A REPORT ON RESEARCH VISIT TO UNIVERSITY OF BERGEN, NORWAY
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Tissue engineering is one of the prominent approach in which natural or synthetic biomaterials could interact with the cells to promote the tissue regeneration activities and restoration. Fabrication of polymeric scaffolds plays a major role as a backbone in the field of tissue engineering; which would mimic the function of extracellular matrix due to its various physical, chemical and biological properties. Several natural and synthetic polymers have been widely used for the bone regeneration such as natural biopolymers *viz.* collagen, gelatin, alginate, chitosan and synthetic *viz.* polylactide, polyglycolide, polycaprolactone, poly(lactide-co-glycolide) and ceramic materials like hydroxyapatite, bioglass etc. However, these materials found to have limitations like pore size and its distribution, morphology, hydrophilic properties, mechanical strength, cell attachment and proliferation. To overcome these defects, composite materials like a combination of natural and synthetic polymers or bioceramics and synthetic polymers have been designed in hard and soft tissue engineering.

Owing to the responsibilities of clinicians and researchers towards the tissue regenerative research, I have carried out a short term research on the fabrication and characterization of 3D porous polymeric scaffolds for the bone regenerative applications. Since the synthetic polymer polycaprolactone is approved by US Food & Drug Administration and it has enhanced property for the bone regenerative applications; to fulfill the defects of PCl, gelatin is selected to blend with PCl to form a composite porous scaffold to enrich the tissue regeneration properties. PCl and gelatin was blended and using the 3D bioplotter, the porous 3D scaffolds have been printed at room temperature with different composition of gelatin to PCl. Then the biomaterial was characterized by spectral, contact angle measurements, wettability tests, *in vitro* degradation, and biocompatibility, surface analysis by SEM, nature observations by XRD, tensile strength assessed by

mechanical properties, thermal stability by TGA & DSC and physical properties like porosity, surface area from µ–computed tomography were extensively studied. Bone marrow stem cells were adopted for the cell attachment studies; proliferation and differentiation performances by *in vitro* studies were confirmed by SEM and CLSM. As a nutshell, the consolidated work is expected to be published in a high impacted journal shortly.