

# Carbon NanoDots: New NanoCarriers for Drug Delivery

I. Jénnifer Gómez,<sup>1</sup> Blanca Arnaiz<sup>2</sup> and Maurizio Prato<sup>1,2</sup>

<sup>1</sup>Dipartimento di Scienze Chimiche e Farmaceutiche, Università degli Studi di Trieste, Piazzale Europa 1, 34127, Trieste, Italy. <sup>2</sup>CIC biomaGUNE, Paseo Miramón 182, 20009, San Sebastián, Gipuzkoa, Spain.  
[inmaculadajennifer.gomezperez@phd.units.it](mailto:inmaculadajennifer.gomezperez@phd.units.it)

Tremendous progress over the past decades in the field of nanomedicine emerged constantly. However, the development of water soluble drug delivery systems is still an urgent need, and resource intensive endeavor that is not always guaranteed to result efficacious drugs. Herein, we report a new avenue to change the landscape of future drug carriers based on Carbon NanoDots (CNDs), a fascinating class of recently discovered nanocarbons that comprises quasispherical nanoparticles with sizes below 10 nm. They typically display excitation wavelength dependence, good biocompatibility, high water solubility, and low toxicity, among others.<sup>1</sup> Due to these excellent properties, CNDs have gained tremendous attention in nano-mediated cancer delivery and targeting.<sup>2</sup> In this work, a simple bottom-up approach to obtain CNDs from carbon and nitrogen sources and employing a microwave reactor is described.<sup>3</sup> The resulting CNDs were functionalized with a low water soluble drug, Taxol® (PTX). Moreover, we have studied the potential of the CNDs-PTX nanocarrier against different cell lines.

## References

- [1] a) Baker, S.; Baker, G. *Angew. Chem. Int. Ed.*, 49 (2010) 6726. b) Sun, P.; Zhou, B.; Lin, Y.; Wang, W.; Fernando, S.; Pathak, P.; Meziani, M. J.; Harruff, B. A.; Wang, X.; Wang, H. *J. Am. Chem. Soc.*, 128 (2006) 7756.
- [2] Shi, L.; Wei, S.; Zhiqiang, G. *Chem. Soc. Rev.*, 44 (2015) 362.
- [3] Arcudi, F.; Đorđević, L.; Prato, M. *Angew. Chem., Int. Ed.*, 128 (2016) 2147.

## Figures

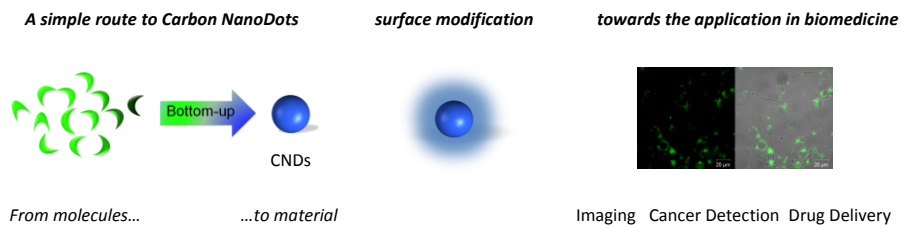


Figure 1: Schematic representation of the synthesis of CNDs and their bioapplications.