**Synthesis of porphyrin derivatives with antitumoral and antimicrobial activity**

***Topic: Organic Chemistry***

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Porphyrins and analogues due to their unique physico-chemical features are finding applications in different fields like artificial photosynthesis, catalysis, sensors, nanomaterials and medicine. In medicine, these compounds are being used with high success as photosensitizers (PS) in Photodynamic Therapy to treat oncological and non-oncological situations like infections caused by microorganisms.1 In this therapy, the photoactivation of the PS by visible light in the presence of molecular oxygen affords highly cytotoxic reactive oxygen species (ROS) that are responsible by the death of target cells (*e.g.* tumoral or microbial). Although the ability of a PS to generate ROS, namely singlet oxygen (1O2) is important for an efficient PDT effect, the structural feature of PS is another crucial aspect that is dependent on the target. Herein will be discussed some recent synthetic strategies developed in the group to obtain PS with adequate solubility in physiological media, to improve their selectivity to target tumoral cells or to photoinactivate microorganisms, to have better penetration on the tissue and also to allow their immobilization in solid supports( Figure 1)2.



**Figure 1:** Tetrapyrrolic macrocycles with antitumoral or antimicrobial activity

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**References:**

1. a) Pandey R. K.,. Zheng G., In The Porphyrin Handbook, Applications: Past, Present and Future. K. Kadish, K., Smith K. M., Guilard R., Eds. Academic: San Diego, 2000, *6*, 157. b) Alves E., Faustino M. A. F., Neves M. G. P. M. S., Cunha Â., Nadais H., Almeida A, *J. Photochem Photobiol. C: Photochem Rev,* **2015**, *22*, 34.

2. Some exemples: Mesquita M. Q., Menezes J. C. J. M. D. S., Pires S. M. G., Neves M. G. P. M. S., Simões M. M. Q., Tomé A. C., Cavaleiro J. A. S., Cunha Â., Almeida A., Daniel-da-Silva A.L., Faustino M. A. F., *Dyes Pigments*, **2014**, *110*, 123; Alves E, Faustino M. A. F., Tomé J. P. C., Neves M. G. P. M. S., Tomé A. C., Cavaleiro J. A. S., Cunha Â., Gomes N. C. M., Almeida A., *Bioorg. Med.Chem*. **2013**, *21,* 4311; Barata J. F. B., Zamarron A., Neves M. G. P. M. S., Faustino M. A. F., Tomé A. C., Cavaleiro J. A. S., Röder B., Juarranz A., Sanz-Rodríguez F., *Eur. J. Med. Chem.* **2015**, *92*, 135.