

Al collegio docenti del Dottorato in Medicina Molecolare

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Ciclo XXXIV Tutor: Prof.ssa Paola Piomboni

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Introduction:

The most important goal of reproductive medicine is to select a healthy embryo to aid infertility couples to get healthy babies.

Trophectoderm biopsy is an invasive operation, although this technique has been worldwide used in IVF Units. Thus, it is necessary to seek for a noninvasive technology to screen embryos for inherited diseases or aneuploidy. Routinely, embryo selection for transfer in utero is mainly based on morphological and developmental characteristics, but 70% of IVF embryos fail to implant. In this context, time-lapse imaging has been proposed for refinement of morphological parameters that may non-invasively predict the developmental potential of embryos. However, embryo morphology does not necessarily reflect functional status, and 30–50% of normal looking embryos are chromosomally abnormal. Over the last decade, developments of non-invasive embryo grading for the greatest viability has looked into metabolic, proteomic and genomic analysis of spent culture media. However, to date, there is no non-invasive platform that has been proven to be of true clinical predictive value or been examined in prospective randomized control trials to be better than current morphology-based selections methods. Therefore, there remains a need for improvements in sensitivity and specificity to predict non-invasively which embryos is destined to develop to blastocyst and to establish a successful pregnancy.

Methods:

- Nanoparticle Tracking Analysis;
- Direct Detect;
- Bioanalyzer;
- Bicinchoninic Acid Assay;
- Size-exclusion chromatography;
- Enzyme-Linked Immunosorbent Assay;
- Droplet Digital PCR;
- Fluorescence-Activated Cell Sorting.
- Lipid Assay

Results:

Through the techniques listed above we carried out preliminary analysis on spent culture media of embryos collected during IVF cycles, searching for the best biomarker that can indicate the quality of the embryos themselves and their state of health in a non-invasive way.

The future goal is to identify one or more molecules and methods that can provide this information and that can be applied in the context of an Assisted Reproduction treatment.

Partecipazione a congressi e corsi:

- 9.baby Symposium 2018, Bologna Teatro Duse 25-27 Ottobre 2018;
- 1st Rome Symposium Vittrification: New Approaches and Strategies, Roma Hotel Quirinale 29 Novembre 2018;
- Diagnosi Preimpianto: Istruzioni per l'uso, Roma Hotel Quirinale 30 Novembre 2018;
- 2° Congresso Internazionale Procreazione Medicalmente Assistita, Firenze Palazzo dei Congressi 21-22 Marzo 2019;
- Congresso Nazionale Società Italiana di Fertilità e Sterilità e Medicina della Riproduzione, Riccione Hotel Nautico 9-11 Maggio 2019.

Pubblicazioni scientifiche: autori, titolo della pubblicazione, nome e numero della rivista, anno di pubblicazione

- Laura Gambera, Anita Stendardi, Camilla Ghelardi, Benedetta Fineschi, Rosamaria Aini. *Effects of antioxidant treatment on seminal parameters in patients undergoing in vitro fertilization*. Archivio Italiano di Urologia e Andrologia 2019; 91, 3 Submitted 2019; Accepted 2019.
- Laura Gambera, Francesca Letizia Vellucci, Anita Stendardi, Benedetta Fineschi, Silvana Pizzasegale, Camilla Ghelardi, Rosamaria Aini. *3 versus 6 oocytes in oocyte donors programs in Italy*. Reproductive BioMedicine Online, Submitted 2019.

Soggiorni in altri laboratori:

- Exosomics S.p.a. Strada del Petriccio e Belriguardo 35, 53100 Siena, Italy.