Etiology of Mastitis: The Role of Infection and Microbiota

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Key Messages
- A diverse microbiota may be observed in human milk.
- Dysbiosis of human milk microbiota could be related to the onset of mastitis.
- Probiotic treatment may help to balance this microbiota and to prevent mastitis.

Human milk contains a diverse microbiota. Studies about this microbiota show a complex bacterial community in which species of the genus Pseudomonas, Streptococcus, or Staphylococcus abound together with species of Bifidobacterium, Lactobacillus, Propionibacterium, Enterococcus, etc. [1, 2]. As in other microbiota, this community of species remains in balance; however, occasionally some specific populations may overgrow, leading to a dysbiosis, which in the mammary gland might progress to mastitis [3]. Mastitis is an inflammatory condition of the breast usually associated with lactation. Dysbiosis in mastitis is characterized by a proliferation of certain bacterial species, such as Staphylococcus spp., which have been identified as one of the main bacterial groups related to mastitis.

Mastitis is also related to a loss of diversity in milk microbiota. In a comparative study between milk microbiota of healthy women and that of women suffering from mastitis, a notable decrease was observed in the percentage of samples containing DNA from different genera such as Lactobacillus, Bifidobacterium, Bacteroides, Parabacteroides, Faecalibacterium, Ruminococcus, Roseburia, Eubacterium, and Propionibacterium [3]. The loss of Lactobacillus in milk microbiota of women suffering from mastitis was first observed in a study performed by Jiménez et al. [4]. They proved that a high level of Staphylococcus spp. in milk was accompanied by a decrease in Lactobacillus spp. However, when a combination of Lactobacillus strains originally isolated from breast milk of healthy women was provided to these women, the load of Staphylococcus spp. in milk was significantly reduced, and Lactobacillus could be detected. Along with the changes observed in the milk microbiota, Lactobacillus administration induced a very significant improvement in the symptoms related to mastitis. Subsequently, different studies have demonstrated the capability of certain probiotic strains to balance the microbiota of human milk by reducing the load of bacterial groups related to mastitis and thus improving the associated symptoms [4–8].

The Lactobacillus strain with more scientific evidence in the field of human mastitis is L. fermentum CECT5716. This is a probiotic strain isolated from breast milk of healthy women endowed with a powerful anti-inflammatory activity probably related to its antibacterial activity and immune-enhancing activity [9, 10].

Two different trials conducted in women suffering from mastitis showed a significant improvement in mastitis condition by decreasing the Staphylococcus spp. load in breast milk [5, 6]. Additionally, a trial conducted in healthy women showed that the consumption of L. fermentum CECT5716 during breastfeeding reduces the incidence of mastitis by approximately 50% relative to its capability to control the proliferation of Staphylococcus spp. in milk [8]. These results prove that probiotic treatment is an effective strategy to control the proliferation of Staphylococcus in breast milk, helping to prevent the development of mastitis.

References