**Designing peptide/graphene hydrogels for biomedical and tissue regeneration applications**

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The progress in biomedical and tissue engineering fields requires the design of novel functional 3D scaffolds. The materials used must be biocompatible, mechanically tunable, and offer further attractive physicochemical properties for applications such as drug delivery or cell culture. Both self-assembling β-sheet peptide hydrogels [1,2] and graphene derivatives [3,4] were shown to hold potential in material science for the construction of such materials. Due to the “simplicity” of the structures formed at the molecular level, the relative robustness of the β-sheet assembly and individual graphene flakes, and the ease of functionalization, very stable functional materials with tailored properties can be designed. In this work, the link between the formation of both simple peptide hydrogels and peptide/graphene derivative hybrid hydrogels and their resulting physicochemical properties and biological activity is presented. A selection of the applications of these materials will also be demonstrated.

References:

1. A. Mujeeb, et al., Acta Biomaterialia, 9, 4609-4617, 2013.

2. D. Roberts et al., Langmuir, 28, 16196-16206, 2012.

3. M. Sheikholeslam et al., Carbon, 71, 284-293, 2014.

4. J. Ramon-Azcon et al., Advanced Materials, 25, 4028-4034, 2013.