Pre-Clinical dosimetry and radiobiology modelling in Targeted Radionuclide Therapy

Position: 30 month contract
Institution: Montpellier Cancer Research Institute (IRCM), France
Availability: first trimester 2021

Montpellier Cancer Research Institute (https://www.ircm.fr) team 7 (Radiobiology for Targeted and Personalised Radiotherapy) that will be officially created on January 2021 is opening a *30 month position* for a research scientist (Post Doc).

General context:
Our team is developing a streamlined approach to preclinical targeted radionuclide therapy (TRT) for translational purposes. We are launching a project that considers the *Development of models for predicting dose-effect relationship in TRT* (DeMoDoRe).

Summary of the project :
Scientific background: While external beam radiotherapy (EBRT) relies on established absorbed dose-response relationships, targeted radionuclide therapy (TRT) is still used as radioactive chemotherapy and it remains very difficult to predict its effectiveness or toxicity based on dosimetric indexes. The reasons being that dosimetry is more complex than for EBRT and that absorbed doses *alone* may not give account of efficacy or efficacy.
Biological effective dose (BED) and Equivalent uniform BED (EuBED) were introduced to give account of the protracted and non-uniform irradiation delivered by TRT. However, there are non-targeted effects (e.g. bystander and immune responses) which are not absorbed dose-related.
To better understand and optimise clinical TRT, we aim to develop new radiobiologic parameters that would consider these non-targeted effects, thereby associating the different phenomena that contribute to radiobiological observations post irradiation.
This project will combine experimental radiobiology experiments on available preclinical models combining vectors and isotopes (^{90}Y, ^{177}Lu, ^{225}Ac) with refined absorbed dose assessment in order to identify the parameters (absorbed dose related or not) that contribute to radiobiological effect. *<u>The current job offer is related to radiation transport and absorbed dose effect modelling.</u>*

Job description:
The selected applicant will be in charge of preclinical dosimetry modelling, at various scales (small animal or cell). Depending on experimental settings, analytical or Monte Carlo approaches will have to be implemented.
- Dosimetric indexes will have to be derived from the experiments: mean absorbed doses, absorbed dose rates, Dose Volume Histograms and Equivalent Uniform Doses (EUD), etc.
- Radiobiologic indexes such as BED and EuBED will be calculated. These parameters will be tested to identify which (if any) can give account of the effects observed from experimental studies performed for the project.

This project is highly multidisciplinary. The recruited person will have to work and exchange with radiobiologists and nuclear medicine physicians. The successful candidate will also have to participate to meetings and teleconference in relation to the project.

Profile of the candidate:
The ideal candidate will have a background in Medical Physics, ideally with previous experience in radiopharmaceutical dosimetry. The candidate should also have some background in computing sciences. Fluency in French is not compulsory, but mastery of professional English is required for communication within the team.

Salary details and contact:
The salary will follow INSERM guidelines, depending on education and experience.
Send CV and application letter to Manuel BARDIES (manuel.bardies@inserm.fr).