Amphiphilic Pt(II) complex for in vivo imaging applications

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Transition metal complexes have attracted much attention because of their rich and peculiar chemical and spectroscopic properties that have found applications in different fields and even as therapeutics.[1] In this field, Pt(II) complexes have been extensively studied especially for cancer treatment thanks to their high cytotoxicity. Platinum complexes can be very luminescent and their emission has been investigated for optoelectronics, while their use as luminescent probes, for cellular imaging, has been much less explored . One of the main drawbacks of phosphorescent compounds as optical labels is the efficient quenching of dioxygen in solution. This problem can be overcome by exploiting the high tendency of such square planar compounds, containing conjugated ligands, to self-assembly in supramolecular structures. This phenomenon can significantly enhance the emissive properties of Pt(II) compounds, because of the formation of new excited states (metal-metal ligand charge transfer, MMLCT) and an increasing rigidity due to the packing of the units, and as a consequence, also a slower or negligible diffusion of dioxygen in the assembled structures. The assemblies therefore can become better probes for imaging application due to their enhanced emission and reduced reactivity.[2] In this regard, our research group has already demonstrated the aggregation induced emission for Pt(II) complexes[3,4] in different media. In this contribution we describe the synthesis and characterization of a luminescent amphiphilic platinum compound, soluble in water, containing a N^N^N pyridil-triazolate and a positively charged functionalized pyridine and its behaviour in vivo. The complex aggregates in water giving a very bright orange luminescence. As an in vivo model we have employed an invertebrate, transparent, freshwater polyp, Hydra vulgaris. It was treated with the phosphorescent complexes at only 20 µM concentration.,
The compound self-assembly in vivo and in particular accumulate in the tentacles of the animal. Interestingly, the results obtained suggest not only the use of this compound for bioimaging and cell tracking but also as enhancer of cell proliferation.

References:

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