

Carbon dots for photodynamic therapy and imaging

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Carbon dots have been identified more than 15 years ago and with time they started to attract a lot of attention, as they are considered promising nanomaterials for future clinical translation. Carbon dots combine numerous characteristics including high photostability, low cytotoxicity, and superior biocompatibility. We have conceived and synthesised multifunctional carbon dots with deep-red emission properties through their controlled chemical modification using folic acid ligand. These conjugates, endowed of a high colloidal stability and an enhanced luminescence, are suitable for targeted intracellular production of reactive oxygen species by laser irradiation leading to efficient cancer cell death (Figure 1) [1]. In addition, we have modified the carbon dots with a chelating agent for gadolinium [2]. These dots showed a better magnetic resonance relaxivity than commercial MRI agents, resulting potential clinical tools as MRI/fluorescence dually functional imaging probes.

References

- [1] Ji, D.-K.; Reina, G.; Guo, S.; Eredia, M.; Samorì, P.; Ménard-Moyon, C.; Bianco A. *Nanoscale Horizons*, 5 (2020) 1240-1249
- [2] Ji, D.-K.; Reina, G.; Liang, H.; Zhang, D.; Ballesteros, B.; Ménard-Moyon, C.; Li, J.; Bianco, A. *ACS Applied Nano Materials* 4 (2021) 1467-1477

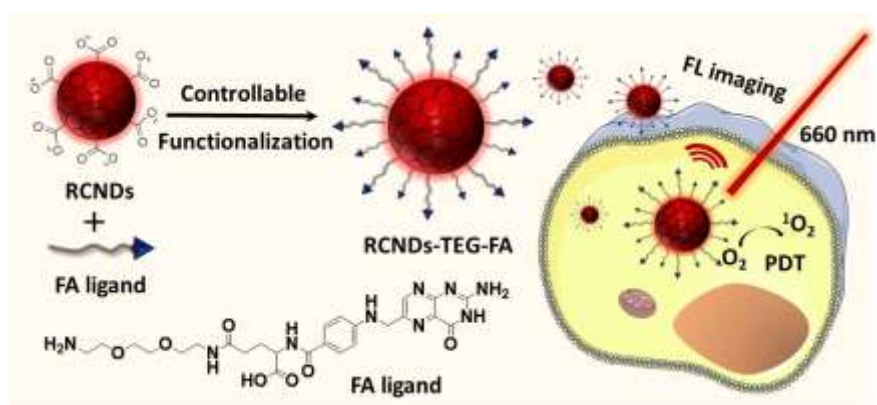


Figure 1: Design of multifunctional carbon dots for photodynamic therapy.