

# INTESTINAL ILLNESSES DURING INFANCY HAVE LONG LASTING EFFECTS ON THE BRAIN, BEHAVIOR, AND GUT

Researchers use animal models to examine effects of infection on the brain and the gut



525,000 children  $\approx$  1/9 children

1 out of every 9 children die every year due to diarrheal diseases which makes this the second leading cause of death in children under 5

Exposure to diarrheal infections during childhood can cause long term conditions, including:

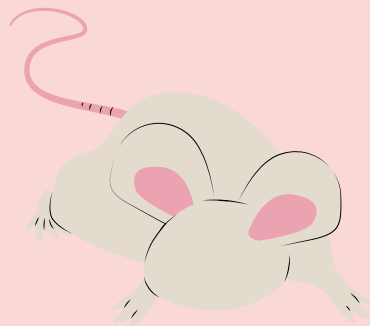
- inflammation in the brain
- learning difficulties
- memory differences



## EXPERIMENT

Researchers infected 7-day old newborn mice with E. coli, a bacterial disease in the intestines, through the mouth and into the stomach. Within these mice, researchers measured later in adulthood their:

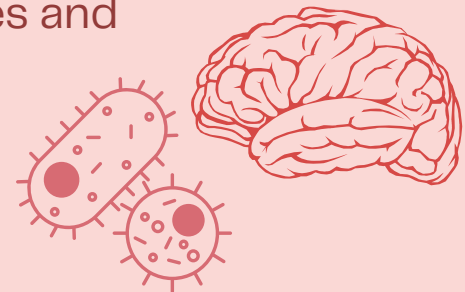
- gut bacteria
- behavior
- intestinal function



## RESULTS

Researchers found that mice infected with E. coli during infancy had long lasting effects as adults, like inflammation (or swelling) in the intestines and memory problems.

Inflammation in the brain was accompanied with learning difficulties and gut infections later in adulthood.



## IMBALANCE FOUND!!!

Researchers found that the gut bacteria suffered a major disruption caused by an imbalance.

This imbalance includes a decline in a bacteria called Firmicutes, which is crucial in gut bacteria and human health.



## FUTURE STUDIES

Intestine diseases continue to be a major public health concern despite improvements in sanitation and clean water availability. Expanding on the role of helpful bacteria in treating learning difficulties or memory differences brought on by bacterial infection is strongly encouraged.



**These results show how early infection, specifically regarding infections in the intestines, can have a profound negative impact on the adult brain.**