Improving the probability of successful in-vitro fertilisation through vaginal microbiome screening using Advanced Technique for Genetic Composition

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Abstract

The relationship between the vaginal microbiome and the probability of a successful in-vitro fertilisation (IVF) have been well documented in the past few years. As the knowledge grows, the limits of untargeted analysis such as 16S-sequencing (16S) and Whole Genome Sequencing (WGS) is being reached. In order to deploy practical, reproducible and reliable vaginal microbiome analysis that can be included in the practice of reproductive medicine, new targeted analysis are needed. We propose to use Advanced Testing for Genetic Composition (ATGC) to measure the vaginal microbiome in routine IVF. The goal of our analysis and study is to develop a model of diagnostic test that could establish a link between some pathogens in the vaginal microbiome and the success rates of IVF. ATGC technology consists in cycling temperature capillary electrophoresis (CTCE) combined with bioinformatics and statistical modelling used to separate DNA molecules based on their physical properties. This technology linked to an specific target analysis will allow us to save time and reducing the risks associated with the biopsy currently used. For this project, we use our maps of bacteria to establish our target analysis, develop our assay and implement it on our tests. A hundred vaginal samples selected from patients undergoing IVF already collected in the Centre Hospitalier Universitaire Vaudois (CHUV). We present the results of a benchmarking analysis against 16S (40 patient samples), and rtPCR (20 patient samples) panel analysis. Those results are often associated with qualitative and quantitative measurements that allow us to better understand the presence of some microbes and the relation between them based on the level of each one. The model and latest results with ATGC analysis has demonstrated that it is possible to use this type of model on a complex map of bacteria to produce a treatment for the future field work of Reproductive Medicine.

Recent Publications

1. Ekstrom, P. O., Khrapko, K., Li-Sucholeiki, X.-C., Hunter, I. W. & Thilly, W. G. Analysis of mutational spectra by denaturing capillary electrophoresis. Nat Protoc 3, 1153–1166 (2008).

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Photograph



Dr Virginia Franco is a medical doctor, gynecologist and obstetrician, specialized in Primary Care, Pathologies of the Low Tract, menopause care and also has experience with obstetric and gynecological emergencies. Virginia is currently participating in a project of vaginal microbiome analyses and the possible link with In Vitro Fertilization Outcomes in the Company Yoni Solutions.

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