The State of FM

- Excessive testing
- Mechanistic speculation outweighs clinical research.
- Empiric medicine has been forgotten
- More testing = better results.
- Information = marketing

What’s needed is a return to practical and cost effective care, which is progressive but conservative.
**IN TODAY’S ISSUE**

**CASE STUDY**
- Histamine overload that initially presented as what looked like a SIBO relapse.

**RESEARCH**
- Low FODMAP versus prebiotics in IBS, a head-to-head trial.
- What level of TPO antibodies should be considered pathogenic? Good news for patients and practitioners.
- Gut-to-brain or brain-to-gut, which pathway is more important?
- Using SIBO breath testing to predict response to antibiotics in patients with IBS.
- An evidence-based thyroid questionnaire.

**PRACTITIONER QUESTION OF THE MONTH**
- Do anti-microbial herbs treat SiFO (small intestinal fungal overgrowth)

**PRACTICE TIP**
- An easy tool for creating HIPAA compliant online forms
Case Study

Patient Info:

- Marry, 46yo female.
- Previous dx: GERD, SIBO, Tachycardia, esophageal stricture
- Chief complaints:
  - Indigestion/heartburn
  - Bloating & nausea
  - Alternating loose stools/diarrhea
  - Brain fog
  - Feeling emotional and can't handle stress
  - Cycle abnormalities
Visit 1 (4/27/16) – History and Exam:

Mary presents as a generally healthy 46yo female who has a good diet and lifestyle. She has experienced a slow progression of her chief complaints. Her reflux/heartburn dates back to 18yoa.

Her symptoms are manageable with diet (low FODMAP/Fast Tract combo) and supplements (glutamine, enzymes) however she is still symptomatic. Her bowel regularity/consistency became worse after Abx, most notably after SIBO Abx, and subsequent Habx (herbal antimicrobials) may have also provoked it.

She reacts negatively to HCl. She also noted ‘the better she eats the worse she feels’.

Initial impression

- Mary may have dysbiosis secondary to antibiotics (C. diff, candida, etc...). The negative reaction to HCl, heartburn, bloating and nausea may also suggest gastritis or even an ulcer. The esophageal stricture may be caused by the reflux/heartburn. The emotional instability and inability to handle stress may indicate female hormone imbalance and/or fatty acid imbalance.
Visit 2 (a few days later, 5/4/16) – Testing and Initial Recommendations

Testing
- Aerodiagnostics Glucose SIBO breath test
- BioHealth 401H
- Diagnostechs custom panel
- Blood panel

Recommendations
- Continue with previous diet (low FODMAP/Fast Tract combo)
- Modified fasting (using bone broth or Masters Cleanse) and elemental/semi-elemental diet experimentation – 2-4 day trial
- Nutritional support: curcumin, vitamin D/K, Magnesium, Omega 3, 6, 9 blend
  - Note: Curcumin may protect esophageal cells for dysplastic changes. Vitamin D has been shown helpful in IBS. Emotional instability may be due to fatty acid deficiencies.
- Hormonal: female hormone support herbal blend (black cohosh, dong qui, chast tree)
- GI:
  - Natural prokinetic, probiotics (lacto/bifido blend, S. boulardii, soil based),
  - Natural acid lowering compound (melatonin, vitamins, and amino acids)
Visit 3 (2 months later, 7/13/16) – Lab Interpretation and Treatment Evaluation

**Lab interpretation:**
- Lab findings are unremarked, see below
  - Aerodiagnostics Glucose SIBO breath test – negative
  - BioHealth 401H – normal
  - Diagnostechs custom panel – normal
  - Blood panel – generally normal

**Subjective Assessment:**
- Fasting – Mary did not respond well to any fasting intervention; she experienced a regression of heartburn and stomach upset.
- Improved:
  - Heartburn
  - Moderately improved PMS and brain fog
  - Bloating & nausea
  - Alternating loose stools/diarrhea
- Worse:
  - Natural acid lowering compound – caused fatigue and was not tolerated
  - Attempting reintroduction of gluten free flours and starches caused general regression (I did not instruct this but Mary decided to experiment).
- Overall – 75% improved subjectively. Mary also commented that she wasn’t sure if the probiotics were helping her.
Impression:

- The negative response to fasting reinforces reflux, ulcerations, and/or gastritis. This should make Mary a good candidate for acid lowering interventions; unfortunately she was unable to tolerate the first formula we tried. Her response to a natural prokinetic was therefore not surprising.
- Her PMS and brain fog improving suggests the fatty acids and hormone support were needed. Note: there is no need to test hormones when using herbs that have an adaptogenic effect on balancing female hormones as we did. A great place to save a patient money.
- Overall, Mary is moving in the right direction.

Recommendations:

- Discontinue the natural acid lowering compound. Avoid starches and GF flours as best you can.
- Discontinue any modified fasting or use of elemental/semi-elemental diet formulas.
- Continue previous program:
  - Diet (low FODMAP/Fast Tract combo)
  - Nutritional support: curcumin, vitamin D/K, Magnesium, Omega 3, 6, 9 blend
  - Hormonal: female hormone support herbal blend (black cohosh, dong quai, chaste tree)
  - GI:
    - Natural prokinetic, probiotics (lacto/bifido blend, S. boulardii, soil based)
- Maintain this program for now, follow up in 2 months.
### Small Intestinal Bacterial Overgrowth (SIBO) Report

**Glucose Substrate**

**Patient Name:**

**Facility Name:** Dr. Ruscio's Practice

**Clinician Name:** Dr. Michael Ruscio

**Clinician NPI Number:** 1821369166

**Clinician Account #:** 3168

**Clinician Address:** 43 Quail Ct., Bldg. 43, Ste. 107

**City, State, Zip:** Walnut Creek, CA 94596

**Clinician Phone:** 1-800-335-7009

**Clinician Fax:** 1-925-478-3428

**Clinician Email:** office@drruscio.com

**Accession Number:** 2069

**Date Ordered:** 5/10/2016

**Date of Service (Collection):** 5/25/2016

**Date Received:** 5/27/2016

**Date Reported (Final):** 5/27/2016

**MR/Chart Number:** NA

---

### Summary Report of Hydrogen & Methane Breath Analysis with Carbon Dioxide Correction

<table>
<thead>
<tr>
<th>Gasses Analyzed</th>
<th>Patient Result</th>
<th>Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in Hydrogen (H₂)</td>
<td>1 ppm (normal)</td>
<td>&lt; 12 ppm</td>
</tr>
<tr>
<td>Increase in Methane (CH₄)</td>
<td>0 ppm (normal)</td>
<td>&lt; 12 ppm (&lt; 3 ppm²)</td>
</tr>
<tr>
<td>Increase in combined H₂ &amp; CH₄</td>
<td>1 ppm (normal)</td>
<td>&lt; 12 ppm</td>
</tr>
</tbody>
</table>

**Analysis of the data suggests:** Bacterial overgrowth is not suspected.

---

### GI Pathogen Screen with H. pylori Antigen - 401H

- **Stool Culture***
  - Normal flora after 24 hours
- **Preliminary Report**
  - * Escherichia coli isolated
- **Final Report**
  - Light
- **Ova & Parasites***
  - No Ova/Parasites detected
- **Ova & Parasites #1**
  - No Ova/Parasites detected
- **Ova & Parasites #2**
  - No Ova/Parasites detected
- **Ova & Parasites #3**
  - No Ova/Parasites detected
- **Trichomoniasis**
  - Not detected
- **Stool Antigens***
  - Cryptosporidium Antigen
    - Not detected
  - Giardia lamblia Antigen
    - Not detected
- **Additional Tests***
  - **Fungi**
    - No fungus isolated
  - **C. difficile Toxin A**
    - Not detected
  - **C. difficile Toxin B**
    - Not detected
  - **Yeast**
    - No yeasts isolated
  - **Occult Blood**
    - Not detected
- **Helicobacter Pylori Stool Antigen***
  - Not detected

---

www.DrRuscio.com/Review
<table>
<thead>
<tr>
<th>Test Name</th>
<th>Result</th>
<th>Notes</th>
<th>Reference Values/Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>MB2S (Total saliva IgA)</td>
<td>12 Normal</td>
<td>Expected Findings: Moderate growth of mixed Gram positive flora.</td>
<td>Normal: 10-20 mg/dL. Borderline High: 21-25 mg/dL.</td>
</tr>
<tr>
<td>MB3 (Lactase) (stool)</td>
<td>&lt;0.5 Elevated</td>
<td>秘制 expected Luminal lactase may indicate gastrointestinal inflammation.</td>
<td>Normal: &gt;6 mg/100g dry wt. Elevated: &gt;8.</td>
</tr>
<tr>
<td>T-5OL (T. spiralis Ab, IgA (saliva))</td>
<td>Not detected</td>
<td>Normal Result: Not detected</td>
<td></td>
</tr>
<tr>
<td>PCO testing at LabCorp - RESULTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CBC w Diff &amp; platelet count</td>
<td>WNL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metabolic Panel, Comprehensive</td>
<td>WNL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lipid Panel</td>
<td>Cholesterol 238-H, LDL 148-H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thyroid-Stimulating Hormone (TSH)</td>
<td>WNL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-3, Free (Triiodothyronine, Free)</td>
<td>WNL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicobacter pylori Antibodies, IgA, IgG, IgM</td>
<td>WNL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helicobacter pylori Urea Breath Test</td>
<td>WNL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Visit 4 (2 months later, 9/16/16):

Subjective Assessment:
- Improved:
  - Mary had generally maintained her previous improvements with the following exceptions
- Worse
  - Runny nose even though not sick, abdominal pain, nausea, anxiety, palpitations
- Mary also reported again 'she feels better the worse she eats'. She also noted that when she eats lots of fermented foods and/or Kombucha she seems to feel worse.

Impression:
- The fact that Mary was experiencing a flare of runny nose (even though not sick), abdominal pain, nausea, anxiety, and palpitations are highly suggestive of histamine overload. She also reported that too much fermented food intake seems to flare her. This further suggest histamine overload. So we had her follow a low histamine diet and discontinued all probiotics (which are a source of histamine) while maintaining her previous treatments listed above.

Recommendations
- Follow a low histamine diet and discontinue all probiotics while maintaining your previous program. Follow up in 4-8 weeks.
Visit 5 (10/28/16):

Subjective Assessment:
- Improved:
  - Stomach pain, reflux, runny nose, stools, bloating, brain fog
- Mary felt the low histamine diet was very helpful. She also noticed the both the lacto/bifido probiotic AND the soil based probiotic caused negative reactions, but the S. boulardii was OK

Impression:
- Reducing Mary’s histamine load was very helpful and was the last piece needing to be addressed to reach full symptomatic resolution.
- The fact she had been on a natural acid lowering agent suggests this was not needed for reflux/heartburn, stomach pain. Interestingly, histamine is involved in gastric acid secretion so by improving/reducing her histamine load we likely address the root cause of any hyperacidity that might be present. It is important to encourage Mary to adhere to whatever follow up her conventional GI is recommending to make sure someone is keeping tabs on any potential histological changes in the esophagus. Hopefully our work together will ensure her esophageal histology improves, but we shouldn’t leave this to chance.

Recommendations:
- Continue previous program
  - Nutritional support: curcumin, vitamin D/K, Magnesium, Omega 3, 6, 9 blend
  - Hormonal: female hormone support herbal blend (black cohosh, dong qui, chast tree)
  - GI:
    - Natural prokinetic, probiotics (S. boulardii)
- But make the following changes
  - Work to expand your dietary boundaries both with your FODMAP/Fast Tract restrictions and with your histamine restrictions
- Follow up in 2 months

www.DrRuscio.com/Review
Visit 6 (12/30/16):

Subjective Assessment

- Mary has maintained all previous improvements and even reports she feels slightly better.
- She has been able to slightly expand her dietary boundaries.

Impression:

- Mary has done great, no more improvement is needed. We can maintain this program for a few more months and then start on curtailing her off the items in her current program to find minimal maintenance plan.

Recommendations:

- Follow up in 2-3 months
Dr. Ruscio’s Comments

When Mary came into my office she had already treated SIBO, but this treatment appeared to make her bowels worse. At her exam she did present with symptoms that could be consistent with SIBO; however, her labs did not support this, nor did they support any other dysbiosis, or other metabolic abnormalities. She also exhibited symptoms consistent with ulcer/gastritis and female hormone imbalances.

She responded well to initial treatment with botanicals for female hormone balancing, and herbal upper GI prokinetic. She did not respond well to fasting-type interventions (which reinforces an ulcer/gastritis/hyperacidity). The effect of probiotics was difficult to ascertain initially. At her subsequent follow up visits Mary started to experience symptom regressions that can be consistent with histamine overload (anxiety, brain fog, runny nose, palpitations). We then had her follow a low histamine diet and discontinue all probiotics (most probiotics being a source of histamine) – she responded very well. Also remember that histamine signals HCl release, so this modification may have been all that was needed to address gastritis/ulceration/hyperacidity – the fact that her symptoms were improved further reinforces this. The above was the combination of factors that Mary needed to achieve satisfactory improvement in all/most of her symptoms. She is thrilled with her results.

This case could have been made more complicated with methylation testing, neurotransmitter evaluations, female hormone assays, HCl/pH assessment, endoscopy, etc., but they were not needed. We focused on practical, clinical fundamentals and achieved excellent results at a small cost and in a short time period.
• Questions?
IN TODAY'S ISSUE

CASE STUDY

- Hypothyroid, Hashimoto’s, H. Pylori and Epstein-Barr virus – when to treat and more importantly when not to treat.

RESEARCH

- Low carbohydrate diets improve thyroid autoimmunity.
- Berberine successful for IBS, but there is a twist.
- Probiotics in IBS, a review of the literature.

PRACTITIONER QUESTION OF THE MONTH

- “I understand that FODMAPs should be avoided in IBS, but what about resistant starch?”

PRACTICE TIP

- At home, smartphone base calprotectin testing
Effects of low-carbohydrate diet therapy in overweight subjects with autoimmune thyroiditis: possible synergism with ChREBP.


Study purpose:

- To assess the impact of a diet devoid of carbohydrates (bread, pasta, fruit, and rice) and free from goitrogenic foods (including dairy) on thyroid function, thyroid autoimmunity and body composition
  - said simply a low carb diet.

Intervention:
Intervention:
3 weeks on respective diet

- Treatment (low carb diet), n = 108
  - Carbohydrates 12%-15%, proteins 50%-60%, and lipids 25%-30%.
    - Dr. R’s note: this may equate to roughly 200 grams of carbs/day
  - Instructed to eat large leafy and other types of vegetables and only lean parts of red and white meat, avoiding goitrogenic food.
  - The following items were also excluded from the diet: eggs, legumes, dairy products, bread, pasta, fruits, and rice. “This protein-rich diet plan was implemented for 3 weeks”

- Control, n = 72
  - A simple, low-calorie diet without restrictions regarding the types of food to consume, but adhered to the recommended dietetic allowances, as suggested by the National Research Institute on Food and Nutrition
    - Dr. R’s note: traditional dietary advice
Main Results:

- Treatment
  - Significant reduction of thyroglobulin (Tg) antibodies -40% and anti-peroxidase (TPO) antibodies -44%
- Control (untreated)
  - Significant increase in thyroglobulin (Tg) antibodies +9%. The level of anti-peroxidase (TPO) antibodies increased without reaching statistical significance +16%.

Additional Results:

- No significant changes in thyroid hormones were reported between groups
- Low carb diet group experienced slightly better improvements in body composition
- 83% of patients with high levels of autoantibodies were breath test positive to lactase which may suggests carbohydrate malabsorption

Authors' Conclusion:

- The dietary regime described in this study could be implemented for the treatment of patients with autoimmune thyroid because of the possibility to reduce the inflammation state in general and of the thyroid gland
Clinical Takeaways:

- A SIMPLE lower carb diet (around 200 grams/day) that removes diary and bread but focuses on meats and vegetables can both dampen thyroid autoimmunity and improve body composition.

Dr. Ruscio’s Comments

The reduction of carbs and allergens (gluten, diary) likely played the largest role, while the impact of avoiding goitrogens was likely minimal. This is because reduction of iodine has been shown to lower thyroid antibodies so one would think eating goitrogens (which impede iodine absorption) may actually help thyroid autoimmunity.

The carb reduction may also have been helpful because the majority of patients expressed a degree of carbohydrate malabsorption. We could speculate that a reduction of carbs (which these subjects poorly absorbed) reduced the amount of available substrate for the microbiota to feed on and may have corrected underlying overgrowths or imbalances thus improving the environment and immune status in the gut, thus improving systemic immune function.

How does this study support a cost effective and efficient FM model? Impressive results in thyroid autoimmunity were obtained without needing food allergy testing, and without needing a highly meticulous or restrictive diet.
CASE STUDY
- Histamine overload that initially presented as what looked like a SIBO relapse.

RESEARCH
- Low FODMAP versus prebiotics in IBS, a head-to-head trial.
- What level of TPO antibodies should be considered pathogenic? Good news for patients and practitioners.
- Gut-to-brain or brain-to-gut, which pathway is more important?
- Using SIBO breath testing to predict response to antibiotics in patients with IBS.
- An evidence based thyroid questionnaire.

PRACTITIONER QUESTION OF THE MONTH
- Do anti-microbial herbs treat SIFO (small intestinal fungal overgrowth)

PRACTICE TIP
- An easy tool for creating HIPAA compliant online forms
Levothyroxine therapy and impaired clearance are the strongest contributors to small intestinal bacterial overgrowth: Results of a retrospective cohort study.

- CONCLUSION: The most important contributors for the development of SIBO in ascending order are immunosuppression, impairment of intestinal clearance and levothyroxine use, but they do not sufficiently explain its emergence.

Functional 13C-urea and glucose hydrogen/methane breath tests reveal significant association of small intestinal bacterial overgrowth in individuals with active Helicobacter pylori infection.

- SIBO more common in those with HP

- **Meta-analysis showing association between H. Pylori and thyroid autoimmunity**

- One study showing treatment of HP can reduce thyroid AI
CASE STUDY

- Hypothyroid, Hashimoto’s, H. Pylori and Epstein-Barr virus – when to treat and more importantly when not to treat.

RESEARCH

- Low carbohydrate diets improve thyroid autoimmunity.
- Berberine successful for IBS, but there is a twist.
- Probiotics in IBS, a review of the literature.

PRACTITIONER QUESTION OF THE MONTH

- “I understand that FODMAPs should be avoided in IBS, but what about resistant starch?”

PRACTICE TIP

- At home, smartphone base calprotectin testing
Questions?
Biofilm demolition and antibiotic treatment to eradicate resistant Helicobacter pylori: a clinical trial.


Figure 2. Representation of the findings of this study. (A) NAC was effective both in inhibiting the biofilm formation and in destroying developed biofilms in cultured H pylori isolates. (B) A NAC pretreatment course before a culture-guided antibiotic regimen is more effective in eradicating resistant H pylori infection than antibiotics alone.
We have shown, for the first time, a statistically significant impact of adding anti-biofilm agents to standard Habx for H2 SIBO and for combined gas SIBO. No significant change for CH4.

**Treatment:** standard SIBO Habx + anti-biofilm agents

**Control:** standard SIBO Habx

N: treatment = 12, control = 9
Predicting a Response to Antibiotics in Patients with the Irritable Bowel Syndrome

- Antibiotic response according to group;
  - Group 1 = 94.7 %
  - Group 2 = 81.4 %
  - Group 3 = 47.2 %
  - Group 4 = 79.9 %

“...the fact that absence of any rise in gases (group 1) predicted the best response (94.7 % improvement rate) is an unexpected, novel observation.”
Comparison of lactulose and glucose breath test for diagnosis of small intestinal bacterial overgrowth in patients with irritable bowel syndrome.

- IBS pts. SIBO positive
  - Lactulose: \((34.3\%)\) 60/175
  - Glucose: \((6.2\%)\) 11/175

- Controls SIBO positive
  - Lactulose: \((30\%)\) 45/150
  - Glucose: \((0.66\%)\) 1/150

- This type of finding has been reinforced by many other studies
  - [PubMed ID](http://www.ncbi.nlm.nih.gov/pubmed/21860825)
  - [PubMed ID](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4069289/)
Summary of Probiotics in IBS

• **IBS** - Two meta-analyses have shown probiotics to be an effective treatment for IBS, with no side effects. A multi-strain mixture of lactic acid bacteria (think lactobacillus and Bifidobacteria) are best. Some evidence suggest including Bifidobacterium infantis in this mixture may be best.

• A dose of anywhere from 100 billion to 900 billion per day can be used, it’s usually best to start around 100 billion and slowly work your way up. There is no need to increase beyond a dose that causes desired improvement
  
  
Studies using probiotics to treat SIBO have shown:

- A symptomatic improvement of 82% was seen using a probiotic as the only treatment for SIBO patients. This improvement was 30% better than a group of patients being treated with the antibiotic metronidazole. (The probiotics contained 33 million Lactobacillus casei and L. plantarum, Streptococcus faecalis, and Bifidobacter brevis – dosed once to twice a day)  

- A 64% reduction of SIBO gas levels after using lactobacillus as the only treatment (6.5 billion Lactobacillus casei Shirota)  

- A 47% SIBO eradication rate using a dose of 2 billion Bacillus clausii,  
  www.ncbi.nlm.nih.gov/pubmed/19352343 this is a soil based/spore forming probiotic as we discussed earlier.
Types of Probiotics

• 4 general classes
  • Lacto/bifido blends
  • S. Boulardii
  • Soil Based, bacillus
  • E. coli Nissle
Why Do Probiotics Help IBS?

• Anti-bacterial?
• Repair and reduce leaky gut
• Immunomodulatory
• Note: most do not colonize, even dead probiotics are helpful
What I DO

• Start patients with a moderate/lower dose of
  • Lacto/bifido blend + S. boulardii + Soil Based
  • Sensitive people I have intro one at a time every few days
  • d/c if any reactions
  • most common reaction – bloating
  • not all tolerate but most do
  • Caution that they are low in prebiotics. Under 1,000mg is OK.
  • Curious on E. Coli but not sold in US.

• in time work to reduce dose but usually have most on low dose at least a few times a week
• Questions?
Summary – Fiber and prebiotics in gut health

• Low FODMAPs and low fermentability

• Fiber and prebiotics can be helpful but their utility has been overstated

• Fiber
  • May help or may harm – less symptomatic = less risk
  • Fiber type matters; lowest risk with soluble fiber – most relevant for supplements
  • IBS subtype matter; most benefit for those with constipation

• Prebiotics
  • May help or may harm – less symptomatic = less risk
  • Ideal dose may be between 3.5-5 grams/day – some benefit with minimal risk of side effects.
  • Many of the studies have high rate of AE when using higher doses
Effects of varying dietary content of fermentable short-chain carbohydrates on symptoms, fecal microenvironment, and cytokine profiles in patients with irritable bowel syndrome.


Study purpose:

- To evaluate the effect of a low FODMAP diet compared to a diet high in prebiotics on IBS symptoms and related co-morbidities.
- Markers tracked
  - IBS symptoms, general health symptoms, GI microbiota (via GA-Map test), SCFAs, cytokines.
  (Important note: the GA-Map test is a new test from Norway and we will discuss in the near future, not to be confused with the GI-Map test).

Intervention (double blinded):
**Intervention (double blinded):**

- 20 patients with IBS (IBS-D and IBS-M) followed a low FODMAP (LFD) diet for 3 weeks.
- ½ patients received 16g/day of FOS prebiotics, the other ½ received a placebo.
- Then all patients performed another 3 weeks on low FODMAP.
- Then the groups were switched - ½ patients reviewed FOS and the other ½ received maltodextrin.

**Results:**

- “There was a significant improvement in all IBS symptoms after 3 weeks of LFD.”
- “An overall patient satisfaction of 85%” was reported on the low FODMAP diet.
- Those on the low FODMAP diet also experienced a significant **improvement** in belching, passing gas, nausea, vomiting, and tiredness.
- When then transitioning to either placebo or FOS
  - 80% of those on placebo maintained improvements.
  - 30% of those on FOS maintained improvements.
- When on FOS, patients experienced a **worsening** of
  - Nausea, vomiting, headache, belching, and passing gas.
Questions?
• Monthly Clinical Training Newsletter
  • 1 in depth case study
  • 3-5 research study summaries
  • Practitioner question of the month
  • Practice tip
Introducing Dr Michael Ruscio’s ...

Future of Functional Medicine Review

Giving functional medicine practitioners the knowledge they need to run a thriving, effective clinic