KRESSER INSTITUTE FOR FUNCTIONAL AND EVOLUTIONARY MEDICINE

Please review the following case studies and evaluate them to the best of your ability. You should treat these case studies as if they were your own patients and determine what treatment protocol to recommend. Don't worry, you won't have to turn in your answers for a grade. These assignments should be treated as more of a self-study tool to help you measure your progress throughout the course. We have also provided an answer key detailing the treatment protocol recommended by Chris and his staff for your comparison.

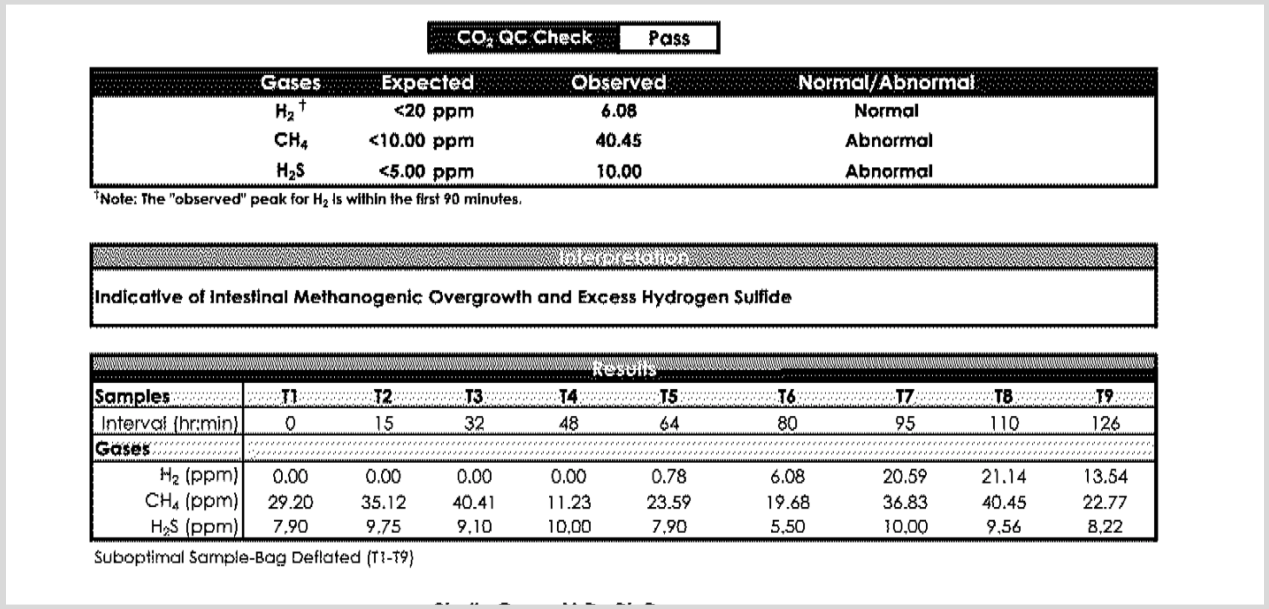
You may also want to discuss the cases with others in the ADAPT Forum.

# Gut Review Case Assignments

## CASE 1, STEP 1:

The patient is a 64-year-old female who presents with constipation, bloating, and abdominal discomfort in her upper gastrointestinal tract after eating and feels that her food "just sits there," making her feel very full. She also reports weight loss resistance, brain fog, dry skin, and fatigue. Additionally, she describes hair thinning and itchy scalp.

### Initial small intestinal bacterial overgrowth (SIBO) breath test:



$CO_2$ QC Check: Pass

| Gases | Expected | Observed | Normal/Abnormal |
|---|---|---|---|
| $H_2$ † | <20 ppm | 6.08 | Normal |
| $CH_4$ | <10.00 ppm | 40.45 | Abnormal |
| $H_2S$ | <5.00 ppm | 10.00 | Abnormal |

†Note: The "observed" peak for $H_2$ is within the first 90 minutes.

Interpretation

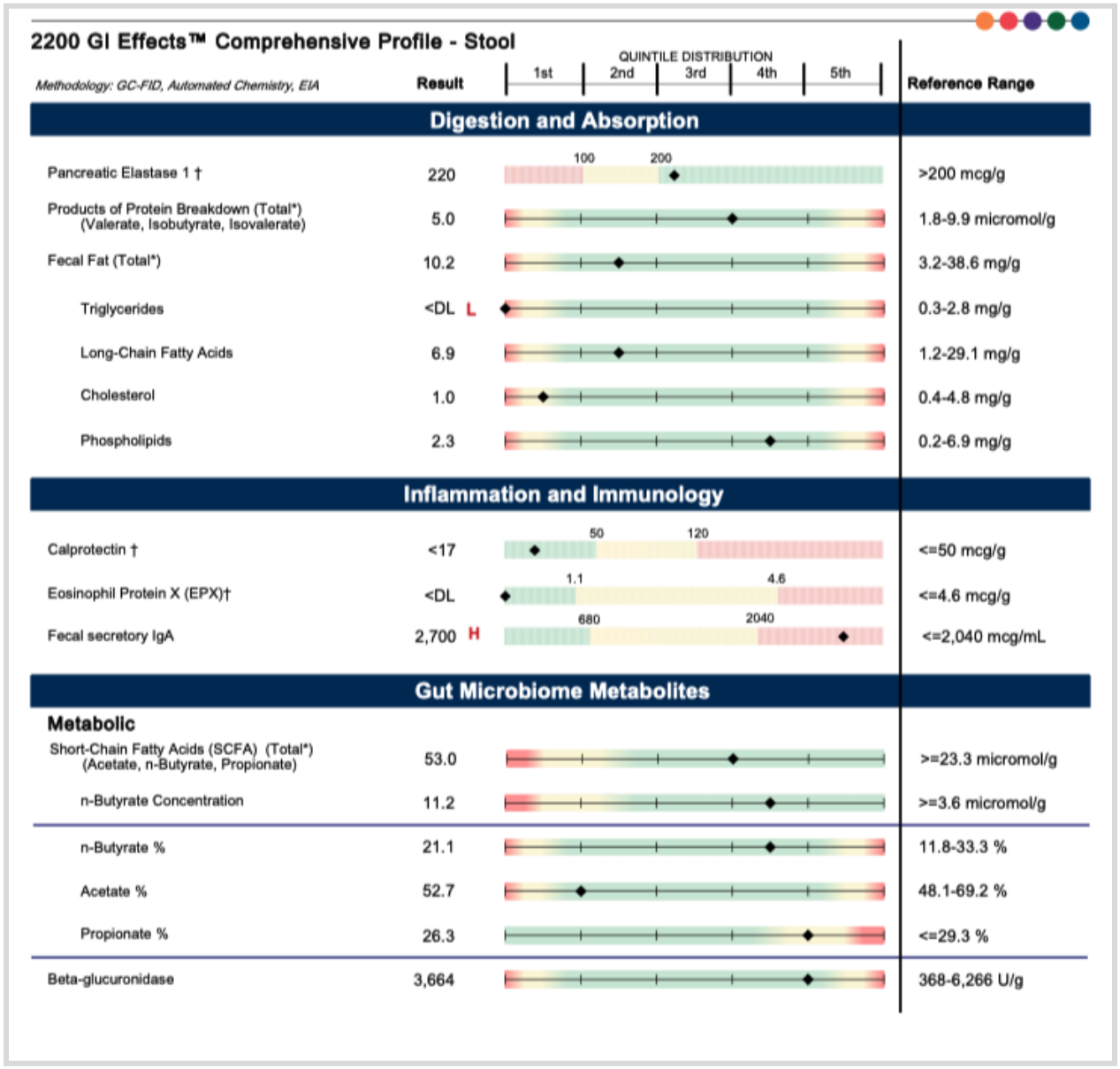
Indicative of Intestinal Methanogenic Overgrowth and Excess Hydrogen Sulfide

Results

| Samples | T1 | T2 | T3 | T4 | T5 | T6 | T7 | T8 | T9 |
|---|---|---|---|---|---|---|---|---|---|
| Interval (hr:min) | 0 | 15 | 32 | 48 | 64 | 80 | 95 | 110 | 126 |
| Gases | | | | | | | | | |
| $H_2$ (ppm) | 0.00 | 0.00 | 0.00 | 0.00 | 0.78 | 6.08 | 20.59 | 21.14 | 13.54 |
| $CH_4$ (ppm) | 29.20 | 35.12 | 40.41 | 11.23 | 23.59 | 19.68 | 36.83 | 40.45 | 22.77 |
| $H_2S$ (ppm) | 7.90 | 9.75 | 9.10 | 10.00 | 7.90 | 5.50 | 10.00 | 9.56 | 8.22 |

Suboptimal Sample-Bag Deflated (T1-T9)

## Initial GI Effects stool test:



**2200 GI Effects™ Comprehensive Profile - Stool**

| Methodology: GC-FID, Automated Chemistry, EIA | Result | QUINTILE DISTRIBUTION (1st / 2nd / 3rd / 4th / 5th) | Reference Range |
|---|---|---|---|
| **Digestion and Absorption** | | | |
| Pancreatic Elastase 1 † | 220 | 100 / 200 | >200 mcg/g |
| Products of Protein Breakdown (Total*) (Valerate, Isobutyrate, Isovalerate) | 5.0 | | 1.8-9.9 micromol/g |
| Fecal Fat (Total*) | 10.2 | | 3.2-38.6 mg/g |
| Triglycerides | <DL L | | 0.3-2.8 mg/g |
| Long-Chain Fatty Acids | 6.9 | | 1.2-29.1 mg/g |
| Cholesterol | 1.0 | | 0.4-4.8 mg/g |
| Phospholipids | 2.3 | | 0.2-6.9 mg/g |
| **Inflammation and Immunology** | | | |
| Calprotectin † | <17 | 50 / 120 | <=50 mcg/g |
| Eosinophil Protein X (EPX)† | <DL | 1.1 / 4.6 | <=4.6 mcg/g |
| Fecal secretory IgA | 2,700 H | 680 / 2040 | <=2,040 mcg/mL |
| **Gut Microbiome Metabolites** | | | |
| **Metabolic** | | | |
| Short-Chain Fatty Acids (SCFA) (Total*) (Acetate, n-Butyrate, Propionate) | 53.0 | | >=23.3 micromol/g |
| n-Butyrate Concentration | 11.2 | | >=3.6 micromol/g |
| n-Butyrate % | 21.1 | | 11.8-33.3 % |
| Acetate % | 52.7 | | 48.1-69.2 % |
| Propionate % | 26.3 | | <=29.3 % |
| Beta-glucuronidase | 3,664 | | 368-6,266 U/g |

*Methodology: Culture/MALDI-TOF MS, Automated and Manual Biochemical Methods, Vitek® 2 System Microbial identification and Antibiotic susceptibility*

## Gastrointestinal Microbiome (Culture)

Human microflora is influenced by environmental factors and the competitive ecosystem of the organisms in the GI tract. Pathogenic significance should be based upon clinical symptoms.

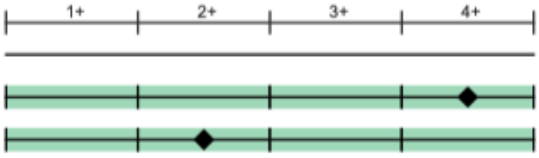
**Microbiology Legend**

| NG | NP | PP | P |
|---|---|---|---|
| No Growth | Non-Pathogen | Potential Pathogen | Pathogen |

**Additional Bacteria**

**Non-Pathogen:** Organisms that fall under this category are those that constitute normal, commensal flora, or have not been recognized as etiological agents of disease.
**Potential Pathogen:** Organisms that fall under this category are considered potential or opportunistic pathogens when present in heavy growth.
**Pathogen:** The organisms that fall under this category have a well-recognized mechanism of pathogenicity in clinical literature and are considered significant regardless of the quantity that appears in the culture.

### Bacteriology (Culture)




| | | |
|---|---|---|
| *Lactobacillus spp.* | | NG |
| *Escherichia coli* | 4+ | NP |
| *Bifidobacterium* | 2+ | NP |

### Additional Bacteria

| | | |
|---|---|---|
| *alpha haemolytic Streptococcus* | 4+ | NP |
| *Enterococcus faecalis* | 4+ | NP |
| *Enterobacter cloacae* | 4+ | PP |

### Mycology (Culture)

| | | |
|---|---|---|
| *Saccharomyces cerevisiae* | 2+ | NP |
| *Rhodotorula species* | 1+ | NP |

## Parasitology

### Microscopic O&P Results

Microscopic O&P is capable of detecting all described gastrointestinal parasites. The organisms listed in the box represent those commonly found in microscopic stool analysis. Should an organism be detected that is not included in the list below, it will be reported in the Additional Results section. For an extensive reference of all potentially detectable organisms, please visit www.gdx.net/product/gi-effects-comprehensive-stool-test

| Genus/species | Result |
|---|---|
| **Nematodes - roundworms** | |
| *Ancylostoma/Necator* (Hookworm) | Not Detected |
| *Ascaris lumbricoides* | Not Detected |
| *Capillaria philippinensis* | Not Detected |
| *Enterobius vermicularis* | Not Detected |
| *Strongyloides stercoralis* | Not Detected |
| *Trichuris trichiura* | Not Detected |
| **Cestodes - tapeworms** | |
| *Diphyllobothrium latum* | Not Detected |
| *Dipylidium caninum* | Not Detected |
| *Hymenolepis diminuta* | Not Detected |
| *Hymenolepis nana* | Not Detected |
| *Taenia* spp. | Not Detected |
| **Trematodes - flukes** | |
| *Clonorchis/Opisthorchis* spp. | Not Detected |
| *Fasciola* spp./ *Fasciolopsis buski* | Not Detected |
| *Heterophyes/Metagonimus* | Not Detected |
| *Paragonimus* spp. | Not Detected |
| *Schistosoma* spp. | Not Detected |
| **Protozoa** | |
| *Balantidium coli* | Not Detected |
| *Blastocystis* spp. | Not Detected |
| *Chilomastix mesnili* | Not Detected |
| *Cryptosporidium* spp. | Not Detected |
| *Cyclospora cayetanensis* | Not Detected |
| *Dientamoeba fragilis* | Not Detected |
| *Entamoeba coli* | Not Detected |
| *Entamoeba histolytica/dispar* | Not Detected |
| *Entamoeba hartmanii* | Not Detected |
| *Entamoeba polecki* | Not Detected |
| *Endolimax nana* | Not Detected |
| *Giardia* | Not Detected |
| *Iodamoeba buetschlii* | Not Detected |
| *Cystoisospora* spp. | Not Detected |
| *Trichomonads* (e.g. *Pentatrichomonas*) | Not Detected |
| **Additional Findings** | |
| White Blood Cells | Not Detected |
| Charcot-Leyden Crystals | Not Detected |
| **Other Infectious Findings** | |

## Add-on Testing

*Methodology: EIA*

| | Result | Expected Value |
|---|---|---|
| HpSA - *H. pylori* | Positive | Negative |

**HpSA (*Helicobacter pylori* stool antigen)**
*Helicobacter pylori* is a bacterium that causes peptic ulcer disease and plays a role in the development of gastric cancer. Direct stool testing of the antigen (HpSA) is highly accurate and is appropriate for diagnosis and follow-up of infection.

Write down what patterns you see in the above test results. Identify the imbalance and write out the treatment plan you have in mind for this patient. See the answers to this case study in the Case 1, Step 1 Answers handout. Move on to Case 1, Step 2 for follow-up test results.