

## Probiotic may prevent Group B *Strep* in pregnant women

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Group B *Streptococcus* (GBS) can be found in the vagina and rectum of about 25% of healthy adult women. While GBS is not considered a pathogenic organism under most circumstances, its presence during pregnancy is a cause for concern. GBS can be transmitted from the mother to the infant during delivery, potentially resulting in serious complications including neonatal sepsis, pneumonia, and meningitis. In addition, while women who are colonized with GBS are usually asymptomatic, some develop urinary tract infections or uterine infections from this organism.

The Centers for Disease Control and Prevention recommends that all pregnant women be screened for GBS between week 35 and week 37 of pregnancy. Women who test positive at that time are advised to receive intravenous antibiotics (usually penicillin) when they are admitted to the hospital for labor, and again every 4 hours until delivery. Antibiotic treatment decreases the probability of GBS transmission to the infant by about 95%: from 1 in 200 in untreated women to 1 in 4,000 in those given antibiotics. Administration of antibiotics prior to the onset of labor is not recommended as a method for treating GBS, because colonization may recur by the time the woman goes into labor. While intravenous antibiotics protect the infant from GBS infection, they may not be effective if the woman delivers less than 4 hours after treatment is started. Moreover, antibiotics are not risk-free. In addition to the various adverse effects of antibiotics per se (including rare cases of severe allergic reactions), antibiotic treatment increases the incidence of yeast infections in both mother and child, and has the potential to cause long-term imbalances in the vaginal and gastrointestinal flora. Because of the limitations and potential adverse effects of antibiotic therapy, preventing maternal GBS colonization (if it were possible) would be preferable to treating GBS colonization after it has occurred.

A specific probiotic preparation, consisting of the combination of *Lactobacillus rhamnosus* GR-1 and *L. reuteri* RC-14, has previously been reported to be effective for preventing and/or treating various genitourinary infections in women, including candidiasis,<sup>1</sup> bacterial vaginosis,<sup>2,3</sup> and urinary tract infections.<sup>4</sup> These organisms, which were originally isolated from the distal urethra or vagina of healthy women, are more effective than other *Lactobacillus* strains at colonizing the vaginal mucosa, adhering to uroepithelial cells, competing against pathogenic organisms, and producing compounds that inhibit the growth of urogenital pathogens.<sup>5,6,7,8</sup> *L. rhamnosus* GR-1 and *L. reuteri* RC-14 also disrupt the biofilms produced by common urogenital pathogens, and thereby interfere with one of the survival mechanisms of these organisms.<sup>9</sup> This latter action is likely to be important with respect to GBS, which is known to produce a biofilm. Because *L. rhamnosus* GR-1 and *L. reuteri* RC-14 survive passage through the gastrointestinal tract and then apparently migrate to and colonize the genitourinary tract,<sup>10</sup> these organisms are capable of exerting their beneficial effects after oral administration.

In a recent study, 110 pregnant who had positive vaginal and rectal cultures for GBS at 35 to 37 weeks of gestation were randomly assigned to receive, in double-blind fashion 2 probiotic capsules or placebo orally, once a day at bedtime until delivery. Each probiotic capsule contained 10<sup>9</sup> viable cells each of *L. rhamnosus* GR-1 and *L. reuteri* RC-14. The proportion of women who became negative for GBS on admission to the hospital for delivery was significantly higher in the probiotic group than in the placebo group (43% vs. 18%; p = 0.007).<sup>11</sup> In this study, the resolution of GBS did not obviate the need for intravenous antibiotics, because the results of the intrapartum GBS cultures were not available until after

the women had delivered. However, the study raises the possibility that beginning probiotic treatment prior to week 35 of gestation (perhaps at the start of the third trimester) could reduce the prevalence of positive GBS cultures at weeks 35 to 37.

While randomized controlled trials are needed to investigate that possibility, there is anecdotal evidence that such an approach is beneficial. A few years ago, a midwifery practice began recommending that all pregnant women (about 80 per year) take *L. rhamnosus* GR-1/*L. reuteri* RC-14 daily from week 28 of gestation until delivery. Since that recommendation was instituted, there has been a reduction of about 75% in the rate of positive GBS cultures at 35 to 37 weeks. If controlled trials confirm these preliminary observations, then probiotic treatment during the third trimester might become the standard of care, with the potential to improve both maternal and neonatal outcomes.

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<sup>2</sup> Anukam K, et al. Augmentation of antimicrobial metronidazole therapy of bacterial vaginosis with oral probiotic Lactobacillus rhamnosus GR-1 and Lactobacillus reuteri RC-14: randomized, double-blind, placebo controlled trial. *Microbes Infect.* 2006;8:1450-1454.

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<sup>5</sup> Gardiner GE, et al. Persistence of Lactobacillus fermentum RC-14 and Lactobacillus rhamnosus GR-1 but not *L. rhamnosus* GG in the human vagina as demonstrated by randomly amplified polymorphic DNA. *Clin Diagn Lab Immunol.* 2002;9:92-96.

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<sup>8</sup> Kohler GA, et al. Probiotic interference of Lactobacillus rhamnosus GR-1 and Lactobacillus reuteri RC-14 with the opportunistic fungal pathogen *Candida albicans*. *Infect Dis Obstet Gynecol.* 2012;2012:636474.

<sup>9</sup> McMillan A, et al. Disruption of urogenital biofilms by lactobacilli. *Colloids Surf B Biointerfaces.* 2011;86:58-64.

<sup>10</sup> Reid G, Bruce AW, Fraser N, Heinemann C, Owen J, Henning B. Oral probiotics can resolve urogenital infections. *FEMS Immunol Med Microbiol.* 2001;30:49-52.

<sup>11</sup> Ho M, et al. Oral Lactobacillus rhamnosus GR-1 and Lactobacillus reuteri RC-14 to reduce Group B Streptococcus colonization in pregnant women: A randomized controlled trial. *Taiwan J Obstet Gynecol.* 2016;55:515-518.