Gas production in the bowel

Jens Rikardt Andersen, MD, MPA
Dept Human Nutrition, University of Copenhagen
Nutrition Unit 5711, Rigshospitalet

Gas production in the bowel

* **Depends on (at least):**
* **Substrate**
* **Bacterial flora**
* **Transit time / motility**
* **And probably much more**

IBS – GAS - microflora

* **In patients with IBS where bloating is the most bothersome symptom, the microflora has shown reduced concentration of coliforms, lactobacilli and bifidobacteria compared to controls (Balsari et al 1982, Lembo et al. 1999),**
* **Lactobacilli and bifidobacteria do not generate much gas in the intestine (to our knowledge).**
* **Malinen et al 2005 observed less lactobacillus species in patients with diarré- dominated IBS and more species of Veillinella among IBS patients with constipation as the most dominating symptom compared to controls.**
* **King et al 1998 found that the production of intestinal gas especially hydrogen was increased among patients with IBS compared to controls.**

The shortcomings of clinical trials assessing the efficacy of probiotics in irritable bowel syndrome.

Rogers NJ, Mousa SA. J Altern Complement Med. 2012;18:112-9.

Multiple clinical trials within the past decade have aimed to study the safety and efficacy of **various probiotic strains** in treating patients with irritable bowel syndrome (IBS). However, there exists much **heterogenicity** in study design among these trials, namely, in bacterial strain, dose, dosage form, sample size, study duration, and population demographics.

A total of 62 articles were used in constructing this review, with **20 original articles**.

Major differences in study design, as well as an **outstandingly high "placebo effect,"** making the ability to compare these articles as a means for evidence-based treatment therapy in IBS very difficult.

Effect of probiotics

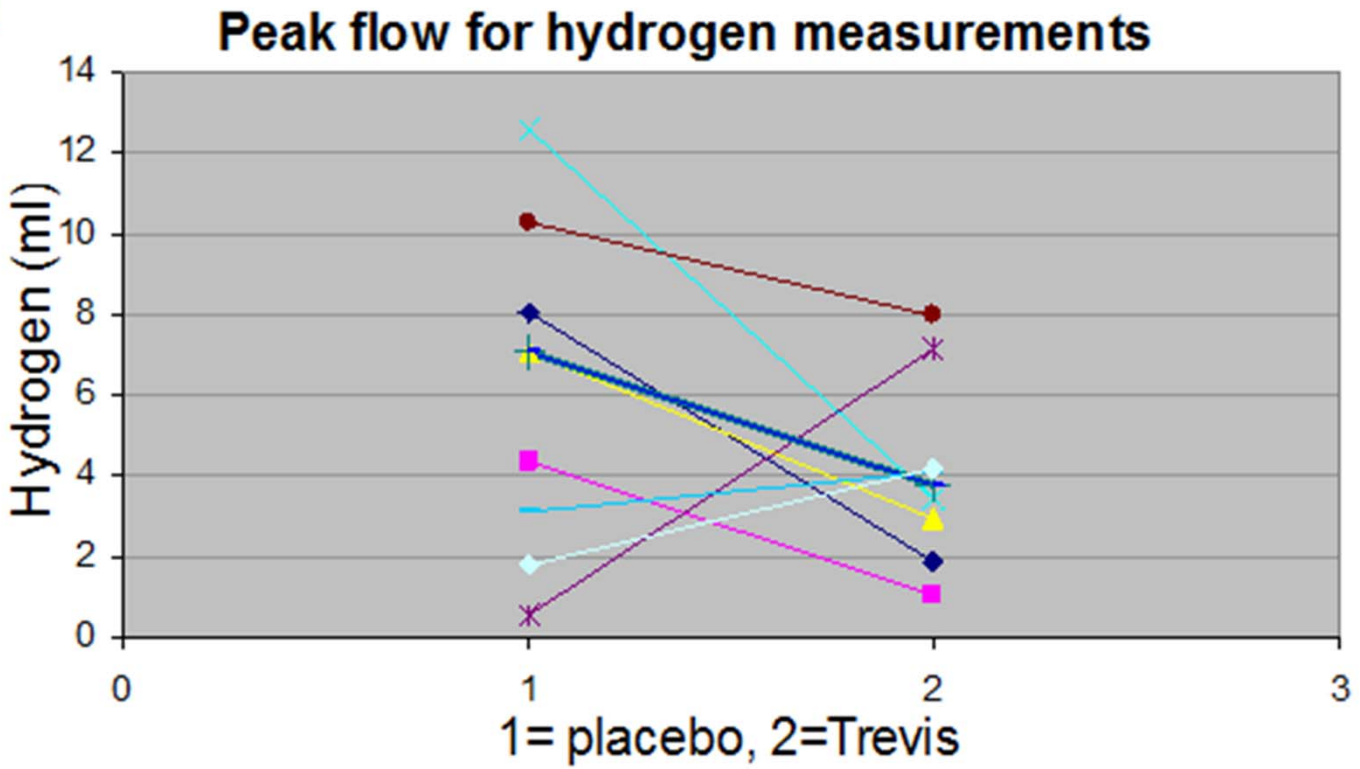
Julie Bernstorf Schrøder, Ella Bisgaard, Lene Jespersen, Peter Westermann, Jens Rikardt Andersen, under publication

In a double-blinded, placebo-controlled, randomised, cross-over trial 20 women received Trevis (*L. acidophilus*, *B. animalis*, *S. thermophilus*, *L. delbrueckii*, 1-10E+09 CFU/capsule) or placebo for 7 weeks.

Objective measurements were assesed by H_2 and CH_4, DGGE and sequence analyses of Lactobacillus and Bifidobacteria from anarobic feces samples.

H_2 after administration of Trevis was reduced compared to baseline and placebo, though not significantly. There was no effect on CH_4. There was a significant increase in *L. acidophilus* after administration of Trevis (p=0.03). No correlation was found between *L. acidophilus*, gas and symptom measurements. There was no significant effect of Trevis on subjective measurements.

Effect of probiotics



Peak flow for H2 production for Trevis and placebo. Average peak values for H2 production were lower after Trevis than after placebo and baseline interventions, but this was not significant.

Gut microbiota is not modified by Randomized, Double-blind, Placebo-controlled Trial of VSL#3 in Diarrhea-predominant Irritable Bowel Syndrome.

Michail S, Kenche H. Probiotics Antimicrob Proteins. 2011;3:1-7.

Several clinical trials show that probiotics, such as VSL#3, can have a favorable effect on IBS.

This double-blind, randomized placebo-controlled study has been conducted in diarrhea-predominant IBS subjects in order to investigate the effect of VSL#3 on the fecal microbiota. The bacterial composition of the fecal microbiota was investigated using high-throughput microarray technology to detect 16S RNA. Twenty four subjects were randomized to receive VSL#3 or placebo for 8 weeks.

The use of VSL#3 in this pilot study was safe and showed improvement in specific GSRS-IBS scores in diarrhea-predominant IBS subjects. The gut microbiota was not affected by VSL#3 consumption suggesting that the mechanism of action is not directly linked to the microbiota.

Review: probiotics for the treatment of irritable bowel syndrome--focus on lactic acid bacteria.

Clarke G, Cryan JF, Dinan TG, Quigley EM. Aliment Pharmacol Ther. 2012;35:403-13

* Of the 42 trials evaluated examining the efficacy of LAB in IBS, 34 reported beneficial effects in at least one of the endpoints or symptoms examined, albeit with tremendous variation in both the magnitude of effect and the choice of outcome under consideration.
* Progress in the field will require an improved understanding of how the microbiota impacts on health and disease, adequately powered long-term multicentre trials and the embracing of bench to bedside approaches.

IBS Colonic Transit Time (CTT) and Symptoms: What's the Link?

Törnblom H, Van Oudenhove L, Sadik R, Abrahamsson H, Tack J, Simrén M.
Am J Gastroenterol. 2012 Feb 14. doi: 10.1038/ajg.2012.5. [Epub ahead of print]

Total and segmental CTT was assessed using radiopaque markers in 359 patients with IBS (279 females). These results were compared with existing normal values for healthy men and women without gastrointestinal (GI) symptoms.

Rome III subtypes (n=338), or by use of the Rome II modular questionnaire into Rome II subtypes (n=143).

CTT was normal in 287 patients (80%), whereas 53 (15%) had accelerated and 19 (5%) had delayed CTT.

IBS subgrouping according to Rome III ($P<0.0001$) and Rome II criteria ($P<0.001$) was associated with the presence of abnormal CTT. Stool form ($r=-0.40$; $P<0.0001$) and stool frequency ($r=-0.30$; $P<0.0001$) were moderately and negatively correlated to total CTT.

No correlations of clinical significance were found between transit data and the three GI symptoms.

Comparison of colonic transit time between patients with constipation-predominant irritable bowel syndrome and functional constipation.

Ansari R, Sohrabi S, Ghanaie O, Amjadi H, Merat S, Vahedi H, Khatibian M. Indian J Gastroenterol. 2010 Mar;29(2):66-8

Functional constipation (FC) and constipation-predominant IBS (C-IBS) are two main subtypes of constipation. Radio-opaque markers were used to measure colonic transit time (CTT).

Rome II criteria

10 radio opaque markers daily for six days. A plain abdominal X-ray was taken on the seventh day in 50 FC and 50 C-IBS patients

To calculate the total and segmental colonic transit time in hours, number of markers in right and left colonic and rectosigmoid area were counted and multiplied by 2.4. The mean total and segmental colonic transit time were compared between the two groups.

The total CTT was not significantly different between FC patients (52.2 [35.5] h) and C-IBS patients (41.2 [31.6] h; p = 0.10).

The mean rectosigmoid transit time was significantly slower in FC patients (19.9 [15.5] h) compared to C-IBS patients (11.9 [10.6] h; p = 0.003).

?

* After to night we are probably convinced, that substrate matters
* Are we convinced, that complaints are related to microbiota?
* Are we convinced, that complaints are related to transit time?

* What are we doing to morrow?

* Do we recommend probiotics?
* Do we recommend laxatives?

* Do we recommend FODMAP?