M2 Pharmacotechnie

Laboratoire / Institut : Institut Curie, UMR9187/U1196.
Equipe de recherche : Chemistry and Modelling for Protein Recognition.
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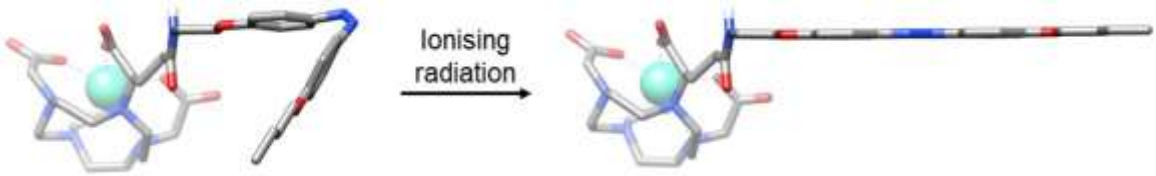
Formulation of MRI-detectable compounds for radiotherapy-triggered therapeutic actions

Electromagnetic radiation-triggered therapeutics are suffering from no translation into wide clinical applications for many years.[1] Even if ingenuity of the currently developed photo-triggered systems is impressive (cage compound, switch, motor, pump, etc.), they are still facing to be unsuitable for large clinical practices due to the low-energy photons required for their activation and which cannot reach tissues deeper than 1 cm. On the other hand, high-energy photons able to reach any depth in the body, such as those used for radiotherapy, cannot induce specific and selective molecular actions.

By the association of approaches from photoactivation and radiotherapy, our group recently developed theranostic prodrugs adapted for MRI imaging and activation into deep-tissues using radiotherapy sources.[2] This new development in photoactivation opens the way towards novel opportunities in the translation of photoswitching molecular tools currently limited to research area into clinical applications, and paves the way towards the development of original therapeutic approaches.



Inactive prodrug Active drug

These investigations are part of an interdisciplinary research initiative and rely on a collaborative network at the intersection of chemistry, physics, and biology. The internship project is part of the formulation of new compounds able to induce radiotherapy-triggered therapeutic effects. It will include **formulation of liposomes and/or emulsions and physicochemical characterization**.

Required skills :

We are looking for an intern with a **strong motivation** to engage in **interdisciplinary science**. **Knowledge formulation is required**, and scientific curiosity is highly valued.

References :

1) D. Liu, F. Yang, F. Xiong, N. Gu, *Theranostics*, **2016**, *6*, 1306.
2) A. Guesdon-Vennerie, P. Couvreur, F. Ali, F. Pouzoulet, C. Roulin, I. Martínez-Rovira., G. Bernadat, F.-X. Legrand, C. Bourgaux, C. L. Mazars, S. Marco, S. Trépout, S. Mura, S. Mériaux, G. Bort, *Nat. Commun.*, **2022**, *13*, 4102.