Board of examiners

Prof. dr. Uri Ben-David
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Prof. dr. Karine Breckpot, Chair
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Prof. dr. Mieke Geens, Promoter
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VRIJE UNIVERSITEIT BRUSSEL

PhD in Medical Sciences
2020-2021

INVITATION to the Public defence of

Alexander KELLER

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

Shifting the context of differentiation: Chromosomal abnormalities in pluripotent stem cells

The defence will take place on **Wednesday**, **14 July 2021 at 4 p.m.**

and will be organised online

via Zoom meeting, accessible through the following link:

https://gf.vub.ac.be/redirects/PhD_defense_Alexander_Keller.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

Human pluripotent stem cells (hPSCs) are known to be genetically unstable, and recurrently acquire specific copy number variations (CNVs) throughout their genome, often as low-grade mosaics. This presents a significant challenge to the use of the cells in research and eventually the clinical. In this thesis we had two primary aims; first, to develop a novel technique to evaluate the mosaic nature of these cells and second, to evaluate the impact of recurrent gains of chromosome 12p13.31 on differentiation. We validated the use of shallow whole genome sequencing as an effective tool to identify CNVs in single hPSCs. We also identified a general reduction in differentiation capacity and the formation of residual pluripotent cells in differentiating hPSCs. This led to improved understanding of the molecular mechanisms involved in the onset of differentiation, and expanded our understanding of the impact recurrent CNVs can have on hPSCs.

Curriculum Vitae

Alexander Keller obtained a Bachelor of Science from the University of Oregon in 2011 (USA) with degrees in human physiology, biology, and chemistry. He obtained a Master of Science in molecular biology from the Vrije Universiteit Brussel in 2015, were he began work as a PhD candidate in the research group Reproduction and Genetics (REGE) under the supervision of Prof. dr. Claudia Spits and Prof. dr. Mieke Geens. During his PhD he was awarded the Strategic Basic research fellowship by the Fonds voor Wetenschappelijk Onderzoek (FWO) as well as travel grants for oral presentations at international conferences. He has published five research papers, one as first author with a second paper currently under review. He also published a high impact review and book chapter.