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State of art biomaterials and hydroxyapatite coatings for bioimplant sustainably

Biomaterials are used for making devices that can interact with biological systems of peoples who not only suffers from congenital heart, bone or dental diseases but even sometime young and dynamic people such as sportspersons need replacements due to fracture and excessive strain. The biomaterials are commonly used in dentistry, orthopedics, plastic and reconstructive surgery, ophthalmology, cardiovascular surgery, neurosurgery, immunology, histopathology, experimental surgery, and veterinary medicine etc. Biomaterials when placed inside the human body are called bio-implants. The first and foremost requirement for the choice of the biomaterial to be placed in the human body is that it should be biocompatible and not cause any adverse reaction in the body like allergy, inflammation and toxicity either immediately after surgery or under post operative conditions. The corrosion resistance of the stainless steels depends on the carbon content and is reduced as the carbon forms carbides at the grain boundaries. So the material with low carbon content (less than 0.030%) such as 316L stainless steel is used for manufacturing the surgical implants. The reason for its popularity is relative low cost, reasonable corrosion resistance, increased mechanical strength, and ease of fabrication. But these steels are subjected to attack when transplanted in highly aggressive human body environment. Coating of metallic implant materials with bioactive ceramics such as hydroxyapatite $[(Ca_{10}(PO_4)_6(OH)_2), HA]$ is a popular method to promote the bone healing leading to the rapid biological fixation of implants. Because the chemical composition of HA is similar to that of the natural bone, it has excellent osteo conduction properties comparison with other bioactive materials to increase the implant sustainability.

Biography

Prof. Buta Singh Sidhu is graduate and postgraduate from Panjab University Chandigarh. He did his Ph.D. from Metallurgical and Materials Engineering Department of IIT, Roorkee in the field of surface engineering. Dr. Sidhu, who is the awardee of Best Engineering College Teacher Award by ISTE, New Delhi is President of Society of Materials and Mechanical Engineers (SOMME). He has published around 150 research papers in reputed journals and conference proceedings. He has also authored three books and has served as Dean Academic in one of the largest technical university in India i.e. PTU for more than seven years.

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