

Exploring the Biocompatibility and Performance of Metals and Ceramics as Biomaterials, A Comprehensive Study for Advanced Medical Applications

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Abstract : Biomaterials, specifically metals and ceramics, are indispensable components in the realm of medical science, shaping the landscape of implantology and prosthetics. This study delves into the intricate interplay between these materials and biological systems, aiming to scrutinize their suitability, performance, and biocompatibility. Employing a multi-faceted approach, a range of methodologies were meticulously employed to comprehensively characterize these biomaterials. Advanced material characterization techniques were paramount in this research, with scanning electron microscopy providing intricate insights into surface morphology, and X-ray diffraction unraveling the crystalline structures. These analyses were complemented by in vitro assessments, which gauged the biological response of cells to metals and ceramics, shedding light on their potential applications within the human body. A key facet of our investigation involved a comparative study, evaluating the corrosion resistance and osseointegration potential of both metals and ceramics. Through a series of experiments, we sought to understand how these biomaterials interacted with physiological environments, paving the way for informed decisions in medical applications

Keywords : metals, ceramics, biomaterials, biocompatibility, osseointegration

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