

Tuning Polyamidoamine Design to Increase Uptake and Efficacy of Ruthenium Complexes for Photodynamic Therapy

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Nanomedicine holds great promises to change the way drugs are delivered to their target, owing to the use of nano-sized drug carriers capable to enter cells and be trafficked intracellularly via energy dependent pathways [1, 2]. This is very different from the way most drugs arrive to their target, often based simply on their solubility and partition coefficients in lipids and water. Despite some valuable successes, drug delivery remains rather challenging and several factors are still limiting its potential. Among such factors, it has emerged, for instance, that most nano-sized carriers entering cells via endocytosis are later trafficked along the endolysosomal pathway to the lysosomes, where the low pH and abundant proteases can degrade and destroy the internalised cargo. Strategies to escape the endosomes and lysosomes are being investigated.

Among the many polymer species employed as drug delivery vectors, linear polyamidoamines (PAAs) are very interesting and promising materials.

In this communication it will be presented a new polycationic PAA endowed with a luminescent Ru complex (Ru-PhenAN) and its ability to target the cell nucleus. It shows unique trafficking to the cell nucleus of all the treated cells, also at polymer doses as low as cytotoxicity is very low. Also, it will be shown the efficacy of Ru-PhenAN as photosensitizers for photodynamic therapy (PDT), a treatment of pathological conditions based on the photo-activation of a bioactive compound, which is not harmful in the absence of light irradiation [3].

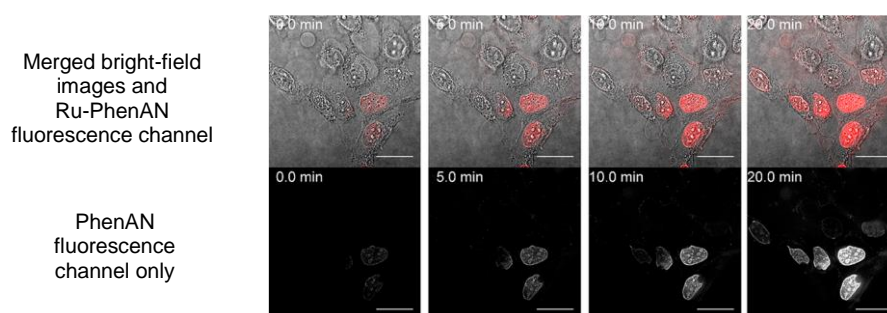


Figure 1. Cellular localization of Ru-PhenAN in HeLa cells incubated with 30 $\mu\text{g}/\text{mL}$ of Ru-PhenAN for 1 h. The fluorescence images and overlap with the bright-field channel show progressive accumulation of Ru-PhenAN at the nuclear level. Scale bar: 25 μm .

References

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