



Editorial

Lactobacillus and lower genital tract infection



Dear Editor,

Lactobacillus species, including *Lactobacillus crispatus*, is the dominant component in vaginal microbiota in one-half of all women with a healthy vagina who produce a substantial amount of lactic acid and hydrogen peroxide to maintain an acidic vaginal environment (pH 3.5–4.5). This inhibits overgrowth of harmful microorganisms such as Group B streptococci, *Escherichia coli*, *Staphylococcus aureus*, *Gardnerella vaginalis*, or other fastidious or uncultivated anaerobes.¹ Such anaerobes often result in obstetric, gynecological, or surgical complications.^{2,3}

The study by Amin et al⁴ in this issue of the *Journal of the Chinese Medical Association* evaluated the vaginal microbiome from 100 vaginal swabs obtained from 100 women at the reproductive age of 25–50 years. The authors found that nearly 60% of the vaginal samples could identify the presence of *Lactobacillus* strains, and accidentally detect one pathogen—*Clostridium perfringens*—an anaerobic Gram-positive bacterium. The authors then used the extracts isolated from the *Lactobacillus* species to test the *in vitro* antibacterial activity against *C. perfringens*. The minimal inhibitory concentration (MIC) for *C. perfringens* ranged from 15.6 µg/mL to 31.2 µg/mL.⁴ In addition, the authors further found that the extracts of the *Lactobacillus* species also showed a significant inhibitory effect on the other pathogens, including *Candida albicans* (MIC 30–100 µg/mL), *S. aureus* (MIC 40–100 µg/mL), and *E. coli* (MIC 25–80 µg/mL).⁴ The authors concluded that the women without vaginal *Lactobacillus* strains might be susceptible to nonindigenous and potentially harmful microorganisms.⁴

This study is interesting and might be of great value, although many questions could be identified in Amin et al's⁴ investigation. However, there is some chance that the claims of their study could be overstated.

First, the authors did not provide an answer as to whether the women infected with *C. perfringens* belonged to the *Lactobacillus* species-rich or the *Lactobacillus* species-absent environment. Compared with a previous study by the same institute (Health Research Institute, Infectious and Tropical Disease Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran),⁵ there is no difference in the

incidence of presence of the *Lactobacillus* species between healthy women in Mousavi et al's⁵ study and healthy unknown women in Dr.'s study⁴ (66% vs. 59%). In fact, the above finding is not surprising, because the incidence of *Lactobacillus* species in both studies (59% and 66%) was consistent with a large study (only 58–90% of women with the identified *Lactobacillus* species).⁶

Second, the authors failed to provide any evidence showing that women complicated with vaginal infection might have a higher percentage of failure to identify the *Lactobacillus* species. In fact, Amin et al's⁴ group did not mention whether this woman who was positive for *C. perfringens* had identification of *Lactobacillus* species. In addition, there are many species of *Lactobacillus*, and previous evidence has shown that different *Lactobacillus* species can act against other pathogens. One study showed that, compared to the *Lactobacillus iners*-dominated cervicovaginal microbiota, *L. crispatus*-dominated cervicovaginal microbiota is less likely to shift to dysbiosis, and is associated with a lower prevalence of sexually transmitted infections.⁷

Third, the authors did not evaluate the difference in components of the vaginal microbiomes between the presence and absence of *Lactobacillus* species in women, or show data indicating that women without *Lactobacillus* species in their vagina will be complicated with more pathogens in their vagina.

Finally, what is the key element for the bactericidal effect? In addition, how did the extract of *Lactobacillus* species work on *C. albicans*? The authors failed to mention this, but they provided evidence to show that the antimicrobial activity of extract of *Lactobacillus* species was unrelated to its acidic nature.⁴ If true, it is contrary to the conventional wisdom that holds that the acidic environment of the vagina provides a protective role against the overgrowth of opportunistic bacteria.¹ That is to say, an acidic environment is only the end product of the presence of *Lactobacillus* species, and not the main cause of a healthy vagina. If the authors had calculated the pH value of these extracts of *Lactobacillus* species, and generated the result that the pH of the extract of *Lactobacillus* species did not correlate with MIC on bacteria, then their conclusion might be more convincing. The authors did show the varying impact of MIC of extract of isolates on the growth

of opportunistic bacteria (*S. aureus* and *E. coli*); however, if the authors could further identify the main *Lactobacillus* species in each isolate, such information might be of greater value. We believe that different *Lactobacillus* species might have different abilities to inhibit these opportunistic bacteria, which requires further research.

In conclusion, two recent publications^{4,5} of the *Journal of the Chinese Medical Association* emphasize the importance of the vaginal microbiome in women's health. Further understanding of the interaction of the human body with its “residents” (microorganisms or other living things) could provide a better chance to promote the general health in the larger adult female reproductive-aged population.

Conflicts of interest

The authors declare that they have no conflicts of interest related to the subject matter or materials discussed in this article.

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Wen-Ling Lee
Department of Medicine,
Cheng-Hsin General Hospital,
Taipei, Taiwan,
ROC

Department of Nursing,
Oriental Institute of Technology,
New Taipei City, Taiwan,
ROC

Department of Nursing,
National Yang-Ming University,
Taipei, Taiwan,
ROC

Department of Obstetrics and Gynecology,
National Yang-Ming University,
Taipei, Taiwan,
ROC

Peng-Hui Wang*
Department of Obstetrics and Gynecology,
National Yang-Ming University,
Taipei, Taiwan,
ROC

Department of Obstetrics and Gynecology,
Taipei Veterans General Hospital,
Taipei, Taiwan,
ROC

*Corresponding author. Dr. Peng-Hui Wang, Department of Obstetrics and Gynecology, Taipei Veterans General Hospital, 201, Section 2, Shih-Pai Road, Taipei 112, Taiwan, ROC.
E-mail addresses: phwang@vghtpe.gov.tw,
pongpongwang@gmail.com,
phwang@ym.edu.tw (P.-H. Wang).