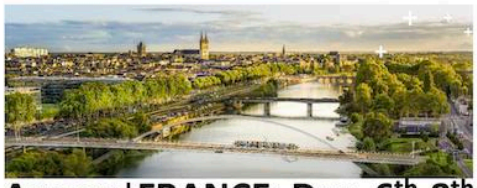

Bimodal nanoparticles for MRI and optical imaging based on polymer vesicles (polymersomes) for image-guided drug delivery

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In modern medicine, bioimaging acquired a leading place among the diagnosis methods. This is why researches are continually being carried out to improve the available techniques. One of the most used modalities to obtain anatomical information is magnetic resonance imaging (MRI). Although it is highly resolutive, it suffers from low sensitivity, which needs to be enhanced by a contrast agent. However, the clinically approved commercially available contrast agents are based on gadolinium complexes, which can lead to nephrogenic systemic fibrosis for certain patients. That is why the synthesis of complexes based on another magnetic cation, such as manganese (Mn^{2+}), is developed. Manganese ions are indeed potentially less toxic since they are naturally present in the body.[1] Further improvements will consist in the optimization of the relaxometric properties of the macrocyclic complexes grafted on polymer nano-vesicles, also called “polymersomes”. These are made of a pH-sensitive polyester shell encapsulating doxorubicin in order to obtain a controlled release of the drug in the acidic tumoral environment. A bimodal system is also envisaged for increasing the sensibility by using optical imaging in the near infrared with the ZW800-1, a green indocyanine derivative. The final objective is thus to obtain a bimodal nanostructure with encapsulated doxorubicin. (Figure 1)

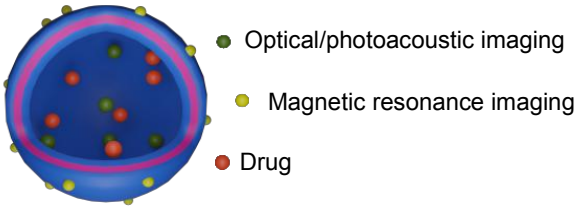

Figure 1: Schematic representation of the desired nanostructure

Reference

[1] M. Devreux *et al*, Inorganic Chemistry, 2021, 60, 6, 3604–3619