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PhD in Medical Sciences
2018-2019

INVITATION to the Public defence of

Gezim BALA

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

Molecular imaging of atherosclerotic plaque inflammation using nanobodies: paving the path towards clinical translation.

Thursday 25 April 2019

Auditorium Vanden Driessche, 16:00
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

In the recent years, important advancements have been achieved in atherosclerosis research by elucidating the molecular and cellular pathways of inflammation that trigger the thrombotic complications of atherosclerosis. Translating of these findings has stimulated the development of new multi-modal imaging modalities incorporating molecular probes to provide detailed information involving atherosclerosis plaque structure and inflammation.

The aim of this thesis was to optimize and investigate the potential of small antigen fragments called nanobodies as nuclear imaging agents to target atherosclerosis plaque inflammation as a step towards clinical translation.

In the first part of the thesis we have described the development and validation of a nanobody based molecular probe for PET/CT imaging of vascular cell adhesion molecule-1 (VCAM-1) expression as a marker of plaque inflammation. We have shown that ¹⁸F-radiolabeled anti-VCAM-1 nanobody is a specific tracer that accumulates in atherosclerotic lesions.

In the second part of the thesis, we have demonstrated that anti-VCAM-1 nanobody can be radiolabeled with radiometals, such as ⁶⁸Ga as an alternative strategy that is easy to implement in clinical routine.

In the third part of the thesis we have investigated the feasibility of imaging the presence of alternatively activated macrophages by targeting macrophage mannose receptor (MMR) expression in a murine model of atherosclerosis. In this particular animal model, we didn't find a correlation between tracer uptake and plaque burden because of the intraplaque absence of MMR expression.

Curriculum Vitae

Gezim Bala was born on 23th of March 1982 in Shkoder, Albania. He started Medical School at University of Tirana and obtained his master degree at University of Ghent. During his last year of medical studies, he participated on Dr. Bram Roosens' scientific project at Vrije Universiteit Brussel, regarding aortic valve calcifications. He was graduated in 2011 and started his residency in Internal Medicine /Cardiology. Meanwhile he began with his PhD programme under supervision of Prof. Hernot Sophie and Prof. Van Camp Guy/Prof. Cosyns Bernard at In Vivo Cellular and Molecular Imaging (ICMI) Laboratory of the Vrije Universiteit Brussel. During his research he focused on the development of nuclear tracers to target atherosclerotic plaque inflammation. His research has been presented at several national and international scientific conferences and has resulted in 15 scientific publications in international peer-reviewed journals, among which 5 publications as first author. In 2014, he received the Young Investigator Award from European Association of Cardiovascular Imaging and in 2016, he won the Young Investigator Award from Belgian Society of Cardiology. His residency in cardiology will be finished in September 2019.