Mouse model reveals colostrum's critical role in fighting undernutrition

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Control dam  
Day 0  

Offspring cross-fostered before any suckling  

Control group  
Newborns receiving colostrum followed by mature milk

No Colostrum/Mature Milk dam  
Delivered at day -9  

9 days-old offspring humanely killed at day 0

No Colostrum/Mature Milk group  
Newborns receiving mature milk from birth and no colostrum
During World Breastfeeding Week, a new international study, published in Microbiome, has revealed that the first drops of breast milk are crucial for healthy growth at birth and can help combat chronic undernutrition, which affects 200 million children and causes more than 3 million deaths annually worldwide.

Led by Professor Valerie Verhasselt, Director of the Larsson-Rosenquist Foundation Center for Immunology and Breastfeeding (CIBF) at The University of Western Australia's Medical School and Telethon Kids Institute, the research highlights the crucial impact of diet at birth on healthy growth, independent of the gut microbiota.

"Chronic undernutrition is a severe health burden that predominantly affects children in low and middle-income countries, causing growth failure, immune dysfunction and neurodevelopmental deficits," Professor Verhasselt said.

"Most traditional prevention strategies have focused on complementary feeding; the period when infants transition from exclusive breastfeeding to receiving additional foods and liquids, missing the critical early stages of growth.

"We investigated whether dietary intervention at birth could prevent chronic malnutrition by influencing the infant microbiota, focusing on colostrum—the unique yellow breast milk produced in very low amounts during the first two to three days and ideally received within an hour of birth."
"Our hypothesis centered on colostrum's high levels of bioactive factors, including growth factors and microbiota-shaping compounds, which are critical at the time when the gut is colonized with bacteria, compared to mature milk and especially pre-lacteal feeds like formula."

The researchers found that feeding mature milk instead of colostrum at birth leads to growth failure, indicating colostrum's crucial role in preventing this condition and the importance of developmentally appropriate interventions.

"We discovered that while colostrum significantly impacts gut microbiota development, its benefits for growth don't depend on the microbiota," Professor Verhasselt said.

"This finding was unexpected, given the importance of the microbiota in regulating adult physiology and it highlighted that early in development, when the microbiota is not stable, appropriate nutrition may be a safer way to control growth.

"Additionally, colostrum deprivation results in growth hormone resistance and subsequent growth failure, independent of common causes like undernutrition and infection, again showing the strong impact of the choice of diet at birth."

Professor Verhasselt said despite World Health Organization (WHO) guidelines recommending breastfeeding within the first hour, along with exclusive breastfeeding, at least 1 in 3 newborns worldwide don't receive optimal colostrum feeding, with misconceptions about its nutritional adequacy contributing to this issue.

"This study provides robust scientific evidence of the long-term benefits of colostrum in preventing growth failure and adds to the recent findings of the Center on the role of colostrum in preventing another major child
health burden, helminth infection, strongly advocating for investing in the implementation of WHO guidelines," she said.

The preclinical findings of long-term benefits from the first drops of colostrum pave the way for investigating the effects of colostrum in human birth cohorts and should hopefully lead to more evidence for implementing WHO guidelines on early breastfeeding practices and developing age-appropriate nutritional interventions for health promotion, Professor Verhasselt said.


Provided by University of Western Australia

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