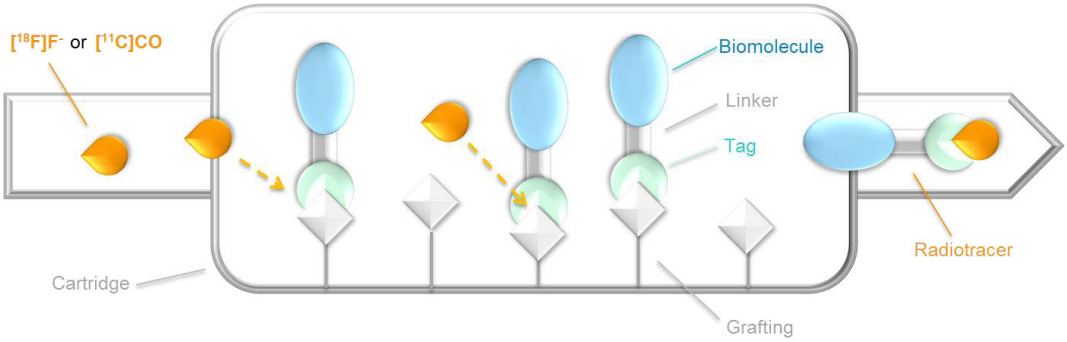
^{18}F- and ^{11}C-labelled bioconjugates for positron emission tomography (PET): from design to developing new synthetic tools

Dr. **Philippe HERMANGE**, MCF

ISM *Institut des Sciences Moléculaires*, UMR 5255, CNRS, Université de Bordeaux,
351 Cours de la Libération, 33405 Talence cedex
e-mail: philippe.hermange@u-bordeaux.fr

Positron Emission Tomography (PET) has become a powerful tool for medical diagnostic over the last decades, and incorporation of ^{18}F ($t_{1/2}$ = 109.8 min) and ^{11}C ($t_{1/2}$ = 20.4 min) isotopes into molecules of biological interest has been extremely investigated by organic chemists.[1] However, regarding their extremely short half-lives, the time to prepare the injected sample (i.e. synthesis *and* purification) has to be reduced to the minimum to achieve an efficient procedure, and the overall operating mode should be manageable by non-chemists technicians. Such constraints can explain the difficulty to transfer new synthetic methods to clinical applications.[2] Indeed, standard strategies often imply complex chemical preparations and/or need a time-consuming HPLC purification at the end of the synthesis to remove the large excess of starting material (usually 10^3 to 10^5 fold). In this context, we will describe the designs and the syntheses of new biomolecule-based conjugates, which allow a last-step labelling by [^{18}F]fluoride[3] or [^{11}C]CO.[4,5] Moreover, exploratory researches to prepare solid-phase supported precursors with a labelling-triggered release will be also presented, aiming fully automated and user-friendly procedures for the versatile production of PET tracers.[6,7]



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