NON-INVASIVE DETECTION OF METABOLICALLY IMPARIED EUPLOID BLASTOCYSTS WITH LOW IMPLANTATION POTENTIAL

Cabello-Pinedo S[1], Abdulla H[2], Seth-Smith ML[1], Escriba M[3], Crespo J[3], Horcajadas JA[1] , Munné S[1]

[1] Overture Life, Madrid, Spain; [2] Texas A&M University Corpus Christi, TX, US; [3]Juana Crespo Clinic, Valencia, Spain

As not all euploid embryos implant, is it posible to identify non-implanting euploid basltocysts from their spent media metabolomics profile?

Conclusions

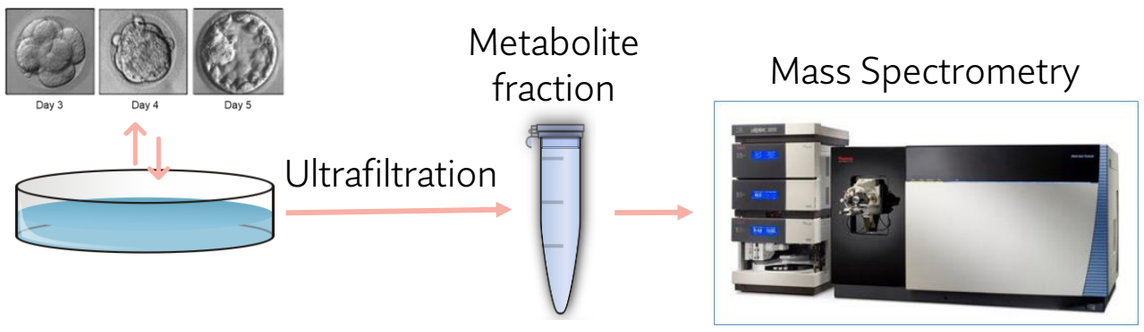
A 30.95% of euploid embryos showed a metabolomics profile predicting poor implantation potential despite being euploid. Although further research is necessary, these results open the possibility of applying metabolomics to differentiate, within euploid embryos, those that are viable from the ones that will not result in a successful pregnancy.

Introduction

Preimplantation Genetic Testing (PGT) is used in routine clinical practice to avoid the transfer of aneuploid embryos with minimal chance of resulting in a viable pregnancy. However, even the best PGT-A published results do not exceed 70% ongoing pregnancy rates. Little is understood of the causes of failure of euploid embryos to implant, and methods to discriminate between viable euploid embryos and non-viable euploid embryos have not been developed yet.

Methods

- Spent media samples, in culture between days 3 and 5
- Embryos were:
  - transferred to the patient → train subset (n=37)
  - later analysed by PGT → test subset (n=42)



1

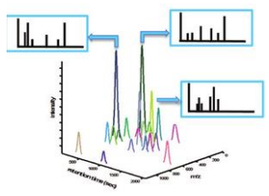
Building the method:

i. Metabolite quantification

ii. Statistical analysis

iii. Biomarker identification → MPI *

Train subset

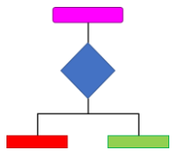


2

Euploid embryos study:

MPI was applied to 42 embryos classified as euploid

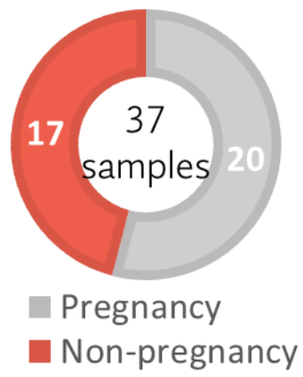
Test subset

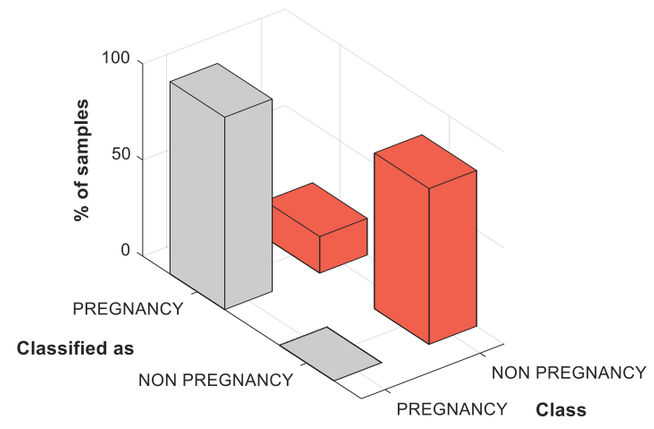


* MPI: Metabolite Pregnancy Index

Results

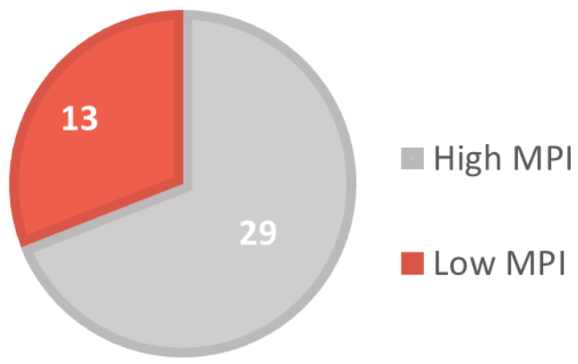
- Around 90% accuracy of Vitrolife MPI, using 37 biomarkers in train subset:





- Applying MPI to euploid samples in test subset:

42 samples classified as euploid through PGT-A



- MPI predicts that **30.95% of euploid embryos** have a metabolomics profile predicting **low implantation potential.**

Analysis of spent media metabolomics profile could predict about 30 percent of euploid embryos that would fail to implant, coinciding with the upper limit of PGT-A success.

If you are interested in collaborating in the project, please contact metabolomics@overture.life