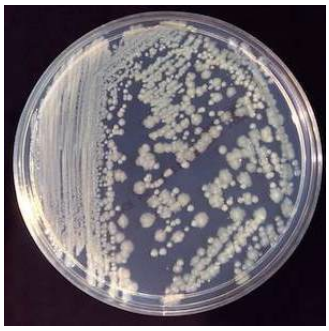
ICU
MANAGEMENT & PRACTICE

Critical Illness Leads to Significant, Rapid Dysbiosis



Microbiome signatures derived from intensive care unit (ICU) patient samples show great promise as diagnostic markers and guides to therapeutic interventions to restore the normal microbiome, according to a study published in *mSphere*.

Critical illness is thought to involve the loss of “health-promoting” microbes and concurrent overgrowth of pathogenic bacteria (dysbiosis), leading to increased susceptibility to nosocomial infections, organ failure and sepsis.

Daniel McDonald, Department of Pediatrics, University of California San Diego, with colleagues from the USA and Canada, investigated faecal, oral and skin samples from 115 mixed intensive care unit (ICU) patients from 4 centres in the U.S. and Canada, at two time points - within 48 hours of admission and on day of discharge or on day 10. The samples were compared to samples from patients without critical illness. They found that many taxons of “health-promoting” organisms were lacking in ICU patients, who also frequently had overgrowth of known pathogens. The microbiome sources were unexpected, and the disruption of the microbial community was greater at the second time point. In addition, the researchers found that a set of concerning inflammatory taxons, including from the *Enterobacteriaceae* family, co-occur. They also found that large depletions of organisms thought to confer anti-inflammatory benefits. They note the unexpected finding that faecal and oral samples taken at admission were more similar to each other than to samples taken at discharge, “implying that the length of stay in an ICU is associated with community disruption.”

See Also: Study: Microbiome Disruption May Have Key Role in ARDS, Sepsis

The authors note that use of antibiotics is a limitation of the study, as this precluded differentiating the effect of antibiotic pressure from the effect of critical illness. However, they say that “irrespective of the cause, the evidence suggests that critical care patients may benefit from therapeutics focused on improvement of the microbiome.”

They conclude: “These data may provide the first steps toward defining targeted therapies that correct potentially “illness-promoting” dysbiosis with probiotics or with targeted, multimicrobe synthetic “stool pills” that restore a healthy microbiome in the ICU setting to improve patient outcomes.”

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