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Editorial

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Biocompatible graphene for tissue engineering, high resolution diagnostic imaging techniques, cells proliferation and drug delivery systems

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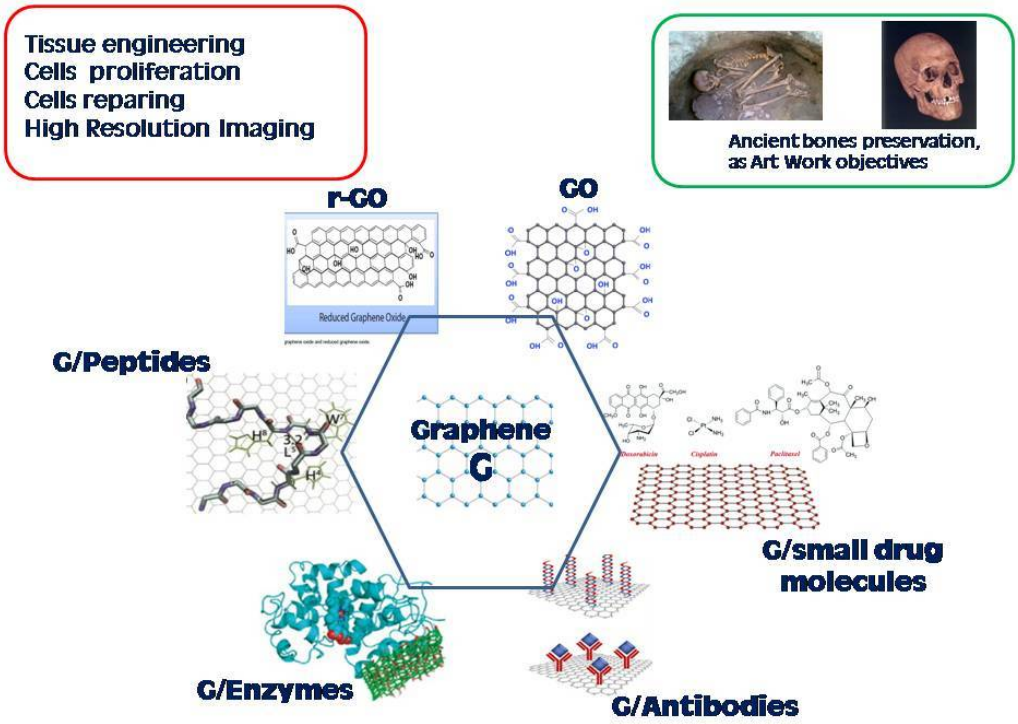

Figure 1. Graphical Abstract

Editorial

Graphene and its chemical derivatives represent a new generation of materials, very promising in Medicine for its chemical-physical and biochemical properties, related to the quantum behaviour. Graphene exhibits excellent electrical and thermal conductivity, high biocompatibility, auto-fluorescence features and large surface area, all extremely useful properties in Medicine field applications. Especially the biocompatibility aspect is the key point for the assembly of high-performance medical devices, imaging tools and scaffold prototypes for tissue engineering. Biocompatibility properties depend on a "metal free" chemical composition of graphene derivatives, its Nano sheets shape and the great versatility of the surface chemistry, that allows to decorate the graphene sheets with bio-molecules, ideal for making the new material compatible with the cellular compartments and tissues. For this purpose, new scaffolds assembled with graphene/collagen/

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hydroxyapatite Nano-composites are suitable to regenerate modern bones and also ancient bones, especially this latter useful to preserve as Cultural Heritage tools, with modern nanotechnologies dedicated to the conservation and musealization of Art Work objectives (as human skeletons of Prehistory). Graphene is also an excellent medium for the proliferation of neuronal cells and for the regeneration of cardiac tissues, with excellent integration in human body functionalities. Furthermore, high performances graphene tips are suitable for the assembly of diagnostic and theranostic devices, where, mainly the optical features of graphene and graphene derivatives are applied for high definition medical screening and high-resolution imaging techniques. Its electromagnetic properties also provide the great opportunity to design new nanomotors and nanomachines for drugs and therapeutics delivery and discovery. (Figure 1).