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## **Compound in Breast Milk Fights Harmful Bacteria**

*Simple, Inexpensive Compound Could Be Added to Formula or Cow's Milk*

**DENVER and IOWA CITY** – Researchers at National Jewish Health and the University of Iowa have identified a compound in human breast milk that fights infections by harmful bacteria while allowing beneficial bacteria to thrive. Human breast milk has more than 200 times the amount of glycerol monolaurate (GML) than is found in cows' milk. Infant formula has none. GML is inexpensive to manufacture. Future research will determine if GML could be a beneficial additive to cow's milk and infant formula.

"Our findings demonstrate that high levels of GML are unique to human breast milk and strongly inhibit growth of pathogenic bacteria," said Donald Leung, MD, PhD, professor of pediatrics at National Jewish Health and senior author on a paper in *Scientific Reports*.

"While antibiotics can fight bacterial infections in infants, they kill the beneficial bacteria along with the pathogenic ones," said Patrick Schlievert, PhD, professor of microbiology and immunology at the University of Iowa Carver College of Medicine and first author on the *Scientific Reports* paper. "GML is much more selective, fighting only the pathogenic bacteria while allowing beneficial species to thrive. We think GML holds great promise as a potential additive to cows' milk and infant formula that could promote the health of babies around the world."

After determining that human breast milk contains much higher levels of GML than does cows' milk, the researchers showed that human breast milk inhibits the growth of the pathogenic bacteria *Staphylococcus aureus*, *Bacillus subtilis* and *Clostridium perfringens*, while neither cows' milk nor infant formula had any effect. Human breast milk did not inhibit the growth of the beneficial bacteria *Enterococcus faecilis*. Babies fed on human breast milk have high levels of beneficial bifidobacteria, lactobacilli and enterococci bacterial species.

When researchers remove the GML from human breast milk, it lost its antimicrobial activity against *S. aureus*. When they added GML to cows' milk, it became antimicrobial.

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The researchers also showed that GML inhibits inflammation in epithelial cells, which line the gut and other mucosal surfaces. Inflammation can damage epithelial cells and contribute to susceptibility to both bacterial and viral infections.

Drs. Schlievert and Leung have applied for a patent for the use of GML as a beneficial additive to cows' milk and infant formula.

#### **About National Jewish Health**

[National Jewish Health](http://www.njhealth.org) is the leading respiratory hospital in the nation. Founded 120 years ago as a nonprofit hospital, National Jewish Health today is the only facility in the world dedicated exclusively to groundbreaking medical research and treatment of patients with respiratory, cardiac, immune and related disorders. Patients and families come to National Jewish Health from around the world to receive cutting-edge, comprehensive, coordinated care. To learn more, visit [www.njhealth.org](http://www.njhealth.org).

#### **About University of Iowa Health Care**

[University of Iowa Health Care](http://uihealthcare.org) is the state's only comprehensive academic medical center, dedicated to providing world-class health care and health-related outreach services to all Iowans. Based in Iowa City, UI Health Care includes [University of Iowa Hospitals and Clinics](http://uihospitals.org), the [University of Iowa Roy J. and Lucille A. Carver College of Medicine](http://uiroyj.org), and [University of Iowa Physicians](http://uiphysicians.org), the state's largest multi-specialty physician group practice.