

# Microbe Categories and GI-MAP<sup>®</sup> Patterns Associated with IBS & SIBO

## Primary Hydrogen Producers

*Faecalibacterium prausnitzii*  
*Roseburia* spp.  
*Bacteroidetes phyla*  
*Firmicutes phyla*

## Primary Methane Producers

*Methanobacteriaceae (family)*

## Primary Hydrogen Sulfide Producers

*Bacteroides fragilis*  
*Escherichia* spp.  
*Enterobacter* spp.  
*Desulfovibrio* spp.  
*Morganella* spp.  
*Pseudomonas aeruginosa*  
*Staphylococcus aureus*  
*Citrobacter* spp.  
*Citrobacter freundii*  
*Klebsiella* spp.  
*Klebsiella pneumoniae*  
*Proteus* spp.  
*Proteus mirabilis*  
*Fusobacterium* spp.

## Histamine Producing Bacteria

*Lactobacillus* spp.  
*Morganella* spp.  
*Pseudomonas*  
*Pseudomonas aeruginosa*  
*Citrobacter freundii*  
*Klebsiella*  
*Klebsiella pneumoniae*  
*Proteus*  
*Proteus mirabilis*  
*Enterobacter* spp.  
*Escherichia* spp.  
*Fusobacterium* spp.

## Mast Cell-Activating Microbes

*H. pylori*  
*Enterococcus faecalis*  
*Pseudomonas aeruginosa*  
*Staphylococcus aureus*  
*Streptococcus* spp.  
*Candida* spp.  
*Candida albicans*  
Lipopolysaccharide producers (see LPS list)

## Lipopolysaccharide (LPS) Producing Bacteria

*Escherichia* spp.  
*Enterobacter* spp.  
*Morganella* spp.  
*Pseudomonas* spp.  
*Pseudomonas aeruginosa*  
*Citrobacter* spp.  
*Citrobacter freundii*  
*Klebsiella* spp.  
*Klebsiella pneumoniae*  
*Proteus*  
*Proteus mirabilis*



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## Gut Barrier Permeability (“Leaky Gut”) Pattern

<b>Intestinal Permeability</b>	Any Pathogen	High	<i>Pathogens (page 1)</i>
	<i>Lactobacillus</i> spp.	Low	<i>Normal Flora (page 2)</i>
	<i>Akkermansia muciniphila</i>	Low; <dl	
	<i>Candida albicans</i>	High	<i>Fungi/Yeast (page 3)</i>
	Anti-gliadin IgA	High	<i>Intestinal Health Markers (Page 4)</i>
	Zonulin	High	
<b>Low Butyrate/SCFA Production</b>	<i>Clostridia (class)</i>	Low; <dl	<i>Normal Flora (page 2)</i>
	<i>Faecalibacterium prausnitzii</i>	Low	
	<i>Firmicutes</i> phylum	Low	
<b>Poor Mucosal Health</b>	<i>Bifidobacterium</i> spp.	Low; <dl	<i>Normal Flora (page 2)</i>
	<i>Escherichia</i> spp.	Low	
	<i>Lactobacillus</i> spp.	Low	
	<i>Akkermansia muciniphila</i>	Low; <dl	
	<i>Bacteroidetes</i> phylum	Low	

## Markers Associated With Digestive Dysfunction

<b>Pathogens (low to high levels)</b>	Most types, especially if multiple pathogens are present
<b><i>H. pylori</i> (moderate to high levels)</b>	<i>Helicobacter pylori</i> (with or without virulence factors)
<b>Normal Flora (high levels)</b>	<i>Enterococcus</i> <i>Lactobacillus</i> <i>Akkermansia muciniphila</i>
<b>Phyla Microbiota (high levels)</b>	<i>Bacteroidetes</i> and/or <i>Firmicutes</i>
<b>Opportunistic Bacteria, Yeast and Parasites (moderate to high levels)</b>	<i>Bacillus</i> spp. <i>Enterococcus faecalis</i> <i>Enterococcus faecium</i> <i>Morganella</i> spp. <i>Staphylococcus</i> spp. <i>Staphylococcus aureus</i> <i>Streptococcus</i> spp. <i>Methanobacteriaceae</i> (family) <i>Desulfovibrio</i> spp. <i>Klebsiella pneumoniae</i> <i>Prevotella</i> spp. <i>Candida</i> spp. <i>Candida albicans</i> <i>Parasitic Protozoa</i>
<b>Intestinal Health Markers</b>	Elastase-1 (often low to moderately low levels) Steatocrit (sometimes elevated)