the involvement of biological systems as they offset thermodynamic limitations by establishing kinetic control on nucleation and growth of the crystals leading to the synthesis of phase pure and crystalline HA nanoparticles. Unique properties of these nanomaterials such as increased wettability and surface area, lead to increased protein adsorption when compared with conventional biomaterials. Additionally these nanoparticles are biocompatible and in vivo results have suggested that it also helps in the bone wound healing or repair on live rat models.

Biography

Lubna Sheik is in her 4th year of PhD currently, working in CSIR-IICB and CSIR-NML. She is working on biomaterials for biomedical application. Topic of her research is nanohydroxyapatite for bone repair. She has published 7 papers in reputed journals. Her main work is on the synthesis and characterization of these nanoparticles. They have proved to be promising candidates after in vitro and in vivo tests.

lubna.sheikh4@gmail.com