Antibiotics given in infancy may have adverse impact on adult gut health

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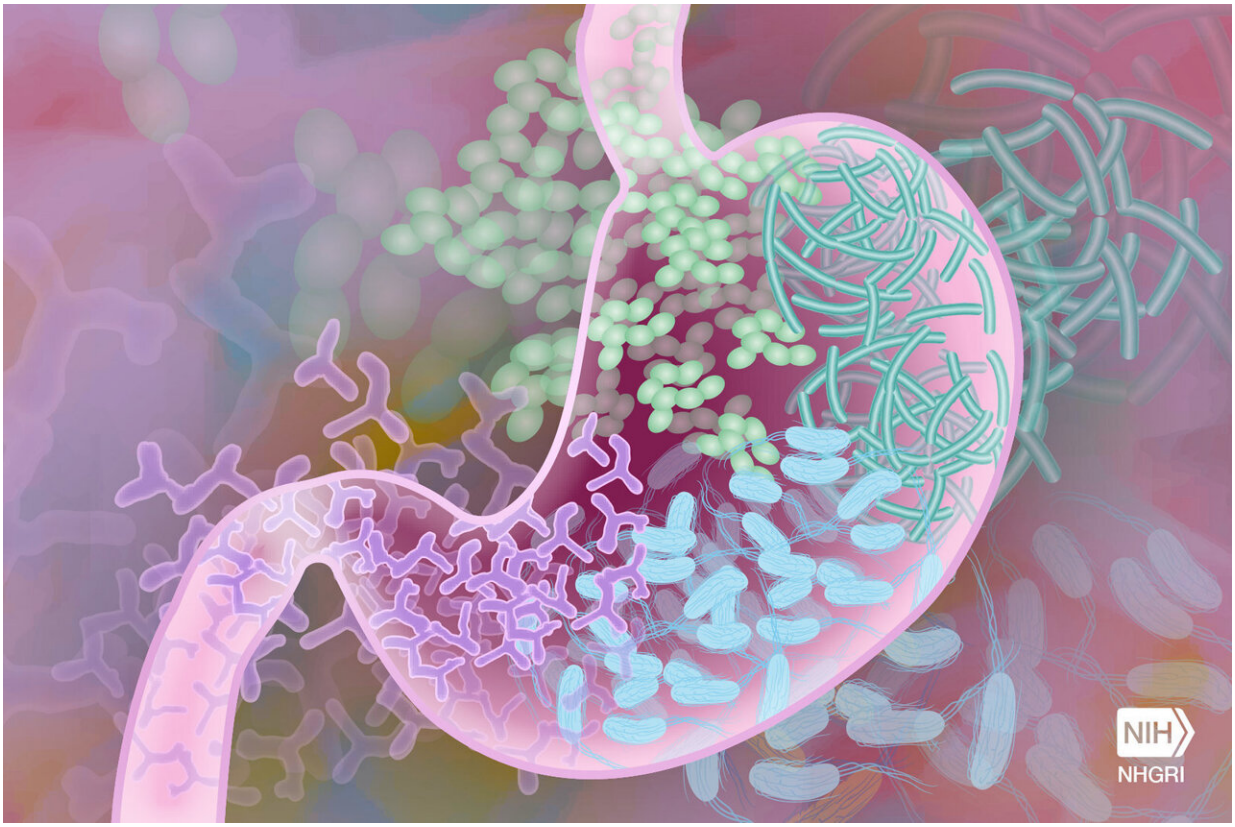

Illustration of bacteria in the human gut. Credit: Darryl Leja, National Human Genome Research Institute, National Institutes of Health

Preterm and low birth-weight babies are routinely given antibiotics to prevent—not just treat—infections, which they have a high risk of

developing. A new study published in *The Journal of Physiology* has found that early life exposure to antibiotics in neonatal mice has long-lasting effects on their microbiota, enteric nervous system, and gut function. This could mean that babies given antibiotics may grow up to experience gastrointestinal issues.

This discovery by the research team from the Department of Anatomy and Physiology at the University of Melbourne is the first to show that antibiotics given to neonatal mice yields these long-lasting effects that result in disturbed gastrointestinal function, including the speed of motility through the gut and diarrhea-like symptoms in adulthood.

The research team gave mice an oral dose of vancomycin every day for the first ten days of their lives. They were then reared normally until they were young adults, and their gut tissue was looked at to measure its structure, function, microbiota, and nervous system. The investigators found that changes were also dependent on the sex of the mice. The females had long whole gut transit and the males had lower fecal weight than the control group. Both males and females had greater fecal water content, which is a diarrhea-like symptom.

Mice have many similarities to humans, but they are born with more immature guts than humans and have accelerated growth due to their shorter life spans. Their gut microbiota and nervous systems are less complex than those of humans, so the findings cannot yet be directly correlated to human children and infants. The researchers will be doing further studies on the mechanisms of antibiotics on the gut and the causes of the sex specific actions, and on whether early-life antibiotic use has effects on metabolism and brain function.

Lead physiologist Dr. Jaime Foong said, "We are very excited about the findings of our study which show that antibiotics given after birth could have prolonged effects on the enteric nervous system. This provides

further evidence of the importance of microbiota on gut health and could introduce new targets to advance antibiotic treatment to very young children."

More information: Neonatal antibiotics have long-term sex-dependent effects on the enteric nervous system, *The Journal of Physiology* (2022). DOI: 10.1113/JP282939

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