

Influence of breast milk vs. formula and genetics on gut microbiota composition could help prevent Celiac disease

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The autoimmune condition, Celiac disease, afflicts roughly one in 133 Americans. It is caused by a combination of genetic and environmental factors. Now a team of investigators from Spain shows that the level of genetic risk of celiac disease influences the composition of infants' gut microbiota, and confirms earlier studies showing that the type of milk feeding—breast vs. formula—also influences the species distribution. Their hypothesis is that these changes in the intestinal microbiota may directly influence the risk of celiac disease, and that if this is so, changes in diet—particularly breast feeding—could reduce that risk. The research is published in the August *Applied and Environmental Microbiology*.

The newborn intestine is colonized immediately after birth by microorganisms from the mother and the environment. Earlier research had shown that breast feeding protects against celiac disease as compared to formula feeding, as well as that the intestinal microbiota is less diverse in breast- than in formula-fed infants, with different genera predominating in each. The new research also shows that infants at high genetic risk of celiac disease have a high prevalence of certain *Bacteroides* spp that is different from the population in those at low genetic risk.

The investigators report further that the type of milk influences *Bacteroides* species composition, in particular with breast feeding

favoring the prevalence of *B. uniformis*, a species associated with the low risk genotype, and reducing differences in *Bacteroides* species composition between the two genetic risk groups. “Altogether, this could explain the protective role that breast-feeding plays against development of celiac disease, as reported in previous observational studies,” says principal investigator Yolanda Sanz of the Instituto de Agroquímica y Tecnología de Alimentos, Valencia, Spain.

If associations between the composition of the gut microbiota, the genotype, and incidence of celiac disease are confirmed, “We will be able to recommend breastfeeding, and propose dietary intervention trials to modulate the intestinal microbiota in subjects at risk of developing celiac disease, in order to try to prevent its development,” says Sanz.

The study includes 75 full term infants, all with at least one first degree relative suffering from [celiac disease](#), but who had varying degrees of genetic risk. In the study, the researchers sorted the infants into two groups according to [genetic risk](#), a high-risk (7-28 percent) group, and a low-risk (less than one percent) group. They plan to follow the [infants](#) long enough to determine who gets the disease, which will shed further light on whether the intestinal flora influence risk.

More information: E. Sanchez, et al., 2011. Influence of environmental and genetic factors linked to celiac disease risk on infant gut colonization by *Bacteroides* species. *Appl. Environ. Microbiol.* 77:5316-5323

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