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PhD in Pharmaceutical Sciences
2015-2016

INVITATION to the Public defence of

Anneleen BLYKERS

To obtain the academic degree of '**DOCTOR IN PHARMACEUTICAL SCIENCES**'

Immuno-PET imaging of cancer using small antibody fragments: Development and preclinical validation of ¹⁸F-radiolabeled Nanobodies towards personalised medicine.

Thursday 24 March 2016

Auditorium **5**, 17:00

Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:

<http://www.vub.ac.be/english/infoabout/campuses>



Vrije Universiteit Brussel

Summary of the dissertation

Positron emission tomography (PET) is becoming the driving force of molecular imaging. This imaging technique detects distribution of radiopharmaceuticals in the body allowing rapid measurement of metabolic changes. Hence, PET-probes enable rapid diagnosis and individual assessment of treatment response as path towards providing personalised medicine. Fluorine-18 (^{18}F) is a particularly suitable and attractive radioisotope for PET-imaging due to its availability at high activities and relatively long half-life ($t_{1/2}$ 109.8 min) permitting multi-step synthesis and distribution of ^{18}F -radiopharmaceuticals to other clinical services. In contrast to full size antibodies, radiolabeled smaller antibody fragments like camelid single-domain antibody-fragments, Nanobodies, are attractive tools for targeted molecular imaging. These Nanobodies benefit from easier generation, improved tissue penetration and their short circulatory half-life, which matches the half-life of ^{18}F . This thesis is aimed at developing and comparing radiochemical synthesis procedures for incorporating the PET radioisotope ^{18}F in the Nanobody molecule. After optimization of different labeling strategies, subsequent preclinical validation of the new PET tools in tumor models was studied to evaluate their utility and value. Clinical translation of these Nanobody based PET probes empowers the improved diagnosis and evaluation of response to anticancer therapy.

Curriculum Vitae

Anneleen Blykers was born on September 22nd 1988 in Leuven. In 2006, she started the study of Pharmaceutical Sciences at the Vrije Universiteit Brussel (VUB) and graduated as Pharmacist in 2011. During her master thesis work on the radiosynthesis of the hypoxia tracer ^{18}F -FMISO, performed at the In vivo Cellular and Molecular Imaging (ICMI) laboratory, her scientific interest in radiopharmacy and molecular imaging using radiolabeled antibody fragments raised. In 2011, she prolonged her stay in the lab working on ^{18}F -labeling of Nanobodies under promotorship of Prof. Vicky Caveliers and Prof. Catarina Xavier. During her PhD she had the opportunity to work for a period of six months at the Wolfson Molecular Imaging Centre (WMIC) in Manchester under supervision of Dr. Christian Prenant and Dr. Adam McMahon. She is first-author of 2 published papers in peer-reviewed journals and is currently preparing two more papers. She presented her research on several international and national conferences and supervised three master thesis students. In parallel she completed her training as Radiopharmacist at the Nuclear Medicine Department (UZ-Brussel).