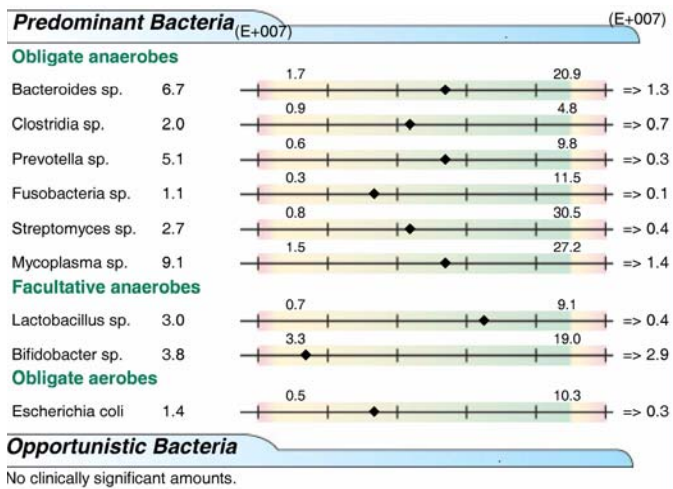


Case Study – 76 y/o Female

A common dilemma for our customers is deciding on the safest and most appropriate treatment when the **GI Effects Profile** reveals the presence of a bacterial, yeast or parasite infection. For many the initial question is whether to use a botanical or pharmaceutical based treatment. If the practitioner chooses to go down the botanical route, they are faced with an array of products to choose from. This case study serves as an example of the effect of a popular broad-spectrum anti-microbial botanical product on predominant bacteria and related markers on the **GI Effects Profile**.

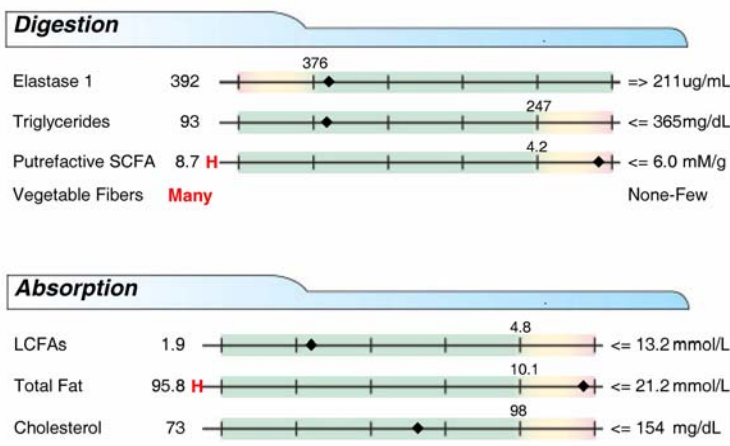
When looking at the panel of predominant bacteria, the most important factor is the relative balance of each genus. The ideal pattern is to have all genera within one quintile band of each other. The extent to which bacteria deviate from this pattern corresponds with the extent of intestinal dysbiosis. If the predominant species within an individual's GI tract are in balance, it minimizes the risk of colonization by pathogens.

The predominant bacteria panel below is from a 76 y/o female. The patient enjoys good health for her age and took the test as a preventative measure.

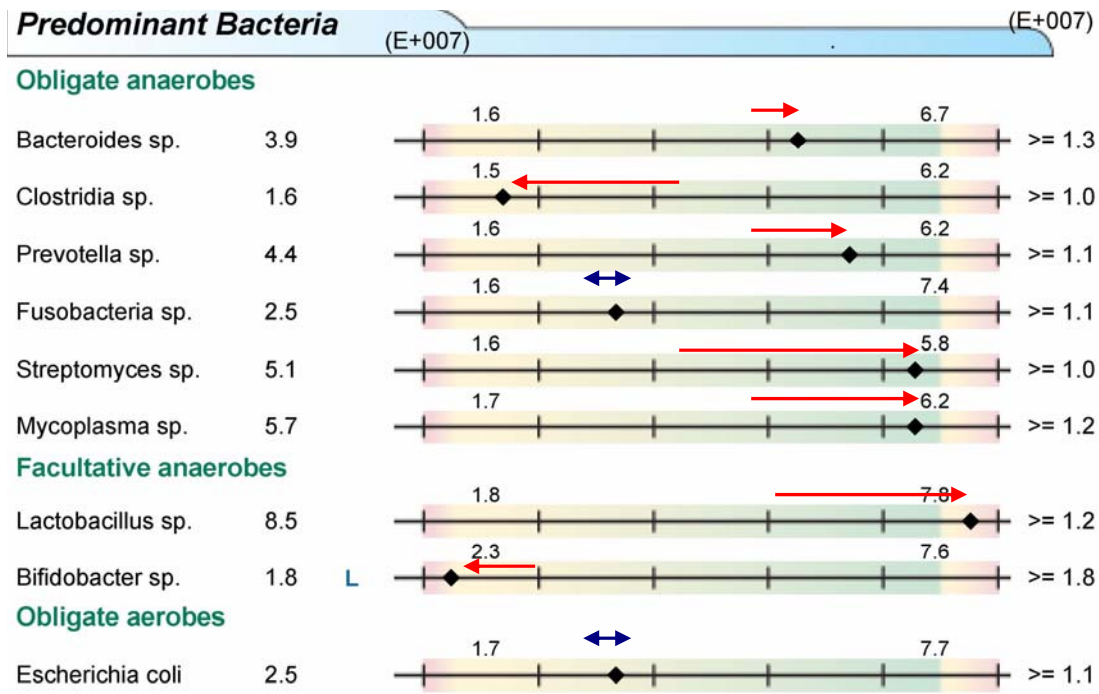


The result shows a relatively even distribution of predominant bacteria. With the exception of *Fusobacteria sp.*, *Bifidobacter sp.* and *Escherichia coli*, all genera are within one quintile band of each other. We can infer from this panel that the likelihood of colonization with pathogens is relatively small.

The remaining markers on the **GI Effects Profile** were within limits with the exception of the finding of a protozoan; taxonomy unavailable, high putrefactive SCFA's, vegetable fibers and total fat.



Prior to her follow-up test, the patient supplemented with 6 capsules/day of a popular broad-spectrum anti-microbial botanical combination product for 5 weeks. The results of her second *GI Effects Profile* are shown below.



Opportunistic Bacteria

No clinically significant amounts.

The predominant bacteria panel above shows a significant change in predominant bacteria levels from the initial test. There is a greater disparity in the relative levels of each predominant bacterial genus. Certain genera have risen; others have decreased, while some have remained the same. Such a scenario is indicative of a moderate dysbiosis.

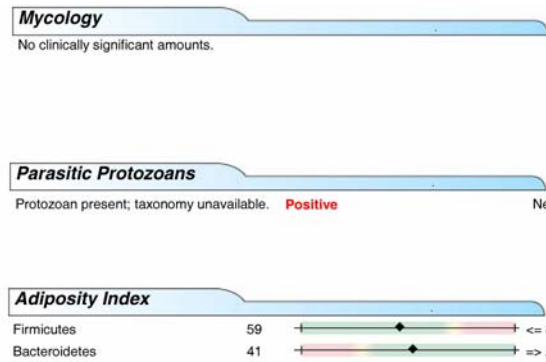
Studies that have used molecular techniques to measure the effect of short-term antibiotics on predominant bacterial levels normally show a reduction in diversity and concentration.^{1,2} Therefore it is somewhat surprising to see a general trend towards an increase in predominant bacterial numbers for this patient. One explanation may be the length of supplementation. Five weeks supplementation is much longer than the usual 7-day regime for antibiotics. Administration of an anti-microbial product for five weeks may have allowed for the proliferation of bacterial species carrying anti-microbial resistant genes.

Indeed below we can see that drug resistant genes for the aminoglycoside (aacA/aphD) and beta-lactam class (mecA) of antibiotics have emerged on the follow-up test. It is logical to assume that other resistance genes have developed, which are not measured on the GI Effects Profile. It is likely that the five-week period of anti-microbial supplementation has allowed for the overgrowth of a number of drug resistance bacterial species, leading to an increase in the levels of certain genera of predominant bacteria.

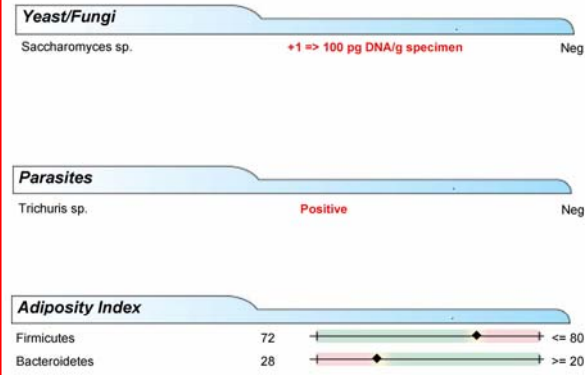
<i>GI Effect Profile #1</i>				<i>GI Effect Profile #2</i>			
Drug Resistance Genes				Drug Resistance Genes			
aacA, aphD	Neg	gyrB, ParE	Neg	aacA, aphD	Pos	gyrB, ParE	Neg
mecA	Neg	PBP1a, 2B	Neg	mecA	Pos	PBP1a, 2B	Neg
vanA, B, and C	Neg			vanA, B, and C	Neg		

Further to the significant changes in predominant bacteria, major changes also emerged for other markers on the *GI Effects Profile*.

GI Effect Profile #1



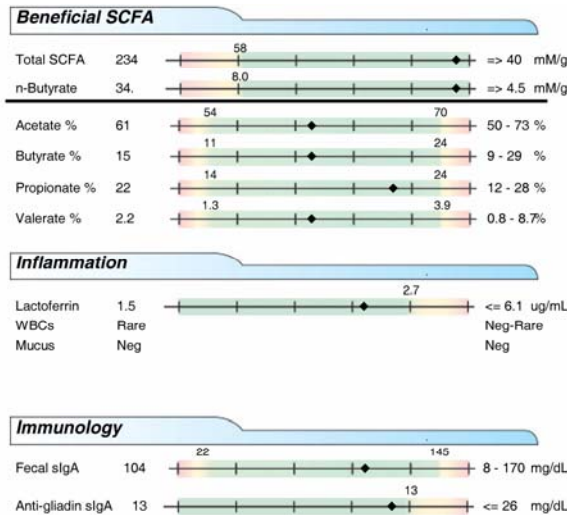
GI Effect Profile #2



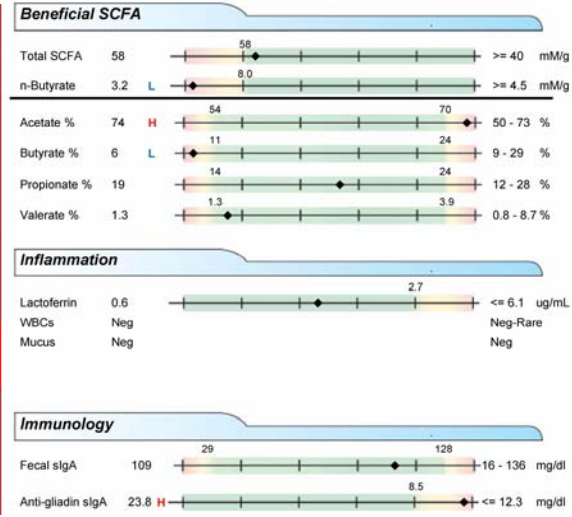
Emergence of the yeast *Saccharomyces sp.* is most likely due to supplementation with *Saccharomyces boulardii*, which the patient commenced shortly before the submission of the second sample. While the patient's original protozoan was abolished, the changed GI environment has allowed a *Trichuris sp.* to take up residence.

Further changes in SCFA's and immunology markers are displayed below.

GI Effect Profile #1



GI Effect Profile #2



Above we see how shifts in predominant bacteria have led to changes in bacterial metabolic output, resulting in a dramatic reduction in the levels of SCFA's with a concomitant change in the makeup of total SCFA's, illustrated by the high acetate and low butyrate.

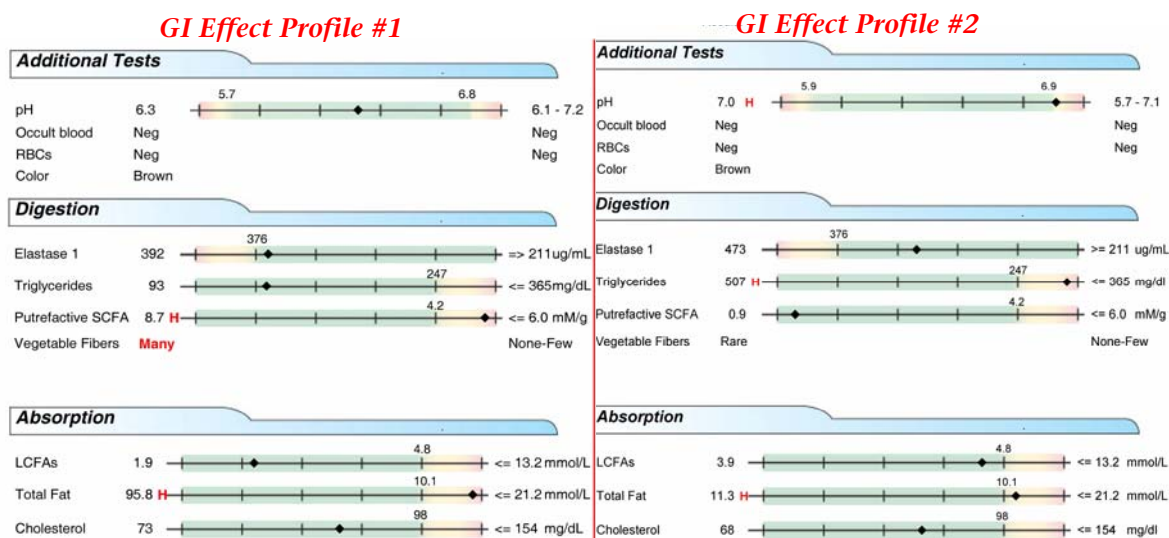
Relationship of Microbiota to Risk of Celiac Disease

Regarding the raised anti-gliadin secretory IgA, recent research has found significant differences to exist between the fecal microbiota of celiac infants and healthy controls.³ In support of this finding; other recent studies have shown that fermentation of wheat flour with certain probiotics can alleviate much of the toxicity of gluten for individuals with celiac disease. One study found that long-time fermentation of wheat flour with VSL#3 (a high-potency multi-strain lactic acid and bifido-bacteria probiotic) effectively abolished the toxicity of the gliadin epitopes responsible for celiac disease.⁴ Another fascinating study measured the effect of sourdough, which had been fermented for 24 hours with a special combination of lactobacilli on intestinal permeability. When ingesting the

sourdough made with lactobacilli, celiac patients did not show the normal increase in intestinal permeability elicited by ingestion of sourdough without lactobacilli.⁵ In a later study, the same researchers showed that the lactobacilli strains used in the making of sourdough are able to fully digest the proline- and glutamate-rich polypeptides that are generated during endoluminal proteolytic digestion of gluten and thought to be responsible for the inappropriate T-cell-mediated immune response in celiacs.⁶

These series of studies suggest that unfavourable modulation of predominant bacteria levels may predispose an individual to increased sensitivity to gluten. This would explain how an unfavourable shift in predominant bacteria levels can lead to the development of raised fecal anti-gliadin secretory IgA seen above.

Below we see the effect of the change in predominant bacteria on pH, digestion and absorption markers.



Raised pH is most likely due to a dramatic reduction in SCFAs. Triglyceride levels have increased significantly indicating maldigestion of fat. This is a common finding in patients with dysbiosis and/or bacterial, yeast or parasite infections. Interestingly, putrefactive SCFA have decreased dramatically. A significant reduction is also seen for total fat.

Taken together the combined findings of these reports suggest that in this 76 y/o female, predominant bacteria levels were significantly altered after several weeks of treatment with a broad-spectrum anti-microbial botanical product. The trend for an upward shift in predominant bacterial numbers is most likely due to overgrowth of drug resistant carrying bacteria resulting from the extended anti-microbial treatment. Changes in predominant bacteria were also reflected by changes in multiple areas of the GI Effects Profile. Interestingly, the patient did not note any particular regression in gut symptoms, apart from a slight tendency toward more loose stools.

An important point to note is that the anti-microbial product was part of a three-tiered protocol, which involves supplementation with two more products aimed at restoring correct GI flora and healing the gut mucosa. Further testing will be important to measure the effects of these follow-on products.

This case study serves to illustrate the potential of herbal-based anti-microbial/anti-parasitic therapy to have broad-ranging effects on the microbiota of the GI. This case study also highlights the importance of follow-up testing to determine efficacy of therapy.

References:

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