

Board of examiners

**Prof. dr. Ludovic Vallier**

Wellcome - MRC Cambridge Stem Cell Institute  
University of Cambridge  
Cambridge, UK

**Prof. dr. Frederic Lluís Viñas**

Stem Cell Institute  
Katholieke Universiteit Leuven

**Prof. dr. Luc Leyns**

Developmental and Stem Cell Biology  
Vrije Universiteit Brussel

**Prof. dr. Joery De Kock**

In Vitro Toxicology & Dermato-Cosmetology  
Vrije Universiteit Brussel

**Prof. dr. Hilde Van de Velde, Chair**

Research Group Reproduction and Immunology  
Vrije Universiteit Brussel

**Prof. dr. Karen Sermon, Promoter**

Research Group Reproduction and Genetics  
Vrije Universiteit Brussel

**Prof. dr. Mieke Geens, Co-promoter**

Research Group Reproduction and Genetics  
Vrije Universiteit Brussel



PhD in Medical Sciences  
2019-2020

INVITATION to the Public defence of

**Dominika Dziedzicka**

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

**Differentiation propensity of human embryonic stem cell lines: assays and molecular mechanisms.**

**Thursday, 9 January 2020 at 5 p.m.**

In Auditorium **Piet Brouwer**

Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussels

How to reach the campus Jette:

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

---

## Summary of the dissertation

Human pluripotent stem cells (hPSCs) hold a great promise for many biomedical applications due to their ability to give rise to any cell type of the adult human body. However, not every hPSC line will differentiate towards a targeted lineage with high efficiency and this variability can significantly hinder hPSC-based applications.

The first aim of this PhD thesis was to evaluate distinct short-term differentiation assays (spontaneous embryoid body differentiation and directed differentiation in a monolayer and a micropatterned culture) for their suitability to accurately assess and compare differentiation propensities between individual human embryonic stem cell lines. The second aim was to gain new insight into molecular mechanisms which may cause differentiation bias. The two aims were addressed in three separate studies presented in the thesis.

Taken together this thesis demonstrates that differences in the activity of signalling pathways influence the efficacy of early lineage specification already at the very onset of differentiation and highlights which technical aspects should be taken into account to study the differentiation propensity and which to improve the efficiency of hPSC differentiation protocols.

## Curriculum Vitae

Dominika obtained her Master degree in Medical Biotechnology at University of Warsaw with a thesis about toxicology of human neural stem cells. In September 2013, she joined Research Group Reproduction and Genetics at Vrije Universiteit Brussel as a PhD candidate under the supervision of Prof. Karen Sermon and Prof. Mieke Geens. Her PhD project aimed to investigate differentiation propensity of individual human pluripotent stem cell lines.

In September 2015, Dominika was awarded a 4-year PhD fellowship from Research Foundation – Flanders. From 2017 to 2019, she did long-term internships as an International Visiting Graduate Student in Prof. Peter Zandstra lab at University of Toronto, where she performed part of her PhD research using a micropatterned cell culture platform.

During her PhD, Dominika co-authored five research articles, including one as a first author and one as a joint first author, one review article, and she presented her research at multiple international and national conferences.