

# Targeting bacteria in the gut might help burn and trauma patients

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A study published in *PLOS ONE* has found that burn patients experience dramatic changes in the 100 trillion bacteria inside the gastrointestinal tract.

Loyola University Chicago Health Sciences Division scientists found that in patients who had suffered [severe burns](#), there was a huge increase in Enterobacteriaceae, a family of potentially harmful bacteria. There was a corresponding decrease in [beneficial bacteria](#) that normally keep harmful bacteria in check.

The findings suggest that burn patients might benefit from treatment with probiotics (live beneficial bacteria). The findings also might apply to other trauma patients, including patients who have suffered traumatic brain injuries, said senior author Mashkoor Choudhry, PhD.

In healthy individuals, the [gastrointestinal tract](#) contains more than 100 trillion bacteria, called the microbiome, that live symbiotically and provide numerous benefits. If this healthy balance is disrupted, a state called dysbiosis occurs. Dysbiosis has been linked to many conditions, including [inflammatory bowel disease](#), obesity, rheumatoid arthritis and diabetes.

Dr. Choudhry and colleagues examined fecal samples from four severely burned patients who were treated in the Burn Center of Loyola University Medical Center. The samples were taken 5 to 17 days after the burn injuries occurred. The microbiomes of these patients were

compared with the microbiomes of a control group of eight patients who had suffered only minor burns.

In the severely burned patients, Enterobacteriaceae accounted for an average of 31.9 percent of bacteria in the gut microbiome. By comparison, Enterobacteriaceae accounted for only 0.5 percent of the microbiome in patients who had suffered minor burns.

Enterobacteriaceae is a family of bacteria that includes pathological bacteria such as *E. coli* and *Salmonella*.

Dr. Choudhry said such imbalances of bacteria may contribute to sepsis or other infectious complications that cause 75 percent of all deaths in patients with severe burns. The imbalance could compromise the walls of the gastrointestinal tract, enabling [harmful bacteria](#) to leak out of the gut and into the bloodstream. Dr. Choudhry is planning further studies to confirm this hypothesis.

A burn or other traumatic injury appears to start a vicious cycle: In response to the injury, the body's immune system mounts an [inflammatory response](#). This causes an imbalance in the microbiome, further boosting the inflammatory response and triggering an even greater imbalance in the microbiome, said Richard Kennedy, PhD, a co-author of the study.

Dr. Choudhry said further research would be needed to determine whether administration of probiotics could restore a healthy microbiome and reduce the risk of sepsis and other infectious complications.

Provided by Loyola University Health System

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