

**Metals
and Water**

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**IV International Congress in
Water Soluble Metal Complexes Applications**

Zaragoza, 24-25th June 2021

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A THERANOSTIC WATER-BASED PLATFORM MADE OF CARBON NANOTUBES AND NANOCELLULOSE FOR SELECTIVE COLON CANCER KILLING

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For their large surface area and versatile chemical reactivity, single-walled carbon nanotubes (SWCNTs) are regarded as the basis of new pharmacological complexes. Here, SWCNTs are chemically functionalized with fluorescein, folic acid, and capecitabine drug, being the latter commonly used against colorectal cancer. Functionalized SWCNTs are dispersed in water through their synergistic interaction with type-II nanocrystalline cellulose (II-NCC), and the resulting colloidal system is tested in vitro on both normal and cancer human colon cells (Caco-2). The bare SWCNT/II-NCC hybrid presented a selective effect against cancer Caco-2 cells,¹ so the study was extended also to the functionalized analogues. The functionalized SWCNT/II-NCC hybrid shows a higher activity than the reference capecitabine drug against the cancer Caco-2 cell line. However, the effect appears to be intrinsically associated to the SWCNT/II-NCC complex, particularly boosted by fluorescein, while the presence of the capecitabine chemical group is not required. In addition, fluorescence imaging is shown on cell cultures by confocal microscopy, highlighting the enormous potential of this nanohybrid platform towards colon cancer theranostics.²

References

1. González-Domínguez, J. M.; Ansón-Casaos, A.; Grasa, L.; Abenia, L.; Salvador, A.; Colom, E.; Mesonero, J. E.; García-Bordejé, J. E.; Benito, A. M.; Maser, W. K. *Biomacromolecules* **2019**, *20*, 3147–3160.
2. González-Domínguez, J. M.; Grasa, L.; Frontiñán-Rubio, J.; Abás, E.; Domínguez-Alfaro, A.; Mesonero, J. E.; Criado, A.; Ansón-Casaos, A. *Submitted 2021*.