Oral Presentations

INVITED SESSION

SESSION 01: KEYNOTE LECTURES SESSION

Monday 28 June 2010 **08:30 - 09:30**

O-001 Novel strategy with potential to identify developmentally competent IVF blastocys

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Introduction: The vast majority of embryos generated by assisted reproduction technology fail to implant. This failure must be ascribed to the embryo rather than the uterus as it is not uncommon to attain a single implantation following the transfer of more than one embryo of good morphological quality. Currently there are no markers fully predictive of developmental competence. The present study used a combination of blastocyst biopsy and DNA fingerprinting with the aim of identifying the gene expression profile of a developmentally competent human blastocyst.
Materials and Methods: Forty-eight patients undergoing assisted reproduction treatment consented to blastocyst biopsy followed by blastocyst transfer. Ten to twenty TE cells were biopsied from each blastocyst. Seven patients had transfers where all embryos implanted (defined as viable embryos, group 1). In contrast, 23 patients had transfers where none of the embryos implanted (defined as non-viable embryos, group 3). Biopsy samples were amplified and gene expression was evaluated using microarrays. For 18 patients in which some of the biopsied embryos implanted (Group 2), sibling trophectoderm biopsy samples and cells from subsequent offspring were subjected to DNA fingerprinting to determine which blastocyst in the transfer cohort developed to term.
Results: Blastocyst biopsy did not appear to impair developmental competence. Comparative microarray analysis of cDNA from pooled viable and non-viable samples identified over 7000 transcripts expressed exclusively by viable blastocysts. The most significant of these included genes involved in cell adhesion and cell communication, events important to the early stages of implantation. DNA fingerprinting of 3 cohorts of sibling embryos successfully identified the blastocysts that produced term pregnancies.
Conclusions: The combination of blastocyst biopsy, microarray gene expression profiling and DNA fingerprinting is a powerful tool to identify diagnostic markers of competence to develop to term. Further refinement of the gene list may result in a rapid diagnostic assay to prospectively identify the single most viable blastocyst among a cohort for transfer. The strategy may also be used to refine existing criteria such as morphology or metabolomics for selecting a blastocyst for transfer.

O-002 Innovative reproductive technologies: risks and responsibilities

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In view of the global burden of subfertility and the reproductive needs of couples at a high risk of having a child affected by genetic disease, efforts are needed for making assisted reproduction more effective, less burdensome and more equally accessible. However, new reproductive technologies are frequently introduced in clinical practice without a sound evaluation of their efficacy, effectiveness and/or safety. Safety issues in this context refer both to patients (mostly women) undergoing the relevant medical procedures, and to the health of children born as a result. Responsible innovation requires making potentially risky reproductive technologies the subject of research, ideally proceeding through the steps of preclinical investigations, clinical trials and (long-term) follow-up studies. Factors provoking morally problematic shortcuts to this scheme include the scientific rat race (being the first to publish results of clinical innovation), narrowly conceived provider interests, funding problems and legal limits to human embryo research.

Animal studies are a crucial first step that often also allows the study of multigenerational health effects. No such studies were done prior to the introduction of ICSI, not only because testing in animal models was too readily assumed to be technically impossible, but also because of the immediate success of the new approach, leading to the birth of healthy children. In the case of oocyte freezing, systematic preclinical studies were only undertaken after early clinical applications led to high rates of chromosomal damage and low effectiveness.

As results from animal studies cannot always be extrapolated to humans, preclinical research using human embryos may be useful for studying effects on developmental processes and epigenetic mechanisms. Unfortunately, the scope for this type of research is affected by the categorical prohibition of creating embryos for research in the European Convention on Human Rights and Biomedicine and in the law of several countries. Although commentators have referred to cryopreservation and in vitro maturation (IVM) of oocytes as examples of new technologies where preclinical embryo research might have been useful, the rapid dissemination of these procedures, especially oocyte freezing, seems to render this a superseded and increasingly irrelevant recommendation. However, a case may still be made for considering the inclusion of embryo research in a multi-track approach to evaluating these technologies. Of course, this requires a careful procedure for obtaining the necessary donor-oocytes in a morally responsible way. Would it, for instance, be acceptable to ask women who choose to cryopreserve their oocytes for later use to contribute to this research by donating some of their eggs?

Although the vast majority of children conceived through assisted reproduction seem reassuringly normal and healthy, accumulating concerns about possible epigenetic alterations underscore the importance of long term follow-up studies, for which uniform protocols need to be defined. These same concerns also question the wisdom of extending the provision of assisted reproduction to couples having still reasonable chances of spontaneous conception, of routinely using ICSI in cases where IVF would be no less effective, and more generally of choosing (combinations of) highly manipulative procedures without a clear necessity. As epigenetic alterations after in vitro conception have been associated with common disorders such as obesity and type II diabetes, the public health impact of small relative risks may still be considerable. At a time where advising patients about preconceptional life style modification has become an increasingly important issue, it seems inconsistent not also to consider the public health effects possibly related to the use of assisted reproductive technologies themselves. This is indeed a new perspective, adding a further responsibility to those (with regard to individual patients and their future children) that the field has traditionally recognized.

SELECTED ORAL COMMUNICATION SESSION

SESSION 02: OVARIAN RESERVE 1

Monday 28 June 2010 **10:00 - 11:30**

O-003 Age-specific normogram for antral follicle count: McGill reference guide

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Objective: Create an age-specific normogram for antral follicle count (AFC) in unselected fertility population.
Methods: We evaluated all baseline transvaginal ultrasound (US) records performed at McGill Reproductive Center, Montreal, in the period between November 2007 and September 2009. After excluding patients with polycystic ovaries (PCO) namely 12 or more follicles per ovary, 1866 baseline US scan cycles were eligible to be included in our study. Baseline transvaginal ultrasound was performed between days 2 and 4 of the menstrual cycle. Construction of the curves for the 3rd, 10th, 25th, 50th, 75th, 90th and 97th percentile

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