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VRIJE UNIVERSITEIT BRUSSEL

PhD in Medical Sciences
2020-2021

INVITATION to the Public defence of

Maxim GEEROMS

To obtain the academic degree of

'DOCTOR OF MEDICAL SCIENCES'

Improving Fat Grafting Outcome through Enhanced Vasculogenesis: Cell-enriched Fat Grafting with Quality and Quantity cultured Endothelial Progenitor Cells

The defence will take place on Monday, 12th October 2020 at 7 p.m.

and will be organised online via Zoom meeting
accessible through the following link:

https://gf.vub.ac.be/redirects/PhD_defense_Maxim_Geeroms.php

and in Auditorium Piet Brouwer
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

ADMITTANCE to the auditorium will only be granted upon presentation of the personal invitation from the PhD candidate.

Summary of the dissertation

Fat grafting has become common practice for soft tissue reconstruction. Its main limitation remains ischemia with subsequent tissue loss, patient dissatisfaction and the need for additional surgical procedures.

Mononuclear cells (MNCs) in the peripheral blood contain a low percentage of endothelial progenitor cells (EPCs), and often these EPCs have an impaired function in human subjects. The Quality and Quantity culture (QQ) has been developed to phenotypically transform MNCs into a highly vasculogenic cell population for therapeutic vasculogenesis. We hypothesized that enrichment of fat grafts with QQ-cultured EPCs leads to the development of a dense vascular network in the fat graft, contributing to an increased graft retention and better tissue quality.

In two experimental studies, this hypothesis was tested. Firstly, QQ-cultured KSL-cells, as a murine source of EPCs, were added to murine adipose tissue, and grafted in recipient mice. Secondly, QQ-cultured human MNCs were added to lipoaspirates, and grafted in nude recipient mice. After in vitro confirmation of the vasculogenic potential of the QQ-cultured cells, we demonstrated the in vivo contribution of the QQ-cultured cells to the vascularization. The QQ-cultured KSL-cells increased the vessel density in murine fat grafts, and decreased fibrosis. The QQ-cultured MNCs also stimulated the fat graft to develop a rich vessel network, with EPCs integrating in vessel walls, and mitigated the graft's resorption.

Curriculum Vitae

Maxim Geeroms was born on December 15th 1988 in Brussels and studied medicine at the Vrije Universiteit Brussel. After graduating magna cum laude in 2013, he started the Plastic, Reconstructive and Aesthetic Surgery training under the supervision and mentorship of Professor Moustapha Hamdi. He worked in the Burn Centre in the Military Hospital in Brussels (2013-2014) and the Centre Hospitalier de Luxembourg (2014-2015), before interrupting his clinical training to start a PhD project in Medical Sciences. From 2015 to 2017, he was a full time researcher in the Plastic and Reconstructive Surgery lab in the Juntendo University in Tokyo, Japan. He conducted experimental scientific research in stem cell-based techniques for the improvement of fat grafting and vasculogenesis under the co-promotership and guidance of Professor Rica Tanaka and Professor Hamdi. Their work was published in Plastic and Reconstructive Surgery (PRS) Journal, and presented at international conferences in Japan, USA, Belgium, Italy, Spain, Finland, South Korea and France. Since 2017, Maxim Geeroms returned to the Universitair Ziekenhuis Brussel to continue his clinical training, with rotations in CHU Tivoli in La Louvière (2019) and AZ Sint-Jan in Bruges (2020).