IDENTIFICATION OF NEW BIOMARKERS OF HUMAN ENDOMETRIAL RECEPTIVITY AND MATERNAL-FETAL DIALOGUE

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INTRODUCTION

The endometrial receptivity is a key process for the success in assisted reproductive technology. Despite careful embryo selection, two of every three in vitro fertilization (IVF) cycles fail to result in pregnancy, and more than 8 of every 10 transferred embryos fail to implant, making reproduction in humans an inefficient process. The key to successful implantation and subsequent invasion and decidualization is synchronization. The embryo must not only evolve to the blastocyst stage, but the endometrium must also achieve a specific receptive status and cross-talk between the embryo and endometrium must occur during a specific period known as the window of implantation (WOI). Which is usually more or less delayed in recurrent implantation failures. Therefore, it appears essential to identify inadequate endometrial receptivity to offer personalized care management. Molecular diagnostic tools currently available to characterize this process are very limited. In this study, we describe the development and validation of a new personalized molecular test based on endometrial receptivity and maternal-fetal dialogue.

RESULTS

GENOMIC ANALYSIS OF ENDOMETRIAL BIOPSIES PROFILE

Number of genes differentially expressed

Cluster 1

• 1717 genes

Cluster 2

• 338 genes

Cluster 3

• 290 genes

Gene ontology analyzes of over-represented biological terms

Cluster 1

• Cell division
• Cellular proliferation
• Mototic cycle

Cluster 2

• Negative regulation of viral penetration into host cell
• Response to alpha/beta Interferon

Cluster 3

• Response to inflammatory stress
• Regulation of inflammatory stress
• Hormonal regulation

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REFERENCES


CONCLUSION

Evaluation of receptivity and embryo implantation of an endometrium with this new molecular signature can predict IVF success and may help in the management of endometrial preparation for embryo transfer and optimizes chances of successful pregnancy for many couples.

PARTICIPANTS/MATERIALS, AND METHODS

Endometrial receptivity

Genomic analysis of endometrial biopsy profile

50 biopsies

Biopsies were performed in a natural cycle during the optimal theoretical implantation window LH+7 to LH+9 (matrico project).

Pregnancy outcome is know

35 with successful clinical pregnancy
15 with implantation failure

Pregnancy outcome is know

80% ongoing pregnancy
PCA 3.8%

59% ongoing pregnancy
PCA 3.7%

55% ongoing pregnancy
PCA 3.8%

87.6% (CHP)

PCA Mapping 87.6% (CHP)

868 modulated genes

class prediction approach

transcriptomic signature of 60 genes associated to endometrial co-culture successfully transferred

80% ongoing pregnancy

10

1687

50

60 genes

Original panel of 10 genes involved in endometrial receptivity and materno-fetal dialogue

Provisional application US 62,864,979