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## Engineering carbon-based nanomaterials for cancer therapy and bioimaging

**Gil Goncalves**

Institute of Material Science of Barcelona, Spain

The significant advances on the development of synthetic processes has allowed the development of many unusual carbon nanomaterials. Since the nineties, with the discovery of fullerenes, several carbon nanomaterials with different structures and properties have been reported, such as nanotubes, nano onions, nano horns and graphene. The singular features of carbon-based materials have been widely explored for the development of new therapeutic approaches on oncology by the design of new smart materials capable of meeting the clinical demands for the therapy and bioimaging of tumors and cancer cells. The development of new multifunctional carbon nanoplatfoms, can offer new possibilities for cancer detection at early stages of the disease and consequently, improve the success of the treatment. Several approaches have been developed for engineering new carbon nanoplatfoms for carrying high payloads of bioimaging agents or drugs that can be released in controlled manner. Besides, the accurate biofunctionalization of the carbon nanoplatfoms surface can prolong their circulation time in biological fluids and improve their targeting efficiency to specific tumors and cancer cells. Recently, the development of carbon nano-capsules, showed the possibility to hermetic seal in their interior payloads with exciting properties for bioimaging. Indeed, this carbon shelters provide the possibility to explore payloads for biological proposes, that are characterized by high level of toxic effects or inability to reach the desire target. Moreover, after filling, carbon nano- capsules offer the possibility to functionalize the external surface with targeting ligands or biocompatible molecules. This discussion intents to covers the recent progress on the development of new synthetic strategies for nanoengineering carbon nanomaterials as a multifunctional nanoplatfoms for cancer therapy and bioimaging. In addition, it is also a main objective of this topic to discuss the most relevant achievements into the *in vitro* and *in vivo* performance of the carbon nanoplatfoms on the detection and treatment of cancer.

ggoncalves@icmab.es