

New polymer-Ru complex photosensitizer for efficient photodynamic therapy

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In recent years, photodynamic therapy [1] (PDT) has drawn increasing attention as a potential alternative treatment of several solid tumours [2], as for the ones affecting skin, bladder, oesophagus and lungs. Although still emerging, it is already a successful and clinically approved therapeutic modality for the management of the neoplastic and other non-malignant diseases. The major innovation of photodynamic therapy lies in that it relies on two agents, the photosensitizer and light, which show negligible toxicity when administered independently. In this regard, accumulation of the sensitizer in healthy tissues would not be harmful and, for this reason, photodynamic therapy is expected to cause a decrease in the side effects of chemotherapy. Photosensitizers are required to be resistant to photo-bleaching, non-toxic (at therapeutic concentrations) and stable in biological environment. Actually, several photosensitizers currently used in PDT (belonging to the class of porphyrins and phthalocyanines) showed problems related to solubility and self-aggregation, which decreased their therapeutic efficacy. Recently, it has been proposed to use a nanotechnology approach to PDT, that is, to incorporate the sensitizer in nanoparticles in order to increase their solubility and biocompatibility. Moreover, being part of a nano-sized structure, the selectivity of the PDT agent can increase for tumour sites by the mechanisms of passive targeting (EPR effect). In this context, we propose here a self-assembled cation polyamidoamine Ru complex derivative (Figure 1), able to act as very effective photosensitizer when stimulated by a low power LED light source. The communication will show the comparison between three Ru-based photosensitizers, and the correlation between their efficacy and subcellular localization, besides showing their complete chemical and photophysical characterization.

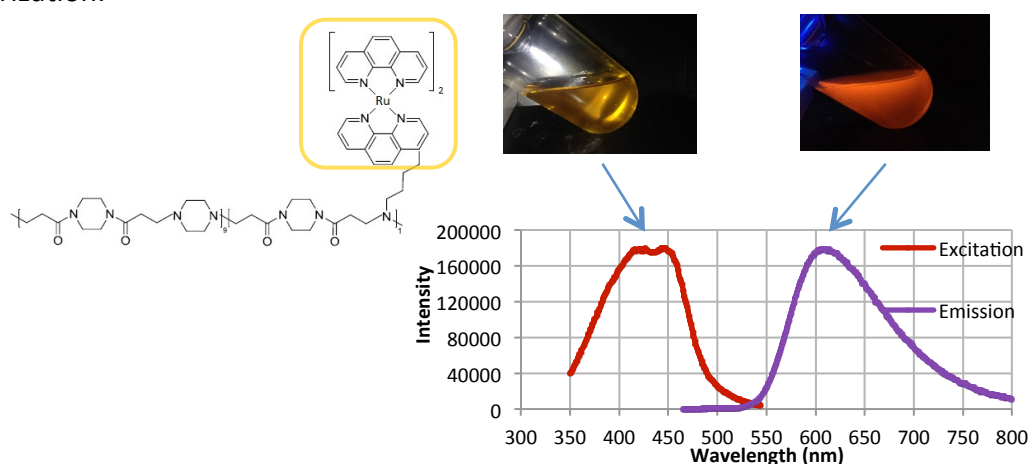


Figure 1. Scheme of polyamidoamine-Ru complex and their excitation and emission spectra.

References

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2. M. Triesscheijn, P. Baas, J.H.M. Schellens, F.A. Stewart, *Oncologist*, **2006**, 11, 1034.

