ENDOMETRIOME
Endometrial Microbiome Analysis

Assessment of the endometrial microbiome to improve the reproductive outcome of infertile patients

Technical Report

The importance of assessing the endometrial microbiome

The balance of bacteria in the endometrium is a key factor for successful embryo implantation. In normal conditions, in the endometrium are mainly present different bacterial species of the Lactobacillus genus. The presence of dysbiotic or pathogenic bacteria may alter the endometrial microbiome and can disrupt the uterine environment, causing **implantation failure** and **pregnancy loss**[1,6].

The most prominent example of a pathology caused by an altered endometrial microbiota is chronic endometritis (CE). CE is characterized by the persistent inflammation of the endometrial mucosa, caused by the presence of bacterial pathogens in the uterine cavity. Because CE is usually asymptomatic and undetectable through vaginal ultrasound, it is often overlooked. The prevalence of CE in infertile patients has been estimated to be approximately 39%; it has been reported as high as 60% and 66% in patients with recurrent pregnancy loss (RPL) and repeated implantation failure (RIF), respectively[2-3]

	Bacterial species	Clinical outcome
Pathogenic bacteria	*Staphylococcus, Streptococcus, Enterococcus, Mycoplasma, Ureaplasma, Enterobacteria (Escherichia, Klebsiella), Chlamydia and Neisseria.*	These bacteria cause infection, which is linked to implantation failure and recurrent miscarriage
Dysbiotic bacteria	*Bifidobacterium, Prevotella, Sneathia, Atopobium, Veillonella…*	Microbial imbalance is linked to embryo implantation failure
Optimal microbiome	*Lactobacillus*	A balanced microbiome improves the reproductive prognosis, resulting in increased chance of pregnancy and live births

Endometriome™ (Endometrial Microbiome Analysis)

Endometriome™ is a screening test that evaluates the endometrial microbiome, to improve clinical management of infertile patients.

Endometriome™ test provides a complete view of the endometrial bacterial composition, reporting the **10 most represented bacteria in the endometrium**, as well as identifying the **8 most common pathogens causing chronic endometritis** (CE).

Endometriome™ test can determine whether the uterine microbial environment is optimal for embryo implantation. Depending on the results, it recommends embryo transfer or antibiotic and probiotic treatment, if needed, to restore an optimal microbiome.

Endometriome™ test also detects **chronic endometritis** causing bacteria and helps clinicians to recommend appropriate antibiotic and probiotic treatments.

Endometriome™: Benefits

- **Endometriome™** can determine the percentage of lactobacillus present in the endometrium, to improve the patient's reproductive outcome.
- **Endometriome™** will determine whether the uterine microbial environment is optimal or not for embryo implantation.

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- If the endometrium is non-Lactobacillus dominated, the **Endometriome™** report will suggest a proper treatment.
- **Endometriome™** also detects the most common pathogenic bacteria causing chronic endometritis, recommending an appropriate antibiotic and probiotic treatment.

Endometriome™: Indications for testing

Endometriome™ test may be beneficial for:

- Patients with **Recurrent Implantation Failure** (**RIF**);
- Patients with **Recurrent Pregnancy Loss** (**RPL**);
- **Any patient** wishing to conceive, by assessing the microbiological environment that the embryo will encounter at implantation.

Endometriome™: Methodology

Endometriome™ test uses the latest **Next Generation Sequencing** (**NGS**) technology to determine the complete endometrial microbiome profile from endometrial tissue or endometrial fluid. It also provides information on the detection and percentage of specific bacteria causing **CE**.
The technology is based on DNA extraction followed by amplification and barcoded sequencing of **7 hypervariable regions** (**V2, V3, V4, V6, V7, V8,** and **V9**) of **bacterial 16S ribosomal RNA** (**rRNA**) [4-5].
This bacterial gene, conserved in all bacteria, presents nine variable regions with species-specific DNA sequences. This enables the taxonomic assignment and relative quantification of each bacteria present in a sample.

Understanding Endometriome™ results

The **Endometriome™** test report will provide information about the overall microbial enviroment of the uterine cavity. It includes:

- Percentage of Lactobacilli in the endometrial sample.
- Percentages of the most represented bacteria detected in the endometrial sample.
- Whether the endometrial microbiome is **normal** or **abnormal**.
- Detection and percentages of specific bacteria causing CE (Enterococcus spp., Enterobacteriaceae, Streptococcus spp., Staphylococcus spp., Mycoplasma spp, and Ureaplasma spp).
- Detection and percentages of pathogens associated with sexually transmitted infections (Chlamydia and Neisseria spp).
- Recommended probiotic/antibiotic therapy, if required.

POSITIVE RESULT
Identification of dysbiotic or pathogenic bacteria, with a non–Lactobacillus dominated (**<90%**) endometrial microbiota.
Detection of specific bacteria causing CE (*Enterococcus spp., Enterobacteriaceae, Streptococcus spp., Staphylococcus spp., Mycoplasma spp, and Ureaplasma spp*) or pathogens associated with sexually transmitted infections (*Chlamydia and Neisseria spp*).
This test results is significantly correlated with **adverse reproductive outcomes** (reduced implantation rate and increased miscarriage rate).
NEGATIVE RESULT
The endometrial microbiome is **normal** (Lactobacillus dominated endometrium, with high percentage of Lactobacilli, **≥90%**).

Bibliography

1) Moreno et al. Am J Obstet Gynecol 2016; 215:684-703.
2) Cicinelli et al. Reprod Sci 2014; 21(5):640-7.
3) Cicinelli et al. Hum Reprod, 2015; 30(2):323-30.
4) Franasiak et al. J Assist Reprod Genet 2016;33:129–136.
5) Tao et al. Hum Microbiome J 2017;3:15–21.
6) Moreno et al., Am J Obstet Gynecol, 2018; 218:602.e1-16.

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