

Amphiphilic Pt(II) complexes for *in vivo* bioimaging applications

Giorgio Facchetti, Alessandro Aliprandi, Isabella Rimoldi, Claudia Tortiglione, Tania Pecoraro, Giuseppina Tommasini, Angela Tino, Simona Morghera, Luisa De Cola

Metals are essential cellular components selected by nature to carry out indispensable biochemical processes in living organisms. Indeed, transition metals are endowed with unique characteristics and reactivity towards organic substrates.^{1,2} These are the reasons why transition metal complexes have attracted much attention and because of their rich and peculiar properties have found applications in therapeutics and bioimaging. In this field, Pt(II) complexes have been extensively studied especially for cancer treatment due to their high cytotoxicity. Conversely, their application as luminescent probes³ for cellular imaging has been still poorly investigated probably as a consequence of the quenching exerted by dioxygen in water and biological fluids. This apparently drawback could however be overcome by exploiting the high tendency of such square planar compounds to self-assembly in supramolecular structures. The establishment of Pt-Pt metallophilic interactions can significantly enhance the emissive properties of these compounds, so that in principle many biologically relevant processes can be followed in real-time by Pt-based probes.⁴ Recently, our research group has synthesized and characterized a series of luminescent amphiphilic platinum complexes based on a N^NN pyridil-triazolate functionalized with different ancillary ligands to be used *in vivo* bioimaging applications. In particular, Pt-X showed no toxicity up to 72h in invertebrate freshwater polyp *Hydra vulgaris* at 20 μ M emitting a bright orange phosphorescence, mostly localized inside tentacle's tissues. *In vitro* studies on HaCat keratinocytes highlighted the ability of Pt-X to bind plasma and nuclear membranes and surprisingly to enhance cell proliferation in wound healing assays, suggesting a possible -still under investigation- application of this class of platinum complexes in the field of regenerative medicine.

1. Chem. Rev., 2019, 119, 2, 727–729
2. Current Opinion in Chemical Biology, 2021,61:19–31
3. Biomater. Sci., 2021, 9, 285
4. Chemistry, 2020, 26(48): 11007–11012

