

Biodegradable (and non) Metals by Design with Extreme Properties for Bioresorbable Medical Devices

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Over the last 50 years, biomaterials, prostheses and implants saved and prolonged the life of millions of humans around the globe. The main clinical complications for current biomaterials and artificial organs still reside in an interfacial mismatch between the synthetic surface and the natural living tissue surrounding it. Today, nanotechnology, nanomaterials and surface modifications provides a new insight to the current problem of biomaterial complications, and even allows us to envisage strategies for the organ shortage. Advanced tools and new paths towards the development of functional solutions for cardiovascular clinical applications are now available. In this talk, the potential of nanostructured metallic degradable metals to provide innovative solutions at medium term for the cardiovascular field will be depicted. Focus will be on Fe-based biodegradable metals with exceptional resistance, ductility and elasticity, for pushing innovative applications in vascular surgery. The intrinsic goal of this talk is to present an extremely personal look at how biodegradable metals can impact materials, surfaces and interfaces, and how the resulting unique properties allowed biomedical functional applications to progress, from their introduction, to the promising future that biodegradable metals may or may not hold for improving the quality of the life of millions worldwide.