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Geneeskunde & Farmacie

GF

PhD in Medical Sciences
2014-2015

INVITATION to the Public defence of

Afroditi MERTZANIDOU

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

Chromosomal abnormalities in the human preimplantation development.

Wednesday 29 April 2015
Auditorium **P. Brouwer**, 16:00
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:
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Summary of the dissertation

Chromosomal abnormalities arising during pre-implantation embryo development negatively influence embryo survival. Human preimplantation embryos have high levels of aneuploidy and mosaicism. It is suggested that embryos correct their ploidy status as they move further in development but it is still unclear how and when this correction occurs.

We used single-cell array comparative genomic hybridisation (array-CGH) to study the levels of aneuploidy and mosaicism in top quality Day-3 and Day-4 preimplantation embryos. We investigated whether the correction of the genetic content of embryos initiates at Day-4 of development and we aimed at visualizing the evolution of chromosomal imbalances and mosaicism throughout the first four days of human development.

We analysed 14 Day-3 IVF embryos and we found 71.4% of them being mosaic. From the analysed blastomeres, 55.7% were diploid and 44.3% had chromosomal abnormalities. Next, all blastomeres of 13 Day-4 good-quality embryos (4 fresh PGD embryos and 9 cryopreserved embryos) were analysed. In one PGD embryo all the analysed cells were euploid and the other three were mosaic (16-75% abnormal cells). All 9 frozen-thawed embryos were abnormal. Six were mosaic (30-100% abnormal cells) and three had meiotic abnormalities, in two of which co-existed with mitotic abnormalities.

Our findings highlight the high prevalence of aneuploidy and mosaicism up to Day-4 of preimplantation development. Mitotic chromosomal abnormalities seem to appear early in development but do not prevent the embryo development at least until Day-4. We did not observe signs of correction of the genetic embryo content until Day-4 of development.

Curriculum Vitae

Afroditi Mertzanidou studied Biology at the Aristotle University of Thessaloniki (Greece) and graduated in 2004. In 2006 she obtained a master's degree in Molecular Biology, Genetics and Biotechnology at the same university. From 2005 to 2007 she was research assistant at the 'Biogenesis' IVF unit, Thessaloniki, Greece. She joined the Research group Reproduction and Genetics of the VUB in October 2007 as a PhD student supported by the IWT. Her project focussed on investigating the levels of aneuploidy and mosaicism in high quality human preimplantation embryos on day-3 and day-4 of development by using single cell array-CGH. She has authored seven peer-reviewed publications, with over 170 citations, two of which as first author. Since January 2013 she works in the Directorate General for Competition of the European Commission in Brussels.