Science News

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Mom's microbes influence her offspring's immune system, mice study shows

Date: March 17, 2016

Source: American Association for the Advancement of Science

Summary: During gestation, a mother's microbiome shapes the immune system of her offspring, a new study in mice suggests. While it's known that a newborn's gut microbiota can affect its own immune system, the impact of a mother's microbiota on her offspring has largely been unexplored.

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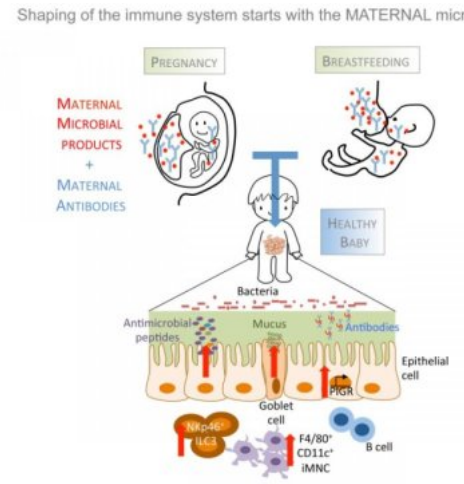

A graphical abstract of our findings. This material relates to a paper that appeared in the March 18, 2016, issue of Science, published by AAAS. The paper, by M. Gomez de Agüero at University of Bern in Bern, Switzerland, and colleagues was titled, "The maternal microbiota drives early postnatal innate immune development."

Credit: Mercedes Gomez de Agüero, Stephanie Ganal-Vonarburg, Kathy D. McCoy, and Andrew J. Macpherson

During gestation, a mother's microbiome shapes the immune system of her offspring, a new study in mice suggests. While it's known that a newborn's gut microbiota can affect its own immune system, the impact of a mother's microbiota on her offspring has largely been unexplored.

Here, Mercedes Gomez de Agüero et al. infected the guts of pregnant mice with E.coli engineered to dwindle over time, allowing the mothers to become germ-free again around the time they gave birth.

This temporary colonization of E.coli in the mother affected the immune system of her offspring; after birth, the offspring harbored more innate lymphoid and mononuclear cells in their intestines compared to mice born to microbe-free pregnant mothers. Similar results were seen when pregnant mothers were temporarily colonized with a cocktail of eight other microbes.

An RNA analysis of offspring born to gestation-only colonized mothers compared with controls revealed greater expression of numerous genes, including those that influence cell division and differentiation, mucus and ion channels, and metabolism and immune function.

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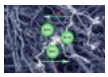

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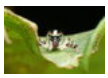

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By transferring serum from bacteria-colonized pregnant mice to non-colonized pregnant mice, the researchers found that maternal antibodies likely facilitate the transmission and retention of microbial molecules from a mother to her offspring.

The results of this study add another surprising chapter to the growing body of literature surrounding the effects of the gut microbiota on immune functioning.

Story Source:

The above post is reprinted from materials provided by **American Association for the Advancement of Science**. *Note: Materials may be edited for content and length.*

Journal Reference:

1. Mercedes Gomez De Agüero, Stephanie C. Ganal-Vonarburg, Tobias Fuhrer, Sandra Rupp, Yasuhiro Uchimura, Hai Li, Anna Steinert, Mathias Heikenwalder, Siegfried Hapfelmeier, Uwe Sauer, Kathy D. Mccoy, Andrew J. Macpherson. **The maternal microbiota drives early postnatal innate immune development**. *Science*, 2016 DOI: 10.1126/science.aad2571

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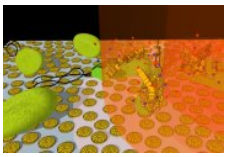

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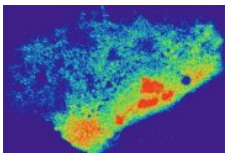

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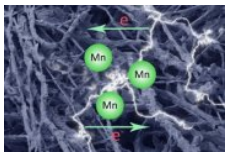

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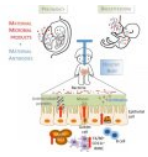

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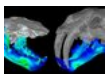

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