NON-INVASIVE METABOLOMICS ANALYSIS OF SPENT CULTURE MEDIA PREDICTS EMBRYO VIABILITY

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Are there metabolites in spent media that can act as biomarkers to predict embryo implantation?

Conclusions

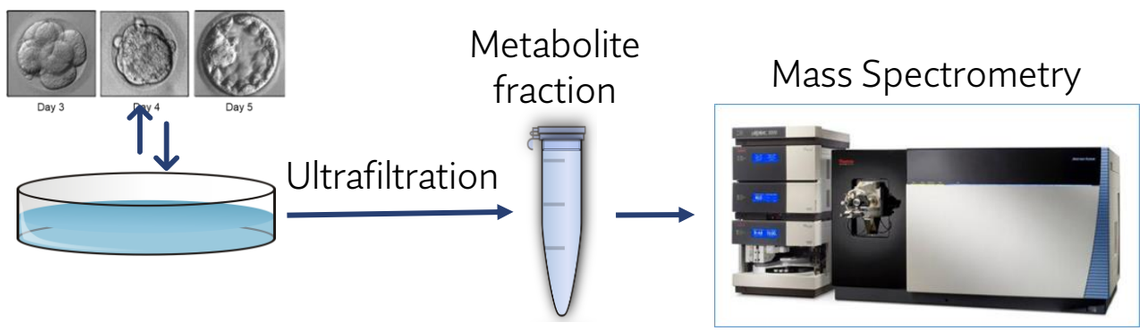
Embryos that resulted in a successful pregnancy showed notable differences in the concentration of certain metabolites quantified in spent culture media, compared to the ones that did not implant. A set of culture-media specific biomarkers were identified and used to build a Metabolite Pregnancy Index (MPI), able to predict embryo viability, which showed an average accuracy of around 80%.

Introduction

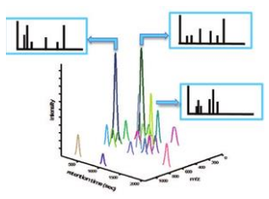
A critical step in IVF cycles is the selection of the best embryo to be transferred. The standard of care tool for embryo selection has been morphokinetics criteria, but the effectiveness of ART remains limited and only 10-30% of embryos transferred to the uterus implant. During the last 20 years, the alternative has been PGT, an invasive method that requieres embryo biopsy. Novel non-invasive embryo screening methods are required to optimize embryo selection using AI-morphokinetics, metabolomics and NI-PGT.

Methods

- Spent media samples (n=197), in culture between day 3 and 5
- Using two different culture media: Vitrolife (n=68) and SAGE (n=129)

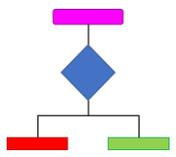


1 Building the method:



i. Metabolite quantification
ii. Statistical analysis
iii. Biomarker identification → MPI *

2 Testing the method:



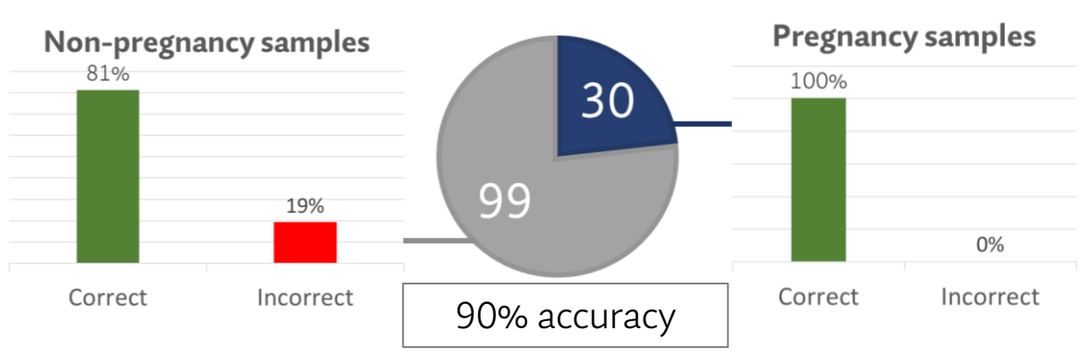
Testing MPI to predict new sample viability.

* MPI: Metabolite Pregnancy Index

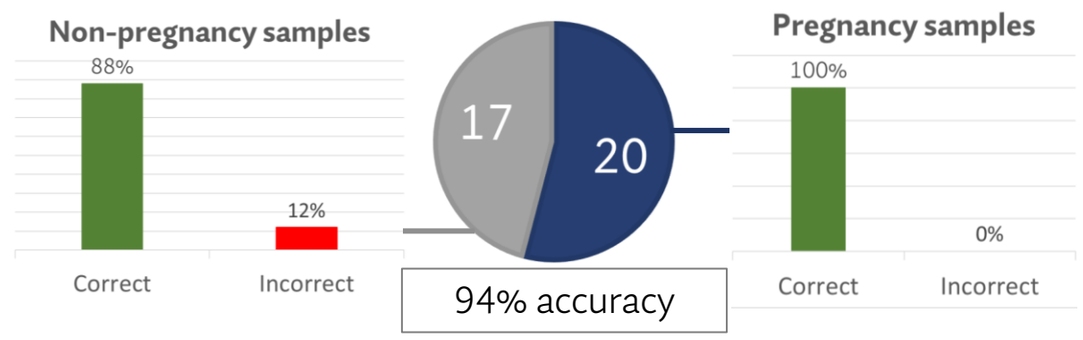
Results

- A total of 37 biomarkers identified and selected to build MPI:

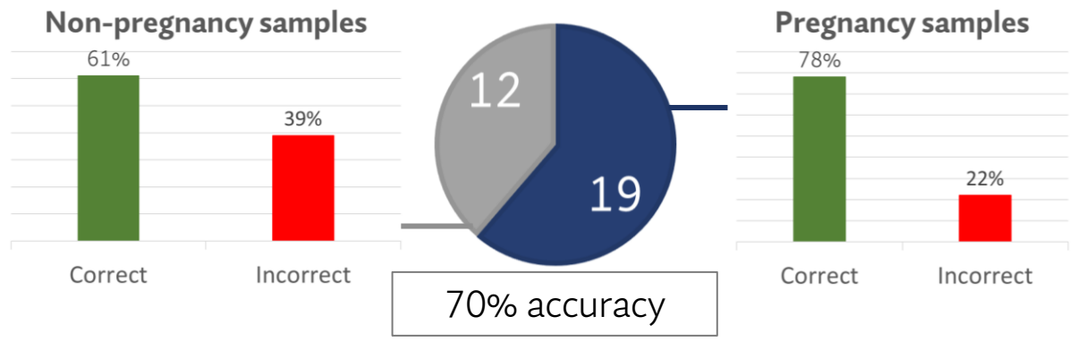
SAGE Media MPI



Vitrolife Media MPI



MPI blind test for Vitrolife



A set of culture-media specific biomarkers were identified that highly predicted implantation potential.

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