

## **Biomaterials in Regenerative/Reparative Medicine**

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Tissues are lost due to trauma, surgery or disease such as cancer. The loss of tissue or its function may have disabling or even a fatal outcome. Thus, man has searched long for solutions. Mammals have a limited capacity to regenerate lost tissues and repair (scar tissue) is the default wound healing mechanism in mammals. Large defects need other solutions to reconstruct. Early attempts comprised replacement by artificial materials. Later, tissues were transplanted from “external” sources. It was thought that selective cell (e.g. parenchymal cell) transplantation is what the needed procedure to restore function and ideas evolved into “tissue engineering” approach. With advances made in cell biology, we know now that almost every tissue have stem cells. However, there seems to be a limited number, problems in recruitment(?) to handle healing large tissue defects. The field of regenerative medicine comprises tissue engineering, stem cell technology and genetic engineering. Tissue engineering can be achieved using cells, biomaterials, signaling factors, etc. However, because the target is to obtain a functional tissue in the body, vascularity, in most cases, is of utmost importance and it is currently a limiting factor in the success of tissue engineering therapies. Occasionally, regeneration can be achieved using either cells alone, biomaterial alone or combined. Biomaterials whether used alone or combined with cells, have thus a major role. According to their evolution, biomaterials can be classified into “bionert,” bioactive and the latest multifunctional. Various intelligent biomaterials with active molecule releasing properties are under development. Biomaterials can also be, currently, produced at the nano-level, e.g. nano-fiber based scaffolds. This will enhance further the prospects and the potential of success of regenerative medicine. Because of its nature, regenerative medicine is essentially a multidisciplinary field. Nevertheless, clinical vision is required. In future, regenerative medicine will also be related to developments in personalized medicine, nanomedicine and other emerging combinations will hopefully find answers for the current challenges. We, thus, look forwards to seeing human suffering alleviated more efficiently, and that the quality of life is improved.