A COMPREHENSIVE APPROACH TO THE EVALUATION AND TREATMENT OF SMALL INTESTINAL FUNGAL OVERGROWTH, YEAST AND CANDIDA FOR PATIENT EDUCATION

A review of 30 years of research on the Yeast Problem and a Comprehensive Approach to Evaluation and Treatment

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DISCLAIMER:

- I have no actual or potential conflict of interest in relation to this program/presentation.
- Information is not intended to treat, diagnose, cure, or prevent any disease. Information provided is for informational purposes only and represents the opinions formed by the author based on experiences and review of numerous sources of information related to the subject matter. Patients should consult directly with their personal medical professional. Information is not intended to serve as medical advice. Always seek the advice of a licensed health care provider before making any treatment decisions. The author expressly disclaims responsibility for any adverse effects that may result from the use or application of the information contained in this presentation.

GOALS FOR TODAY'S TALK:

TALK SLOWLY!!!

AND…….

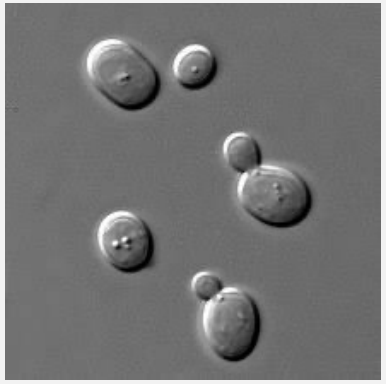
REVIEW SIFO/YEAST FROM A 30 YEAR HISTORICAL PERSPECTIVE TO THE PRESENT

ANOTHER TRIGGER FOR IBS AND DIGESTIVE DISORDERS?

OUTLINE:

- Big Picture: Overview of Yeast/Candida/Fungal related disorders
- What is SIFO?
- Research involving yeast/fungus/SIFO with IBS and associated conditions
- How can SIFO be Diagnosed?
- How can SIFO be Treated with an Integrative Approach?
- Labs
- Finding a practitioner

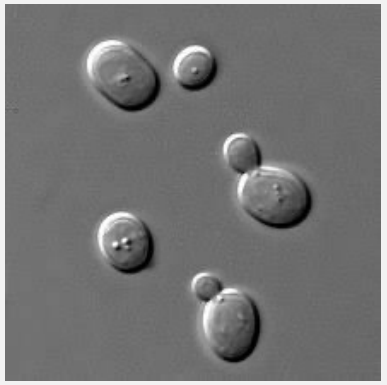
BIG PICTURE: YEAST/CANDIDA/FUNGAL RELATED DISORDERS



BIG PICTURE: YEAST VS MOLD VS FUNGUS:

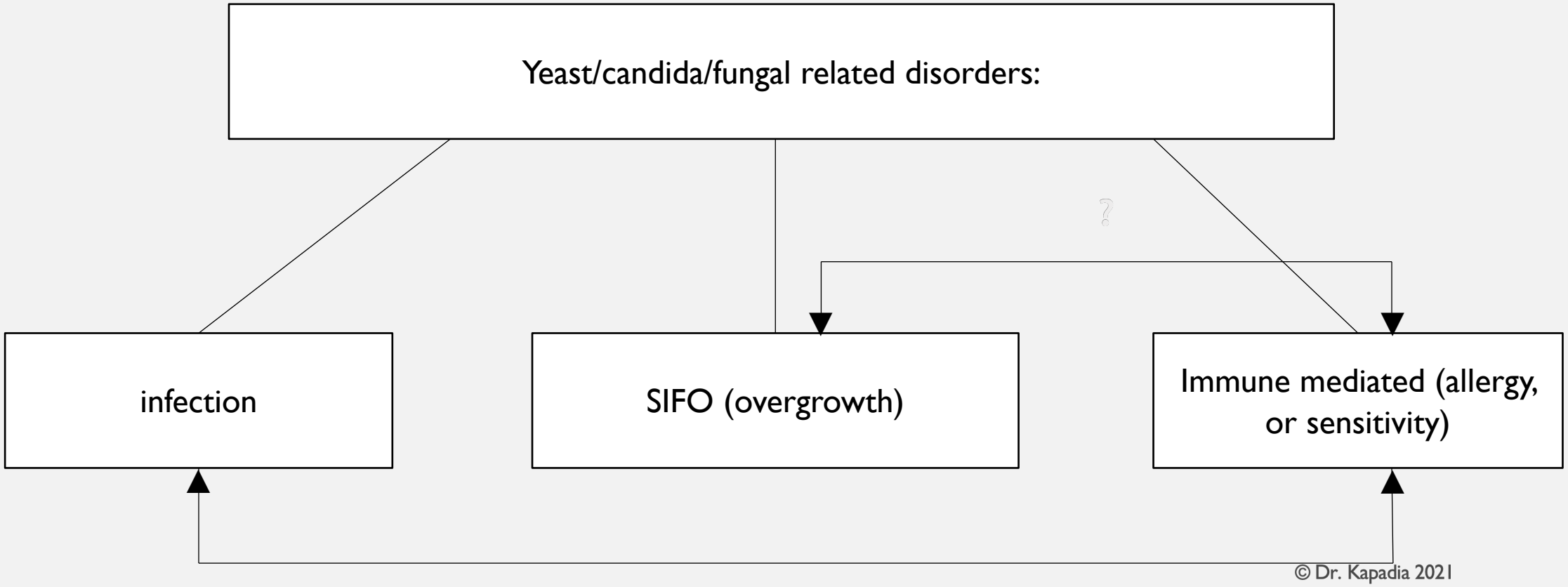
- Fungi = Kingdom
  - Includes: molds, yeast
  - SIFO refers to yeast for the most part
  - Relationship between environmental molds and internal yeast/SIFO (?)

BIG PICTURE: SIFO/YEAST/CANDIDA:



- Species: candida
- Location: Small intestine
- Commensal vs loss of tolerance

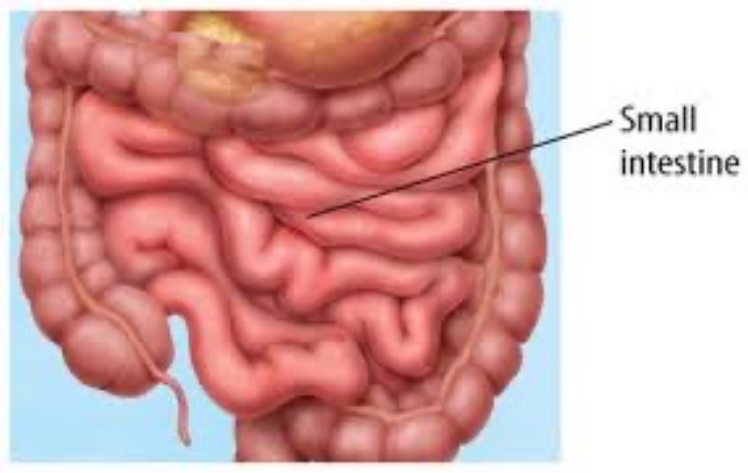
BIG PICTURE: YEAST/CANDIDA/FUNGAL RELATED DISORDERS:



BIG PICTURE: YEAST/CANDIDA/FUNGAL RELATED DISORDERS:

- Infection
- SIFO
- Immune mediated/allergy

WHAT IS SIFO?



SIFO: DEFINITIONS:

- Dr. Satish Rao, MD
- SIFO: "Small intestinal fungal overgrowth (SIFO) is characterized by the presence of an excessive number of fungal organisms in the small intestine associated with gastrointestinal (GI) symptoms."

Curr Gastroenterol Rep. 2015 Apr;17(4):16. doi: 10.1007/s11894-015-0436-2. **Small intestinal fungal overgrowth.** Erdogan A, Rao SS.

SIFO: DEFINITIONS/SYMPTOMS CONT'D:

- SIFO definition: SIFO involves an excessive # of *fungal* organisms in the small intestine as opposed to an excessive # of *bacterial* organisms in the small intestine (SIBO)

- Symptoms of SIFO from literature = SAME as SIBO
  - Symptoms include: belching, bloating, indigestion, nausea, diarrhea, gas (clinically also constipation)
  - SAME as SIBO symptoms: Cannot tell the difference from symptoms alone
  - Likely we will find more and more systemic symptoms

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SIFO: DEFINITIONS/SYMPTOMS CONT'D:

- *Symptoms based on clinical experience:*
  - sugar cravings
  - intolerance to starch, alcohol and/or sugars (both refined and honey/maple syrup and fruit in general)
  - constipation (although diarrhea possible) and severe bloating
  - IC, endometriosis, vulvodynia (Dr. Vincent observations)
  - Hypoglycemia
  - allergic tendencies (food and environmental allergy)
  - inappropriate laughter, brain fog
  - history of recurrent antibiotics particularly in women
  - recurrence of symptoms shortly after stopping therapy
  - Symptoms that overlap with SIBO, but negative breath test or no symptom improvement with normalization of breath test

SIFO DEFINITIONS CONT'D: SMALL VS LARGE INTESTINE?

- SIFO: small intestine
- Large intestine also? Yes
  - IBD research

- "yeast problem"
  - location more important in research than clinically (in my experience)

Inflammation and gastrointestinal Candida colonization Carol A. Kumamoto. Curr Opin Microbiol. 2011 August ; 14(4): 386–391. doi:10.1016/j.mib.2011.07.015.

RISK FACTORS FOR SIFO:

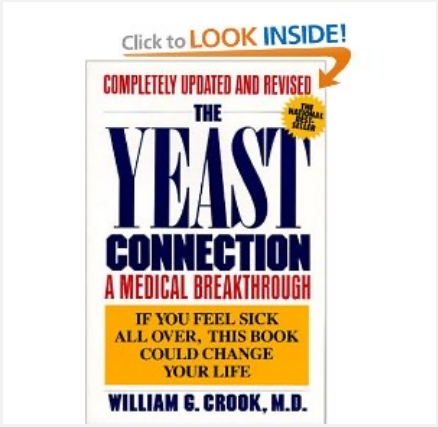
- Risk factors for SIFO in immunocompetent patients: (similar for SIBO):
  - Dysmotility
  - PPI's or H2 blockers
  - Pancreatic enzyme deficiency
  - Antibiotics
  - Prior GI surgery including colectomy
  - Opioids (current use)

Curr Gastroenterol Rep. 2015 Apr;17(4):16. doi: 10.1007/s11894-015-0436-2. **Small intestinal fungal overgrowth.** Erdogan A, Rao SS.

Anti-Secretory Therapy and Opioid Analgesics Confer Increased Risk for Developing Small Intestinal Bacterial and Fungal Overgrowth. Ding et al. Gastroenterology. April 2016. 150 (4). Supp 1:S489.

SIFO: A NEW CONDITION? 30+ YEARS OF INVESTIGATION

30+ YEARS AGO:



- "The Missing Diagnosis" by C. Orian Truss, MD. 1983
- "Notes on the Yeast Problem" by Sidney M. Baker, MD. 1983
- "Superimmunity for Kids" by Leo Galland, MD. 1988
- "The Yeast Connection" by William G. Crook. 1989
- "The Four Pillars of healing" by Leo Galland, MD. 1997
- "Detoxification and Healing" by Sidney M. Baker, MD. 2003
- Autism: Have We Done Everything We Can for this Child?: Effective Biomedical Treatments by Sidney Baker, MD. 2005
- Candida Information Packet. Marjorie Crandall Ph.D. 2007
- Multiple publications by Dr. Rao, MD, PhD in the last 5+ years on SIFO

SIFO: A NEW CONDITION? 30+ YEARS OF INVESTIGATION

- Nutrition and Candidiasis: Leo Galland, MD, FACP, FACN. Report from paper presentation at "Yeast-Human Interaction Symposium", 1983
- Examined common nutritional deficiencies (will revisit later in our talk)
- Potential effects of candida:
  - Fermentation of carbohydrates
  - Production of toxins

http://orthomolecular.org/library/jom/1985/pdf/1985-v14n01-p050.pdf

SIFO/CANDIDA AND ASSOCIATED CONDITIONS

WHAT CONDITIONS HAS SIFO AND/OR CANDIDA BEEN ASSOCIATED WITH?

- IBS
- IBD
- Celiac Disease
- Food sensitivities
- PUD
- Allergies
- Mast Cell Activation
- Autoimmune disease
- Eczema
- Urticaria…..

SIFO/CANDIDA AND IBS:

- Evidence for SIFO's link to IBS symptoms:
- Dr. Rao multiple publications
  - 2013 study: 63% of patients had overgrowth: 40% had SIBO, 26% had SIFO, and 34% had mixed SIBO/SIFO
  - Other publications: 25% of patients with chronic GI symptoms may have SIFO
  - Predominant symptoms in 60-80% of patients with SIFO: abdominal pain, bloating, fullness, nausea, gas
  - No symptoms found to be unique to those with SIFO vs SIBO vs no overgrowth

SIFO/CANDIDA AND IBS:

- Evidence for SIFO's link to IBS symptoms:
- Santelmann et al. publication in 2005:
  - "An infection of the intestinal mucosa with Candia might lead to…inflammation within subgroups of patients with IBS symptoms."
  - "…there is increasing evidence for yeasts being able to cause IBS symptoms in sensitized patients"

SIFO/CANDIDA AND IBD (CROHN'S AND UC):

- Crohn's Disease (CD):
  - Colonization with candida
  - ASCA
  - Altered response to candida colonization

Standaert-Vitse A et al. Candida albicans colonization and ASCA in familial Crohn's disease. Am J Gastroenterol 2009; 104: 1745-5.

Zwolinska-Wcislo M et al. Effect of Candida colonization on human ulcerative colitis and the healing of inflammatory changes of the colon in the experimental model of colitis ulcerosa. J Physiol Pharmacol 2009; 60: 107-18.

Zwolinska-wcislo M et al. Are probiotics effective in the treatment of fungal colonization of the gastrointestinal tract? Experimental and clinical studies. J Physiol Pharmacol 2006; 57 Suppl 9:35-49.

SIFO/CANDIDA AND IBD (CROHN'S AND UC):

- Ulcerative Colitis:
  - High % colonized with candida
  - Antifungals and remission (fluconazole/probiotics + mesalamine/azathioprine)

Standaert-Vitse A et al. Candida albicans colonization and ASCA in familial Crohn's disease. Am J Gastroenterol 2009; 104: 1745-5.

Zwolinska-Wcislo M et al. Effect of Candida colonization on human ulcerative colitis and the healing of inflammatory changes of the colon in the experimental model of colitis ulcerosa. J Physiol Pharmacol 2009; 60: 107-18.

Zwolinska-wcislo M et al. Are probiotics effective in the treatment of fungal colonization of the gastrointestinal tract? Experimental and clinical studies. J Physiol Pharmacol 2006; 57 Suppl 9:35-49.

SIFO/CANDIDA AND GLUTEN SENSITIVITY/CELIAC DISEASE:

- Candida colonization is hypothesized to be a trigger for gluten sensitivity and celiac disease in genetically susceptible individuals
  - Hwp1 = hyphal wall protein
  - Cross-reactivity between Hwp1 and gliadin

Corouge M et al: **Humoral immunity links Candida albicans infection and celiac disease.** 2015 Mar 20;10(3):e0121776. doi: 10.1371/journal.pone.0121776. eCollection 2015.

Nieuwenhuizen WF **Is Candida albicans a trigger in the onset of coeliac disease?** Lancet. 2003 Jun 21;361(9375):2152-4.

SIFO/CANDIDA AND ALLERGIES:

Antibiotics

↓

candida colonization of gut

↓

increased allergies to mold spores + other allergens

Noverr MC, Falkowski NR, McDonald RA, McKenzie AN , Huffnagle GB: Development of allergic airway disease in mice following antibiotic therapy and fungal microbiota increase: role of host genetics, antigen, and interleukin-13. Infect Immun 2005; 73: 30–8. MEDLINE

Noverr MC, Noggle RM, Toews GB, Huffnagle GB: Role of antibiotics and fungal microbiota in driving pulmonary allergic responses. Infect Immun 2004; 72: 4996–5003. MEDLINE

SIFO/CANDIDA, ALLERGIES AND MAST CELL ACTIVATION:

candida colonization

↓

increased intestinal permeability (partly mast cell mediated)

↓

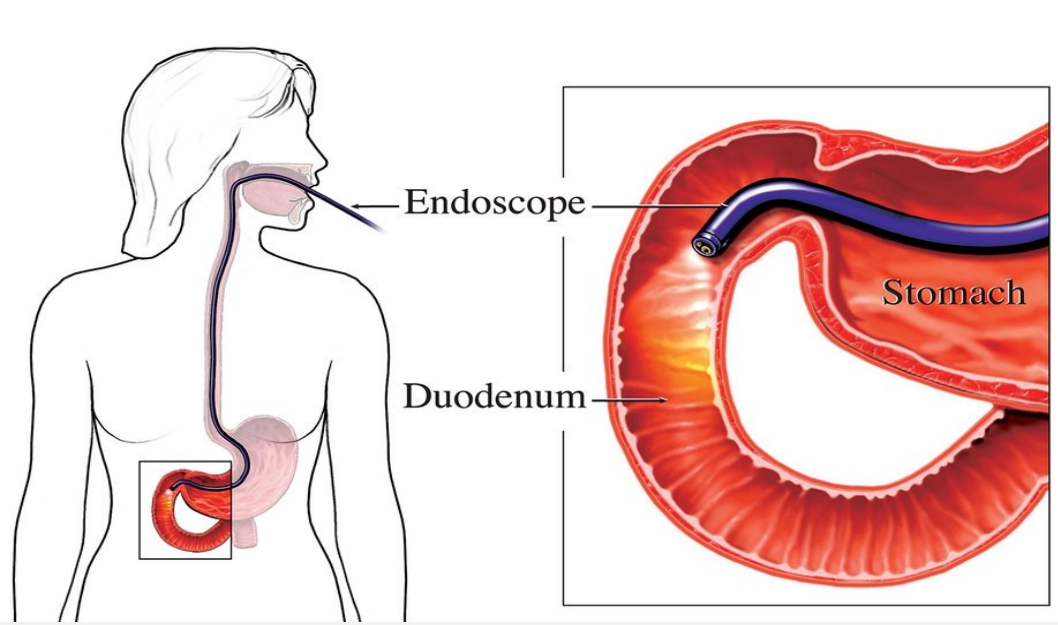
sensitization against food antigens

Yamaguchi N, Sugita R, Miki A, Takemura N, Kawabata J, Watanabe J, Sonoyama K: Gastrointestinal Candida colonisation pro-motes sensitisation against food antigens by affecting the mucosal barrier in mice. Gut 2006; 55: 954–60.

DIAGNOSIS OF SIFO

DIAGNOSIS:

- Gold Standard at this time: aspiration and culture from 3rd or 4th portion of duodenum or jejunum (can be done during EGD with a gastroenterologist).



Curr Gastroenterol Rep. 2015 Apr;17(4):16. doi: 10.1007/s11894-015-0436-2.Small intestinal fungal overgrowth. Erdogan A, Rao SS.

DIAGNOSIS CONT'D:

- Other options if aspirate not available:
  1. Candida Immune Complex: Quest Code 95856 or Alletess
  2. Candida Antibodies (IgG/IgA/IgM): Quest Code 30440 or Alletess
  3. Organic Acid Testing: (Great Plains, etc.)
  4. IgG Food panel: including Baker's/Brewer's Yeast
  5. Stool test (?)
  6. ??? Clinical response to a 2-4 week trial of sugar/yeast free diet and antifungal medication

DIAGNOSIS CONT'D: IMMUNE COMPLEX:

- Candida Immune Complex: Quest Lab site:
  - Candida albicans antigen + anti-Candida IgG antibodies + complement
  - Caveat: false neg if non-candida species (?)

Reference: Quest lab: https://www.questdiagnostics.com/testcenter/BUOrderInfo.action?tc=30440&labCode=DAL

DIAGNOSIS CONT'D: CANDIDA ANTIBODIES:

- Candida Antibodies (IgG/IgA/IgM):
- 2007 study: Compared IgG antibody measurements between population with high FRDQ-7 scores vs symptom-free controls
- Candida IgG concentration significantly higher in the non-control group than in the control group
- No significant difference for Candida IgA or IgM

Elevation of Candida IgG Antibodies in Patients with Medically Unexplained Symptoms. Lewith, G. et al of Alternative & Complementary Medicine. Vol 13:1129-1133, 2007

DIAGNOSIS CONT'D: CANDIDA ANTIBODIES:

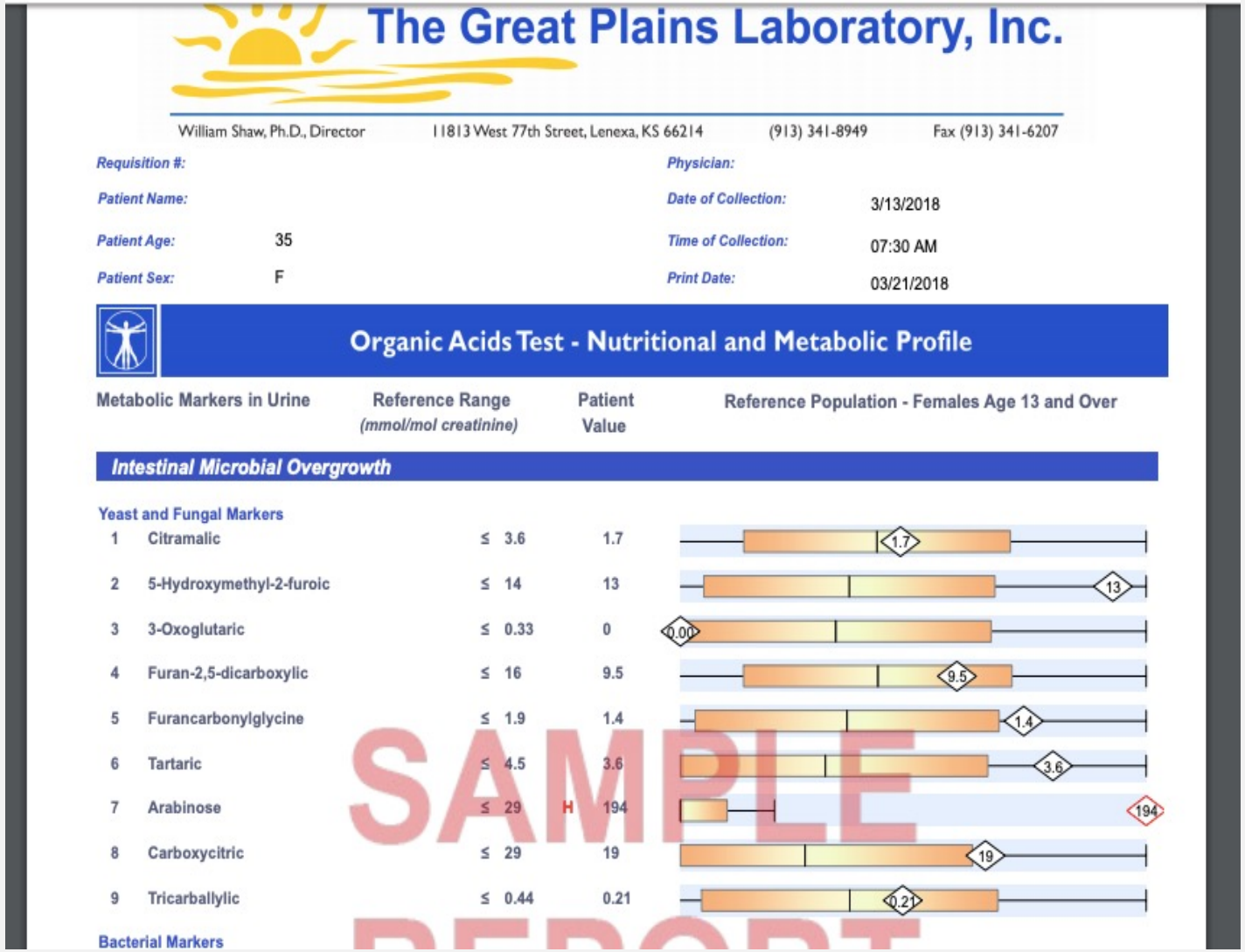
- Candida Antibodies (IgG/IgA/IgM):
- Antibodies: NOT diagnostic, but clues

Elevation of Candida IgG Antibodies in Patients with Medically Unexplained Symptoms. Lewith, G. et al of Alternative & Complementary Medicine. Vol 13:1129-1133, 2007

DIAGNOSIS CONT'D: ORGANIC ACID TESTING:

- Urine Organic Acid Testing: Great Plains and Others
  - 9 metabolites in urine associated with yeast/fungus
  - Arabinose + others

DIAGNOSIS CONT'D: ORGANIC ACID TESTING:



The Great Plains Laboratory, Inc.

William Shaw, Ph.D., Director | 11813 West 77th Street, Lenexa, KS 66214 | (913) 341-8949 | Fax (913) 341-6207

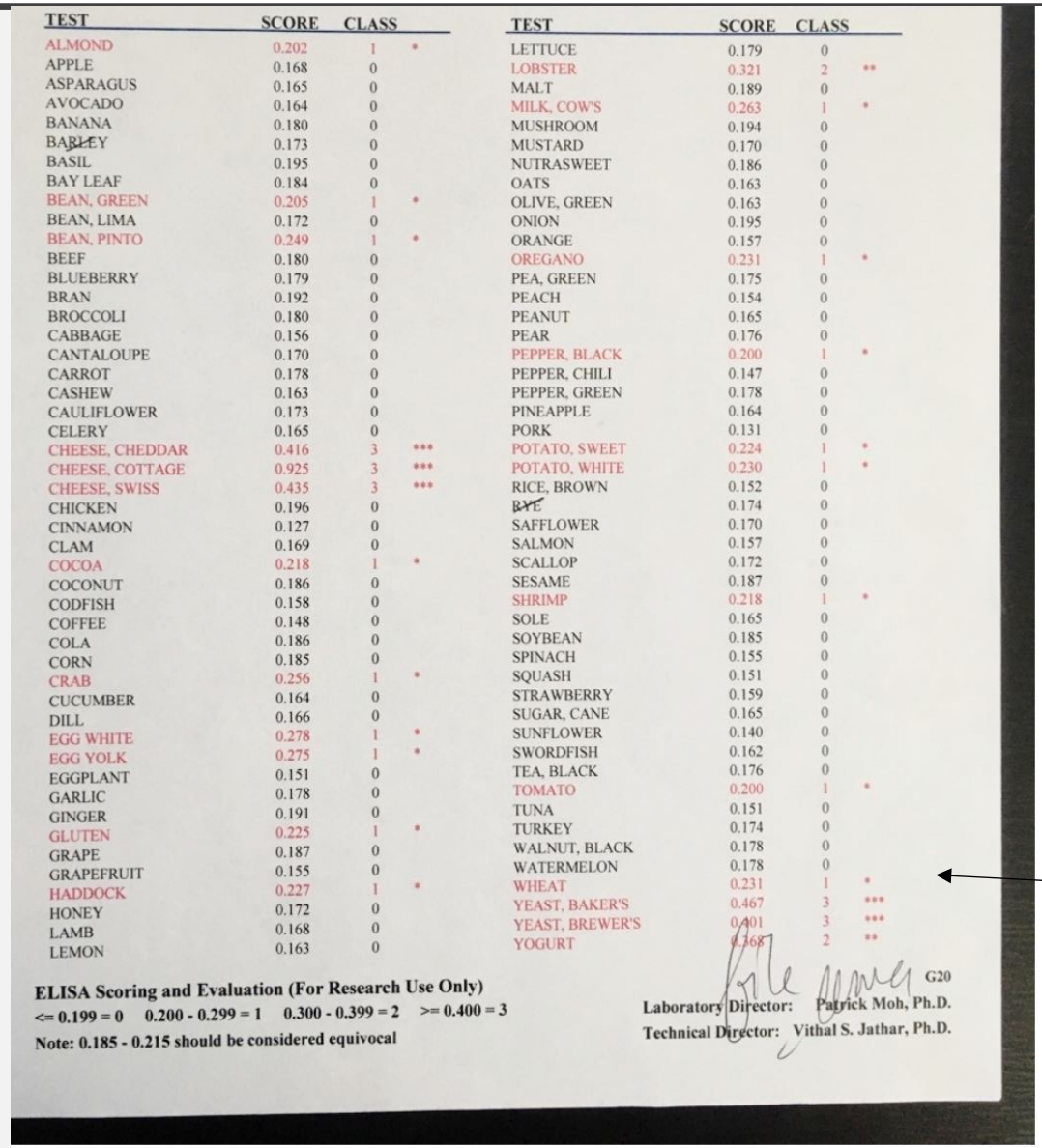
Requisition #:		*Physician:*	
Patient Name:		*Date of Collection:*	3/13/2018
Patient Age:	35	*Time of Collection:*	07:30 AM
Patient Sex:	F	*Print Date:*	03/21/2018

Organic Acids Test - Nutritional and Metabolic Profile

Metabolic Markers in Urine	Reference Range (mmol/mol creatinine)		Patient Value	Reference Population - Females Age 13 and Over
Intestinal Microbial Overgrowth				
Yeast and Fungal Markers				
1 Citramalic	≤ 3.6		1.7	1.7
2 5-Hydroxymethyl-2-furoic	≤ 14		13	13
3 3-Oxoglutaric	≤ 0.33		0	0.00
4 Furan-2,5-dicarboxylic	≤ 16		9.5	9.5
5 Furancarbonylglycine	≤ 1.9		1.4	1.4
6 Tartaric	≤ 4.5		3.6	3.6
7 Arabinose	≤ 29	H	194	194
8 Carboxycitric	≤ 29		19	19
9 Tricarballylic	≤ 0.44		0.21	0.21
Bacterial Markers				

SAMPLE REPORT

DIAGNOSIS CONT'D: IGG FOODS WITH YEAST:



TEST	SCORE	CLASS		TEST	SCORE	CLASS	
ALMOND	0.202	1	*	LETTUCE	0.179	0	
APPLE	0.168	0		LOBSTER	0.321	2	**
ASPARAGUS	0.165	0		MALT	0.189	0	
AVOCADO	0.164	0		MILK, COW'S	0.263	1	*
BANANA	0.180	0		MUSHROOM	0.194	0	
BARLEY	0.173	0		MUSTARD	0.170	0	
BASIL	0.195	0		NUTRASWEET	0.186	0	
BAY LEAF	0.184	0		OATS	0.163	0	
BEAN, GREEN	0.205	1	*	OLIVE, GREEN	0.163	0	
BEAN, LIMA	0.172	0		ONION	0.195	0	
BEAN, PINTO	0.249	1	*	ORANGE	0.157	0	
BEEF	0.180	0		OREGANO	0.231	1	*
BLUEBERRY	0.179	0		PEA, GREEN	0.175	0	
BRAN	0.192	0		PEACH	0.154	0	
BROCCOLI	0.180	0		PEANUT	0.165	0	
CABBAGE	0.156	0		PEAR	0.176	0	
CANTALOUPE	0.170	0		PEPPER, BLACK	0.200	1	*
CARROT	0.178	0		PEPPER, CHILI	0.147	0	
CASHEW	0.163	0		PEPPER, GREEN	0.178	0	
CAULIFLOWER	0.173	0		PINEAPPLE	0.164	0	
CELERY	0.165	0		PORK	0.131	0	
CHEESE, CHEDDAR	0.416	3	***	POTATO, SWEET	0.224	1	*
CHEESE, COTTAGE	0.925	3	***	POTATO, WHITE	0.230	1	*
CHEESE, SWISS	0.435	3	***	RICE, BROWN	0.152	0	
CHICKEN	0.196	0		RYE	0.174	0	
CINNAMON	0.127	0		SAFFLOWER	0.170	0	
CLAM	0.169	0		SALMON	0.157	0	
COCOA	0.218	1	*	SCALLOP	0.172	0	
COCONUT	0.186	0		SESAME	0.187	0	
CODFISH	0.158	0		SHRIMP	0.218	1	*
COFFEE	0.148	0		SOLE	0.165	0	
COLA	0.186	0		SOYBEAN	0.185	0	
CORN	0.185	0		SPINACH	0.155	0	
CRAB	0.256	1	*	SQUASH	0.151	0	
CUCUMBER	0.164	0		STRAWBERRY	0.159	0	
DILL	0.166	0		SUGAR, CANE	0.165	0	
EGG WHITE	0.278	1	*	SUNFLOWER	0.140	0	
EGG YOLK	0.275	1	*	SWORDFISH	0.162	0	
EGGPLANT	0.151	0		TEA, BLACK	0.176	0	
GARLIC	0.178	0		TOMATO	0.200	1	*
GINGER	0.191	0		TUNA	0.151	0	
GLUTEN	0.225	1	*	TURKEY	0.174	0	
GRAPE	0.187	0		WALNUT, BLACK	0.178	0	
GRAPEFRUIT	0.155	0		WATERMELON	0.178	0	
HADDOCK	0.227	1	*	WHEAT	0.231	1	*
HONEY	0.172	0		YEAST, BAKER'S	0.467	3	***
LAMB	0.168	0		YEAST, BREWER'S	0.401	3	***
LEMON	0.163	0		YOGURT	0.368	2	**

ELISA Scoring and Evaluation (For Research Use Only)

<= 0.199 = 0 0.200 - 0.299 = 1 0.300 - 0.399 = 2 >= 0.400 = 3

Note: 0.185 - 0.215 should be considered equivocal

G20

Laboratory Director: Patrick Moh, Ph.D.

Technical Director: Vithal S. Jathar, Ph.D.

DIAGNOSIS CONT'D: STOOL TESTING?

- Clinical utility?
  - Majority colonized with yeast
  - What defines an "overgrowth"?
  - Clinically: more concerning if candida/yeast does NOT show up on stool test (?)
  - If it does show up: sensitivities may be helpful

MY OVERALL TESTING APPROACH:

Initial Visit:

1. Candida Immune Complex and IgG/IgA/IgM Antibodies (Has been covered via Quest/Labcorp)
2. Gluten sensitivity panel (even if "avoiding gluten", still check)
   - Cross-reactivity candida and gluten
   - TTG IgA/IgG, Deamidated gliadin IgA/IgG, Total IgA
3. Nutrient levels: zinc, copper, B12, ferritin

MY OVERALL TESTING APPROACH CONT'D:

Follow-up Visit:

1. Cyrex Array #3 or Wheat Zoomer if gluten panel negative through Quest/Labcorp (4-6 week challenge)
2. Stool testing moreso for protozoa/parasites

   -Parasitetesting.com, Parawellness, Doctor's Data, GI MAP
3. Sometimes IgG Food panel if unclear sensitivities
4. Occasionally OAT test (insurance coverage, etc.)

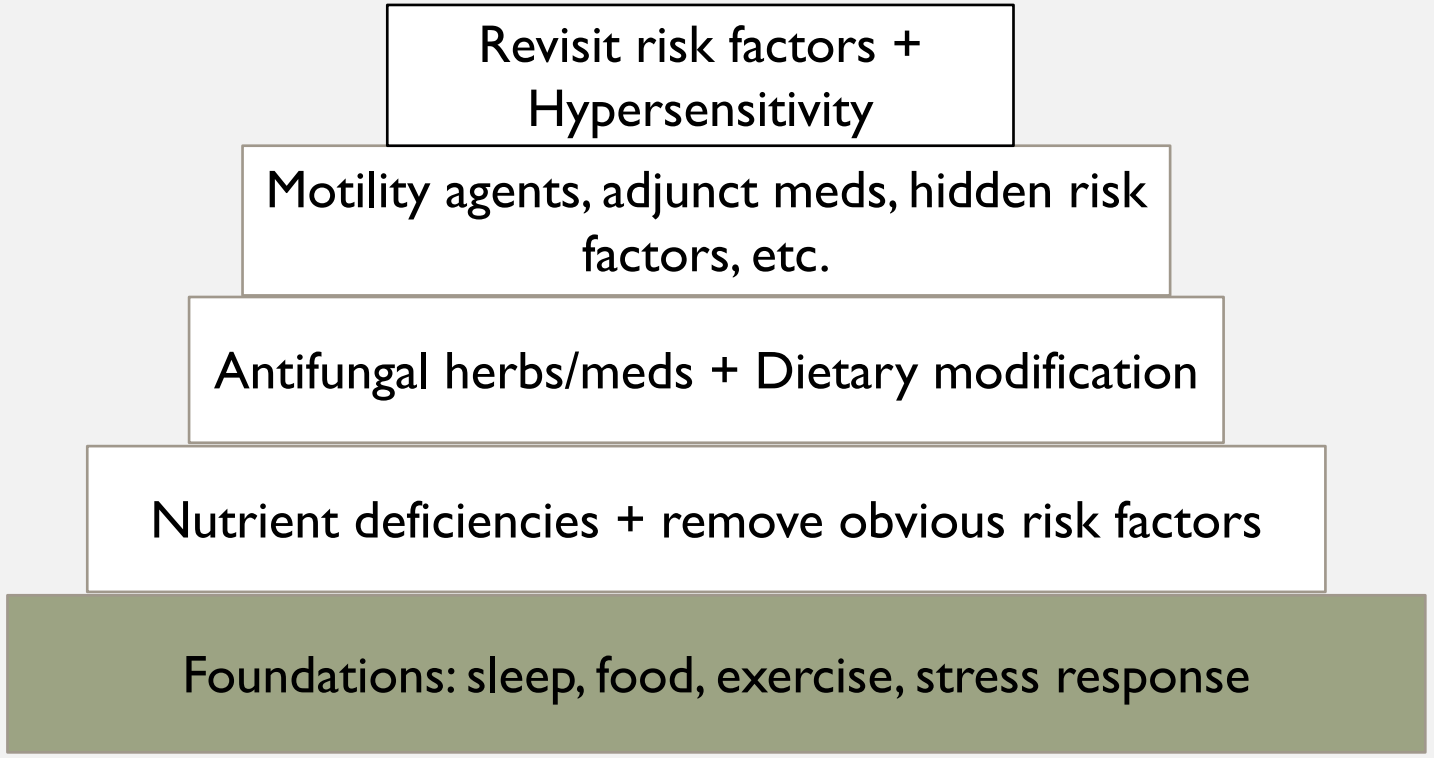
MY OVERALL TESTING APPROACH CONT'D:

- No non-invasive way to "diagnose" a yeast problem
- Lab testing provides clues
- If labs elevated: "gives me information about how your body is interacting with yeast in the gut/mucous membranes and that there may be a problem"

TREATMENT: A MULTI- PRONGED APPROACH

TREATMENT: A MULTI-PRONGED APPROACH

Integrative Approach to the Treatment of SIFO:

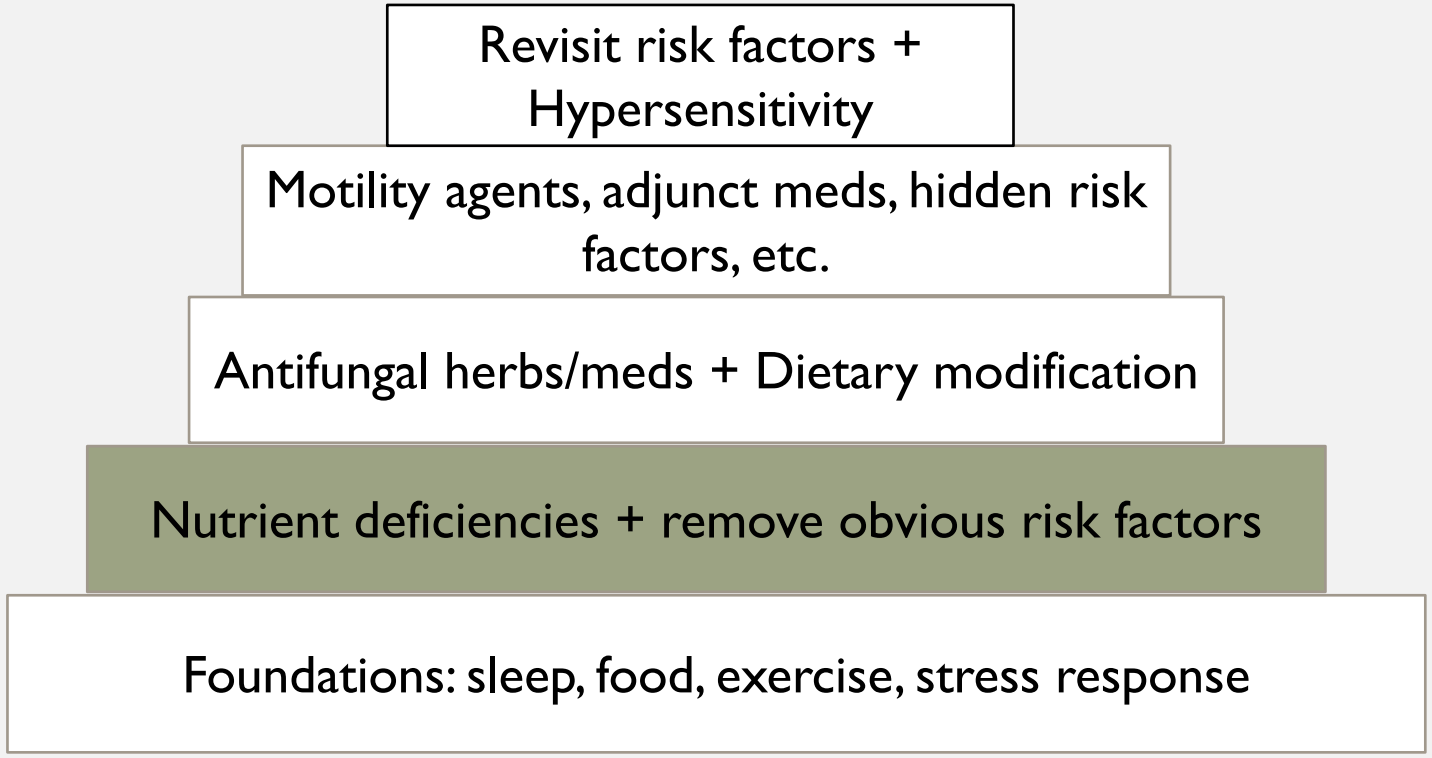


FOUNDATIONS:

- Sleep
- Food
- Exercise
- Stress Response
  - Limbic System Retraining (see DNRS Questionnaire)

TREATMENT: A MULTI-PRONGED APPROACH

Integrative Approach to the Treatment of SIFO:



NUTRIENTS:

Nutrition and Candidiasis: Leo Galland, MD, FACP, FACN. Report from paper presentation at "Yeast-Human Interaction Symposium", 1983

NUTRIENTS CONT'D:

Common nutritional deficiencies with yeast problem:

- Magnesium
- B6 (need zinc and riboflavin for P5P synthesis)
- EFAs
- iron
- Vitamin A
- folate

NUTRIENTS CONT'D:

Common nutritional deficiencies:

- Iron deficiency known to predispose to candida infection
- Vitamin A necessary for T-cell and mucous membrane function
- Zinc deficiency can depress serum retinol/Vitamin A
- Deficiencies in biotin and zinc associated with candida infection
- Folate deficiency can impair immune function

NUTRIENTS CONT'D: TESTING:

- Zinc: plasma level through Labcorp, Quest, etc.
  - Goal level of 80-100 (have to check copper also and balance if needed)

- Vitamin A: retinol level through Labcorp, Quest, etc. or just safe supplementation:
  - Vitamin D complete (Allergy Research Group) or Cod Liver Oil
  - Don't take if considering pregnancy (pre-formed Vitamin A can be teratogenic in larger doses)

NUTRIENTS CONT'D: TESTING:

- B vitamins (in particular B6, biotin):
  - Trial of supplement (Thorne Basic B Complex, etc.)

- Magnesium:
  - can check RBC Magnesium, but often just supplement

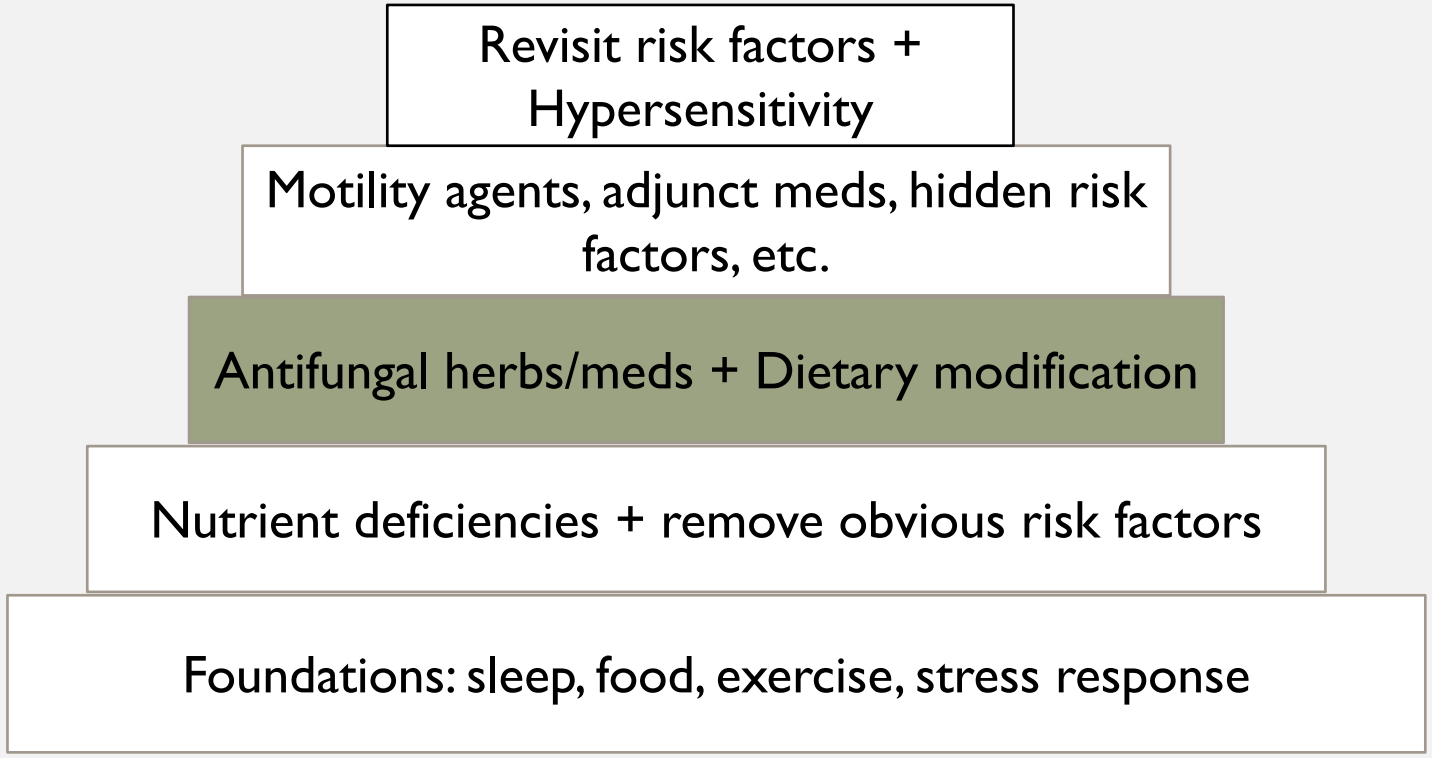
- Iron: check ferritin level through Quest, Labcorp, etc.
  - Goal level 50s+ (?)
  - Goldilocks level

REMOVE OBVIOUS RISK FACTORS:

- PPIs, H2 blockers (If not needed)
- motility issue (?): cause and effect
- pancreatic enzyme deficiency
- opioids
- antibiotics

TREATMENT: A MULTI-PRONGED APPROACH

Integrative Approach to the Treatment of SIFO:



NATURAL TREATMENT OPTIONS: USE UNDER GUIDANCE OF PRACTITIONER:

- Fungal specific supplements:
  - Thorne SF-722
  - Beyond Balance Mycoregen:
  - (Mega MycoBalance (undecylenic acid + propolis))
  - (S. Boulardii)

TREATMENT OPTIONS: NATURAL OPTIONS CONT'D:

- Several other herbs, not fungal specific: Supreme Nutrition Products:
  - Melia Supreme (neem)
  - Morinda Supreme (noni)
  - Golden Thread Supreme (coptis)
  - Olive Leaf Supreme

TREATMENT OPTIONS: NATURAL OPTIONS CONT'D:

Advantages of using natural options:

- Comfort
- Safety

TREATMENT OPTIONS: NATURAL OPTIONS CONT'D:

Disadvantages of using natural options:

- broad spectrum
- What are we treating?

TREATMENT OPTIONS: MEDICATION OPTIONS: USE UNDER GUIDANCE OF PRACTITIONER

MEDICATION TRIALS: unclear response to herbals, want to rule in/out a yeast problem. Definitely use under the guidance of a practitioner.

- Nystatin:
  - If react: compounding (generic has red dye, various starches)
  - off sugars/sweeteners
  - With/without food
  - Safe, inexpensive
  - Dose titration

TREATMENT OPTIONS: MEDICATION OPTIONS CONT'D:

MEDICATION TRIALS CONT'D:

- Fluconazole:
  - LFTs at baseline, Drug interaction check
  - Off sugars/sweeteners

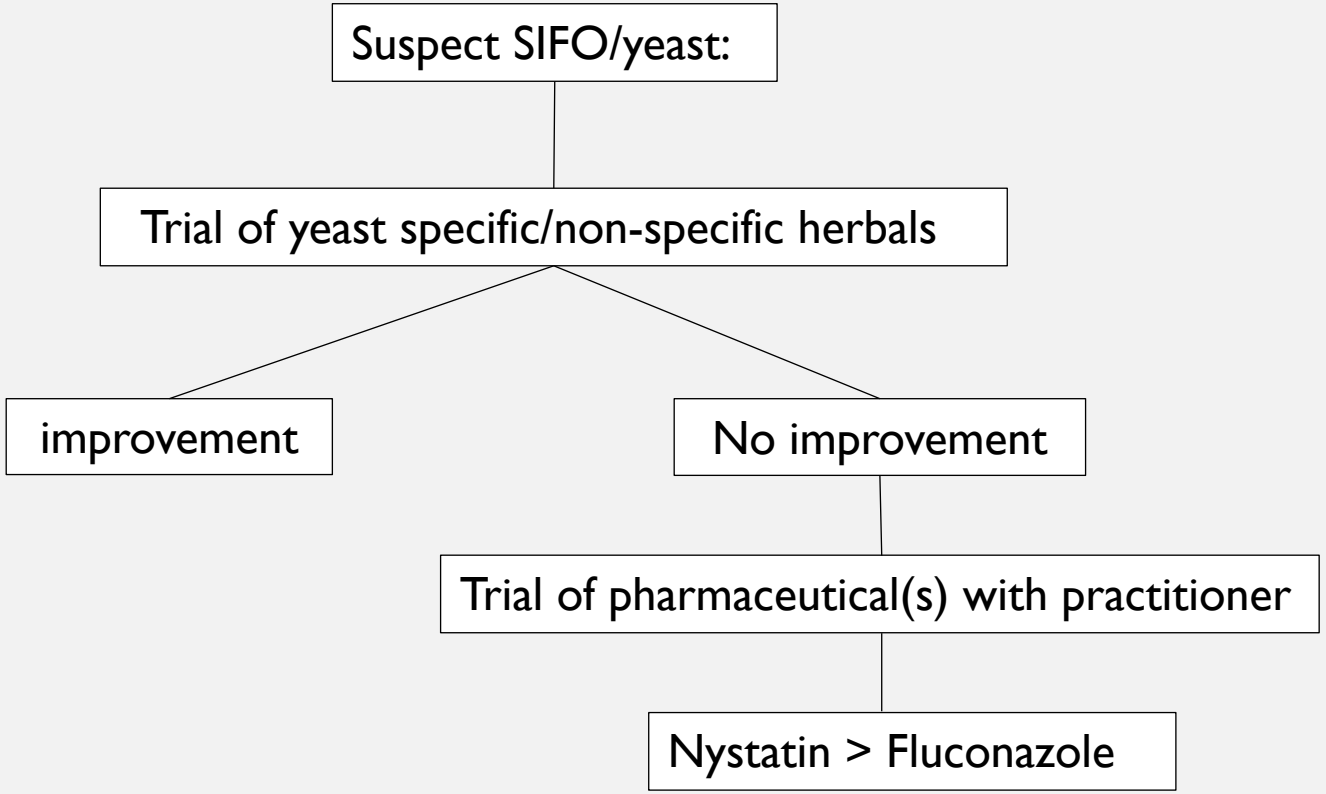
TREATMENT OPTIONS: MEDICATIONS CONT'D:

- Advantages of using a pharmaceutical:
  - More specific

TREATMENT OPTIONS: MEDICATIONS CONT'D:

- Disadvantages of using a pharmaceutical:
  - systemic antifungals (fluconazole, etc.):
    - Need to monitor LFTs
    - drug interactions
  - Systemic and non-systemic antifungals:
    - ?resistance

AN OVERALL PRACTITIONER'S APPROACH TO HERBAL/MED TREATMENT:



TREATMENT OPTIONS: MY OVERALL APPROACH CONT'D:

- Yeast Specific Herbals:
  - SF-722, Mycoregen (?Mega Mycobalance)
- Non Specific Herbals:
  - Melia Supreme (neem)
  - Morinda Supreme (noni)
  - Golden Thread Supreme (coptis)
  - Olive Leaf Supreme
- Pharmaceuticals

TREATMENT OPTIONS: DURATION OF TREATMENT:

- My approach:
  - For herbals and nystatin: at least 1-3 months if helping, then prn
  - herbals for long term management: may need longer sustained tx
  - Week off every 4-6 weeks as needed, then restart
  - Should not keep "coming back" unless risk factors:
    - Researched risk factors (PPIs, dysmotility, etc.)
    - Stress/limbic system dysfunction/vagus nerve
    - Allergy/hypersensitivity
    - Others….

THOUGHTS ON RESISTANCE WITH PHARMACEUTICALS:

- Increasing resistance on population level?
- Intrinsic resistance of particular species

THOUGHTS ON RESISTANCE CONT'D: POPULATION LEVEL:

- "Antifungal resistance is observed when the growth of the pathogen is unaffected at a therapeutic concentration of the antifungal agent."
- "azoles are notorious for their higher predisposition to lead to resistance….."
- "although drug-resistance to polyenes is relatively rare, several studies have reported that non-albicans species of Candida…are intrinsically resistant…"

Srinivasan A, Lopez-Ribot JL, Ramasubramanian AK. Overcoming antifungal resistance. *Drug Discov Today Technol*. 2014;11:65-71. doi:10.1016/j.ddtec.2014.02.005

THOUGHTS ON POPULATION LEVEL + INTRINSIC RESISTANCE:

- "Fungal strategy is more dependent on poisoning its competition than on mutation. While many strains of yeast are resistant to one or another antifungal medication—a point that justifies trying one after another before quitting—they are not as likely to become resistant during treatment of a person or a population as are bacteria." Sidney Baker, MD "Detoxification and Healing". 2003

- Debate in the mold community: use of antifungals

THOUGHTS ON RESISTANCE CONTD:

- "Rotation" of herbal antifungals?
  - Trying to find an agent that works: Yes
    - Long-term use: one week break q4-6 weeks if loses effect
  - Resistance issue: No

THOUGHTS ON BIOFILM TREATMENT:

- Should we be treating biofilms?
- Damage to healthy biofilms in our GI tract (?)

THOUGHTS ON BIOFILM TREATMENT:

- Gentle biofilm treatments:
  - Cistus tea (Biopure)
  - Supreme Nutrition: BFB-1 and BFB-2 (topical essential oils)
  - NAC

- Other biofilm options:
  - Biofilm Phase 2
  - Interphase Plus
  - Prescription options (Dr. Paul Anderson, ND)

THOUGHTS ON BIOFILM TREATMENT:

- My approach: sometimes
- Goal is not to eradicate "all" yeast

THOUGHTS ON "DIE-OFF":

- "Some side effects of antifungals are due to immune reactions to the antigens released from killed yeast." (Candida Information Packet, Marjorie Crandall Ph.D. 2005)

- Allergy to candida is probably the main cause of yeast "die-off" symptoms and formation of antigen-antibody immune complexes triggering inflammation. (Candida Information Packet, Marjorie Crandall Ph.D. 2005)

THOUGHTS ON "DIE-OFF" CONT'D:

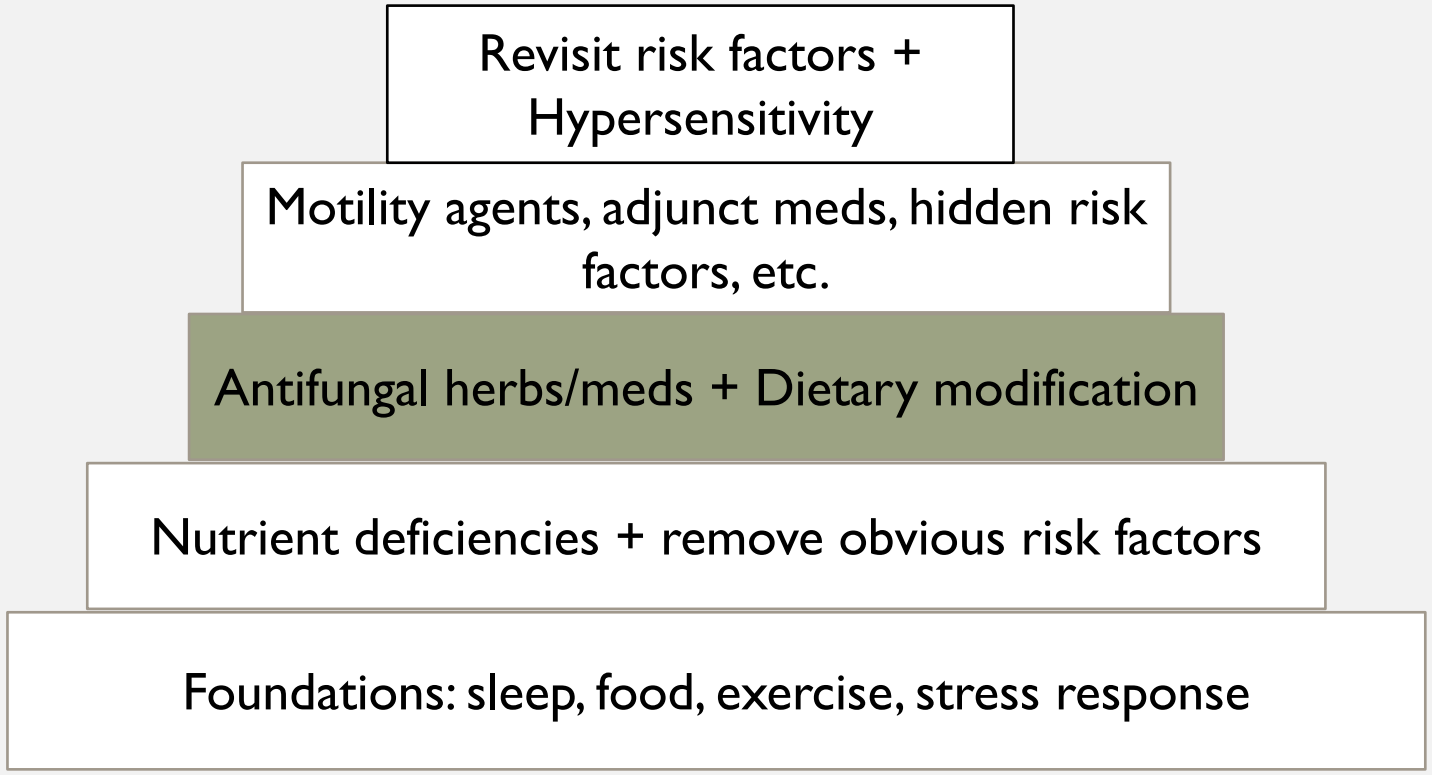
- Probably not a "detoxification" issue
- rashes, GI disturbances, fatigue, body aches, headache, brain fog, etc.
- Estimate < 5% of patients stop treatment because of this
- Education/treatment strategies

THOUGHTS ON "DIE-OFF"

- Strategies to help:
  - Avoiding the yeast/mold related foods (see diet section) to reduce the "load"
  - Hydration, outdoor time, walks, etc.
  - Activated charcoal at a different time of day
  - Alka-Seltzer Gold
  - Reducing dosage
  - Taking herbal/medication in evening
  - If patient can "get through" initial round of treatment, subsequent rounds often less uncomfortable
  - Allergy immunotherapy

TREATMENT: A MULTI-PRONGED APPROACH

Integrative Approach to the Treatment of SIFO:



DIET:

DIET

1. BEFORE ANTIFUNGALS: general principles + yeast challenge

2. DURING ANTIFUNGALS: off yeast related foods, refined sweetening and YOUR sensitivities

3. AFTER ANTIFUNGALS: can add back yeast related foods if tolerated

DIET: GENERAL PRINCIPLES:

- Risks/benefits of restrictive diets
- Psychological impacts
- A fine balance

- Ways to "get foods back":
  - "healing the gut"
  - Brain retraining programs (DNRS, Gupta Program)
  - LDI/LDA
  - long-term avoidance if warranted (NCGS, casein, limiting sugar, etc.)

DIET: GENERAL PRINCIPLES:

- Elimination Diets:
  - Important to discuss short term use; not promoting long-term excessive restriction
  - "Not forever", tool for now
  - Goal is expansion

DIET: GENERAL PRINCIPLES: WWW.AMIKAPADIA.COM/DIGESTIVE-DISORDERS ("GENERAL HYPOALLERGENIC DIET I USE WITH PATIENTS" NEAR TOP OF PAGE)

Amikapadia.com

EATING TO REBALANCE INTESTINAL FLORA/WHOLE BODY FLORA:

GENERAL PRINCIPLES:

- Choose organic when available to avoid GMOs and chemicals/pesticides
- Main 6 GMO crops: cotton, alfalfa, soy, corn, sugar beets, canola
- Even foods that are not genetically modified can contain glyphosate/Round Up (Oats, beans, lentils, grains, some nuts are commonly sprayed with glyphosate as a drying agent). But, if labeled Organic, cannot be sprayed with these chemicals.
- Glyphosate patented as an antibiotic and metal chelator (can bind our minerals and affect our gut microbiome).

FOODS TO INCLUDE:

- Fresh/frozen meat products
- Fresh/frozen fish and shellfish
- All Vegetables except for nightshade vegetables (so no tomato, potato, peppers, paprika, eggplant BUT sweet potatoes and black pepper are fine)
- Fresh or frozen fruit
- Rice (white jasmine is easiest to digest, but can add others if tolerated). Gluten free rice pasta is also fine.
- Quinoa, buckwheat, sorghum, millet, teff, wild rice (if very mold sensitive, white rice is likely safest grain). Choose products labeled "gluten free" if available.
- Fresh herbs
- Dried spices: "Spicely" is one brand that is certified gluten free but most patients tolerate bulk spices, etc.
- Fats: Extra virgin olive oil, sesame oil, coconut oil, avocado oil. Nut oils, tahini, etc. for salads are fine.
- Nuts/seeds: *if tolerated.* Easier to digest if pre-soaked and dehydrated. "Wilderness Family Naturals" sells pre-soaked/dehydrated versions online. Leave nuts/seeds out if they cause bloating/gas, etc.
- Beans: *if tolerated.* If any digestive problems, start with mung beans (easiest to digest). To make beans easier to digest: soak overnight > rinse and boil x 5 minute > rinse and cook in pressure cooker like instant pot. Eden brand is pre-soaked I believe.
- Coffee *if tolerated* (is a major trigger of GI distress for some people and can have mycotoxins; organic and freshly ground is best to minimize mold)
- Ener-G Foods Brown Rice yeast free bread (available at local Fred Meyer or online---should be grilled/toasted) (some other breads to look into: Glutnull brand and Food For Life brand make a yeast free bread, these are carried in some Whole Foods)
- Beverages: water, carbonated water, homemade or store bought nut milks (cautious with gums in store bought nut milks if sensitive), coconut milk, herbal teas. For caffeine/coffee substitute, check out: https://us.foursigmatic.com
- Sweetening: fresh or frozen fruit, stevia, monkfruit are all allowed. (Ex: "Choczero" products sweetened with monk fruit are OK)
- Flour products made with allowable grains, nuts, etc. if tolerated.

DIET: GENERAL PRINCIPLES:

FOODS TO AVOID: Common Food Intolerances AND Mold/Yeast related foods:

- Avoid all sweetening: honey, maple syrup, sugar, etc.
- dairy
- gluten (acronym "BROWS": barley, rye, oats, wheat, spelt)
- soy (don't worry about soy lecithin or soy oil unless you notice a problem)
- corn
- eggs
- juice (no fruit juice; vegetable juice is ok if less than 1/2 carrot juice)
- Mold/Yeast related foods: dried fruit, vinegar, yeast, alcohol, kombucha, fermented foods, fermented vegetables, preserved meats (bacon, etc.), chocolate, black tea

After 1 week on the initial diet, you can "challenge" each of the following foods and see how you do. Start with whichever one you miss the most. You eat some of the food for 1-2 days in a row, and don't change anything else in your diet and see how you feel. If you notice *any* symptoms in the 1-3 days following eating this food, then leave it out. If no noticeable symptoms, OK to keep in diet. Do this process with the following foods, but only challenge one at a time and don't challenge next one until back at your baseline:

- Eggs
- Corn (make sure organic)
- Soy (make sure organic)
- Mold/yeast related foods: vinegar (may need to test different types of vinegars separately), yeast, dried fruit, kombucha, fermented foods, fermented vegetables, preserved meats (bacon, etc.), black tea
- chocolate (cocoa powder)
- Best to keep alcohol out; hard liquor like tequila tends to be better tolerated than wine or beer
- If there were other foods that you kept out initially (coffee, beans, nuts/seeds per guidelines under "Foods to Include" above), can challenge in this same way
- Don't introduce any sweetening until symptoms are significantly improved
- Don't introduce gluten or dairy until meeting with doctor
- Oats contain a protein similar to gluten. Some patients tolerate it, some react. When your symptoms are improved, you can try Organic Gluten Free Oats to see if tolerated.

TIPS:

- Think whole foods: meat, fish, vegetables, sweet potatoes, fruit, nuts/seeds, beans, etc.
- Think simple. Sit down and write out a 4-6 day meal plan
- Consider batch cooking (i.e. on Sundays and Wednesdays)
- Drink lots of water and make sure you are eating enough fiber to keep bowels moving (25 grams/day fiber: can do 1 tbsp ground flaxseed or psyllium husk 2-3x/day in water)
- Most recipes that are on an "Autoimmune paleo diet" will work except for need to avoid mold/yeast related foods if you react to them as discussed above
- Local nutrition services:
  - Marne Bishop: marnebishop@gmail.com, https://www.gingerlynutrition.com/ (Marne is familiar with my diet program for patients, and does cooking lessions, meal planning, etc.)
  - Stella's Kitchen, FitKitchenDirect
- See this website for some recipe ideas (not all are compliant, but gives ideas) http://www.bodyrestorationanownersmanual.com/Cookbook/Contents/Diets.html
- Another good resource for recipes: The Whole Life Nutrition Cookbook by Tom Malterre and his website
- Other resources: Paleomom.com, books by Terry Wahls and Mickey Trescott

DIET: PART 1: BEFORE ANTIFUNGAL TREATMENT:

1. 5 day yeast challenge: before doing herbals/antifungals antifungal

(Adapted from Dr. Sidney Baker's "Notes on the Yeast Problem" halfway down page: https://www.amikapadia.com/digestive-disorders)

DIET: PART 1: BEFORE ANTIFUNGAL TREATMENT:

Yeast challenge:

- remove following foods for 5 days: yeast, vinegar, dried fruit, alcohol, sugar, fermented vegetables, kombucha, black tea/fermented teas, coffee (?unless organic, freshly ground), aged meats, bottled juices, bone broth, anything aged/fermented.
- Then add back some of these on the 6th day, particularly things with yeast or vinegar or fermented vegetables and see how you feel, if any symptoms are worse for the next 1-3 days.
- (See previous link: "Notes on The Yeast Problem" for details on yeast challenge)

DIET: PART 1: BEFORE ANTIFUNGAL TREATMENT 5 DAY CHALLENGE:

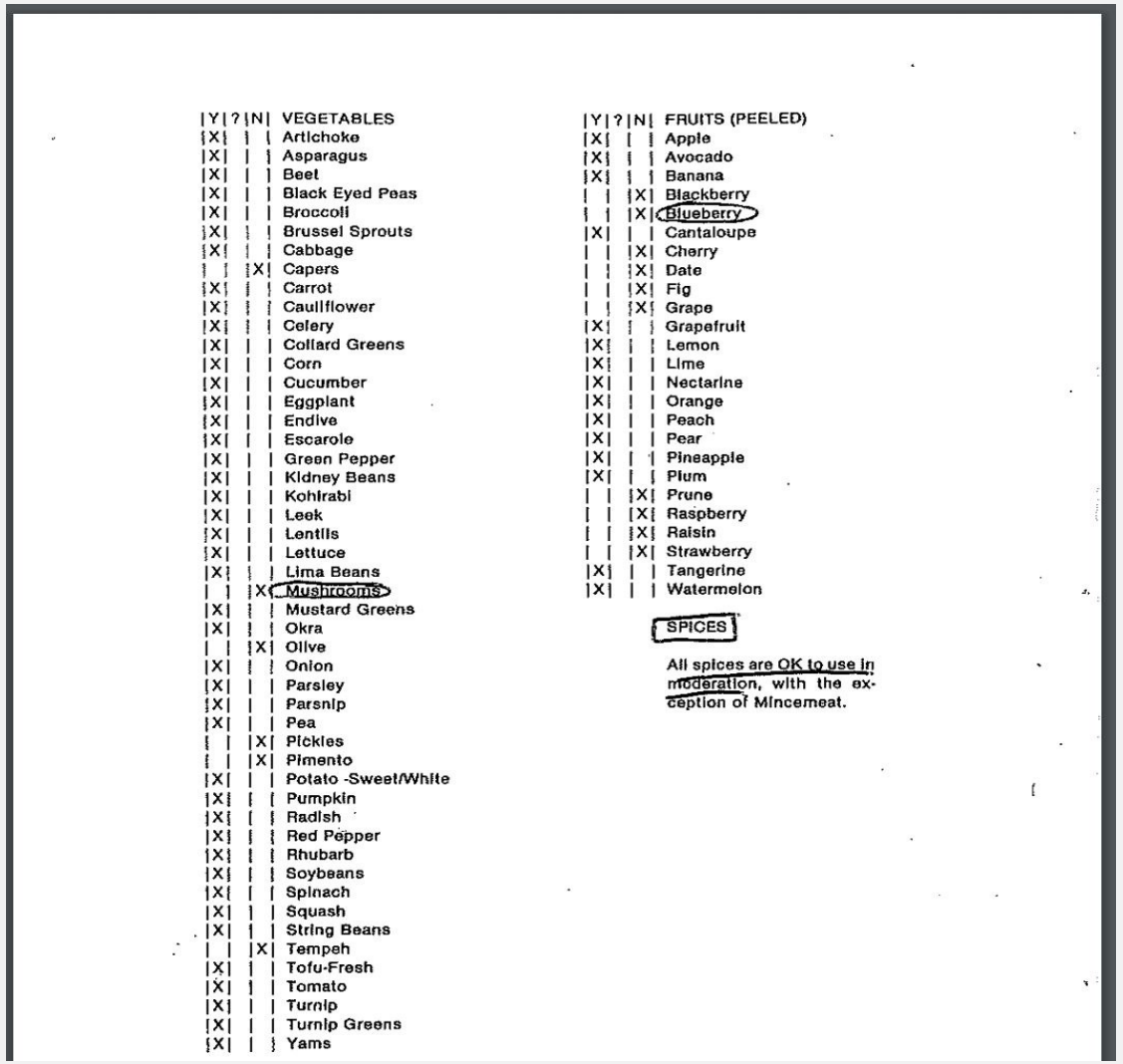
YEAST FOOD/DRINK CHECKLIST

Y = YES, OK TO EAT
? = READ LABEL
N = NO, YOU MAY NOT EAT

Y	?	N		
			DAIRY PRODUCTS	
X			Butter	
X			Margarine	
		X	Cheese	
X			Milk-Cow	
X			Milk-Goat	
X			Yogurt-Plain	
		X	Yogurt-w/Fruit	
			CEREALS AND GRAINS	
		X	Breads-Yeast & Sourdough	
X			Bread-Soda	
	X		Cereals	
	X		Pasta, Noodles	
		X	Rolls, Buns	
X			Waffles, Pancakes, Biscuits	
		X	Cakes, Cookies	
X			Barley	
X			Corn	
X			Grits	
X			Oatmeal	
X			Rice	
			MEATS, EGGS, POULTRY	
X			Bacon	
X			Beef	
X			Chicken	
	X		Cold Cuts	
X			Duck	
X			Eggs	
X			Hamburgers	
	X		Hotdogs	
X			Lamb	
X			Liver	
X			Pork	
	X		Spam	
X			Turkey	
X			Veal	
			FISH	
X			All Fish	
X			All Shellfish	

Y	?	N		
			NUTS AND SEEDS	Nuts vary considerably as to their "moldiness". It depends on how they are stored between being harvested and consumed. Usually nuts in the shell are safer. A fresh taste and odor are helpful indicators of a lack of mold.
	X		Almond	
	X		Brazil Nuts	
	X		Cashew	
	X		Chestnut	
	X		Coconut	
	X		Filbert Nuts	
	X		Macademia Nuts	
	X		Peanuts	
	X		Peanut Butter	
	X		Pecan Nuts	
	X		Pistachio	
	X		Walnut	
	X		Sesame Seeds	
	X		Serame Tahini	
	X		Sunflower Seeds	
			BEVERAGES	
		X	Alcohol	
		X	Chocolate Drinks	
		X	Coffee - Reg/Decaf	
		X	Fruit Juices - Frozen, Concentrate, Canned, Bottled, Carton	
X			Fruit Juices - Fresh Squeezed	
X			Milk	
		X	Sodas	
X			Spring Water	
X			Tap Water	
		X	Tea - Black, Green, Herbal	
			SWEETS, SNACKS & DESSERTS	
		X	Cake, Candy, Carob,	
		X	Chewing Gum, Cookies, Honey	
		X	Ice Cream, Maple Syrup, etc.	
			CONDIMENTS	
		X	Catsup	
		X	Mayonnaise	See Recipe
		X	Mustard	
X			Oils (except olive)	
		X	Salad Dressings	May be made with oil & Lemon.
		X	Vinegar	

DIET: PART 1: BEFORE ANTIFUNGAL TREATMENT: 5 DAY CHALLENGE:



Y	?	N	VEGETABLES
X			Artichoke
X			Asparagus
X			Beet
X			Black Eyed Peas
X			Broccoli
X			Brussel Sprouts
X			Cabbage
		X	Capers
X			Carrot
X			Cauliflower
X			Celery
X			Collard Greens
X			Corn
X			Cucumber
X			Eggplant
X			Endive
X			Escarole
X			Green Pepper
X			Kidney Beans
X			Kohlrabi
X			Leek
X			Lentils
X			Lettuce
X			Lima Beans
		X	Mushrooms
X			Mustard Greens
X			Okra
		X	Olive
X			Onion
X			Parsley
X			Parsnip
X			Pea
		X	Pickles
		X	Pimento
X			Potato -Sweet/White
X			Pumpkin
X			Radish
X			Red Pepper
X			Rhubarb
X			Soybeans
X			Spinach
X			Squash
X			String Beans
		X	Tempeh
X			Tofu-Fresh
X			Tomato
X			Turnip
X			Turnip Greens
X			Yams

Y	?	N	FRUITS (PEELED)
X			Apple
X			Avocado
X			Banana
		X	Blackberry
		X	Blueberry
X			Cantaloupe
		X	Cherry
		X	Date
		X	Fig
		X	Grape
X			Grapefruit
X			Lemon
X			Lime
X			Nectarine
X			Orange
X			Peach
X			Pear
X			Pineapple
X			Plum
		X	Prune
		X	Raspberry
		X	Raisin
		X	Strawberry
X			Tangerine
X			Watermelon

SPICES

All spices are OK to use in moderation, with the exception of Mincemeat.

DIET: PART 2: DURING ANTIFUNGAL TREATMENT:

2. General dietary considerations: During antifungal treatment:
   - Continue avoiding yeast related foods from part 1 if reactive
   - Modify your diet to eliminate all added sugars/sweetening (fresh/frozen fruit is fine if tolerated). Only minimize starches if problematic.
   - Avoid YOUR main food sensitivities: gluten, dairy, etc.
   - gluten sensitivity, sometimes IgG food testing (Alletess 96 IgG panel)
   - General diet handout that I use with patients (see handout)

DIET: PART 3: AFTER ANTIFUNGAL TREATMENT:

Yeast related foods: can "challenge"

- Yeast, dried fruit, preserved meats, kombucha, fermented vegetables/fermented foods.
- don't "feed" yeast (except for dried fruit b/c of sugar)
- Cross-reactivity

DIET: PART 3: AFTER ANTIFUNGAL TREATMENT:

More specifics on Yeast Related Foods: ETOH and Vinegar:

- ETOH:
  - yeast/mold sensitivity issue (beer, wine, cider, etc.).
  - Most tolerate distilled liquors (rum, vodka, tequila, etc.)
  - Minimize use
  - Not with azoles

- Vinegar: If challenge and tolerate them, fine to keep in diet
  - Distilled vinegar is only vinegar without yeast

DIET:

DIET

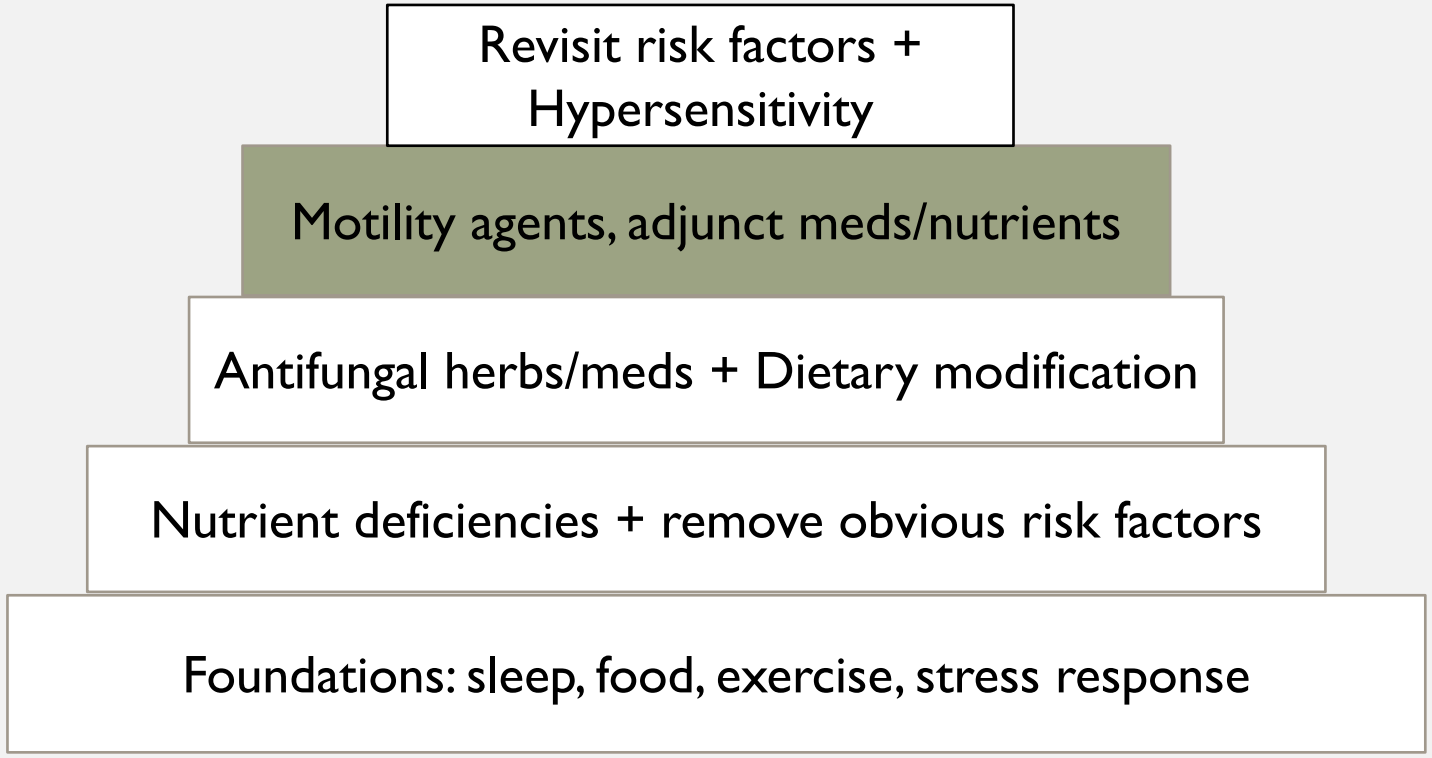
1. BEFORE ANTIFUNGALS: general principles + yeast challenge

2. DURING ANTIFUNGALS: off yeast related foods, refined sweetening and YOUR sensitivities

3. AFTER ANTIFUNGALS: can add back yeast related foods if tolerated

TREATMENT: A MULTI-PRONGED APPROACH

Integrative Approach to the Treatment of SIFO:



MOTILITY AGENTS:

- Dysmotility = risk factor
- ?research

MOTILITY AGENTS CONTD:

- Practical tips for promoting motility:
  - spacing meals
  - avoiding late night eating
  - overnight 12 hour fast
  - diaphragmatic breathing/parasympathetic response

ADJUNCT MEDICATIONS:

- ?Role for mast cell stabilizers (research on mast cell mediated changes in GI tract):
  - symptoms and relapse
  - Medications: H1 blockers, ketotifen, cromolyn, hydroxyzine, etc.
  - Supplements: Quercetin, Vitamin C, etc.

ADJUNCT MEDICATIONS CONT'D:

- Mast Cell stabilizers: Ketotifen
- Mast Cell Stabilizers: Cromolyn
- Natural options: Quercitin, D-Hist, vitamin C, BCQ, etc.

A NOTE ON PROBIOTICS:

- Probiotics: Lactobacillus species helpful in some cases:
  - L. Acidophilus: 60% reduction in Candida colonization of the GI tract.
  - L. Rhamnosus: Significant reduction in intestinal Candida colonization
  - L. Plantarum: shown to prevent growth of Candida
  - S. Boulardii: ?

Zwolinska-Wcislo M, Brozozowski T, Mach T, et al.: Are probiotics effective in the treatment of fungal colonization of the gastrointestinal tract? Experimental and clinical studies. J Physiol Pharmacol 2006; 57 (Suppl 9): 35–49

Manzoni P, Mostert M, Leonessa ML, et al.: Oral supplementation with Lactobacillus casei subspecies rhamnosus prevents enteric colonization by Candida species in preterm neonates: A randomized study. Clin Infect Dis 2006; 42: 1735–42.

Biyari S, Fozouni L. The Inhibitory Effect of Probiotic Bacteria against Drug - Resistant *Candida* Species Isolated from the Oral Cavity of the Elderly, Shiraz E-Med J. 2018 ; 19(6):e62026. doi: 10.5812/semj.62026.

PROBIOTICS CONTINUED:

Item #: 72780

PROBIOTICS CONT'D: USE DURING ANTIBIOTIC COURSE AS PREVENTATIVE:

Serving Size 1 Capsule

Amount Per Capsule		% Daily Value
Probiotic Blend (10 billion CFU) in a base of inulin (derived from chicory root)	400 mg	*
Saccharomyces boulardii	5.0 billion CFU	*
Lactobacillus rhamnosus	2.5 billion CFU	*
Bifidobacterium bifidum	1.25 billion CFU	*
Bifidobacterium breve	1.25 billion CFU	*

* Daily value not established

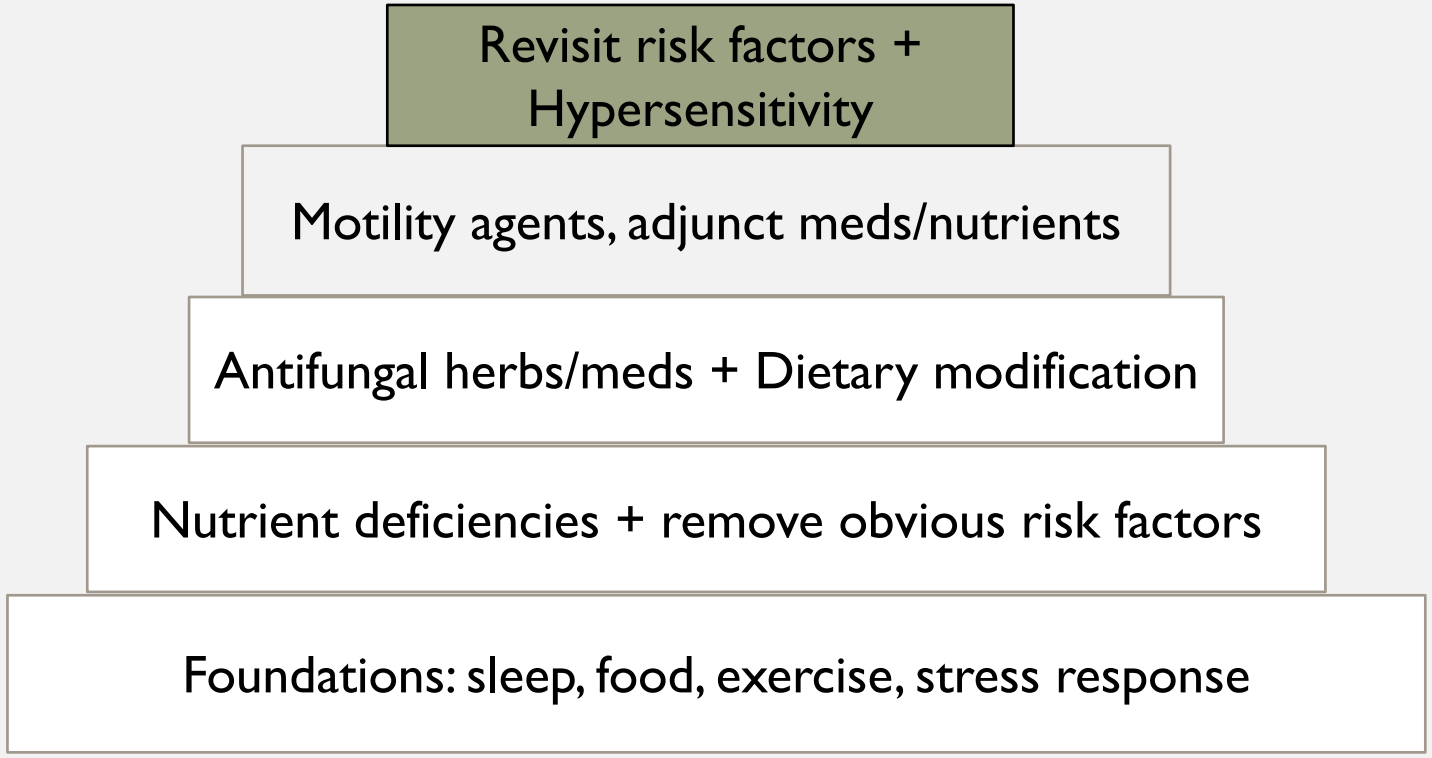
NOTE ON DIGESTIVE ENZYMES:

- Plant based: fungally derived:
  - Digest Gold
  - Similase, etc.

- Animal based (pancreatin, etc):
  - Dipan 9
  - Multizyme

TREATMENT: A MULTI-PRONGED APPROACH

Integrative Approach to the Treatment of SIFO:



REVISIT RISK FACTORS:

- <u>Some are similar to SIBO:</u>
  - Medications: Unnecessary Antibiotics, PPIs, steroids, opioids, NSAIDs, etc
  - Scar Tissue from previous GI surgeries (bodywork, etc.)
  - Nutrient deficiencies
  - HCL or pancreatic enzyme deficiency
  - Autonomic nervous system dysfunction
  - Dysmotility

REVISIT/ADDITIONAL RISK FACTORS:

- Different from SIBO:
  - Yeast Hypersensitivity/Allergy

REMOVE/ADDRESS RISK FACTORS: YEAST SENSITIVITY:

- Different responses to candida:
  - Normal to have delayed hypersensitivity to candida (CMI)
  - Different than immediate hypersensitivity response:
    - Indicates more of a hypersensitivity/allergy
    - approximately 10%

REMOVE/ADDRESS RISK FACTORS: YEAST SENSITIVITY:

- Yeast sensitivity/allergy: a risk factor?
  - Sensitivity to yeast/mold related foods?
  - Significant "die-off" type symptoms?
  - Intradermal testing to candida albicans (AAEM docs)
  - If symptoms recur within a few days of stopping antifungal
  - desensitization (immunotherapy, LDI, etc.)

REMOVE/ADDRESS RISK FACTORS: YEAST SENSITIVITY CONT'D:

- Candida immunotherapy in relation to SIFO/gastrointestinal pathology: No research

- Use of candida immunotherapy with recurrent yeast vaginitis: Some research

REMOVE/ADDRESS RISK FACTORS: YEAST SENSITIVITY CONT'D:

- Candida immunotherapy with recurrent yeast vaginitis:
  - Small Trial: 34 women with recurrent VVC with + candida albicans vaginal cultures, unresponsive to other therapies.
  - Had an immediate (prick or intradermal) skin test positive to C. albicans
  - Weekly injections of C. albicans allergenic extract
  - Twenty-two of the women had improvement
  - "Our results suggest that in a subgroup of patients with recurrent vaginal candidiasis, C. albicans allergen immunotherapy lowers the number and intensity of episodes."
  - Another small trial with similar results: 16 of 18 participants with recurrent VVC responded to candida immunotherapy.

Candida albicans allergen immunotherapy in recurrent vaginal candidiasis. P S Moraes [1], S de Lima Goiaba, E A Taketomi. J Investig Allergol Clin Immunol. Sep-Oct 2000;10(5):305-9.

Desiree Rigg, Michael M. Miller, W. James Metzger. Recurrent allergic vulvovaginitis: Treatment with Candida albicans allergen immunotherapy. American Journal of Obstetrics and Gynecology, Volume 162, Issue 2, 1990, Pages 332-336

RECALCITRANT CASES: WHAT ELSE TO LOOK FOR?

RECALCITRANT CASES: SYMPTOMS IMPROVE BUT THEN RECUR: WHAT ELSE TO LOOK FOR:

- "Yeast sensitivity" or allergy issue
- Unidentified food sensitivities
- Longer treatment
- Other infections:
  - parasites (protozoa common)
  - SIBO
  - tick-borne infections

RECALCITRANT CASES: SYMPTOMS IMPROVE BUT THEN RECUR CONT'D:

- Mold exposure in environment (home/work/car)
- ?Biofilm
- Referral: GI referral if not already done to rule out more pathologic causes
- Nervous System Component: Stress/Limbic system dysfunction (DNRS, Gupta Program, etc.)

A NOTE ON STRESS/LIMBIC SYSTEM DYSFUNCTION:

Invaluable tools for chronic illness population (GI or other):

1. Brain Retraining:
   - DNRS: https://retrainingthebrain.com/
   - Podcast to learn more: https://drruscio.com/brain-stuck-in-fight-or-flight-mode/

2. Gupta Program:
   - https://www.guptaprogram.com
   - Video/blogcast to learn more:Video #23: https://iepradio.com/videocast/

RECALCITRANT CASES: SYMPTOMS IMPROVE BUT THEN RECUR: WHAT ELSE TO LOOK FOR:

Caveat: most still have improvement with treatment even if have not identified *all* factors

GENERAL Q&A:

- Are prescription or herbal antifungals better tolerated?

GENERAL Q&A:

- What antibiotics/antimicrobials are more likely to cause yeast overgrowth?

GENERAL Q&A:

- Is nystatin powder better/worse tolerated than the tablets?

LAB EXAMPLES

CANDIDA LABS:

CANDIDA ALBICANS AB (IGG,IGA,IGM)		
C.ALBICANS IGG	0.8	
C.ALBICANS IGA	0.4	
C.ALBICANS IGM		**1.0 H**

REFERENCE RANGE: <1.0

INTERPRETIVE CRITERIA:
<1.0 = Antibody Not Detected
> or = 1.0 = Antibody Detected

CANDIDA IMMUNE COMPLEX	**1.82 H**	0.0-1.0 Index	C

The performance characteristics of the listed assay was validated by BioAgilytix Diagnostics. The US FDA has not approved or cleared this test. The results of this assay can be used for clinical diagnosis without FDA approval. BioAgilytix Diagnostics is a CLIA certified, CAP accredited laboratory for performing high complexity assays such as this one.

GLUTEN LABS:

```
GLIADIN (DEAMIDATED)
  AB (IGG, IGA)
  GLIADIN (DEAMIDATED)
    AB (IGA)                                    30 H          <20 U

      Reference Ranges for Gliadin (Deamidated)
       Antibody (IgA):

             <20 units      Antibody Not Detected
       > or = 20 units      Antibody Detected
  GLIADIN (DEAMIDATED)
    AB (IGG)                      1                           <20 U

      Reference Ranges for Gliadin (Deamidated)
       Antibody (IgG):

             <20 units      Antibody Not Detected
       > or = 20 units      Antibody Detected
```

CELIAC DISEASE COMPREHENSIVE PANEL

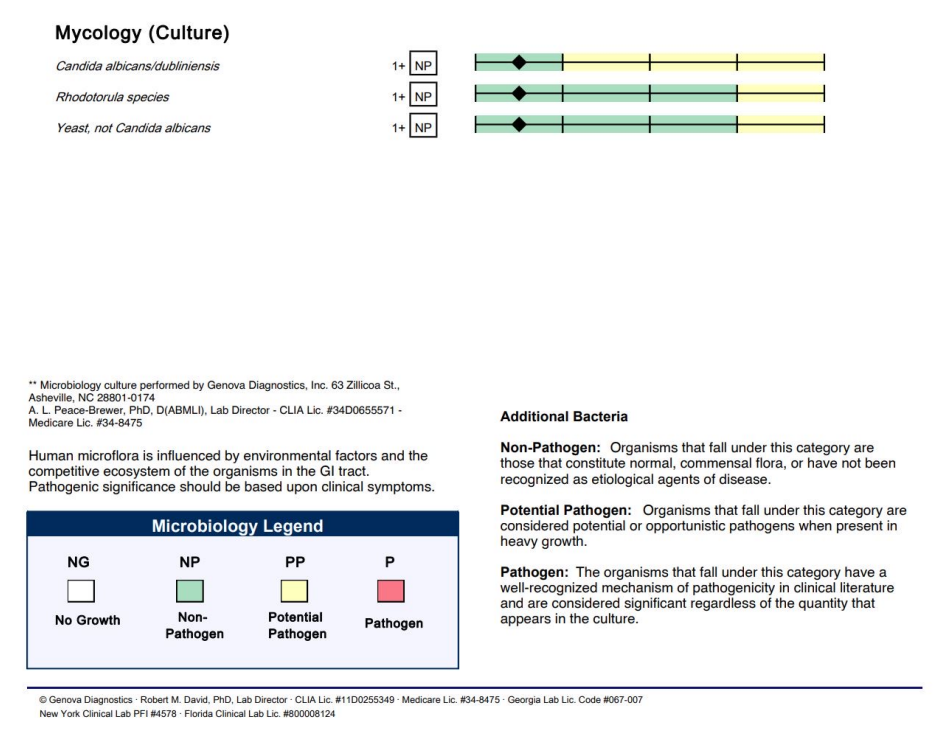
INTERPRETATION **Lab: EZ**

No serological evidence of celiac disease. tTG IgA may normalize in individuals with celiac disease who maintain a gluten-free diet. Consider HLA DQ2 and DQ8 testing to rule out celiac disease. Celiac disease is extremely rare in the absence of DQ2 or DQ8.

Test Results

Test	Results	Flag	Reference Range	Comments	Lab
TISSUE TRANSGLUTAMINASE AB, IGA	<1		U/mL	<4 No Antibody Detected > OR = 4 Antibody Detected	EZ
IMMUNOGLOBULIN A	187		47-310 mg/dL		EZ
TISSUE TRANSGLUTAMINASE AB, IGG	2		U/mL	<6 No Antibody Detected > OR = 6 Antibody Detected	EZ

ADDITIONAL LABS: DIFFERING RESULTS



Mycology (Culture)

Candida albicans/dubliniensis	1+ NP	
Rhodotorula species	1+ NP	
Yeast, not Candida albicans	1+ NP	

** Microbiology culture performed by Genova Diagnostics, Inc. 63 Zillicoa St., Asheville, NC 28801-0174
A. L. Peace-Brewer, PhD, D(ABMLI), Lab Director - CLIA Lic. #34D0655571 - Medicare Lic. #34-8475

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.

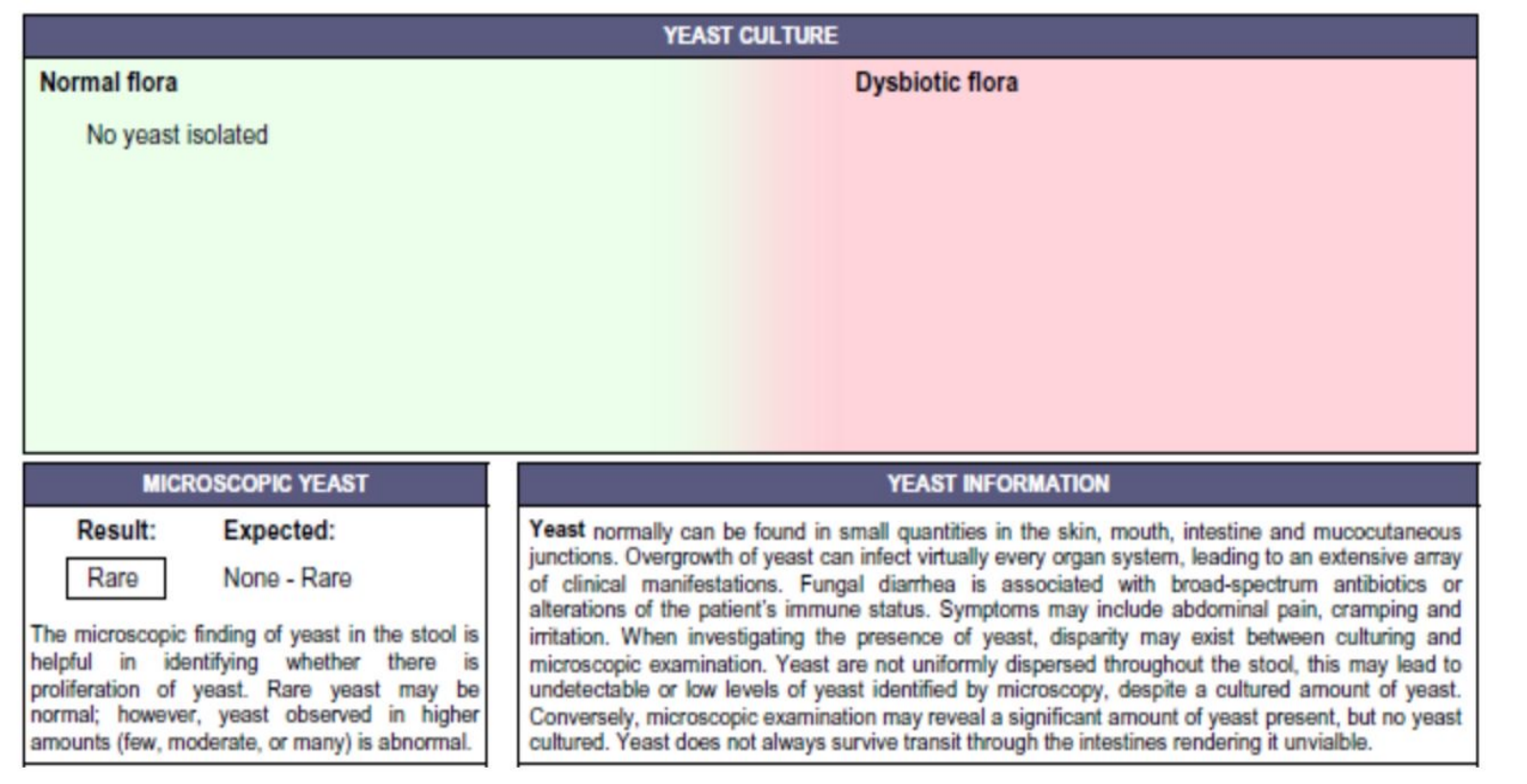
Pathogen: The organisms that fall under this category have a well-recognized mechanism of pathogenicity in clinical literature and are considered significant regardless of the quantity that appears in the culture.

Observations	Result	Reference / UoM	Date/Status
Candida Antibodies IgG [2]	● Positive	Negative Abnormal (applies to non-numeric results)	10/12/2020 04:15 pm
Vendor note: Test results are no longer reported as semi-quantitative due to the discontinuation of reagent kit by the current vendor. The results from the new vendor's reagent kit are reported as Positive, Negative or Equivocal in a qualitative format.			
Candida Antibodies IgM [2]	Negative	Negative	10/12/2020 04:11 pm
Vendor note: Test results are no longer reported as semi-quantitative due to the discontinuation of reagent kit by the current vendor. The results from the new vendor's reagent kit are reported as Positive, Negative or Equivocal in a qualitative format. **Please note reference interval change**			
Candida Antibodies IgA [2]	● Positive	Negative Abnormal (applies to non-numeric results)	10/12/2020 04:09 pm
Vendor note: Test results are no longer reported as semi-quantitative due to the discontinuation of reagent kit by the current vendor. The results from the new vendor's reagent kit are reported as Positive, Negative or Equivocal in a qualitative format. **Please note reference interval change**			

LABS:

Fungi/Yeast		
	Result	Normal
Candida spp.	**<dl**	<5.00e3
Candida albicans	**<dl**	<5.00e2
Geotrichum spp.	**<dl**	<3.00e2
Microsporidium spp.	**<dl**	<5.00e3
Rodotorula spp.	**<dl**	<1.00e3
Viruses		

LABS:



YEAST CULTURE

Normal flora — **Dysbiotic flora**

No yeast isolated

MICROSCOPIC YEAST

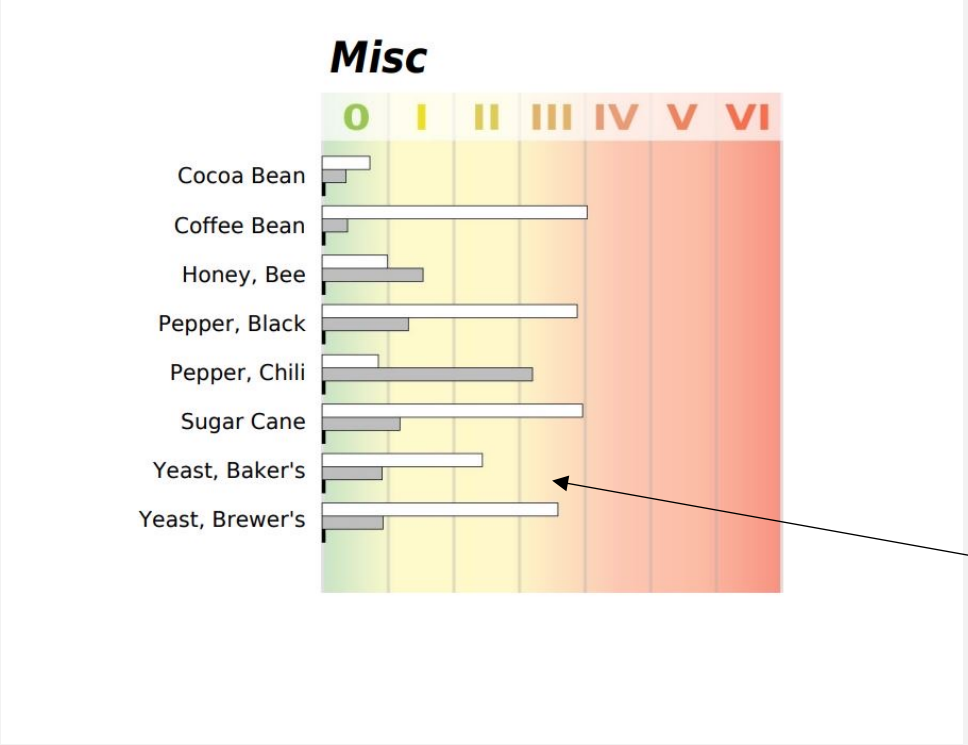
Result:	Expected:
Rare	None - Rare

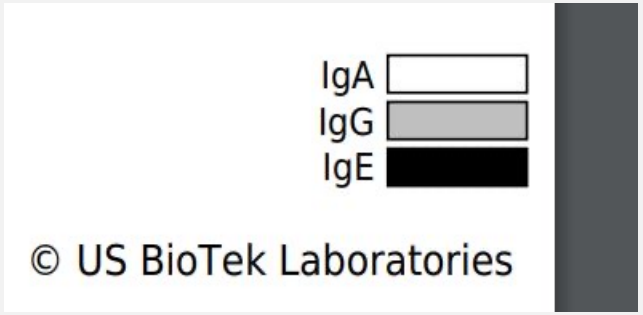
The microscopic finding of yeast in the stool is helpful in identifying whether there is proliferation of yeast. Rare yeast may be normal; however, yeast observed in higher amounts (few, moderate, or many) is abnormal.

YEAST INFORMATION

Yeast normally can be found in small quantities in the skin, mouth, intestine and mucocutaneous junctions. Overgrowth of yeast can infect virtually every organ system, leading to an extensive array of clinical manifestations. Fungal diarrhea is associated with broad-spectrum antibiotics or alterations of the patient's immune status. Symptoms may include abdominal pain, cramping and irritation. When investigating the presence of yeast, disparity may exist between culturing and microscopic examination. Yeast are not uniformly dispersed throughout the stool, this may lead to undetectable or low levels of yeast identified by microscopy, despite a cultured amount of yeast. Conversely, microscopic examination may reveal a significant amount of yeast present, but no yeast cultured. Yeast does not always survive transit through the intestines rendering it unvialble.

LABS:





GREAT REFERENCE: FOR PATIENTS AND PRACTITIONERS:

- "Candida Information Packet" by Marjorie Crandall, Ph.D.
  - Goes over medication dosing, references, publications, research, etc.
  - https://www.yeastconsulting.com/

- List of books in beginning of talk

FIND A PRACTITIONER:

- Ifm.org
- Iseai.org
- https://naturopathic.org/
- https://www.aaemonline.org/

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THANK YOU!