

Processed diets might promote chronic infections that can lead to disorders such as diabetes, researchers find

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Processed diets, which are low in fiber, may initially reduce the incidence of foodborne infectious diseases such as *E. coli* infections, but

might also increase the incidence of diseases characterized by low-grade chronic infection and inflammation such as diabetes, according to researchers in the Institute for Biomedical Sciences at Georgia State University.

This study used mice to investigate how changing from a grain-based diet to a highly processed, high-fat Western style diet impacts [infection](#) with the pathogen *Citrobacter rodentium*, which resembles *Escherichia coli* (*E. coli*) infections in humans. The findings are published in the journal *PLOS Pathogens*.

Gut microbiota, the microorganisms living in the intestine, provide a number of benefits, such as protecting a host from infection by bacterial [pathogens](#). These microorganisms are influenced by a variety of environmental factors, especially diet, and rely heavily on complex carbohydrates such as fiber.

The Western-style diet, which contains high amounts of processed foods, red meat, high-fat dairy products, high-sugar foods and pre-packaged foods, lacks fiber, which is needed to support gut microbiota. Changes in [dietary habits](#), especially a lack of fiber, are believed to have contributed to increased prevalence of chronic inflammatory diseases such as inflammatory bowel disease, metabolic syndrome and cancer.

In this study, the researchers found switching mice from a standard grain-based rodent chow to a high-fat, low-fiber Western-style diet resulted in a rapid reduction in the number of gut bacteria. Mice fed the Western-style diet were frequently unable to clear the pathogen *Citrobacter rodentium* from the colon. They were also prone to developing chronic infection when re-challenged by this pathogen.

The researchers conclude the Western-style diet reduces the numbers of gut bacteria and promotes encroachment of microbiota into the intestine,

potentially influencing immune system readiness and the body's defense against pathogenic bacteria.

"We observed that feeding mice a Western-style diet, rather than standard rodent grain-based chow, altered the dynamics of *Citrobacter* infection, reducing initial colonization and inflammation, which was surprising. However, mice consuming the Western-style diet frequently developed persistent infection that was associated with low-grade inflammation and [insulin resistance](#)," said Dr. Andrew Gewirtz, senior co-author of the study and professor in the Institute for Biomedical Sciences. "These studies demonstrate potential of altering microbiota and their metabolites by [diet](#) to impact the course and consequence of infection following exposure to a gut pathogen."

"We speculate that reshaping [gut microbiota](#) by nutrients that promote beneficial bacteria that out-compete pathogens may be a means of broadly promoting health," said Dr. Jun Zou, senior co-author of the study and assistant professor in the Institute for Biomedical Sciences at Georgia State.

More information: Junqing An et al. Western-style diet impedes colonization and clearance of *Citrobacter rodentium*, *PLOS Pathogens* (2021). [DOI: 10.1371/journal.ppat.1009497](https://doi.org/10.1371/journal.ppat.1009497)

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