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Editorial

Surface Modification, Functionalization and Characterization of Metallic Biomaterials

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1. Introduction

There is an increase in the demand for human implants for the complete or partial replacement of soft and/or hard human tissues due to different reasons, such as a higher life expectancy [1]. However, medical advances are limited due to the reduced number of materials available for use as biomaterials, since they must satisfy biomechanical and biofunctional properties to guarantee the success of implants.

In terms of biomechanical behavior, metals and their alloys are commonly employed as biomaterials because of their superior mechanical properties compared to ceramics and/or polymers. Evaluation of mechanical properties (yield strength, Young's modulus, tribomechanical behavior, fatigue resistance) is required to determine similarities to the piece to be replaced; higher mechanical properties can lead to failures, such as stress-shielding.

However, metallic biomaterials can present poor biofunctional behavior, which can be overcome by the modification (physical [2] and chemical treatments [3]), functionalization and/or coating (biopolymers [4], bioactive glasses [5–8], hydroxyapatite [9,10], therapeutic agents [11,12], etc.) of the surface, to make it more attractive for cell adhesion and proliferation [13,14] while minimizing bacteria-related infections [11,12]. Changes in the surface should be evaluated using different techniques to corroborate the enhancement of osseointegration without degrading the mechanical properties.

2. Contributions

This Special Issue is devoted to works related to metallic biomaterials, from the fabrication to modification of the surface to enhance the bifunctionality, in any of its aspects, and achieve a good tribomechanical-biofunctional balance (Figure 1).

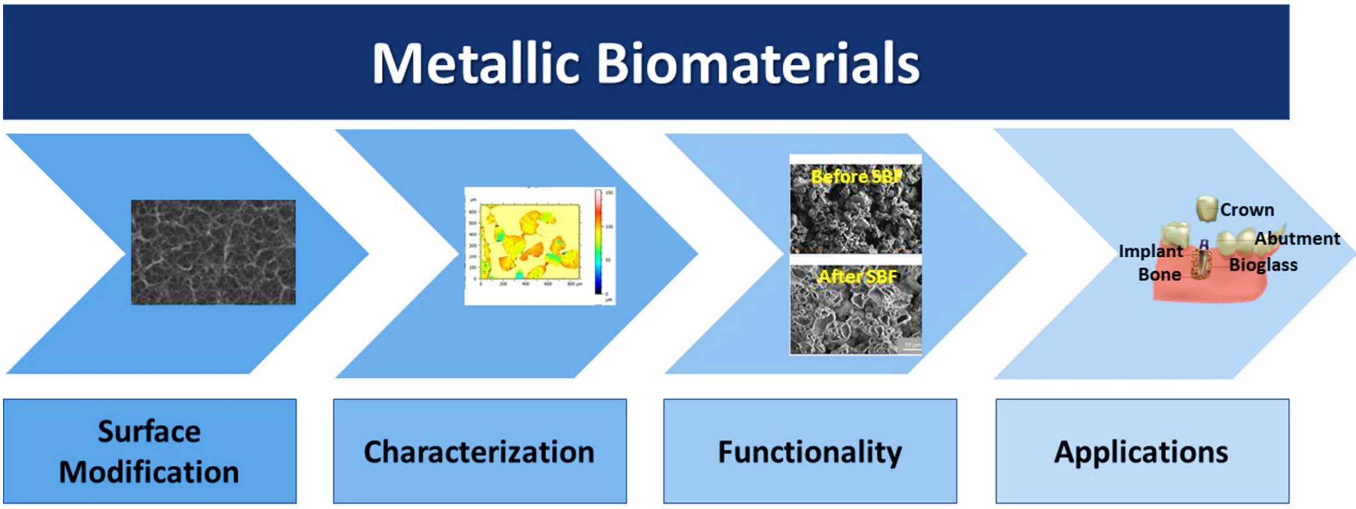

Figure 1. Schematic of the different aspects of the surface modification of metallic biomaterials to be considered for publication in this Special Issue: from the methods for surface modification to its application, through the tribomechanical and/or biofunctional surface characterization.

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