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**Prof. Dr. Stefan Schlatt, Co-promoter**

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PhD in Medical Sciences  
2018-2019

INVITATION to the Public defence of

**Elissavet NTEMOU**

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

**Experimental approaches to improve immature testis tissue transplantation for fertility restoration.**

**Thursday 20 June 2019**

Auditorium **Vanden Driessche**, 17:00  
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussels

How to reach the campus Jette:

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

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## Summary of the dissertation

Chemo- and radiotherapy used to treat cancer or as preconditioning treatment can cause spermatogonial stem cell (SSC) depletion resulting in permanent infertility. Since fertility is an important aspect in human life, fertility restoration strategies are needed. The only fertility preservation option for prepubertal boys is the cryopreservation of immature testis tissue (ITT) containing SSCs. Testis tissue transplantation (TTT) is still an experimental *in vivo* fertility restoration strategy. Prior to a clinical implementation of the technique, improvement of the efficiency of TTT is required. In the first part of this thesis, we demonstrated that pre-treatment of human ITT with vascular endothelial growth factor (VEGF), an angiogenesis inducing factor, improved xenotransplant vascularisation and seminiferous tubule integrity. Moreover, spermatogonial quantity increased over time in the VEGF-treated xenotransplants. In the second part, the superiority of testicular parenchyma was demonstrated over a subcutaneous site as potential site for TTT. ITT from a non-human primate following intratesticular xenotransplantation achieved better recovery rates and differentiation of spermatogonia into spermatozoa suggesting that testicular parenchyma provides the required microenvironment for germ cell differentiation and long-term survival of ITT, likely due to the favourable temperature regulation, growth factors and hormonal support.

To conclude, VEGF improves the efficiency of ITT transplantation and the testicular parenchyma supports the survival and complete maturation of ITT resulting in spermatozoa production. These results contribute to the successful implementation of TTT as clinical application.

## Curriculum Vitae

Elissavet Ntemou was born in Thessaloniki, Greece. She obtained her Bachelor degree in Biology from the Aristotle University of Thessaloniki and she worked for a short period as a Biology teacher. She then moved to the UK to continue her studies at Queen's Medical Centre at the University of Nottingham, where she was awarded with the Master of Medical Sciences in Assisted Reproduction Technology. She worked as a Transgenic Microinjectionist at the Core Centre of Biotechnology Services at the University of Leicester (UK) before she joined the BITE lab as a PhD student supported by the European FP7 program Marie Skłodowska-Curie Actions – International Training Network GROWSPERM. Her work was focused on the improvement of immature testis tissue transplantation as a strategy for fertility restoration. This work resulted in 2 publications as first author and 1 as co-author in top-quality journals. She had presented her work in several international conferences including the meeting of the European Society of Human Reproduction and Embryology, the European Testis Workshop and the World Congress of the International Society for Fertility Preservation. She has been awarded with "Best Embryologist Research Award" by the Obstetric and Gynaecological Society of Thessaloniki and the "Outstanding abstract Award" by the International Society for Fertility Preservation.