



Bioceramics and Bioactive Glasses for Hard Tissue Regeneration

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Editorial

Diabetic foot disease is one of the most common and dreadful complications of diabetes. People with diabetes have up to 34% lifetime risk of developing diabetic foot ulcers, while foot wounds precede around 80% of all diabetes-related lower extremity amputations. Unfortunately, even after successful wound healing, the recurrence rates of diabetic foot ulcers reach up to 40% within a year.

Diabetic foot ulcers commonly occur by minor or repetitive trauma on an area of the foot in a person with diabetic peripheral neuropathy and/or peripheral arterial disease. Foot deformities and reduced joint mobility leading to aberrant biomechanical loading of the foot can also play a notable role. The pathophysiology of diabetic wound healing is multifaceted but not completely understood, and impaired wound healing is the eminent cause leading to chronic open wounds in diabetes. More than half of diabetic open wounds become infected, which further slows ulcer healing and increases the risk of foot amputation.

Bioceramics and bioactive glasses have been applied in orthopedics and dentistry for the repair and replacement of the damaged tissues since the 1980s. The initial use of these bioceramics and bioactive glasses as filling materials for dental and bones extends their application in a broad spectrum of therapeutics and tissue engineering. For hard tissues, the mechanical properties and biocompatibility of these biomaterials have been two critical factors for their successful clinical applications.

In addition, specific chemical composition and topographical properties of bioceramics and bioactive glasses have promising effect by influencing cell-fate via cell-attachment, proliferation, migration, and differentiation under three-dimensional (3D) micro-/nano-environment for improved hard tissue regeneration.

This Research Topic on bioceramics and bioactive glasses for hard tissue regeneration covers the novel ideas and concepts for the synthesis of bioceramics and bioactive glasses and their characterization for chemical and structural characteristics, design of new compositions of bioceramics and bioactive glasses and their processing with desired surface structures or topographies, mechanical, and cellular responses under 3D micro-/nano-environment by regulating of cell-fate and their micro-/nano-environment by bioceramics and bioactive glasses.

Therefore, the goal of this Research Topic is to provide future

perspective and future research directions on new advancements of bioceramics and bioactive glasses-based biomaterials for hard tissue regeneration for successful clinical applications in healthcare market.

This Research Topic proposes to publish original research and review articles on the potential themes including, but not limited to:

Calcium phosphates, bioceramics and bioactive glass nanoparticles.

- Biom mineralization and mechanical properties of various bioceramics and bioactive glasses.
- Design of bioceramics and bioactive glasses to their specific properties required for particular tissue regeneration.
- Bioceramics with specific chemical composition and surface topography.
- Fabrication of polymer-bioceramics and/or bioactive glasses.
- Bioceramics and bioactive glasses for extrusion printing.
- Polymeric nanocomposites of bioceramics and bioactive glasses for hard tissue regeneration.

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