



18 month Post-Doc position for simulation and modeling in imaging

Dosimetry studies using the GATE Monte Carlo simulation platform in ^{99m}Tc -NTP 15-5 SPECT imaging targeting proteoglycans for assessing osteoarthritis response to innovative therapeutic approaches

Supervisor: Lydia Maigne, associate professor, HDR
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Contact:

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Context :

A-SPECT project aims at offering at shorter term a new radiopharmaceutical (called ^{99m}Tc -NTP 15-5 and covered by the world patent WO 01/00621 A1), for targeting proteoglycans as major actors in osteoarthritis pathways, and allowing a functional molecular joint imaging in nuclear medicine. Considering the portfolio of radiotracers routinely used or under development in nuclear medicine, there is no radiotracers able to target cartilage as ^{99m}Tc -NTP 15-5 does. Such ^{99m}Tc -NTP 15-5 imaging of joint has the opportunity to provide new starting points to improve patient follow-up and "accelerate" development of innovative therapies.

In order to demonstrate this hypothesis, and to characterize ^{99m}Tc -NTP 15-5 radiotracer, a collaborative program combining both toxicology studies and preclinical research has been built.

Objectives to tackle in the project are:

- (i) the relevance of ^{99m}Tc -NTP 15-5 imaging for assessing innovative DMOAD approaches, that appeared promising in 2014 for clinical application, with the opportunity to bridge the gap between preclinical and clinical testing.
- (ii) the dosimetry profile associated to ^{99m}Tc -NTP 15-5 imaging of cartilage
- (iii) the extended toxicology profile of ^{99m}Tc -NTP 15-5 as recommended by ANSM, in view of a future clinical transfer

Description of the project:

In the department for Health & Environment of LPC Clermont-Ferrand, we wish to implement the dosimetry associated to ^{99m}Tc -NTP 15-5 imaging of cartilage for rabbits and extrapolate such dosimetry for human.



Actions to fulfill during the 18-month period:

- Collect the biodistribution data and SPECT imaging of ^{99m}Tc -NTP 15-5 imaging of cartilage for rabbits.
- Prepare the 3D numerical rat phantoms from CT scans and elaborate the segmentation of organs (especially liver, kidneys and bone marrow)
- Implement GATE Monte Carlo simulations in order to calculate S-factor and dose for rabbits.
- As a first approximation and in the objective of a clinical transfer, implement GATE Monte Carlo simulations in order to calculate S-factors and dose for human.

Through these actions, the candidate will participate to the improvement and validation of the GATE Monte Carlo simulation for dosimetry purpose in preclinical radiation therapy.

The candidate will join an active multidisciplinary research group composed of physicists, computer scientists, biologists and physicians.

This project requires skills in medical physics and computer science. The knowledge of different Monte Carlo algorithms and / or software will be highly appreciated, especially the knowledge of the C ++ language. A medical physics graduate is more than welcome with a strong background in nuclear medicine.

Salary: 2000 € /month

Employer: University Blaise Pascal

Location: Laboratoire de Physique Corpusculaire, UMR6533, Clermont-Ferrand and Jean Perrin Cancer centre

Duration: 18 months, from 1st of February 2016 to 31st of July 2016

For more information:

Laboratoire de Physique Corpusculaire : <http://clrwww.in2p3.fr>

Department for Health and Environment of LPC: <http://ppse.in2p3.fr>

OpenGATE collaboration: <http://www.opengatecollaboration.org>

To candidate:

Send your CV with your PhD manuscript or last publications together with a cover letter by email to: maigne@clermont.in2p3.fr

If your application is successful, you will be contacted for an interview

Deadline to candidate: 1st of January 2016

