J Current Biomed Report
ISSN: 2717-1906
2023, Volume 4, Number 2
Letters to Editor

Can the microbiome affect human reproductive function?

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Article info:
Received: 07 Aug 2022
Accepted: 14 Aug 2022

Keywords:
Gut microbiota
Microbiome
Reproductivity

To the Editor

The human microbiome is considered as an essential factor for the proper functioning of human physiology. However, an aberrant microbiome structure or dysbiosis can lead to various diseases. Hence, various diseases can cause changes in the microbiome structure and can affect organs such as glands or the reproductive system in the long term [1]. In addition, microbiomes play an essential role in the regulation of human sex endocrine function [2]. Conversely, the gut microbiota can impact on sex endocrine system via modulating the secretion of gut peptides by metabolism, regulation of inflammation, glucose metabolism, or energy homeostasis, and regulation of bioactive lipids that belong to the endocannabinoid system and specific neurotransmitters [3]. Furthermore, Gut microbiota can potentially influence the endocrine control of reproduction by directly transforming hormones, thereby altering their bioavailability and efficacy [4]. Dysbiosis might be related to endocrine and reproductivity disorders. Based on the evidence, a decreased amount of Lactobacilli spp could be related to Endometriosis through Decreased activity of antioxidant enzymes [5]. Proteobacteria spp is related to ovarian tumor tissue by induction of oxidative stress [5]. Also, evidence has shown that an increase in Bacteroides and Prevotella genus is negatively related to sperm motility [6]. Furthermore, Microbiota programming can establish and begin before birth. A growing body of evidence suggests microbial colonization despite intact fetal membranes and out of any infectious context [7]; these microbiotas are primarily located in the placenta and are closely similar to the oral and vaginal ecosystem [8]. Changes in the microbiota of these areas can prevent the fetus from planning immunity, preventing pathological conditions of pregnancy and premature birth [9]. Meanwhile, pregnancy can be categorized as the modulator of gut microbiota with a reduced in-

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dividual richness and an increased between-subject diversity [10]. During pregnancy, Alterations in the abundance of various species have been noticed; for example, an increased quantity of members of Actinobacteria and Proteobacteria and a reduced mass of Faecalibacterium and other SCFA producers were reported [11]. This condition has high benefits for pregnant women as they boost energy storage and provide the growth of the fetus [12]. Moreover, probiotics administered to pregnant women seem to change the microbiota of their infants and Toll-like receptor genes expression in the placenta. It has also been suggested that microbial exposure during pregnancy may be essential for preventing allergic disease in the offspring [13].

In sum, it seems that microbiome alteration can affect human reproductivity function. Interestingly, this relation is not unilateral but bi-lateral, and the human sex endocrine and reproductivity system can impact the microbiome through multiple mechanisms such as metabolism and hormones. Also, the modulation of the microbiome can be regarded as a therapeutic target before birth. Therefore, it is suggested that future researchers assess the impact of the microbiome on human reproductive function.

Authors' contributions

Authors contributed to the manuscript equally. All authors read and approved the final version of article.

Conflict of interest

The authors declare no conflicts of interest.

Ethical declarations

Not applicable.

Financial support

Self-funded.

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