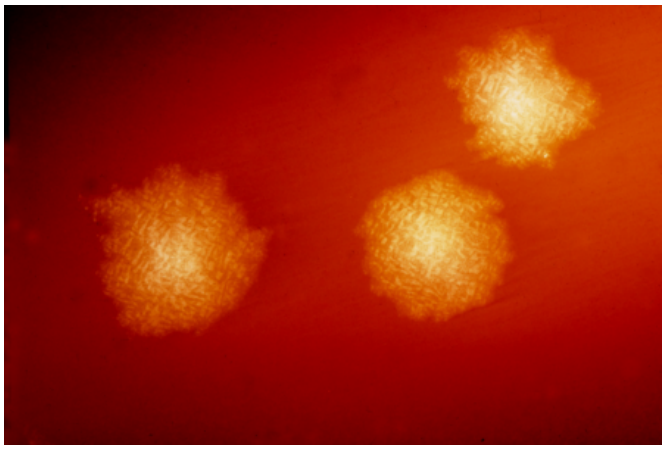
Metabolite therapy proves effective in treating C. difficile in mice

20 March 2018, by Ryan Hatoum



This photograph depicts Clostridium difficile colonies after 48hrs growth on a blood agar plate; Magnified 4.8X. C. difficile, an anaerobic gram-positive rod, is the most frequently identified cause of antibiotic-associated diarrhea (AAD). It accounts for approximately 15-25% of all episodes of AAD. Credit: CDC

A team of UCLA researchers found that a metabolite therapy was effective in mice for treating a serious infection of the colon known as Clostridium difficile infection, or C. difficile.

Mice that were infected with C. difficile were treated with an experimental drug called CSA13, which increased levels of four protective metabolites—molecules that help fuel, maintain and mediate cells. Compared with mice that did not receive CSA13, the mice treated with the drug were significantly more likely to survive the infection, had lower rates of weight loss and—after the treatment was stopped—were less likely to have a relapse of the infection.

C. difficile is a potentially life-threatening intestinal infection that causes severe diarrhea, abdominal pain and other symptoms. Nearly 500,000 people in the U.S.—primarily older adults in hospitals or long-term care facilities—become sick from C. difficile each year, according to the Centers for Disease Control and Prevention.

Treating C. difficile is complicated; the infection is often referred to as a "superbug" because today's therapies are not very effective. Current antibiotics, for instance, do not completely eradicate C. difficile, and because of how they alter protective gut bacteria, antibiotics can increase the risk for the infection to recur.

Studies in humans have shown that fecal transplants have a 90 percent success rate for curing C. difficile infection, but the procedure is not approved by the Food and Drug Administration to treat C. difficile. It also is expensive and may have serious side effects.

Mice infected with C. difficile received treatments of CSA13 either orally or through injections, or were given vancomycin, an antibiotic commonly used to treat the infection. The mice were monitored for 20 days, and they were compared to a control group that received neither treatment.

A profile of the gut bacteria and metabolites from the mice who received CSA13 also indicated that increased levels of the four metabolites the researchers identified can inhibit the infection, reduce mortality rates and reduce weight loss in the mice infected with C. difficile.

The findings suggest metabolite therapy warrants further research as a possible treatment for C. difficile infection in humans.

It is important to note that CSA13 and the metabolites have not yet been approved by the U.S. Food and Drug Administration as safe and effective for humans; they may be used only in research studies.

More information: Jiani Wang et al. Ceragenin

CSA13 Reduces Clostridium difficile Infection in Mice by Modulating the Intestinal Microbiome and Metabolites, *Gastroenterology* (2018). DOI: 10.1053/j.gastro.2018.01.026

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