**Causal Link between Gut Microbiota and Infertility: A Two-sample Bidirectional Mendelian Randomization Study**

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**Backgroud and aims.**To investigate the associations of the gut microbiota with reproductive system diseases, including female infertility, male infertility, polycystic ovary syndrome (PCOS), primary ovarian failure, endometriosis, uterine fibroids, uterine polyps, sexual dysfunction, orchitis, and epididymitis.

**Methods.**A two-sample bidirectional Mendelian randomization (MR) analysis was performed to evaluate the potential causal relationship between the composition of gut microbiota and infertility, along with associated diseases.

**Results:**Sixteen strong causal associations between gut microbes and reproductive system diseases were identified. Sixty-one causal associations between gut microbes and reproductive system diseases were determined. The genus Eubacterium hallii was a protective factor against premature ovarian failure and a pathogenic factor of endometriosis. The genus Erysipelatoclostridium was the pathogenic factor of many diseases, such as PCOS, endometriosis, epididymitis, and orchitis. The genus Intestinibacter is a pathogenic factor of male infertility and sexual dysfunction. The family Clostridiaceae 1 was a protective factor against uterine polyps and a pathogenic factor of orchitis and epididymitis. The results of reverse causal association analysis revealed that endometriosis, orchitis, and epididymitis all led to a decrease in the abundance of bifidobacteria and that female infertility-related diseases had a greater impact on gut microbes than male infertility-related diseases did.

**Conclusions:**The findings from the MR analysis indicate that there is a bidirectional causal relationship between the gut microbiota and infertility as well as associated ailments. Compared with ovarian diseases, uterine diseases are more likely to lead to changes in women's gut microbiota. The findings of this research offer valuable perspectives on the mechanism and clinical investigation of reproductive system diseases caused by microorganisms.

**References**

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