

## Breast-feeding overcomes a genetic tendency toward ear infections, scientists discover

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Breast-feeding protects children otherwise made susceptible to ear infections by abnormalities in specific human genes, researchers at the University of Texas Medical Branch at Galveston have discovered.

About 19 percent of children are prone to chronic and recurrent ear infections (known to physicians as "otitis media"). These infections can interfere with language development and lead to learning difficulties. Scientists have long known that genetics plays a role in this vulnerability, but very few investigations have been done to pinpoint the specific genes involved. Their complex relationship with specific infectious agents and environmental factors such as exposure to cigarette smoke and breast-feeding also has remained largely a mystery.

The UTMB study, published in the December issue of the journal *Pediatrics*, examined genetic samples taken from 505 children in Texas and Kentucky, about 60 percent of whom were classified as "otitis media susceptible" because they had suffered an ear infection before the age of 6 months; had undergone three or more episodes of acute otitis media within a six-month period; had four or more episodes within a 12-month period; or had six or more episodes by age 6. Children who had required drainage tubes to assuage recurrent or persistent ear infections were also placed in the "susceptible" category.

"We know that the tendency to get this infection runs in families, and so we decided to look for small variations — what we call 'single-nucleotide polymorphisms,' or SNPs — in three important genes that

produce inflammatory signaling molecules for the immune system," said lead author Janak A. Patel, a professor in the infectious disease division of UTMB's Department of Pediatrics. "Two of them stood out on their own as signals of increased risk."

The two identified genes generate the immune proteins known as tumor necrosis factor alpha (TNF-alpha) and interleukin 6 (IL-6). SNPs in each individual gene were enough, the researchers found, to create increased risk for childhood ear infections, and simultaneous SNPs in both genes created even more risk. The researchers believe that the particular variations detected cause greater production of inflammatory signaling molecules and reduce immune system effectiveness. But the UTMB scientists found that the effect could be counteracted with a practice long known to increase immune resistance: breast-feeding.

"This is a major finding, that breast-feeding neutralized the effect even in kids who had all the genetic polymorphisms," Patel said. "Not only that, they were protected from recurrent infections even later in childhood, long after they stopped breast-feeding."

By contrast, the group found that another environmental factor — exposure to cigarette smoke — increased vulnerability to otitis media in children with the TNF-alpha gene variation. Cigarette smoke exposure alone, however, was not enough to increase risk for ear infections.

Source: University of Texas Medical Branch at Galveston

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