Acta Scientific Women's Health (ISSN: 2582-3205)

Volume 2 Issue 2 February 2020

Mini Review

Hidden Reasons of Woman's Infertility: Microbiota Milieu

PD Gupta[1]* and K Pushkala[2]

[1]*Former, Director Grade Scientist, Centre for Cellular and Molecular Biology, Hyderabad, India*

[2]*Former, Associate Professor, S. D. N. B. Vaishnav College for Women, Chennai, India*

***Corresponding Author:** PD Gupta, Former, Director Grade Scientist, Centre for Cellular and Molecular Biology, Hyderabad, India.

DOI: 10.31080/ASWH.2020.02.0082

Received: December 12, 2019

Published: January 22, 2020

Abstract

Some of the causes of female infertility were work out in details however now we have understood the unexplained cause of infertility and that is the presence of microbiota in female reproductive tract. Like imbalance of gut microbiota causes health hazards in the same way altered milieu of endometrial and vaginal microbiota may the hidden cause of female infertility. Now this factor should also be considered for infertility treatment.

Keywords: Infertility; Pregnancy; *Lactobacillus*

Successful conception, pregnancy, and childbirth depend on many factors; some of these factors are well studied over the period. The well known causes of female infertility such as, ovulation problems, polycystic ovary syndrome, problems with the fallopian tubes, problems with the uterus, endometriosis are also believed to be, if not all, at least some of these may be due to imbalance of cervicovaginal microbiota. Now lately scientists, all over the world, are engaged in finding the causes behind the unexplained reasons for female infertility and pre term abortions. With the development of technology, DNA and RNA sequencing becoming simple, fast and inexpensive [1]; using this technology many scientists got surprising results.

A team of 30 scientists Chen., *et al*. [2] in their study found that, the female reproductive tract is loaded with microbiota indicative of a non-sterile environment all along the female reproductive tract *i.e*. cervical canal, uterus, fallopian tubes and peritoneal fluid (Figure 1). This finding was confirmed by the presence of 16S rRNA gene amplicon and bacterial culture methodology in healthy 110 women of reproductive age. Further, they showed that the vaginal microbiota is quite different from rest of the reproductive tract.

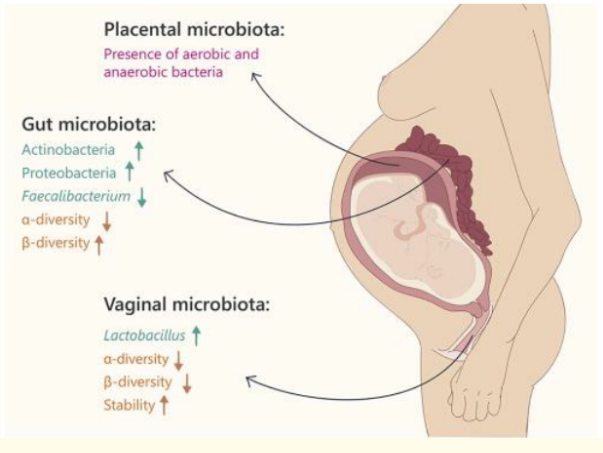

Figure 1: Presence of microbiota in nornal healthy woman during reproductive age. The arrows indicate the readjustment during pragnancy. Redrawn after Meital Nuriel-Ohayon†, Hadar Neuman† and Omry Koren*Microbial Changes during Pregnancy, Birth, and Infancy Front. Microbiol., 14 July 2016| https://doi.org/10.3389/fmicb.2016.01031.

Younes., *et al.* [3] tried to identify cervicovaginal milieu of microbiota and are now able to detect some more microorganisms that were not detected previously, adding missing pieces to the puzzle called "the reproductive-tract microbiota". Lewis., *et al.* [4] have shown that vaginal microbiota forms clusters of a limited number of communities; nevertheless this community structure is dynamic. Communities dominated by *Lactobacillus* species, particularly *Lactobacillus crispatus*, are most associated with vaginal health. Modifiable and non modifiable factors for microbiotal composition are strongly associated with community, race or ethnicity one belongs to. The vaginal hygiene also plays an important role in microbial composition. The vaginal microbiota has great significance in maintaining vaginal health and protecting the host from disease [5,6]. Now there is growing interest in the microbiota specific for female reproductive health and the health of their offspring. Bacterial vaginosis (BV) is an often sub-clinical with a change of the vaginal microbiota from being *Lactobacillus* spp. dominated to a more heterogeneous environment with anaerobic bacteria, such as *Gardnerella vaginalis* and *Atopobium vaginae.* This is a common genital disorder with a prevalence of approximately 19% in the infertile population. A few studies have been conducted in infertile women, and some have suggested a negative impact on fecundity in the presence of BV [7,8].

Pregnancy-associated hormonal and metabolic changes have been known for decades [9], the dramatic changes in microbial composition that take place during gestation have only recently been work out. A number of hormonal changes, environmental exposures and genetic differences may impact the maternal microbiota before and during pregnancy that may alter the developing neonatal microbiota.

It is now clear that only specific *Lactobacillus* species are present with numerical supremacy in the healthy organisms; these species are likely to play a pivotal role in maintaining a supportive environment for implantation and future pregnancy outcome. Lessons learned from the gut microbiota [10] suggest that imbalance in the milieu of the gut microbiota can make a big health hazard [11], of the uterus may potentially modulate immune cell subsets needed for implantation and have implications for tissue morphology During pregnancy, the maternal intestinal and vaginal microbiota has reduced alpha diversity and species richness [12]. Moreover, recent evidence suggests that microbiota niches in pregnancy are not limited to maternal body sites, as the placenta appears to harbour a low biomass microbiota that is presumptively established in early pregnancy and varies in association with a remote history of maternal antenatal infection as well as preterm birth.

Conclusion

The endometrial microbiota is assumed to modulate the function of endometrial cells and local immunity system; it prevents growth of pathogenic microorganisms by its presence and production of protective substances. Endometrial microbiome seems to be important factor of endometrial receptivity. Hyman., *et al*. [13] suggested that the vaginal microbiome on the day of embryo transfer affects pregnancy outcome. After all bacteria are powerful creatures [14].

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