Rationally Designed Long-Wavelength Absorbing Metal Complexes as Photosensitizers for Photodynamic Therapy

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Photodynamic Therapy (PDT) has expanded the range of treatment opportunities for some fungal and bacterial infections and cancer. The first clinically approved photosensitizer (PS) was Photofrin®, which is used to treat various types of cancer (e.g. non-small lung, bladder, oesophageal or brain cancer). As the majority of clinically accepted and investigated PSs are based on the same structural scaffold, these compounds are usually associated with similar drawbacks (e.g. poor water solubility, tedious synthesis and purification, photodegradation and slow clearance from the body causing photosensitivity). To overcome these limitations, existing PSs have been modified revealing a new class of PS. As an emerging class of compounds, Ru(II) polypyridyl complexes have gained much attention due to their attractive chemical and photophysical properties (e.g. high water solubility, high ROS production, chemical stability and photostability). Despite recent research efforts, the majority of investigated Ru(II) polypyridyl complexes lack absorption in the biological spectral window (600-900 nm), limiting their use for the treatment of large or deep-seated tumours. During this talk, we will present our latest results on the use of novel Ru(II) polypyridyl complexes as long wavelength absorbing PSs for PDT.[1-4]

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