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# Gut-Brain Connection Series

**Part 6 - How to Deal with Gut Bugs (SIBO/SIFO) - Weed, Seed & Feed**

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**“All disease begins  
in the gut.”**

Hippocrates  
c.460 - c.370 BC

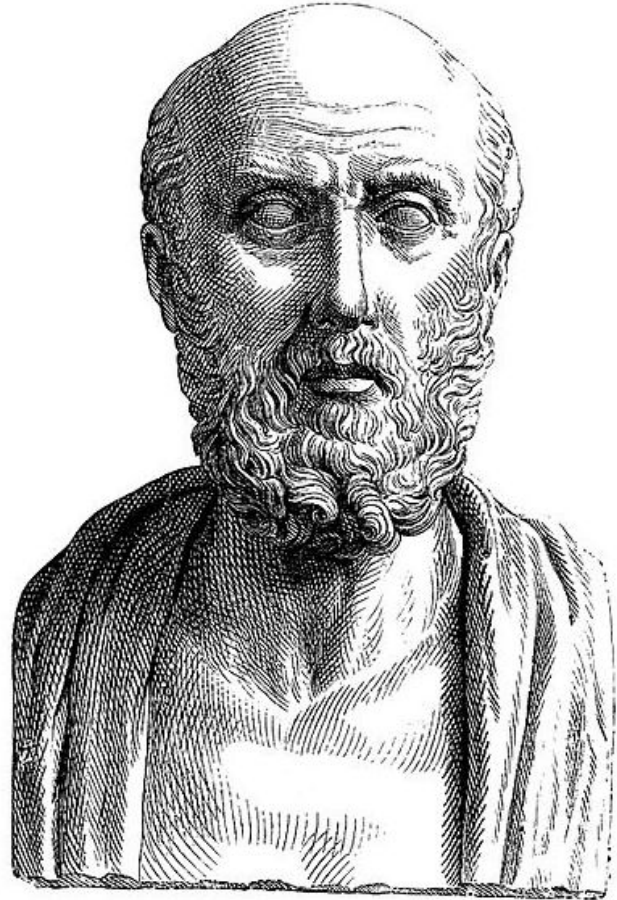
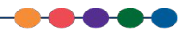


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Review

**Gut flora in health and disease**

Dr Francisco Guarner, MD, PhD, Prof Juan-R Malagelada, MRCP

Altmetric 83

Article  
Current Gastroenterology Reports  
August 2008, Volume 10, Issue 4, pp 396-403  
DOI: [http://dx.doi.org/10.1016/S1526-9896\(08\)00101-0](http://dx.doi.org/10.1016/S1526-9896(08)00101-0)  
First online: 16 October 2008

Article Info

Summary Full Text

**The human gut microbiome: for future health care**

James M. Kinross, Alexander C. von Roon, Elaine Holmes, Aron D. Spector

The human gut is the largest part of these bacterial populations. Resident bacteria on a host of the gut microflora include nutrients, important for and protection of the essential factors and inflammatory health. Probiotic diseases.

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aps American Physiological Society

**Physiological Reviews**

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**Gut Microbiota in Health and Disease**

Inna Sekirov, Shannon L. Russell, L. Caetano M. Antunes, B. Brett Finlay  
Physiological Reviews Published 1 July 2010 Vol. 90 no. 3

Article Figures & Data Info

**Abstract**

Gut microbiota is an assortment of microorganisms inhabiting the mammalian gastrointestinal tract. The composition of this microflora evolves throughout an individual's lifetime and is susceptible to environmental modifications. Recent renewed interest in the structure and function of its central position in health and disease. The microbiota is integral to normal host physiology, from nutritional status to behavior and can be a central or a contributing cause of many diseases, affecting various systems. The overall balance in the composition of the gut microbiota is essential for health and disease.

**HUMAN MICROBIOME JOURNAL**

**2400 YEARS LATER, WE ARE STILL DISCOVERING OF THE IMPORTANCE OF GUT FUNCTION**

In their intestine, humans possess an "extended genome" of millions of bacteria. Because this complex symbiosis influences host metabolism and gene expression, it has been proposed that humans are complex biological systems. Microbiologic analysis and systems biology are now beginning to implicate the etiology of localized intestinal diseases such as the irritable bowel syndrome, Crohn's disease, and colon cancer. These approaches also suggest possible links between previously unassociated systemic conditions such as type 2 diabetes and the intestinal microbiome. This review summarizes the research that is defining our understanding of the microbiome and highlights future areas of research in gastroenterology and human health in which the intestinal microbiome will play a significant role.





## Specialty Laboratory Diagnostics for Gut Function:

The Small Intestine Bacterial Overgrowth (SIBO) Profile



## Overview

- Overview of SIBO
- Learn when to consider testing for SIBO
- Review the test in detail

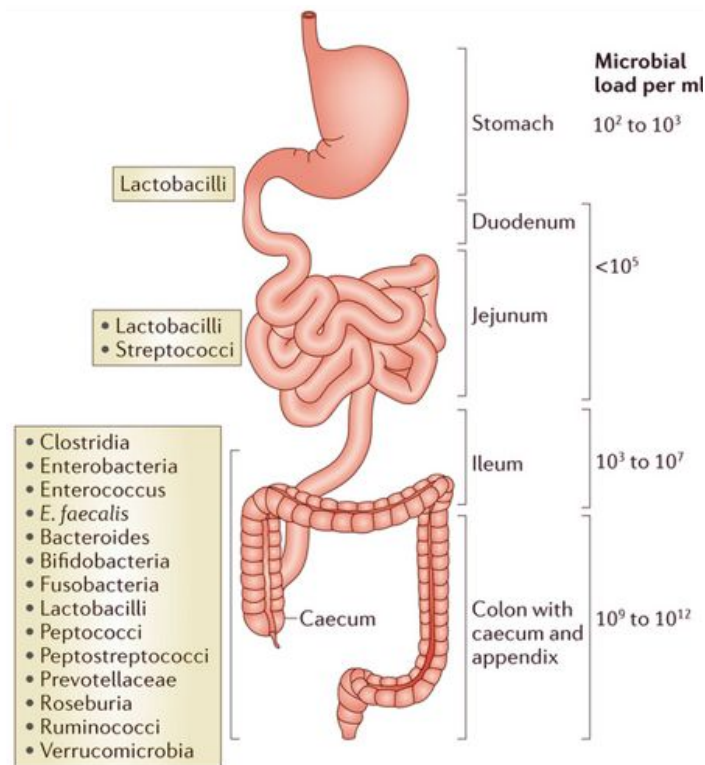






## SIBO: Key Points

1. Increase in bacteria and/or atypical microbiota in the small intestine
2. Symptoms
  - Abdominal pain/distention
  - Flatulence/gas
  - Nausea
  - Dyspepsia (heartburn)
  - Constipation or diarrhea
3. Testing
  - Breath Test



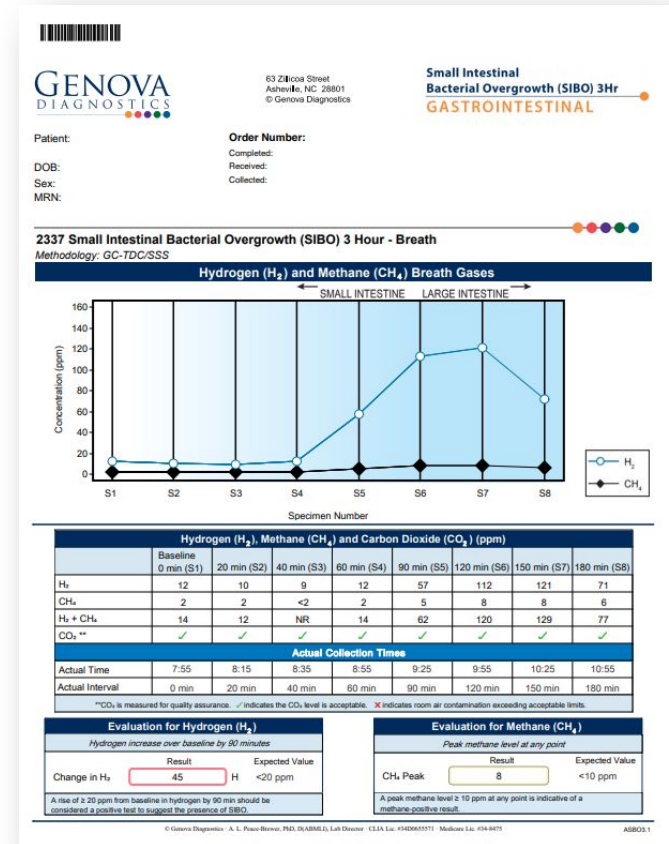
## SIBO: Key Points

### 1. Complications

- Weight loss
- Steatorrhea (fatty stools)
- Vitamin/mineral deficiency
- Anemia
- Osteoporosis (bone loss)

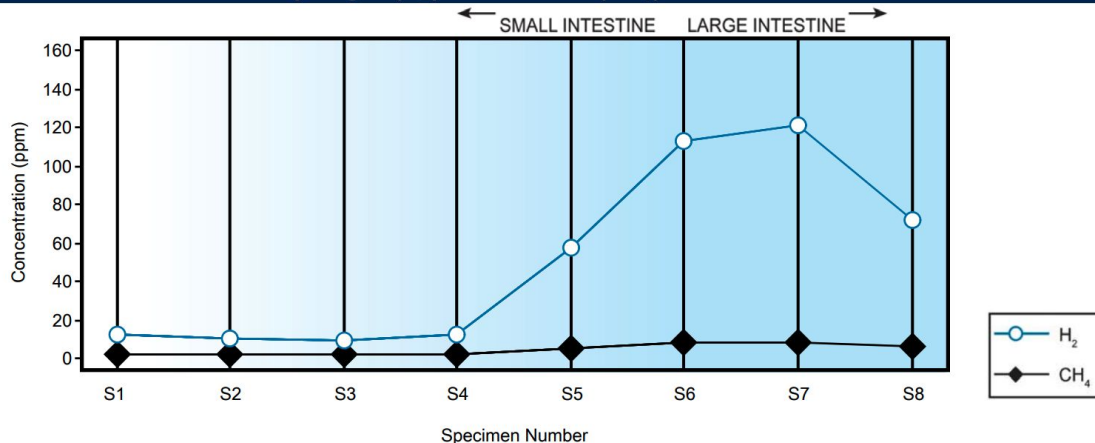
### 2. Treatment Basics

- Kill bacteria or microbiota
- SIBO friendly diet





**Hydrogen (H<sub>2</sub>) and Methane (CH<sub>4</sub>) Breath Gases**



| Hydrogen (H <sub>2</sub> ), Methane (CH <sub>4</sub> ) and Carbon Dioxide (CO <sub>2</sub> ) (ppm)  |                        |             |             |             |             |              |              |              |
|---|------------------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|
|   | Baseline<br>0 min (S1) | 20 min (S2) | 40 min (S3) | 60 min (S4) | 90 min (S5) | 120 min (S6) | 150 min (S7) | 180 min (S8) |
| H <sub>2</sub>  | 12                     | 10          | 9           | 12          | 57          | 112          | 121          | 71           |
| CH <sub>4</sub>   | 2                      | 2           | <2          | 2           | 5           | 8            | 8            | 6            |
| H <sub>2</sub> + CH <sub>4</sub>  | 14                     | 12          | NR          | 14          | 62          | 120          | 129          | 77           |
| CO <sub>2</sub> **  | ✓                      | ✓           | ✓           | ✓           | ✓           | ✓            | ✓            | ✓            |
| Actual Collection Times   |                        |             |             |             |             |              |              |              |
| Actual Time   | 7:55                   | 8:15        | 8:35        | 8:55        | 9:25        | 9:55         | 10:25        | 10:55        |
| Actual Interval   | 0 min                  | 20 min      | 40 min      | 60 min      | 90 min      | 120 min      | 150 min      | 180 min      |
| **CO <sub>2</sub> is measured for quality assurance. ✓ indicates the CO <sub>2</sub> level is acceptable. ✗ indicates room air contamination exceeding acceptable limits. |                        |             |             |             |             |              |              |              |

**Evaluation for Hydrogen (H<sub>2</sub>)**

*Hydrogen increase over baseline by 90 minutes*

|                          | Result | Expected Value |
|--------------------------|--------|----------------|
| Change in H <sub>2</sub> | 45     | <20 ppm        |

A rise of ≥ 20 ppm from baseline in hydrogen by 90 min should be considered a positive test to suggest the presence of SIBO.

**Evaluation for Methane (CH<sub>4</sub>)**

*Peak methane level at any point*

|                      | Result | Expected Value |
|----------------------|--------|----------------|
| CH <sub>4</sub> Peak | 8      | <10 ppm        |

A peak methane level ≥ 10 ppm at any point is indicative of a methane-positive result.



## Conditions commonly associated with SIBO include:

- IBS
- IBD
- Celiac Disease
- Diabetes
- Fibromyalgia
- Rosacea
- Parkinson's Disease
- Obesity

Risk factors for development of SIBO include structural/anatomic issues, motility disorders, organ system dysfunction, elderly age and various medications (recurrent antibiotics, PPIs) that alter the gut microflora populations.



# Treat the Root Cause!

In nearly all cases SIBO is caused by **poor gut motility** (failure of the Migrating Motor Complex to clean out your small intestine between meals).

Therefore, in addition to treating the small bacterial overgrowth, we must address the underlying root cause(s) of poor gut motility.



# Candida Overgrowth Risk Factors

- Long-term antibiotic use (e.g. acne, otitis media, sinusitis)
- High-dose antibiotic use (short-term) for surgery, UTI, etc...
- Use of alcohol or fermented beverages
- Irritable bowel syndrome
- High consumption of sugars, white flour, pastries, etc...
- Compromised immune system
- Chronic stress



## 2 Golden Rules of SIBO Treatment

- 1) take a prokinetic pill
- 2) eat discrete meals (for example at 8am, 1pm, and 6pm; ideally at least 4 hours between meals, and avoid eating right before bedtime).

# Dr. Pimentel's Low-Fermentation Diet (LFD) guide

- ✔ The LFD is much easier to adhere to than some of the other SIBO diets (like SCD and FODMAP diets) because it allows for a greater variety of foods.
- ✔ The goal of the diet is to identify foods that can be more fully digested and thus minimize bacterial growth.
- ✔ Some foods may not agree with you; avoid them.





# Low Fermentation Diet - Key Principles

- ✔ 2 computer modes for intestines - eating and cleaning
- ✔ Don't eat right before bed! Avoid frequent snacking.
- ✔ Avoid foods that are difficult to digest: fructose, lactose, sucralose, sorbitol, xylitol.
- ✔ Avoid humus, beans, legumes, cabbage, brussel sprouts, broccoli, cauliflower and leafy veggies.
- ✔ OK to eat anything that grows under ground or off a plant.
- ✔ Avoid apples, pears and bananas.



# Ignore the Diet During Antibiotic Therapy

- ✔ While you are on the antibiotic regimen, you should ignore the diet.
- ✔ The bacteria are more easily killed when they are replicating so you want to feed them.





# SIBO Treatment

The goal is to treat the underlying cause(s), contain the bacterial overgrowth, and provide nutritional support

- Diet & Prokinetic agents are first-line therapy
- Antibiotic therapy (Weeding) OR Herbs for weeding\* (berberine, oregano oil, wormwood)
- Serum Bovine-derived Immunoglobulins (SBIs)
- Enzymes/HCl



# GLOBAL ADVANCES IN HEALTH AND MEDICINE

[Glob Adv Health Med](#). 2014 May; 3(3): 16–24.

PMCID: PMC4030608

Published online 2014 May 1. doi: [10.7453/gahmj.2014.019](https://doi.org/10.7453/gahmj.2014.019)

PMID: [24891990](https://pubmed.ncbi.nlm.nih.gov/24891990/)

## Herbal Therapy Is Equivalent to Rifaximin for the Treatment of Small Intestinal Bacterial Overgrowth

[Victor Chedid](#), MD, [Sameer Dhalla](#), MD, [John O. Clarke](#), MD, [Bani Chander Roland](#), MD, [Kerry B. Dunbar](#), MD, [Joyce Koh](#), MD, [Edmundo Justino](#), MD, [Eric Tomakin](#), RN, and [Gerard E. Mullin](#), MD<sup>✉</sup>

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# Abstract

## Objective:

Patients with small intestine bacterial overgrowth (SIBO) have chronic intestinal and extraintestinal symptomatology which adversely affects their quality of life. Present treatment of SIBO is limited to oral antibiotics with variable success. A growing number of patients are interested in using complementary and alternative therapies for their gastrointestinal health. The objective was to determine the remission rate of SIBO using either the antibiotic rifaximin or herbals in a tertiary care referral gastroenterology practice.



# Design

One hundred and four patients who tested positive for newly diagnosed SIBO by lactulose breath testing (LBT) were offered either rifaximin 1200 mg daily vs herbal therapy for 4 weeks with repeat LBT post-treatment.



## Results

Three hundred ninety-six patients underwent LBT for suspected SIBO, of which 251 (63.4%) were positive 165 underwent treatment and 104 had a follow-up LBT. Of the 37 patients who received herbal therapy, 17 (46%) had a negative follow-up LBT compared to 23/67 (34%) of rifaximin users ( $P=.24$ ). The odds ratio of having a negative LBT after taking herbal therapy as compared to rifaximin was 1.85 (CI=0.77-4.41,  $P=.17$ ) once adjusted for age, gender, SIBO risk factors and IBS status. Fourteen of the 44 (31.8%) rifaximin non-responders were offered herbal rescue therapy, with 8 of the 14 (57.1%) having a negative LBT after completing the rescue herbal therapy, while 10 non-responders were offered triple antibiotics with 6 responding (60%,  $P=.89$ ). Adverse effects were reported among the rifaximin treated arm including 1 case of anaphylaxis, 2 cases of hives, 2 cases of diarrhea and 1 case of *Clostridium difficile*. Only one case of diarrhea was reported in the herbal therapy arm, which did not reach statistical significance ( $P=.22$ ).



# Conclusion

SIBO is widely prevalent in a tertiary referral gastroenterology practice. Herbal therapies are at least as effective as rifaximin for resolution of SIBO by LBT. Herbals also appear to be as effective as triple antibiotic therapy for SIBO rescue therapy for rifaximin non-responders. Further, prospective studies are needed to validate these findings and explore additional alternative therapies in patients with refractory SIBO.



# NUTRIENT SUPPORT FOR SIBO

| Nutrient                       | Dosing   | Advantage   |
|--------------------------------|--|---|
| <b>Saccharomyces boulardii</b> | 10 billion CFU/day                                       | <ul style="list-style-type: none"><li>• Stomach acid-resistant probiotic yeast</li><li>• Balances GI Flora</li><li>• Supports intestinal barrier function and integrity</li><li>• Enhances immune function</li></ul>  |
| <b>Betaine-HCL + Pepsin</b>    | Approx. 550 mg - 1g per high protein meal for 6-9 months | <ul style="list-style-type: none"><li>• Provides HCL to help support normal gastric PH</li><li>• Supports the healthy digestion of dietary protein</li><li>• Improves the absorption of essential minerals</li><li>• Stimulates the pancreas to release digestive enzymes</li></ul> |
| <b>Digestive Enzymes</b>       | 1-3 capsules 10-15 minutes before meals                  | <ul style="list-style-type: none"><li>• Support healthy digestion and maximize nutrient absorption</li><li>• Enzyme support for food sensitivities</li><li>• Stimulate the release and production of digestive enzymes in the pancreas</li></ul>                                    |
| <b>Omega -3 Fatty Acids</b>    | 4-6 g/day  | <ul style="list-style-type: none"><li>• Reduces inflammation</li><li>• Helps reduce constipation</li></ul>  |



# NUTRIENT SUPPORT FOR SIBO

| Nutrient                        | Dosing   | Advantage  |
|---------------------------------|--|--|
| <b>Vitamin D3</b>               | 5,000-10,000 IU/day until levels reach 45-70 ng/ml | <ul style="list-style-type: none"><li>• Tightens gap junctions in the intestinal lining</li><li>• Balances immune function</li></ul>                           |
| <b>IgG</b>                      | 2.5 gm/day for 3-6 months                          | <ul style="list-style-type: none"><li>• Binds and Eliminates Pathogens</li><li>• Contains growth factors that build and repair the intestinal lining</li></ul> |
| <b>Slippery Elm bark powder</b> | 1 tsp (2,500 mg) once or twice daily for 3 months  | <ul style="list-style-type: none"><li>• Mucilaginous bark forms a protective coat and soothes the intestinal lining</li></ul>                                  |



# NUTRIENT SUPPORT FOR SIBO

| Nutrient                       | Dosing   | Advantage   |
|--------------------------------|--|---|
| <b>Oregano/Clove/Thyme oil</b> | 100-200 mg 3x day for 2-3 months   | <ul style="list-style-type: none"><li>• Act as antimicrobial and antifungal herbs</li><li>• Balances gut microbiome by reducing burden of pathogenic microbial organisms</li><li>• Provide antioxidant protection</li></ul> |
| <b>Berberine</b>               | 500 mg 2-3 x/day for 2-3 months  | <ul style="list-style-type: none"><li>• Helps break down biofilm</li><li>• Acts as an antifungal</li><li>• Helps balance the gut microbiome by reducing the burden of unfavorable bacteria</li></ul>                        |
| <b>Allicin (stabilized)</b>    | 450 mg/capsule<br>2 capsules twice a day<br>For three months   | <ul style="list-style-type: none"><li>• Bioactive compound in garlic</li><li>• Broad spectrum antimicrobial activity, including antifungal action</li><li>• Helps detoxify heavy metals</li></ul>                           |
| <b>NAC</b>                     | 600-1,200 mg/day on an empty stomach for 6-9 months  | <ul style="list-style-type: none"><li>• Increases the production of glutathione for cellular detoxification support</li><li>• Biofilm buster</li><li>• Acts as an antioxidant</li></ul>                                     |
| <b>Serrapeptase</b>            | 1-2 enteric-coated capsules<br>(80,000-130,000 SUs per capsule)<br>2-3 x/day on an empty stomach between meals for 90 days | <ul style="list-style-type: none"><li>• Acts as a proteolytic enzyme</li><li>• Helps break down biofilm</li><li>• Reduces immune complexes</li></ul>  |



# Biofilm Disruptors

- ✔ NAC
- ✔ Serrapeptidase
- ✔ Other enzymes including strong proteases
- ✔ Plant Oils (e.g. oregano, clove, thyme)



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# THANK YOU!

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