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Joint PhD VUB & UvA
2018-2019

INVITATION to the Public defence of

Jaime ONOFRE MEZA

To obtain the academic degree of

'DOCTOR IN MEDICAL SCIENCES'

Testicular cell freezing for fertility preservation in pre-pubertal boys undergoing gonadotoxic therapy.

Monday 27 May 2019

Auditorium **Piet Brouwer**, 17:00
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

Fertility preservation prior to gonadotoxic therapies is an important emerging field. This technology seeks to safeguard future chances of fatherhood in prepubertal patients facing fertility compromising regimens (e.g. chemo- or radiotherapy) by cryopreserving spermatogonial stem cell (SSC)- containing testicular tissue (TT). This procedure is currently offered as an innovative experimental method. This thesis started with an overview of the efficiency of existing TT and testicular cell suspension (TCS) cryopreservation protocols. Efficient cryopreservation protocols for human TT include DMSO, human serum albumin and sucrose, and these are currently applied in the clinic. For TCSs, cryopreservation and cell functionality remained suboptimal. We optimized the cryopreservation protocol for TCSs with immature mouse TCSs aiming for a better cell recovery and fertility restoration after SSC transplantation. The use of an insulate-controlled freezing device and DMEM supplemented with 1.5M DMSO, 10% FCS and 60µM of an anti-apoptotic factor (Z-VAD(Oe)-FMK) as cryomedium resulted in 49% survival of SSCs. For human primary testicular cells, upon freezing, the highest recovery of viable cells was achieved by freezing cells using DMEM supplemented with 1M DMSO, 20% HSA, 30 µM Z-VAD(Oe)-FMK and 200 mM of trehalose in an insulate-controlled slow freezing device. Controlled-rate thawing improved the viability even more. Finally, we compared the ability to restore fertility by SSCT after cryopreserving TCSs with that after cryopreserving TT. Our results highlighted the superiority of TT cryopreservation, as currently applied, to preserve functional SSCs.

Curriculum Vitae

Jaime Onofre was born on the 15th of December 1986 in Guayaquil, Ecuador. He studied at the Medical Sciences Faculty of the University of Bordeaux where he obtained a Bachelor degree in Physiology, Pathology and Health. At the Medical Sciences Faculty of the University Paris Diderot, he obtained a Master degree in Human Reproduction and Assisted Reproduction Technologies. After having completed an internship at the BITE lab, he was selected for a joint PhD mandate at the Vrije Universiteit Brussel and the Universiteit van Amsterdam with support of the European FP7 program Marie Skłodowska-Curie Actions – International Training Network GROWSPERM. For 4 years, he worked on the optimization of testicular cell cryopreservation. This work resulted in 2 publications as first author and 1 as co-author in top-quality journals. His work has been presented in several international conferences including the European Testis Workshop, the meeting of the European Society of Human Reproduction and Embryology and the meeting of the International Society for low temperature Biology and Medicine.