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RadboudUMC

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Department of Small animals, UGent

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Cellular and Molecular Immunology
Vrije Universiteit Brussel

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Department of Neurosurgery
Vrije Universiteit Brussel/UZBrussel

Prof. Philippe De Sutter
Department of Gynaecology
UZBrussel

Prof. dr. Ilse Smolders, Chair
Center for Neurosciences
Vrije Universiteit Brussel

Prof. dr. Sophie Hernot, Promotor
In vivo Cellular and Molecular Imaging
Vrije Universiteit Brussel

Prof dr. Nick Devoogdt, Co-promotor
In vivo Cellular and Molecular Imaging
Vrije Universiteit Brussel

VRIJE UNIVERSITEIT BRUSSEL

PhD in Medical Sciences
2019-2020

INVITATION to the Public defence of

Pieterjan DEBIE

To obtain the academic degree of **'DOCTOR OF MEDICAL SCIENCES'**

Design of fluorescent and hybrid nanobody tracers for image-guided surgery.

Wednesday, 13 November 2019 at 4 p.m.
In Auditorium **Piet Brouwer**
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:
http://www.vub.ac.be/english/infoabout/campuses

Summary of the dissertation

Surgery, in combination with or without chemo and/or radiotherapy, remains the most recommended treatment with curative intent for many localized tumours. Since the prognosis of the patient is greatly impacted by the presence of residual disease, improving the detection of malignant lesions during surgery could be of great benefit. A promising technique to achieve this, is by using fluorescence guidance. Here, fluorescent contrast agents are used intraoperatively to delineate tissues of interest (such as tumors).

In this dissertation, the optimal design of targeted fluorescent tracers based on nanobodies, which are small antigen binding fragments derived from camelid heavy-chain antibodies, was investigated on the preclinical level. Both the properties of the nanobody itself, with regard to their tumor penetrating potential, as well as the effect of the addition of a fluorophore, were evaluated, and a proof of concept image-guided surgery study was performed. Finally, the design of a bimodal nanobody tracer, combining fluorescence and nuclear imaging, was investigated.

This work reveals nanobodies to be very promising candidates for the design of fluorescent and bimodal tracers for surgical guidance. Further developments over the next years must now pave the way for clinical translation, where the true value of these tracers for the patient will be determined.

Curriculum Vitae

Pieterjan Debie was born in Brussels on 02/12/1991. He studied Bio-engineering sciences at the VUB, and graduated in 2015. Pieterjan then started his PhD under promotorship of Prof. Sophie Hernot in the In vivo Cellular and Molecular Imaging lab (ICMI). His research concerns the design of fluorescent nanobody tracers for use in image-guided surgery.

Pieterjan has presented his work at multiple international conferences and has published several first author publications in respected journals in the field.