



TREATMENT GUIDE FOR PHYSICIANS

Gastrointestinal Infections

OVERVIEW

Infections are a common cause of gastrointestinal symptoms worldwide (e.g. [1,2]). SmartGut tests for several pathogenic microorganisms including *Clostridium difficile*, *Campylobacter*, *Escherichia-Shigella*, *Salmonella enterica*, and *Vibrio cholerae*. The SmartGut test is intended for patients with chronic conditions rather than acute symptoms of <4 weeks duration. Certain pathogens that may cause acute diarrheal illness are also implicated in post-infectious chronic conditions. For example, *Salmonella*, *Shigella*, and *Campylobacter* are positively associated with sudden-onset forms of irritable bowel syndrome (IBS) [1,3-6]. *Campylobacter* is also believed to be a predisposing agent in inflammatory bowel disease (IBD) [1,7,8]. In addition, the relative abundance of *Escherichia coli* is often increased in the stool of patients with Ulcerative Colitis (UC) and Crohn's disease (CD) [9-13]. The gut microbiome may play a role in risk of gastrointestinal infections as well as risk of related complications.

INDICATIONS FOR SMARTGUT TESTING

- Diarrhea, abdominal pain, nausea, change in stool habits, abnormal stool consistency (according to the *Bristol stool scale* [14]), presence of blood in the stool.

RELEVANT SMARTGUT RESULTS

- **Low microbial diversity:** Studies analyzing changes during *C. difficile* infections [15,16] suggest that infections can decrease microbial diversity. Another study suggested that microbiota composition can influence the susceptibility to *Campylobacter* infections [17].
- **Presence of at least one of the following pathogenic microorganisms:**
 - *Clostridium difficile* [18]
 - *Campylobacter* [1]
 - *Escherichia-Shigella* [19,20]
 - *Salmonella enterica* [2]
 - *Vibrio cholerae* [21]
- **High levels of:** *Bacteroides fragilis* [22], *Clostridium* [23]
- **Low levels of** *Lactobacillus* [24]

CLINICAL TREATMENT SUGGESTIONS BASED ON SMARTGUT RESULTS

MONITOR THE FOLLOWING CLINICAL MARKERS:

- Microbial diversity
- Presence of pathogenic organisms: *Clostridium difficile*, *Campylobacter*, *Escherichia-Shigella*, *Salmonella enterica* and *Vibrio cholerae*.
- Change in the levels of: *Bacteroides fragilis*, *Clostridium*, *Lactobacillus*

INTERVENTIONS TO CONSIDER:

- **Antibiotics:** Patients with positive results for any pathogenic microorganisms should meet and discuss this with their physician and be treated with appropriate antibiotics as defined by current standard of care.
- **Consider the use of probiotics, prebiotics or synbiotics:** A systematic review of the evidence showed the use of probiotics can help to prevent *C. difficile* associated diarrhea [25]. Another meta-analysis suggested that probiotics can also prevent traveller's diarrhea [26], an infection affecting travelers caused by different pathogens, including *Escherichia coli* and *Salmonella*. Additional studies also suggested that prebiotics can protect against gastrointestinal pathogens [27].
- **Consider a fiber-rich diet:** A preliminary study made in mice containing human gut microbiota [28] showed that the deprivation of fiber in the diet made the mice more susceptible to a pathogen-induced colitis. The regular consumption of fiber-rich products such as vegetables and grains can help the microbiome protect against pathogens.
- **Consider a fecal microbiota transplantation (FMT):** The use of FMT has been described to be effective for the treatment of *C. difficile* infection [29]. This practice is approved and regulated by the FDA for recurrent *C. difficile* infection; FMT is considered an investigational new drug for all other conditions and requires an appropriate permit [30].
- **Refer to Gut Conditions Treatment Guide:** Pathogenic microorganisms are associated with development of IBS and IBD, please refer to [Gut Conditions Treatment Guide](#) for more treatment suggestions.

POTENTIAL OUTCOMES

- Improvement in symptom management
- Potentially decrease the risk of related conditions such as IBS or IBD

References

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