THE INSTITUTE FOR FUNCTIONAL MEDICINE®

Prescribing an Elimination Diet

ELIZABETH BOHAM, MD, MS, RD

Applying Functional Medicine in Clinical Practice

Disclosure

Elizabeth Boham, MD has indicated she has no financial relationships with any commercial interest.

Evidence Icons: Key

Clinical Disclaimers:

Association, not causation

Lab test
(Labs not generally accepted in conventional care)

Clinical experience
(Intervention warranted by historical clinical experience of educator and/or functional medicine community of practitioners in the context of evidentiary paucity)

Clinical judgment
(Intervention warranted by clinical judgment of educator and/or functional medicine community of practitioners in the context of evidentiary paucity)

Conflict of interest

Study Types:

Animal study

In vitro study

n of 1, or single-case study

In silico *(Computerized molecular modeling)*

Performance Objectives

1. Understand the fundamentals and variations of the elimination diet
2. Recognize why and when to use an elimination diet
3. Be able to implement an elimination diet
4. Evaluate problems and implement practical solutions for patients on an elimination diet
5. Systematically assess patient response to an elimination diet

Evidence Icons: Key

Clinical Disclaimers:

Association, not causation

Lab test
(Labs not generally accepted in conventional care)

Clinical experience
(Intervention warranted by historical clinical experience of educator and/or functional medicine community of practitioners in the context of evidentiary paucity)

Clinical judgment
(Intervention warranted by clinical judgment of educator and/or functional medicine community of practitioners in the context of evidentiary paucity)

Conflict of interest

Study Types:

Animal study

In vitro study

n of 1, or single-case study

In silico *(Computerized molecular modeling)*

Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Understand the fundamentals and variations of the elimination diet.

Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Recognize why and when to use an elimination diet.

Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Be able to implement an elimination diet.

Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Evaluate problems and implement practical solutions for patients on an elimination diet.

Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Systematically assess patient response to an elimination diet.

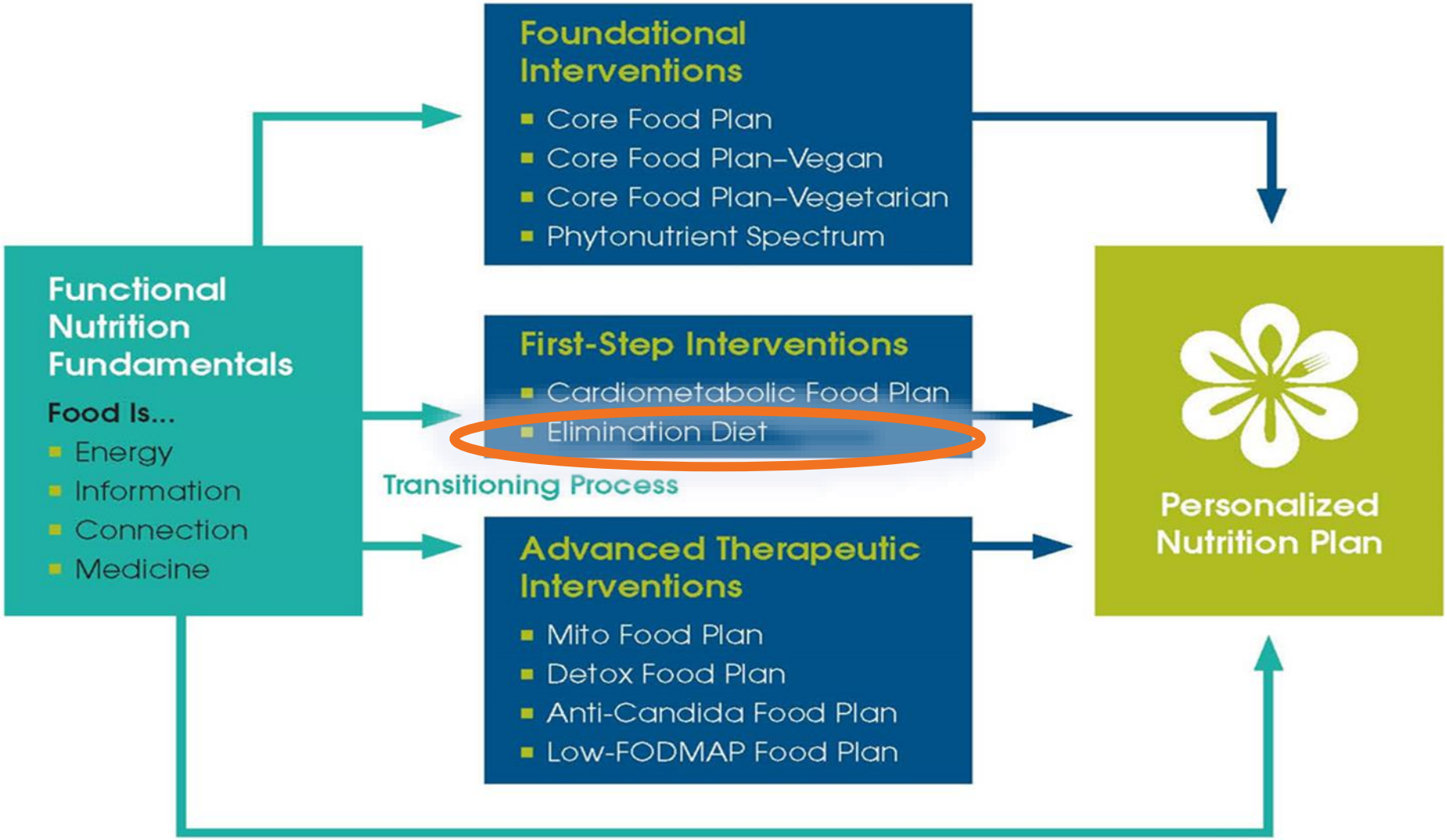
Initiate

1. Perform further assessment
2. Referral to adjunctive care
    - Nutritional Professional
    - Lifestyle Educator
    - Healthcare Provider
    - Specialist
3. Initiate therapy

Initiate Therapeutic Interventions

1) Consider Chronicity and Severity
2) REDUCE Triggers or Triggering Events
3) Food First Approach (Elimination Diet or a Low GI/GL Food Plan)
4) Assess and Address Optimal Function of the Organs of Elimination
5) Apply specific medical/functional foods, vitamins/minerals/antioxidants/nutrients to support nutritional balance, reduce inflammation, and increase vitality
6) Consider personalized maintenance plan

Functional Nutrition Dietary Interventions



Performance Objectives

- What
- Why & When
- How
- What If
- Assess

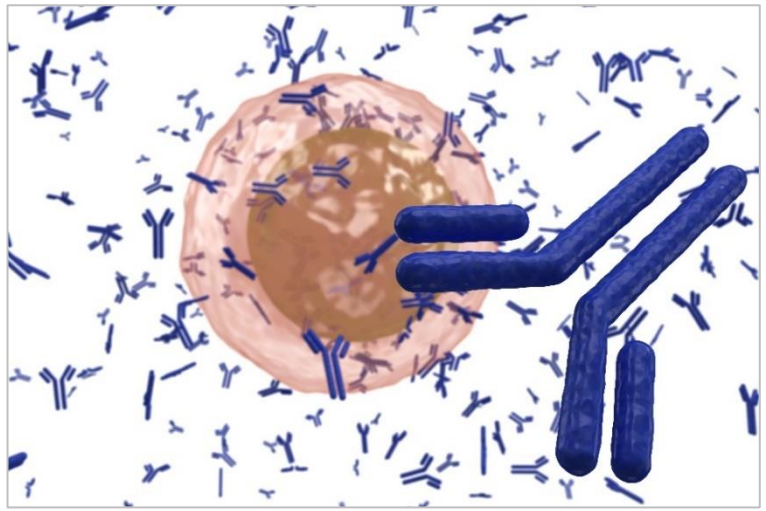
Understand the fundamentals and variations of the elimination diet.

WHAT

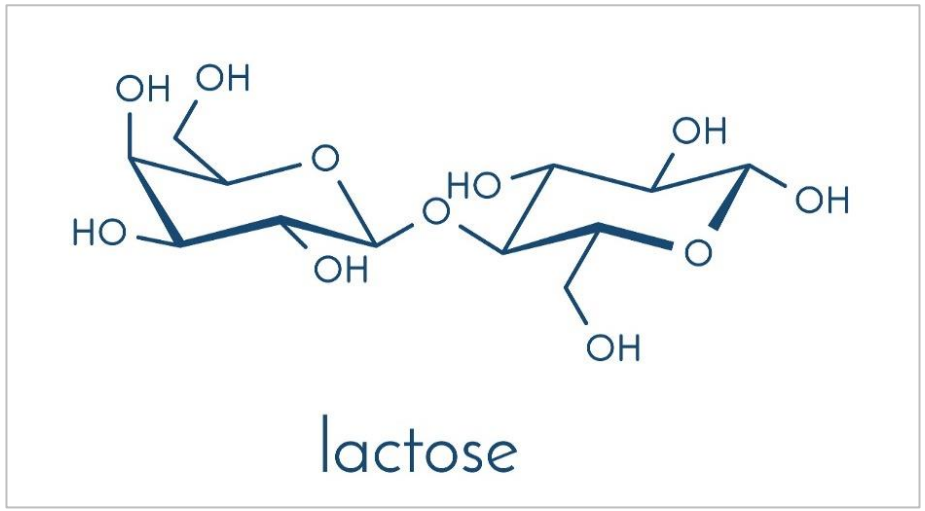
What is an Elimination Diet?

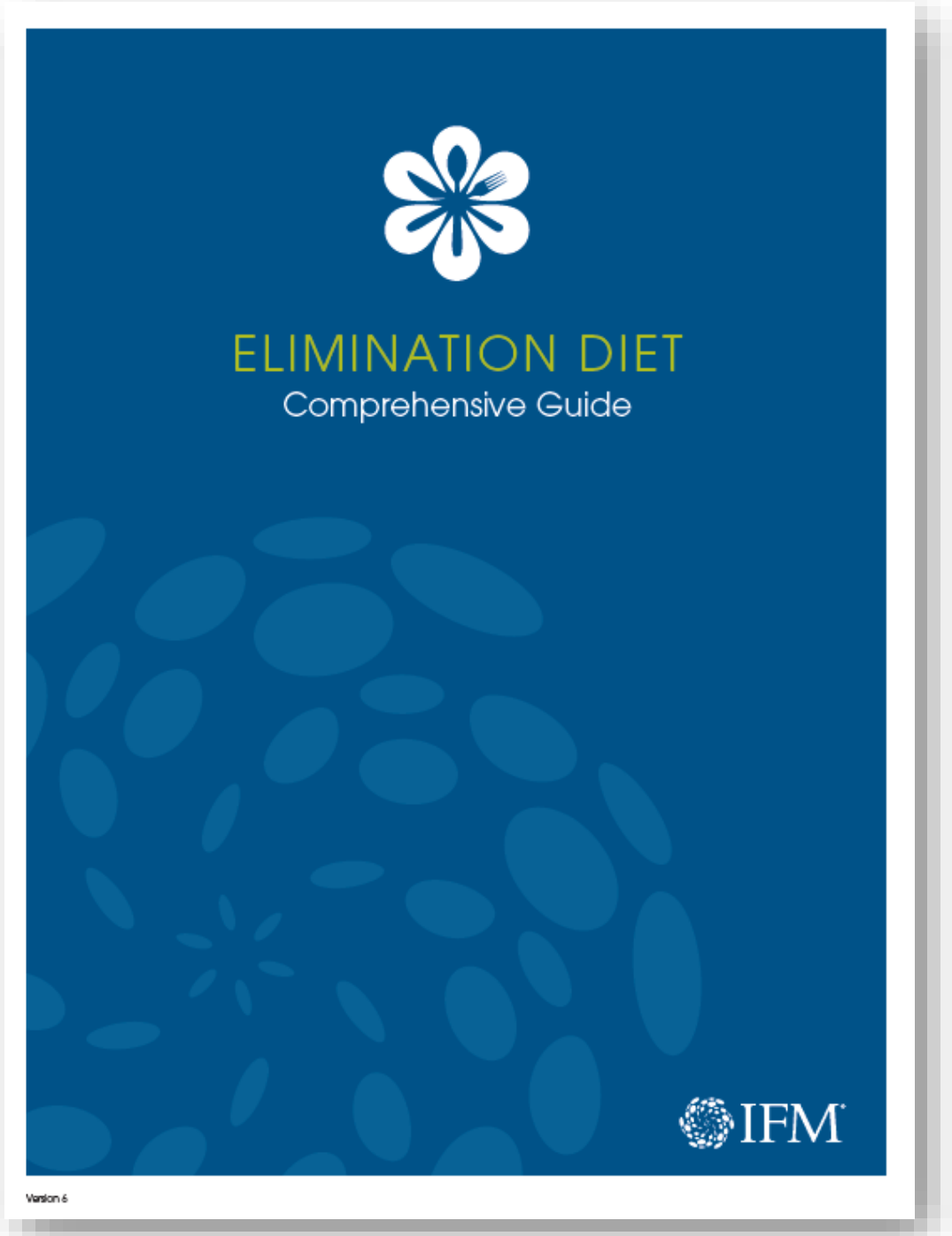
Elimination of foods and food additives that may be causing an immunological or non-immunological reaction

Immunological reaction: Allergy or "hypersensitivity," which may be IgE, IgG, IgM, IgA, or T-cell mediated



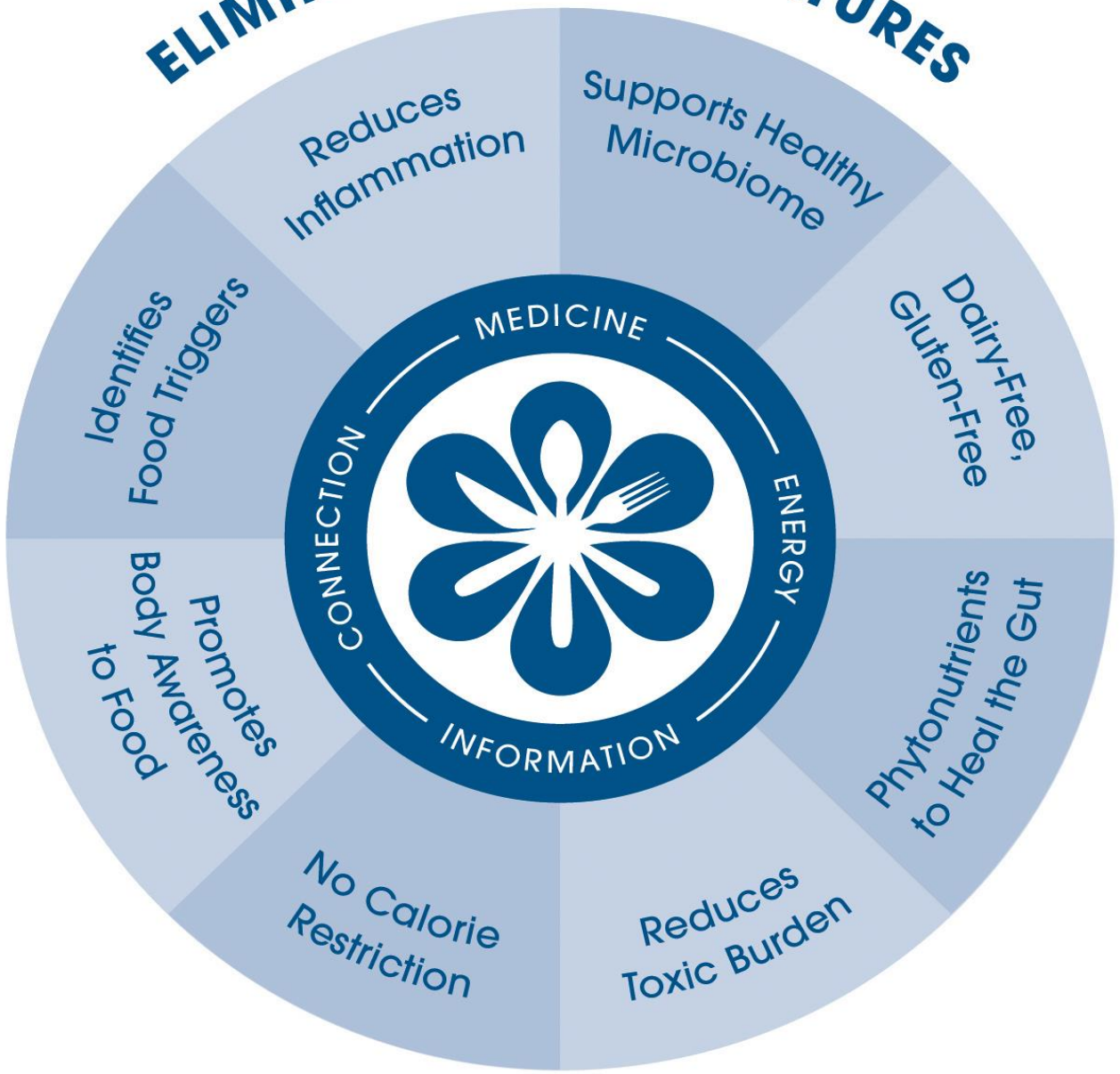
Non-immunological reaction: Intolerance that may be secondary to lactase deficiency, spoilage, or various other toxins



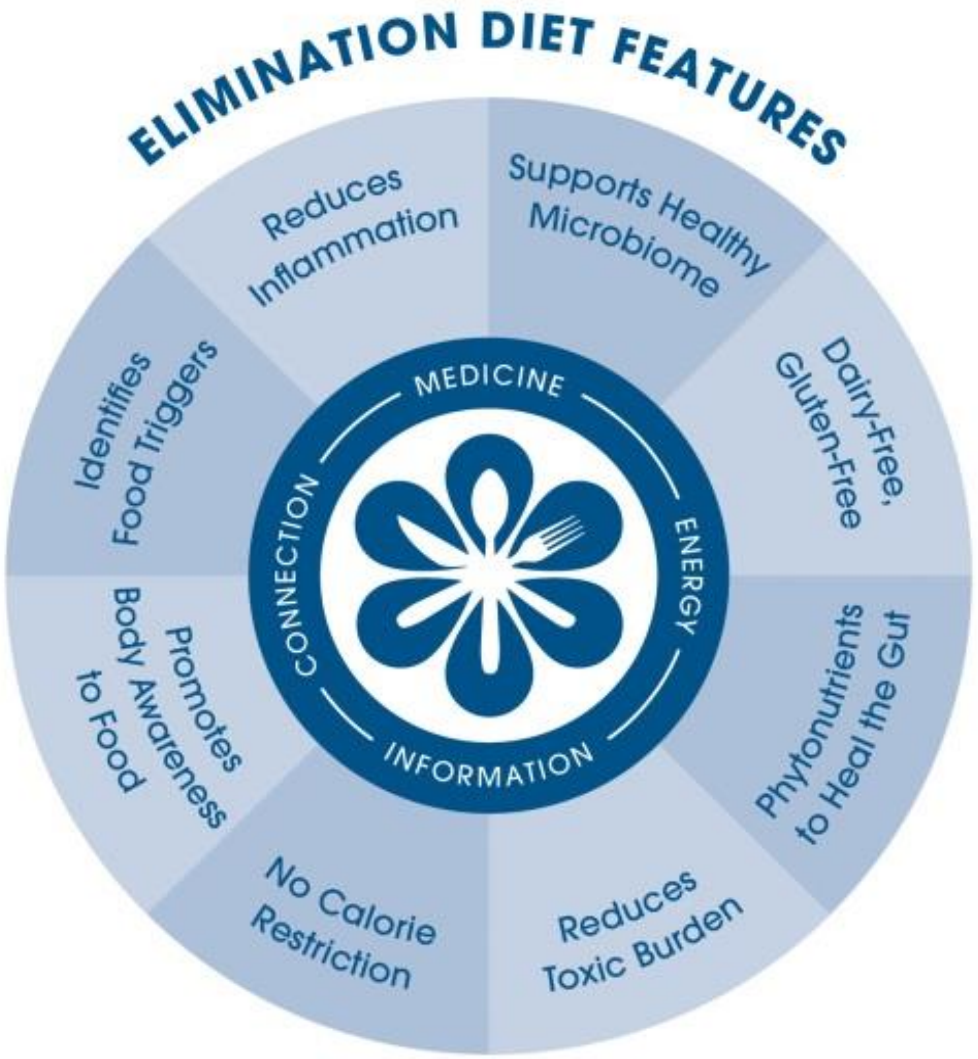


Comprehensive Elimination Diet (in the Toolkit)

ELIMINATION DIET FEATURES



- Identifies Food Triggers
- Reduces Inflammation
- Supports Healthy Microbiome
- Dairy-Free, Gluten-Free
- Phytonutrients to Heal the Gut
- Reduces Toxic Burden
- No Calorie Restriction
- Promotes Body Awareness to Foods



What Do You Need to Implement an Elimination Diet?

- **Educated patient** who is open to the possibility that foods may be causing adverse reactions
- **Confidence** to frame the program positively using stories and/or research
- **Straightforward, practical easy to follow program**

Note: Exclude unsuitable subjects: e.g., past hx of anaphylaxis, pregnant, anorexic, etc.

Performance Objectives

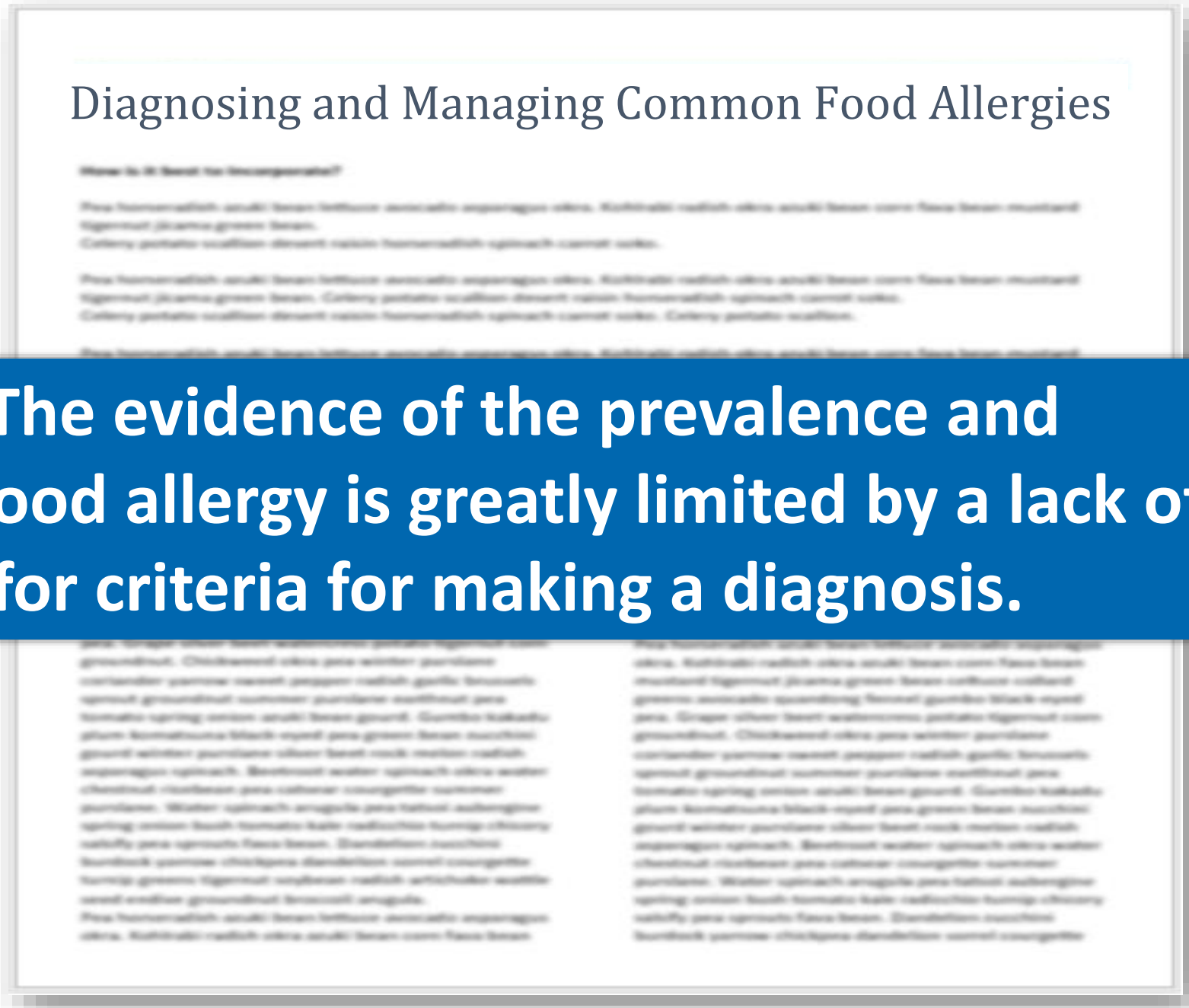
- What
- Why & When
- How
- What If
- Assess

Recognize why and when to use an elimination diet.

WHY

Why an Elimination Diet?

- To understand whether there is a connection between food and symptoms – allergy, sensitivity or intolerance
- To “clear the playing field”
- To improve and enhance detoxification protocols (as you’ll review later in the week)
- To transition to a cleaner, healthier long term food plan



Conclusion: The evidence of the prevalence and management of food allergy is greatly limited by a lack of uniformity for criteria for making a diagnosis.

Chafen JJ et al. Diagnosing and managing common food allergies: a systematic review. JAMA. 2010 May 12;303(18):1848-56. doi: 10.1001/jama.2010.582. Review.

How You Can React to a Food

- **Food Allergy:**
  - Immediate immune reaction to a specific food that occurs every time the food is eaten even in small amounts
  - IgE Immune mediated reaction

- **Food Sensitivity / Intolerance:**
  - Food reaction can be delayed by several hours or days
  - May not occur with small exposures and may be cumulative
  - May involve the immune system (ie IgG / IgA reaction) or may be from a lack of an enzyme (i.e. lactose intolerance, histamine intolerance)

Broader Spectrum of Food Reactions

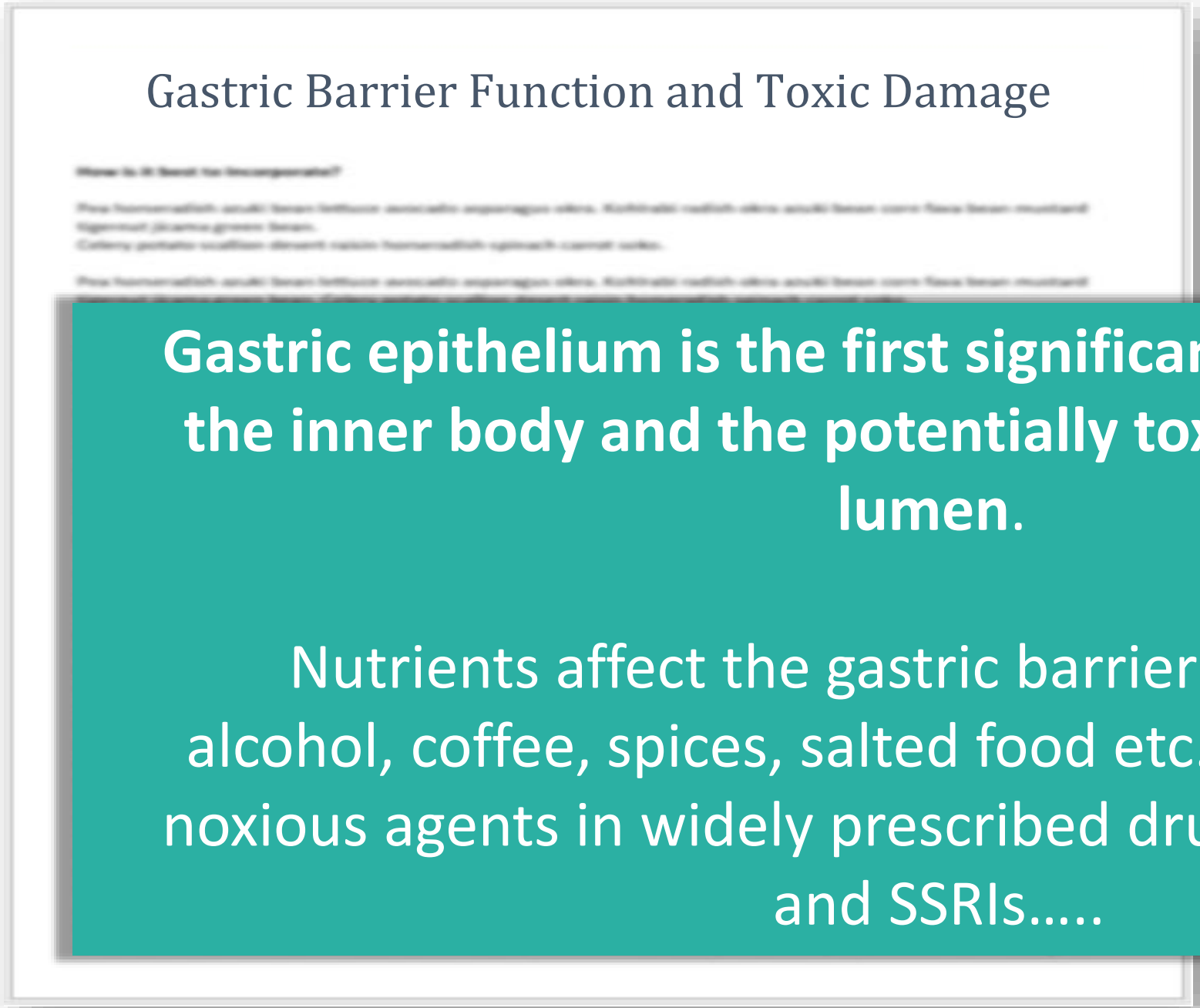
Some food reactions are related to food effect on gut flora, blood sugar fluctuations, etc.

- Difficult to test for as it is not a true allergy nor a sensitivity

Examples:

- High glycemic index foods/processed sweets increase inflammation, increase CRP after meals (e.g., shoulder bursitis in diabetics).
- A low starch diet decreases Klebsiella in the gut and benefits Ankylosing Spondylitis.

1. Esfahani A, Wong JM, Mirrahimi A, Srichaikul K, Jenkins DJ, Kendall CW. The glycemic index: physiological significance. J Am Coll Nutr. 2009 Aug;28 Suppl:439S-445S.
2. Ebringer A, Wilson C. The use of a low starch diet in the treatment of patients suffering from ankylosing spondylitis. Clin Rheumatol. 1996 Jan;15 Suppl 1:62-66.
3. Neuhouser ML, Schwarz Y, Wang C, et al. A low-glycemic load diet reduces serum C-reactive protein and modestly increases adiponectin in overweight and obese adults. J Nutr. 2012;142(2):369–374. doi:10.3945/jn.111.149807
4. Rashid T, Wilson C, Ebringer A. The link between ankylosing spondylitis, Crohn's disease, Klebsiella, and starch consumption. Clin Dev Immunol. 2013;2013:872632. doi:10.1155/2013/872632



Gastric epithelium is the first significant barrier between the inner body and the potentially toxic material in the lumen.

Nutrients affect the gastric barrier continuously- alcohol, coffee, spices, salted food etc…Also very potent noxious agents in widely prescribed drugs-NSAIDs, aspirin, and SSRIs…..

Niv Y, Banić M. Gastric barrier function and toxic damage. Dig Dis. 2014;32(3):235-42. doi: 10.1159/000357855.

The Goal

Therefore, low grade inflammation plays a key role in the pathophysiology of gut dysfunction.

With the elimination diet we are removing food antigens that may be the cause of the inflammation or may become a problem as the result of inflammation.

With the idea that as we heal the gut, we will be able to reintroduce these foods.

REMOVING THE TACKS…… THE POWER OF THE ELIMINATION DIET

WHEN

Gather/GOTOIT	Elimination Diet
Chief Complaint and Medical History	GI sxs-bloating, indigestion, Joint pain, Muscle aches Immune dysregulation, Fatigue
Conditions	**Gastrointestinal** • Irritable Bowel Syndrome • Intestinal Permeability **Immune/Inflammation** • Auto-immune Diseases • Asthma • Atopy &Skin Inflammation • Myalgias and Arthralgias **Mood Disorders** • Depression
Medical History	Allergies, Atopy, Asthma, GI Distress, Pain and Fatigue, AI Diseases
ATMs	Antibiotics, Multiple infections, Trauma, Stress, Familial allergies, Mother with Group B strep, Acid Blocking Medication, Maternal use of PPI during pregnancy
Anthropometrics	Increased BMI, Increased ECW/ICW
Biomarkers & Labs	IgG or IgE food reactions, Celiac, Autoantibodies, Dysbiosis
Clinical Indicators: Nutrition Physical Exam	Dry Skin, thin eyebrows, Fluid retention, and skin inflammation
Diet and Lifestyle	Food Triggers, Allergy Exposures. Excess reliance on one food
Matrix Patterns	Assimilation, Biotransformation, Communication/Defense and Repair

Many Conventional Organizations Recommend Elimination Diets

- **Interstitial cystitis** - new American Urological Guidelines - July 2012
  - Eliminate bothersome foods for **4 weeks, then reintroduce 1 at a time.** If a problem food is identified, stay off for **1 year.**
- **IBS** – American College of Gastroenterology
  - Although various diets have been suggested to benefit IBS patients, the largest body of evidence relates to two specific diets; a diet low in fermentable oligo-saccharides, di-saccharides, and mono-saccharides, and polyols (FODMAPs) and a gluten-free diet.
- **Non-IgE mediated food-induced allergic disorders** - NIAID Guidelines
  - The EP suggests that elimination of 1 or a few specific foods from the diet may be useful in the diagnosis of FPIES, AP, Heiner syndrome, EOE, and other non-IgE mediated food-induced allergic disorders.
- **EOE** - American College of Gastroenterology (ACG) guideline
  - Suggests assessment of response to dietary treatment (removal or reintroduction of food antigens) assessed through clinical symptoms, endoscopic examination, and esophageal biopsy.
- **Pediatric-Onset IBD** – European Society of Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN)
  - Cow's milk elimination diet may resolve or improve symptoms in infants. In infants with resolved or improved symptoms after elimination diet, consider oral challenge before beginning pharmacotherapy.
- **Food Allergy** - European Academy of Allergy and Clinical Immunology's (EAACI) Guidelines

See References: *Multiple Uses of Elimination Diets*

References: Multiple Uses of Elimination Diets

1. Quillin RB, Erickson DR. Practical use of the new American Urological Association interstitial cystitis guidelines. Curr Urol Rep. 2012 Oct;13(5):394-401. doi: 10.1007/s11934-012-0263-z.
2. Ford AC, Moayyedi P, Lacy BE, Lembo AJ, Saito YA, Schiller LR, Soffer EE, Spiegel BM, Quigley EM; Task Force on the Management of Functional Bowel Disorders. American College of Gastroenterology monograph on the management of irritable bowel syndrome and chronic idiopathic constipation. Am J Gastroenterol. 2014 Aug;109 Suppl 1:S2-26; quiz S27. doi: 10.1038/ajg.2014.187.
3. NIAID-Sponsored Expert Panel, Boyce JA, Assa'ad A, et al. Guidelines for the diagnosis and management of food allergy in the United States: report of the NIAID-sponsored expert panel. J Allergy Clin Immunol. 2010;126(6 Suppl):S1–S58. doi:10.1016/j.jaci.2010.10.007.
4. Dellon ES, Gonsalves N, Hirano I, Furuta GT, Liacouras CA, Katzka DA. ACG clinical guideline: Evidenced based approach to the diagnosis and management of esophageal eosinophilia and eosinophilic esophagitis (EoE). The American Journal Of Gastroenterology. 2013;108(5):679-692. doi:10.1038/ajg.2013.71.
5. Levine A, Koletzko S, Turner D, et al, European Society of Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) revised porto criteria for the diagnosis of inflammatory bowel disease in children and adolescents. J Pediatr Gastroenterol Nutr. 2014 Jun;58(6):795-806.
6. Muraro A, Agache I, Clark A, Sheikh A, Roberts G, Akdis CA, Borrego LM, Higgs J, Hourihane JO, Jorgensen P, Mazon A, Parmigiani D, Said M, Schnadt S, van Os-Medendorp H, Vlieg-Boerstra BJ, Wickman M; European Academy of Allergy and Clinical Immunology. EAACI food allergy and anaphylaxis guidelines: managing patients with food allergy in the community. Allergy. 2014 Aug;69(8):1046-57. doi: 10.1111/all.12441. Epub 2014 Jun 18. Erratum in: Allergy. 2014 Oct;69(10):1428. PubMed PMID: 24905609.

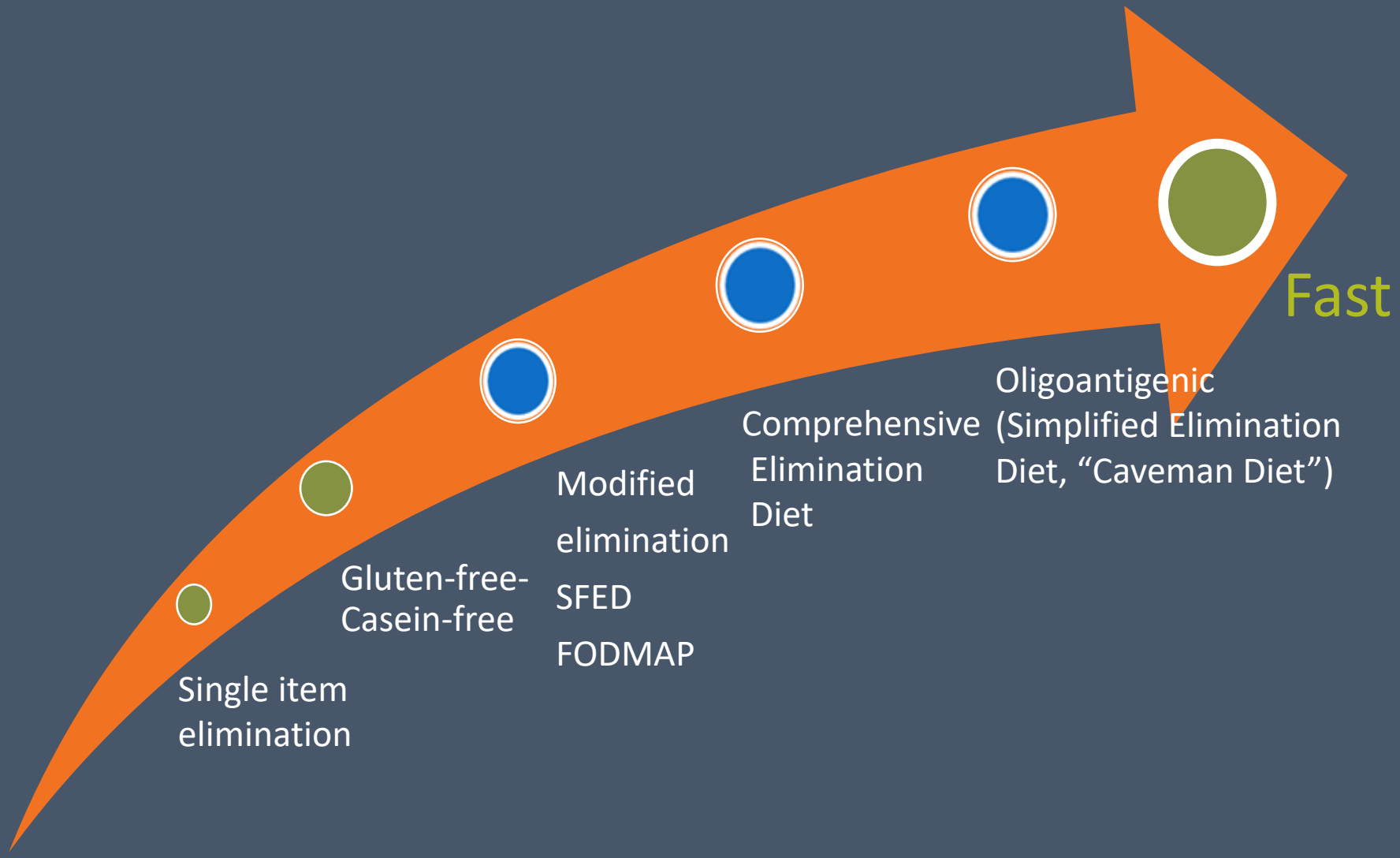
Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Be able to implement an elimination diet.

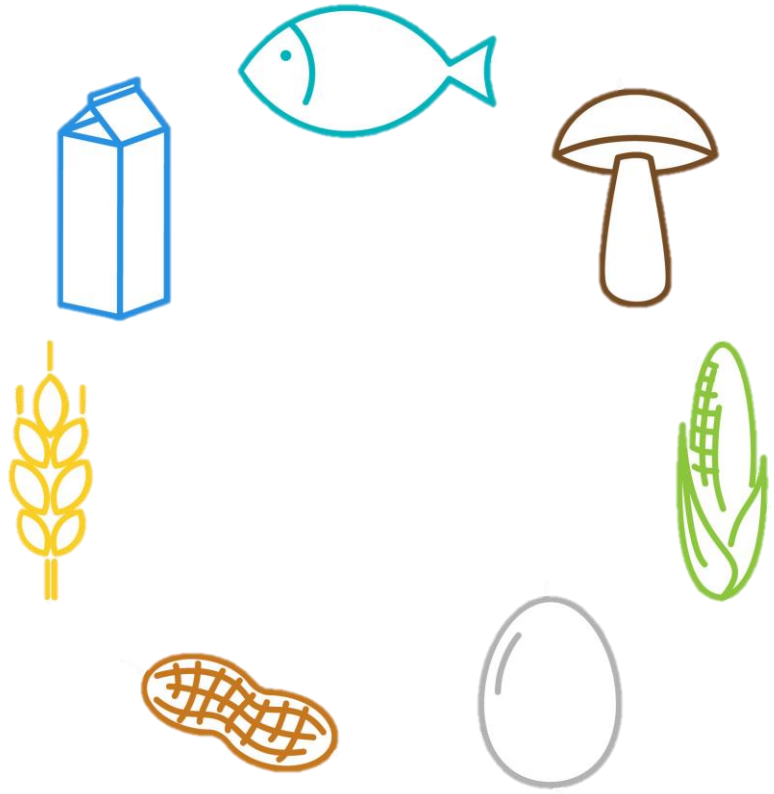
HOW

Elimination Diet Strategies



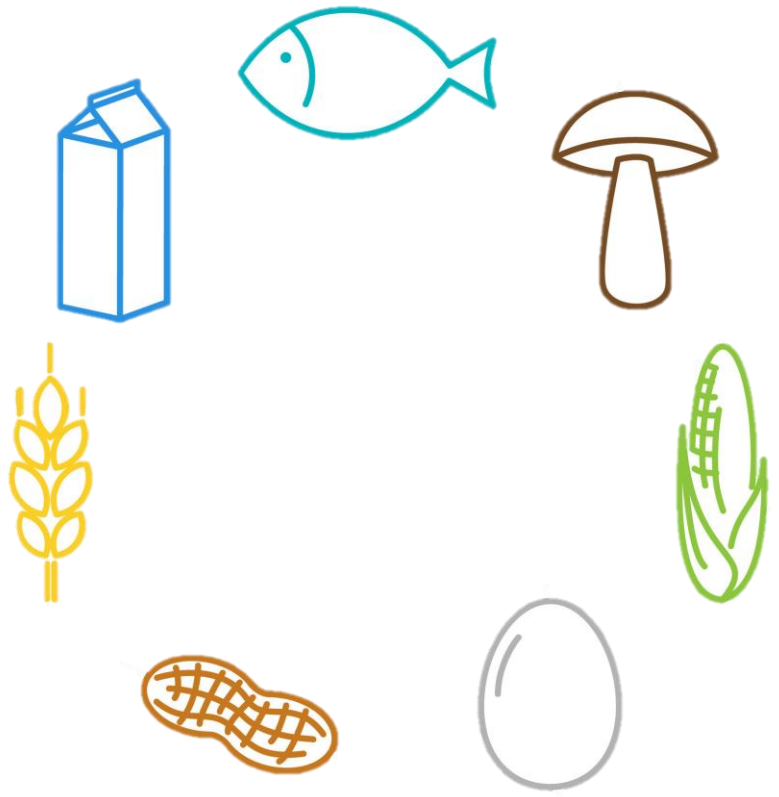
Types of Elimination Diets

- **Single Item Elimination**
- **Food-specific Dietary Restriction**
  - Gluten
  - Egg
  - Dairy
- **Modified Elimination Diets**
  - PALEO
  - Low Histamine
  - Six Food Elimination Diet (SFED)
  - FODMAP
- **Comprehensive Elimination Diet**
- **Oligoantigenic "Simplified Elimination Diet"**
  - (Caveman Diet) – lamb, rice, pear, sweet potato



Types of Elimination Diets

- **Single Item Elimination**
- **Food-specific Dietary Restriction**
  - Gluten
  - Egg
  - Dairy
- **Modified Elimination Diets**
  - PALEO
  - Low Histamine
  - Six Food Elimination Diet (SFED)
  - FODMAP
- **Comprehensive Elimination Diet**
- **Oligoantigenic "Simplified Elimination Diet"**
  - (Caveman Diet) – lamb, rice, pear, sweet potato



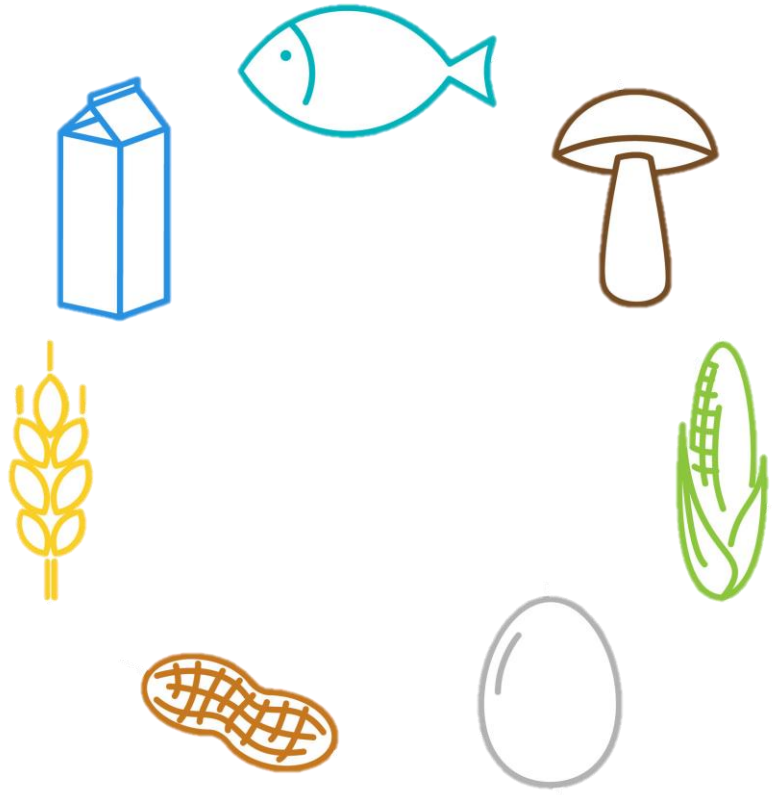
Six Food Elimination Diet

- **Empiric exclusion of 6 food groups (milk, egg, wheat, soy, peanut / tree nuts and seafood) achieved histopathologic** (eosinophil peak count, <15 eos/hpf) **and symptomatic remission in 73.1% of patients with adult EoE.**
- Most frequent trigger foods of EoE: cow's milk, wheat, and eggs
- Food specific IgE serum measurement and SPTs were neither sensitive nor specific methods for predicting EoE triggers: indeed, allergy test results showed little concordance with food reintroduction challenge results
- All **patients who continued to avoid the offending foods maintained histopathologic and clinical remission of EoE for up to 3 years after finishing the study protocol** making this a feasible drug-free maintenance therapy.

Lucendo AJ, Arias Á, González-Cervera J, et al. Empiric 6-food elimination diet induced and maintained prolonged remission in patients with adult eosinophilic esophagitis: a prospective study on the food cause of the disease. J Allergy Clin Immunol. 2013 Mar;131(3):797-804. doi: 10.1016/j.jaci.2012.12.664.

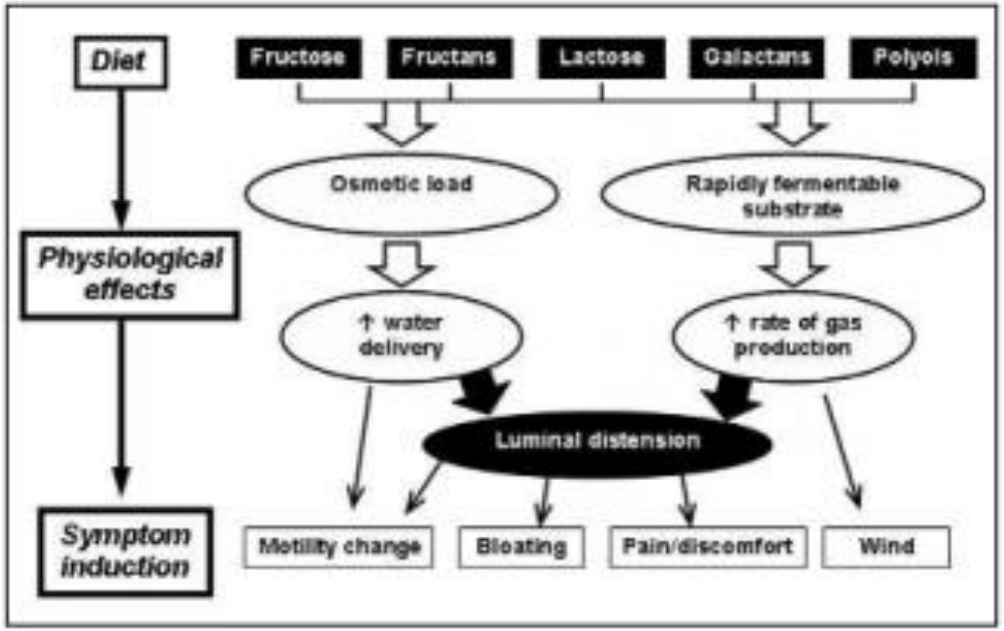
Types of Elimination Diets

- **Single Item Elimination**
- **Food-specific Dietary Restriction**
  - Gluten
  - Egg
  - Dairy
- **Modified Elimination Diets**
  - PALEO
  - Low Histamine
  - Six Food Elimination Diet (SFED)
  - FODMAP
- **Comprehensive Elimination Diet**
- **Oligoantigenic "Simplified Elimination Diet"**
  - (Caveman Diet) – lamb, rice, pear, sweet potato



FODMAPs = Fermentable Oligosaccharides, Disaccharides, Monosaccharides and Polyols

- Poorly absorbed short chain carbohydrates
- Fructose malabsorption represents the fermentation of fructose before it is absorbed
- Due to 3 independent mechanisms: low absorptive capacity of the small intestinal epithelium, rapid transit through the small bowel, and bacterial overgrowth in the distal small bowel



1. Hayes PA, Fraher MH, Quigley EM. Irritable bowel syndrome: the role of food in pathogenesis and management. Gastroenterol Hepatol (N Y). 2014 Mar;10(3):164-74.
2. Figure: Barrett, J., Glbson, P. R. (2007). Clinical Ramifications of Malabsorption of Fructose and Other Short-chain Carbohydrates. Practical Gastroenterology. 31. 51-65.

HIGH FODMAP FOODS

- Wheat, rye
- Onions, garlic, artichokes
- Legumes
- Milk
- Honey, apples, pears, watermelon, mango, stone fruits, sugar-free mints, mushrooms, cauliflower

In your Toolkit!

Overview of the Low-FODMAP Diet

The low-FODMAP diet was developed at Monash University in Australia as an approach for managing patients with functional gut disorders. It involves avoidance of foods that contain specific types of carbohydrates. **FODMAP** is an acronym that stands for **F**ermentable **O**ligosaccharides, **D**isaccharides, **M**onosaccharides, **A**nd **P**olyols. These are specific types of carbohydrates that your body may be unable to efficiently absorb. Since they aren't getting absorbed, certain bacteria in your digestive tract start to feed on them. These bacteria then produce byproducts and waste materials that can lead to symptoms such as gas, bloating, and diarrhea. This can also lead to an overgrowth of these bacteria in the small intestine which can contribute to several other health problems.

What specific foods are to be avoided and what foods are okay to eat?

Foods that contain higher levels of FODMAPs are to be avoided while on the diet; some examples of foods that are to be avoided (high-FODMAP) and those that are permitted (low-FODMAP) are as follows.

Animal Protein

Meats, poultry, and seafood themselves don't contain carbohydrates, so they are not high in FODMAPs. However careful attention must be paid to how animal proteins are prepared. Many sauces and side dishes may contain ingredients that are not permitted while following the low-FODMAP approach.

Legumes

Most legumes are moderate- to high-FODMAP foods. Some may be tolerated in reduced serving sizes, but these foods will likely need to be removed from the diet during an initial elimination phase.

Dairy & Alternatives

Low-FODMAP	High-FODMAP
▪ Butter	▪ Buttermilk
▪ Cheeses (2 oz. or less)	▪ Cream cheese
▪ Brie, Cottage, Feta, Ricotta, Mozzarella, Swiss	▪ Cream
▪ Lactose Free Milk	▪ Ice Cream
▪ Rice/Oat Milk	▪ Milk
▪ Tofu/Tempeh	▪ Sour Cream
▪ Eggs	▪ Yogurt

Nuts & Seeds

Low-FODMAP	High-FODMAP
▪ Brazil nuts	▪ Almonds
▪ Chestnuts	▪ Cashews
▪ Chia seeds	▪ Coconut
▪ Flax seeds	▪ Hazelnuts
▪ Macadamias	▪ Pistachios
▪ Peanuts	▪ Sesame seeds
▪ Pecan halves	▪ Sunflower seeds
▪ Pine nuts	
▪ Pumpkin seeds	
▪ Walnut halves	

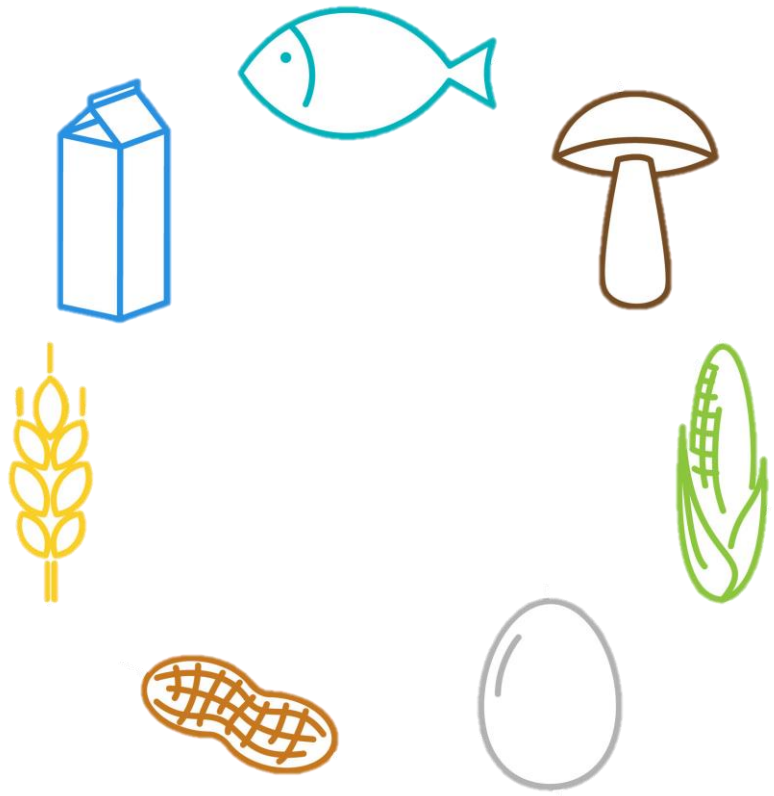
Version 1

FODMAP Resources:
Low-FODMAP Food Plan

In your Toolkit

Types of Elimination Diets

- **Single Item Elimination**
- **Food-specific Dietary Restriction**
  - Gluten
  - Egg
  - Dairy
- **Modified Elimination Diets**
  - PALEO
  - Low Histamine
  - Six Food Elimination Diet (SFED)
  - FODMAP
- **Comprehensive Elimination Diet**
- **Oligoantigenic "Simplified Elimination Diet"**
  - (Caveman Diet) – lamb, rice, pear, sweet potato



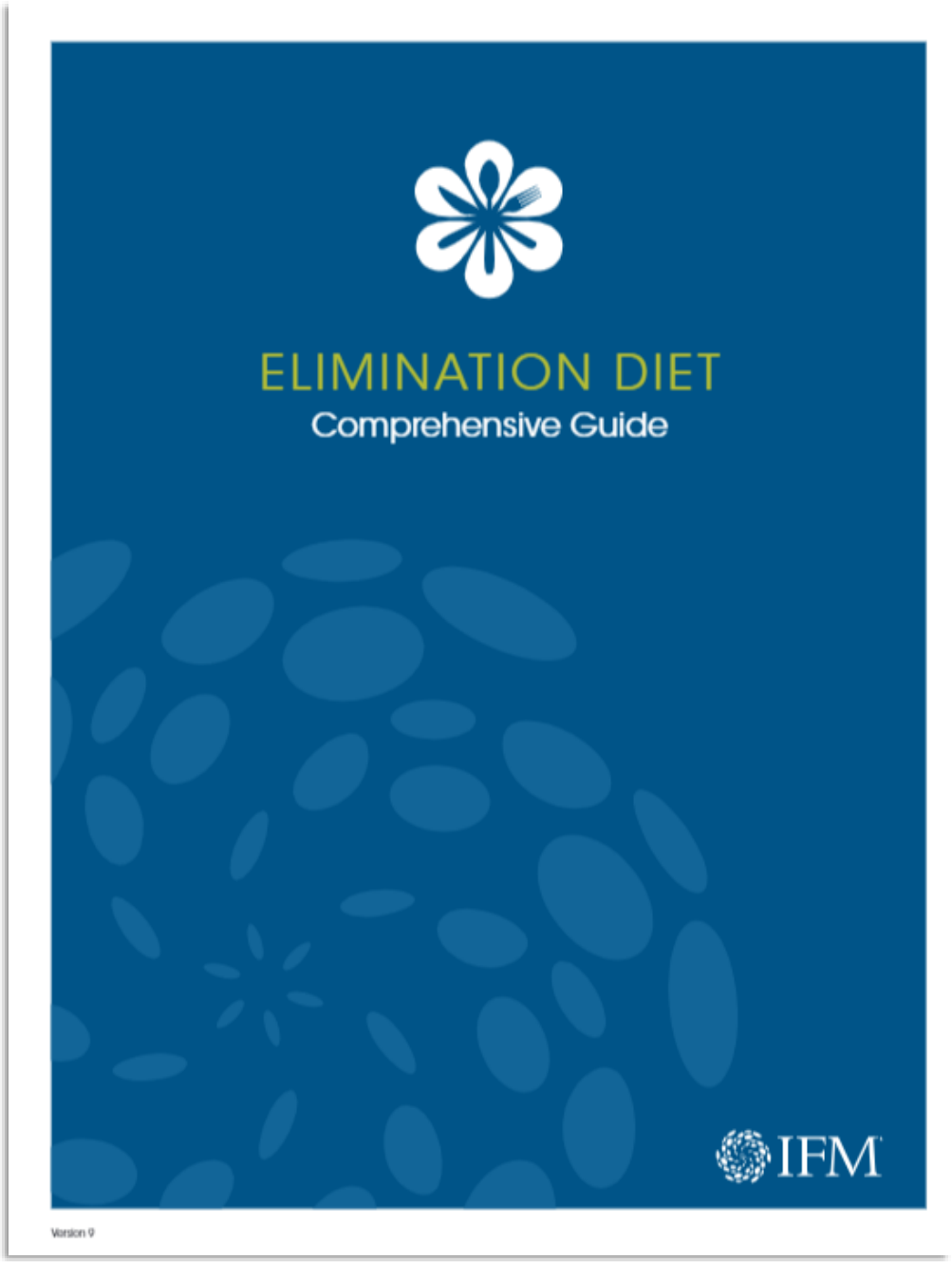
Part 2

Comprehensive Elimination Diet

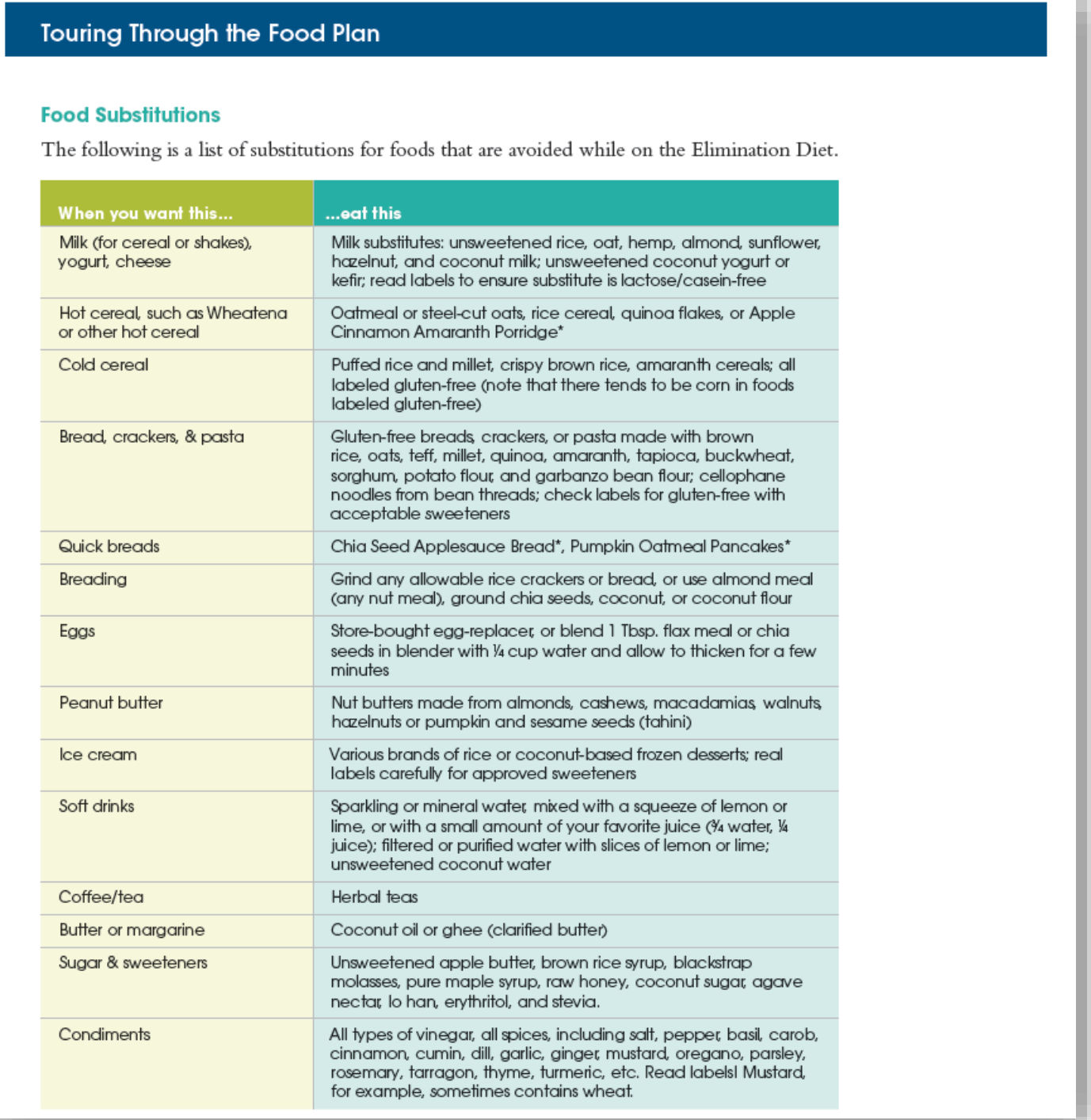
Foods to Avoid	Foods to Eat
■ Alcohol	■ Dairy alternatives
■ Beef	■ Fish
■ Chocolate	■ Fruits (only those specifically listed)
■ Coffee, soft drinks, tea	■ Game meats
■ Corn	■ Gluten-free whole grains (amaranth, buckwheat, millet, quinoa, rice, teff, etc.)
■ Dairy products	■ Healthy oils
■ Eggs	■ Legumes (except soy, peanuts)
■ Gluten-containing grains (all varieties of barley, rye, spelt, wheat)	■ Nuts (except peanuts)
■ Peanuts	■ Poultry
■ Pork	■ Seeds
■ Processed meats	■ Vegetables
■ Shellfish	
■ Soy and soy products	
■ Sugar (white sugar, high-fructose corn syrup, brown sugar, sucrose, etc.)	

Dietary Protocols Should Be:

- Flexible and adaptable
- Relatively easy and straightforward to use
- Designed to allow for consistent evaluation



Comprehensive Elimination Diet



Touring Through the Food Plan

Food Substitutions

The following is a list of substitutions for foods that are avoided while on the Elimination Diet.

When you want this...	...eat this
Milk (for cereal or shakes), yogurt, cheese	Milk substitutes: unsweetened rice, oat, hemp, almond, sunflower, hazelnut, and coconut milk; unsweetened coconut yogurt or kefir; read labels to ensure substitute is lactose/casein-free
Hot cereal, such as Wheatena or other hot cereal	Oatmeal or steel-cut oats, rice cereal, quinoa flakes, or Apple Cinnamon Amaranth Porridge*
Cold cereal	Puffed rice and millet, crispy brown rice, amaranth cereals; all labeled gluten-free (note that there tends to be corn in foods labeled gluten-free)
Bread, crackers, & pasta	Gluten-free breads, crackers, or pasta made with brown rice, oats, teff, millet, quinoa, amaranth, tapioca, buckwheat, sorghum, potato flour, and garbanzo bean flour; cellophane noodles from bean threads; check labels for gluten-free with acceptable sweeteners
Quick breads	Chia Seed Applesauce Bread*, Pumpkin Oatmeal Pancakes*
Breading	Grind any allowable rice crackers or bread, or use almond meal (any nut meal), ground chia seeds, coconut, or coconut flour
Eggs	Store-bought egg-replacer, or blend 1 Tbsp. flax meal or chia seeds in blender with ¼ cup water and allow to thicken for a few minutes
Peanut butter	Nut butters made from almonds, cashews, macadamias, walnuts, hazelnuts or pumpkin and sesame seeds (tahini)
Ice cream	Various brands of rice or coconut-based frozen desserts; read labels carefully for approved sweeteners
Soft drinks	Sparkling or mineral water, mixed with a squeeze of lemon or lime, or with a small amount of your favorite juice (¾ water, ¼ juice); filtered or purified water with slices of lemon or lime; unsweetened coconut water
Coffee/tea	Herbal teas
Butter or margarine	Coconut oil or ghee (clarified butter)
Sugar & sweeteners	Unsweetened apple butter, brown rice syrup, blackstrap molasses, pure maple syrup, raw honey, coconut sugar, agave nectar, lo han, erythritol, and stevia.
Condiments	All types of vinegar, all spices, including salt, pepper, basil, carob, cinnamon, cumin, dill, garlic, ginger, mustard, oregano, parsley, rosemary, tarragon, thyme, turmeric, etc. Read labels! Mustard, for example, sometimes contains wheat.

Comprehensive Elimination Diet:

TOURING THROUGH THE FOOD PLAN

Getting Started

It's Worth the Effort!

Some dietary changes present greater challenges than others. Keep in mind that feeling healthy is worth the effort. Focus on the end result. The first few days are the hardest, particularly when having symptoms of withdrawal from foods that had been eaten several times daily (breads, desserts, milk products, processed and sweetened fast foods, pasta, etc.). Be sure to shop ahead (using the shopping guide included in the recipe handout) and prepare some quick meals or snacks ahead of time. This dietary program may initially require more time and energy than typically spent preparing foods for each meal. It is worth your time—and remember that it is temporary. However, most people feel so good after being on the diet that they want to continue eating this way!

How Long Will It Last?

The Functional Medicine practitioner advises on the duration of the Elimination Diet for every patient. Typically, the Elimination Diet is followed for three weeks. Shorter time periods may not yield the same results, as the body needs time to clear its reactivity to foods that are triggering symptoms. Initially, symptoms may worsen for a short time (rarely more than a few days) due to withdrawal from the foods commonly eaten. Transient reactions may be experienced in the first four to seven days as the body adjusts to the intake of different foods. These reactions can include changes in sleep patterns, fatigue, lightheadedness, headaches, joint or muscle stiffness, and gastrointestinal complaints. Such symptoms rarely last for more than a few days and will vary depending on the person's body and lifestyle factors.

What Foods Can Be Eaten?

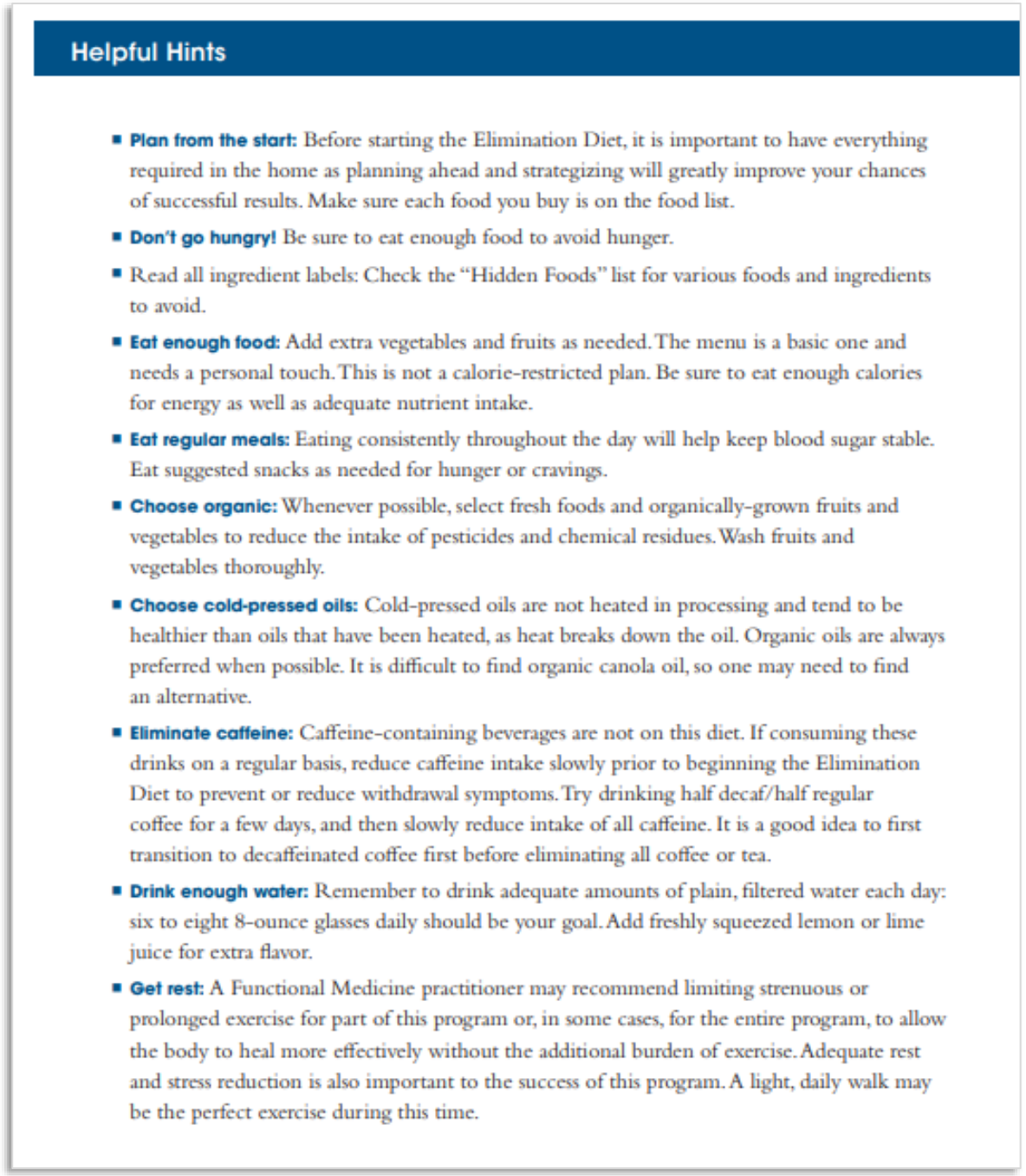
It is necessary to eat ONLY the foods that are on the food list. If a food is not on the list, do not eat it. By the end of the prescribed period of the Elimination Diet, most people note improvements in many symptoms. They report increased energy and mental alertness, fewer headaches, less muscle or joint pain, fewer and milder GI symptoms, and a general sense of improved well-being.

What About Snacking and Eating Out?

It is typical to snack on whatever is available at work or at home. When following the Elimination Diet, have only acceptable foods around in the event of hunger. Keep snacks and salad dressings at work for a quick snack or lunch salad. Eating out is generally not recommended as you will not be aware of all that is in the food served. Traveling is also best avoided during this time, for the same reasons. It can be quite challenging to eat while on the road or in an airport. If you do travel or visit with friends or family, it is helpful to have the right food available to eat. Bring along nuts, fruits, and vegetables that will travel well.

Comprehensive Elimination Diet:

GETTING STARTED



Helpful Hints

- **Plan from the start:** Before starting the Elimination Diet, it is important to have everything required in the home as planning ahead and strategizing will greatly improve your chances of successful results. Make sure each food you buy is on the food list.
- **Don't go hungry!** Be sure to eat enough food to avoid hunger.
- Read all ingredient labels: Check the "Hidden Foods" list for various foods and ingredients to avoid.
- **Eat enough food:** Add extra vegetables and fruits as needed. The menu is a basic one and needs a personal touch. This is not a calorie-restricted plan. Be sure to eat enough calories for energy as well as adequate nutrient intake.
- **Eat regular meals:** Eating consistently throughout the day will help keep blood sugar stable. Eat suggested snacks as needed for hunger or cravings.
- **Choose organic:** Whenever possible, select fresh foods and organically-grown fruits and vegetables to reduce the intake of pesticides and chemical residues. Wash fruits and vegetables thoroughly.
- **Choose cold-pressed oils:** Cold-pressed oils are not heated in processing and tend to be healthier than oils that have been heated, as heat breaks down the oil. Organic oils are always preferred when possible. It is difficult to find organic canola oil, so one may need to find an alternative.
- **Eliminate caffeine:** Caffeine-containing beverages are not on this diet. If consuming these drinks on a regular basis, reduce caffeine intake slowly prior to beginning the Elimination Diet to prevent or reduce withdrawal symptoms. Try drinking half decaf/half regular coffee for a few days, and then slowly reduce intake of all caffeine. It is a good idea to first transition to decaffeinated coffee first before eliminating all coffee or tea.
- **Drink enough water:** Remember to drink adequate amounts of plain, filtered water each day: six to eight 8-ounce glasses daily should be your goal. Add freshly squeezed lemon or lime juice for extra flavor.
- **Get rest:** A Functional Medicine practitioner may recommend limiting strenuous or prolonged exercise for part of this program or, in some cases, for the entire program, to allow the body to heal more effectively without the additional burden of exercise. Adequate rest and stress reduction is also important to the success of this program. A light, daily walk may be the perfect exercise during this time.

Comprehensive Elimination Diet:

HELPFUL HINTS

The Role of Anti-Inflammatory Foods in the Elimination Diet

Inflammation is present if there is pain, redness, and swelling in the body. Inflammation taxes the immune system. It is best to eliminate inflammation as much as possible. Inflammation is associated with many chronic diseases. All adverse food reactions create inflammation in the body. For example, inflammation in the gut can results in diarrhea or constipation. Inflammation in the joints can lead to arthritis-type symptoms.

The following section on what to include or exclude will help patients ensure that anti-inflammatory foods are the focus in the diet.

Anti-inflammatory Foods to Include:

In general, fresh fruits and vegetables and foods that provide omega-3 fats are the best way to provide anti-inflammatory support to your body. The typical American diet contains a higher percentage of omega-6 fats, which can be pro-inflammatory when they are out of balance with omega-3 fats.

Include these foods:

1. **Fatty fish**, such as wild-caught salmon, mackerel, cod, tuna, and sardines, provide a balance of essential fatty acids high in anti-inflammatory omega-3 fats.
2. **Grass-fed lamb or buffalo meats** contain significant amounts of omega-3 fats than meat from grain-fed animals.
3. **Nuts and seeds**, especially almonds, walnuts, and flax seeds, contain omega-3 fats and healthy fiber.
4. **Dark leafy greens**, such as kale, broccoli, collards, cabbage, and other cruciferous vegetables are high in fiber and may protect the body from pro-inflammatory molecules called cytokines. They are also high in phytonutrients called glucosinolates that assist detoxification.
5. **Red and blue colored fruits and vegetables** such as red cabbage and onion, red bell pepper, all berries, red grapes, cherries, and plums contain anti-inflammatory phytonutrients.
6. **Extra-virgin olive oil and olives** contain anti-inflammatory phytonutrients called polyphenols.
7. **Moist heat cooking using low temperatures**, such as crock-pot cooking, creates fewer inflammatory by-products.
8. **Certain spices**, such as turmeric, ginger, oregano, garlic, rosemary, cayenne, cloves, and cinnamon, have anti-inflammatory properties. Use them in combination with food, especially when using high-heat cooking methods.

Comprehensive Elimination Diet:

THE ROLE OF ANTI-INFLAMMATORY FOODS

Inflammatory Foods to Exclude:

Focusing on anti-inflammatory foods in the diet is just the first step. What is not eaten is as important as what is eaten.

During the Elimination Diet, and even afterwards, reduce or eliminate the following:

1. **Trans-fats:** Found in processed foods like cakes, cookies, bagels, and crackers.
2. **Refined sugars:** Added refined sugars are pervasive in processed foods. Read the labels very carefully for sugars such as HFCS, corn sugar, corn syrup, and sucrose.
3. **Foods with a high glycemic response:** High-glycemic foods create blood sugar spikes after eating; these can stress the body to overproduce insulin, which is not healthy. Over time, the body becomes less equipped to handle high-sugar foods, and inflammation increases from the excess sugar and insulin produced. Examples of foods with a high-glycemic response are refined grains and breads, desserts, sweetened beverages, and highly processed prepared foods. Rice and bananas, both of which are on the Elimination Diet, are moderately high in glycemic impact, so eat protein at the same time to offset any blood sugar spikes.
4. **High omega-6 oils such as corn or soy:** Most people eat high amounts of refined vegetable oils in their diet if they eat lots of processed foods. These oils have high amounts of omega-6 fats and too little omega-3 fats. When the omega-6 fat level in the diet is too high compared with the omega-3 level, enzymes involved in inflammation can be activated. The goal is to balance those two types of fats.
5. **Gluten-containing foods (wheat, rye, barley, spelt, kamut):** More people are learning that they have gluten intolerance. While it is unknown why this is happening, one theory is that the genetic modification of these grains in the modern era of agriculture has led to changes in how most people digest them in the gut. For some people, wheat may be more of an issue; for others, all of these grains could provoke inflammatory-related symptoms. Another theory about the recent surge of gluten intolerance is that the reaction isn't caused by the grains themselves, but rather by the pesticides and herbicides the grains are treated with. Yet another theory is that treating grains with enzymes or acid to make flour that is more easily mixed with liquids (a process called deamidation), may be affecting the body's ability to handle them.
6. **Saturated animal fats from grain-fed red meats:** Dietary fat has had a bad reputation for a long time. However, there are many types of fats and they are not all inflammatory; too much poor quality fat is the real problem. New research suggests that a high-fat meal of animal foods could lead to inflammation in the body. Adding vegetables to the meal can help to offset the inflammation. This finding does not mean that one should not eat animal foods, but that if they are eaten, vegetables should be included with the meal.

Comprehensive Elimination Diet:

THE ROLE OF ANTI-INFLAMMATORY FOODS

Guidelines for Reintroducing Foods

How to Get Started

To help identify potential problem foods once the Elimination Diet has been completed, foods that seemed associated with symptoms ("challenge foods") should be reintroduced into the diet, one at a time in two-day intervals.

1. On the first day of the reintroduction phase, choose whatever food is missed the most or craved the most, or was eaten most often. The order of reintroduction of foods is not critical.
2. Eat a generous amount of that food throughout Day 1 (two or three average-size portions), while continuing to eat foods on the Elimination Diet. During that day and the next (Day 2), record any symptoms on the Food Reintroduction Symptoms Tracker (available from your Functional Medicine practitioner).
3. If there is no reaction to the food during this two-day period, keep that food in the food plan and reintroduce a second food on Day 3. Watch for any symptoms on Day 3 and Day 4. If there is no reaction, keep that food in the diet and add the third challenge food, and so on.

If any food provokes symptoms, stop eating that food immediately, wait until the symptoms clear, and reintroduce the next food. After testing all of the challenge foods, try the problem food again using the same procedure (one day of eating the food and noting symptoms during the following two-day period).

Foods to Be Reintroduced

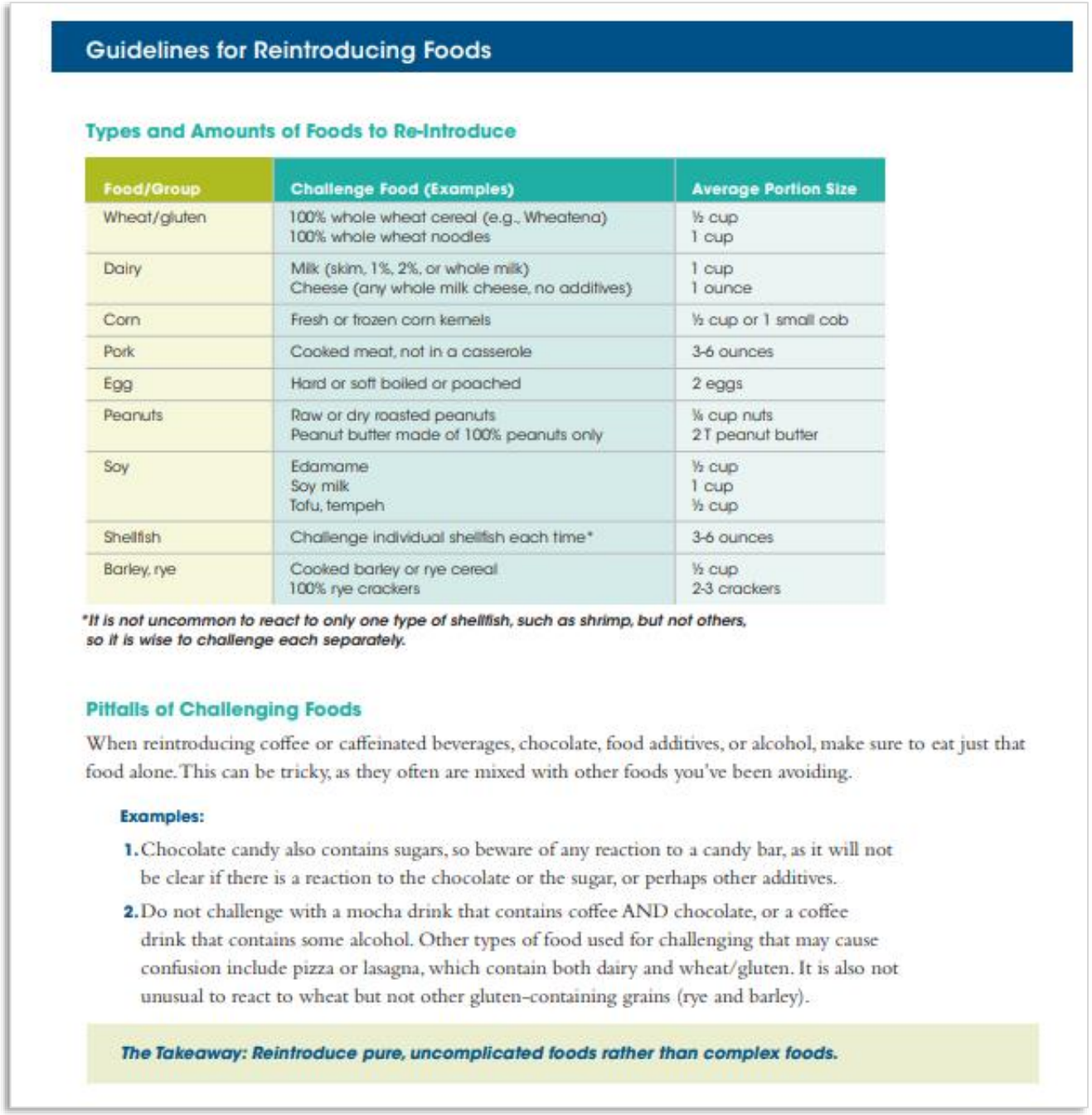
On the Elimination Diet, patients avoid wheat, dairy, soy, corn, peanuts, eggs, beef, pork, and shellfish. A Functional Medicine practitioner may add some other items to the list of foods to avoid. Patients can pick the order in which to try reintroducing these foods. For example, some people eliminate wheat throughout the food challenge period and only add it back at the very end.

After testing the above foods, begin to challenge the remaining foods that were avoided during the Elimination Diet such as barley, rye, coffee/tea (regular or decaf), alcohol, and chocolate.

For each food, identify and eat a pure form containing no additives or ingredients that have been eliminated, such as sugar or preservatives. The following are examples of pure foods from each of these food categories.

Comprehensive Elimination Diet:

GUIDELINES FOR REINTRODUCING FOODS



Guidelines for Reintroducing Foods

Types and Amounts of Foods to Re-Introduce

Food/Group	Challenge Food (Examples)	Average Portion Size
Wheat/gluten	100% whole wheat cereal (e.g., Wheatena) 100% whole wheat noodles	½ cup 1 cup
Dairy	Milk (skim, 1%, 2%, or whole milk) Cheese (any whole milk cheese, no additives)	1 cup 1 ounce
Corn	Fresh or frozen corn kernels	½ cup or 1 small cob
Pork	Cooked meat, not in a casserole	3-6 ounces
Egg	Hard or soft boiled or poached	2 eggs
Peanuts	Raw or dry roasted peanuts Peanut butter made of 100% peanuts only	¼ cup nuts 2 T peanut butter
Soy	Edamame Soy milk Tofu, tempeh	½ cup 1 cup ½ cup
Shellfish	Challenge individual shellfish each time*	3-6 ounces
Barley, rye	Cooked barley or rye cereal 100% rye crackers	½ cup 2-3 crackers

**It is not uncommon to react to only one type of shellfish, such as shrimp, but not others, so it is wise to challenge each separately.*

Pitfalls of Challenging Foods

When reintroducing coffee or caffeinated beverages, chocolate, food additives, or alcohol, make sure to eat just that food alone. This can be tricky, as they often are mixed with other foods you've been avoiding.

Examples:

1. Chocolate candy also contains sugars, so beware of any reaction to a candy bar, as it will not be clear if there is a reaction to the chocolate or the sugar, or perhaps other additives.
2. Do not challenge with a mocha drink that contains coffee AND chocolate, or a coffee drink that contains some alcohol. Other types of food used for challenging that may cause confusion include pizza or lasagna, which contain both dairy and wheat/gluten. It is also not unusual to react to wheat but not other gluten-containing grains (rye and barley).

The Takeaway: Reintroduce pure, uncomplicated foods rather than complex foods.

Comprehensive Elimination Diet:

GUIDELINES FOR REINTRODUCING FOODS

Higher Success Rate with Individualized Instruction and Access to Clinician

"The higher success rate in the patients enrolled in the latter half of the study may be explained by the intensive dietary education that occurred ….and could also be owing to the fact that early in the study dietary education was provided in group format, **whereas as the study progressed, dietary education was provided as individual training sessions.** As the study progressed patients had direct access to a dietitian dedicated ..via phone or email."

Gonsalves N, Yang G-Y, Doerfler B, Ritz S, Ditto AM, Hirano I. Elimination diet effectively treats eosinophilic esophagitis in adults; food reintroduction identifies causative factors. Gastroenterology. 2012;142(7):1451-1459.e1; quiz e14-15. doi:10.1053/j.gastro.2012.03.001

How long should you stay on the Elimination Diet?

- IgG makes up 75% of total immunoglobulins
- **Half life of ~21-23 days**
- **Therefore, elimination diets should be at least 3 weeks to decrease IgG by half.**
- Length of elimination diet will be influenced by ATMs in patient's case, S&S, health status, etc.

Ig	Half-life
IgG[a]	23.0
IgG1[b]	21.0
IgG2[b]	21.0
IgG3[b]	7.1
IgG4[b]	21.0
Fc[a]	10-20
Fab[a]	0.18
L chain[a]	0.14
IgA[a]	5.8
IgM[a]	5.1
IgD[a]	2.8
IgE[a]	2.5

Improvements from Elimination Diets can continue past 3 weeks.

Reprinted from Immunology and Allergy Clinics of North America, Vol. 28, Bonilla, F. A., Pharmacokinetics of Immunoglobulin Administered via Intravenous or Subcutaneous Routes, Pages 803-819, Copyright 2008, with permission from Elsevier.

Comprehensive Elimination Diet

Foods to Avoid	Foods to Eat
■ Alcohol	■ Dairy alternatives
■ Beef	■ Fish
■ Chocolate	■ Fruits (only those specifically listed)
■ Coffee, soft drinks, tea	■ Game meats
■ Corn	■ Gluten-free whole grains (amaranth, buckwheat, millet, quinoa, rice, teff, etc.)
■ Dairy products	■ Healthy oils
■ Eggs	■ Legumes (except soy, peanuts)
■ Gluten-containing grains (all varieties of barley, rye, spelt, wheat)	■ Nuts (except peanuts)
■ Peanuts	■ Poultry
■ Pork	■ Seeds
■ Processed meats	■ Vegetables
■ Shellfish	
■ Soy and soy products	
■ Sugar (white sugar, high-fructose corn syrup, brown sugar, sucrose, etc.)	

Elimination Diet Food Plan

PROTEINS — *Proteins*

Servings/day_____

Lean, free-range, grass-fed, organically grown animal protein; non-GMO, organic plant protein; and wild-caught, low-mercury fish preferred.

Animal Proteins:

- ☐ Fish: Halibut, herring,● mackerel, salmon, sardines,● etc.–*1 oz*
- ☐ Meat: All wild game, buffalo, elk, lamb, venison–*1 oz*
- ☐ Poultry (skinless): Chicken, Cornish hen, turkey–*1 oz*

Plant Protein:

- ☐ Spirulina–*2 T*

Protein Powder:

- ☐ Check label for # grams/scoop (*1 protein serving=7 g*) Hemp, pea, rice

1 serving as listed = 35–75 calories, 5–7 g protein, 3–5 g fat, 0–4 g carbs

Average protein serving is 3–4 oz (size of palm of hand).

Eliminate

Beef/veal, canned meats, cold cuts, eggs, frankfurters, pork, shellfish, whey, soy (miso, natto, tempeh, tofu, textured vegetable protein)

LEGUMES — *Proteins/Carbs*

Servings/day_____

Organic, non-GMO preferred

- ☐ Bean soups–*¼ c*
- ☐ Dried beans, peas, or lentils (cooked)–*½ c*
- ☐ Flour, legume–*¼ c*
- ☐ Green peas (cooked)–*½ c*
- ☐ Hummus or other bean dip–*⅓ c*
- ☐ Refried beans, vegetarian–*½ c*

1 serving = 90–110 calories, 3–7 g protein, 0 fat, 15 g carbs

Eliminate

Soybean products (edamame, miso, soy sauce, tamari, tempeh, tofu, soy milk, soy yogurt, textured vegetable protein)

DAIRY ALTERNATIVES — *Proteins/Carbs*

Servings/day_____

Unsweetened, organic preferred

- ☐ Kefir: Coconut (plain)●▲–*4-6 oz*
- ☐ Milk: Almond, coconut, flaxseed, hazelnut, hemp, rice–*8 oz*
- ☐ Yogurt: Coconut (cultured)●▲–*4-6 oz*

1 serving = 25–90 calories, 1–9 g protein, 1–4 g carbs (nutritional values vary)

Eliminate

Butter, cheese, cottage cheese, cream, frozen yogurt, ice cream, milk, non-dairy creamers, soy milk, yogurt (dairy and soy), whey

NUTS & SEEDS — *Proteins/Fats*

Servings/day_____

Unsweetened, unsalted, organic preferred

- ☐ Almonds–*6*
- ☐ Brazil nuts–*2*
- ☐ Cashews●–*6*
- ☐ Chia seeds–*1 T*
- ☐ Coconut (dried)–*3 T*
- ☐ Flaxseed (ground)–*2 T*
- ☐ Hazelnuts–*5*
- ☐ Hemp seeds–*1 T*
- ☐ Macadamias–*2-3*
- ☐ Nut and seed butters–*½ T*
- ☐ Pecan Halves–*4*
- ☐ Pine nuts–*1 T*
- ☐ Pistachios–*16*
- ☐ Pumpkin seeds–*1 T*
- ☐ Sesame seeds–*1 T*
- ☐ Sunflower seeds●–*1 T*
- ☐ Walnut halves●–*4*

1 serving = 45 calories, 5 g fat

Eliminate

Mixed nuts (with peanuts), peanuts, peanut butter

FATS & OILS — *Fats*

Servings/day_____

Minimally refined, cold-pressed, organic, non-GMO preferred

- ☐ Avocado●–*2 T or ⅛ whole*
- ☐ Coconut milk, regular (canned)–*1½ T*
- ☐ Coconut milk, light (canned)–*3 T*
- ☐ Ghee/clarified butter (grass-fed)–*1 t*
- ☐ Olives:● Black, green, kalamata–*8*
- ☐ Oils, cooking: Avocado, coconut, grapeseed, olive (extra virgin), rice bran, sesame–*1 t*
- ☐ Oils, salad: Almond, avocado, flaxseed, grapeseed, hempseed, olive (extra virgin), pumpkin, safflower (high-oleic), sunflower (high-oleic), sesame, walnut–*1 t*
- ☐ Prepared salad dressing with acceptable oils–*2 T*

1 serving = 45 calories, 5g fat

Eliminate

Butter, corn oil, cottonseed oil, margarine/spreads, mayonnaise, peanut oil, shortening, soybean oil

KEY

● **High Histamine** ■ **Nightshades** ▲ **Fermented Foods**

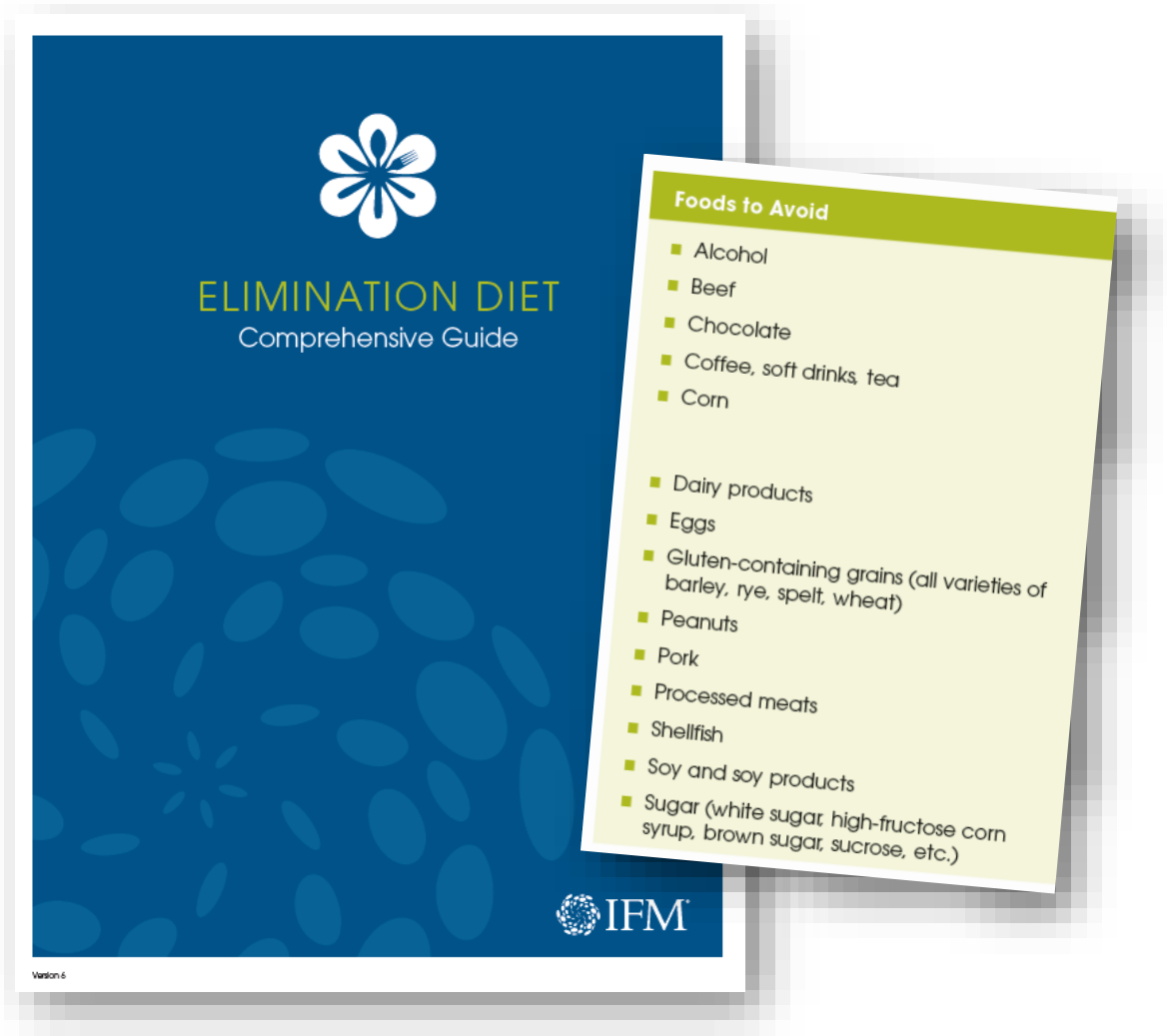
Notes: *Nutritional amounts are based on average values for the variety of foods within each food category.*

Dietary prescription is subject to the discretion of the health practitioner.

IFM

Version 10

Why Eliminate Particular Foods?



This is a great resource for your patients to review why they should eliminate particular foods and why they should consume others!

Foods Avoided on The Elimination Diet

- Foods that are avoided are those **generally eaten often, even several times daily**.
- These include wheat, gluten-containing grains, corn, dairy, beef/pork, soy and refined/artificial sweeteners.

Gluten-containing grains

- Proteins in gluten called gliadins can break down the microvilli (finger-like protrusions of intestinal cells) in the small intestine → intestinal permeability, food allergies/sensitivities/intolerances and/or other GI or autoimmune conditions.
- Many gluten-containing grains also treated with pesticides and herbicides can increase inflammation.

Brown AC. Gluten sensitivity: problems of an emerging condition separate from celiac disease. Expert Rev Gastroenterol Hepatol. 2012 Feb; 6(1):43-55. doi: 10.1586/egh.11.79.

Corn

- Corn is commonly added to many processed food products and fast foods.
- Most corn is genetically modified.

Soy

- Soy is commonly added to many processed food products.
- Most soy is also genetically modified.
  - GMO soy has been shown to have high residues of glyphosate.[1]

Bøhn T, Cuhra M, Traavik T, Sanden M, Fagan J, Primicerio R. Compositional differences in soybeans on the market: glyphosate accumulates in Roundup Ready GM soybeans. Food Chem. 2014 Jun 15;153:207-15. doi: 10.1016/j.foodchem.2013.12.054.

Beef/Pork

- Beef/pork is commonly added to many processed food products and fast foods. The Elimination Diet avoids foods that are those generally eaten often.
- Conventional sources are rich in toxins and the Elimination diet aims to reduce toxic burden.

Alisson-Silva F, Kawanishi K, Varki A. Human risk of diseases associated with red meat intake: Analysis of current theories and proposed role for metabolic incorporation of a non-human sialic acid. Mol Aspects Med. 2016 Oct;51:16-30. doi: 10.1016/j.mam.2016.07.002.

Dairy

- Dairy products such as milk, yogurt, cheeses, and butter, when eaten in large amounts, may be inflammatory in certain individuals due to…
  - The milk itself (lactose or casein); It is estimated that somewhere between 25% and 90% of the world's population is lactase-deficient to some extent.
  - The contaminants in the milk, such as growth hormone and antibiotics that were given to the cow.

Merras-Salmio L, Kolho KL, Pelkonen AS, Kuitunen M, et al. Markers of gut mucosal inflammation and cow's milk specific immunoglobulins in non-IgE cow's milk allergy. Clin Transl Allergy. 2014 Mar 5;4(1):8. doi: 10.1186/2045-7022-4-8

Eggs

- The Elimination Diet avoids foods that are those generally eaten ofte even several times daily including eggs.
- Eggs are also a common allergen.

Refined Sugars

- The Elimination Diet avoids foods that are those generally eaten often, even several times daily - including sugar
- In the Western diet, dietary intake of sugar is overwhelming.
  - Among 18 countries, the total sugar intake as a percentage of energy ranged between 13.5–24.6% in adults.[2]
- Dietary sugar intake has been shown to increase biomarkers of subclinical inflammation.[1]

1. Della Corte KW, Perrar I, Penczynski KJ, Schwingshackl L, Herder C, Buyken AE. Effect of Dietary Sugar Intake on Biomarkers of Subclinical Inflammation: A Systematic Review and Meta-Analysis of Intervention Studies. Nutrients. 2018 May 12;10(5). pii: E606. doi: 10.3390/nu10050606.
2. Newens KJ, Walton J. A review of sugar consumption from nationally representative dietary surveys across the world. J Hum Nutr Diet. 2016 Apr;29(2):225-40. doi: 10.1111/jhn.12338.

General Recommendation

- Start with the Comprehensive Elimination Diet, which avoids common allergens and inflammatory foods while promoting the ingestion of anti-inflammatory foods.

- **However, in certain circumstances…**
  - Consider a food plan geared specifically to **eliminate certain sugars**.
  - Consider a food plan to remove foods that contain one or more of the following: **histamines, nightshades, salicylates, or oxalates** These compounds found in certain vegetables and fruits may cause food intolerances in certain individuals.
    - Nightshades and foods high in histamine are highlighted on the food list to help individuals for whom these foods are a concern.

Vegetables

All vegetables are allowed: raw, steamed, sautéed, juiced or roasted vegetables

Exceptions: If someone has arthritis, they **may benefit by also excluding nightshades**: potatoes, eggplant, peppers, tomatoes, cayenne, chili peppers

What about Nightshades?

- Nightshade vegetables are rich in nutrients & phytonutrients; scientific evidence of a link between nightshades and inflammation is lacking.
- Commonly consumed nightshade plants only contain very small amounts of potentially problematic alkaloids.
- A few animal and in vitro studies suggest that compounds in nightshades may increase intestinal permeability, but more research is needed.
- Anatabine is a Solanaceae plant family alkaloid marketed in the United States as a dietary supplement. It has demonstrated anti-inflammatory effects in vivo and in vitro.

1. Lanier RK, Gibson KD, Cohen AE, Varga M. Effects of dietary supplementation with the solanaceae plant alkaloid anatabine on joint pain and stiffness: results from an internet-based survey study. *Clin Med Insights Arthritis Musculoskelet Disord*. 2013;6:73–84. Published 2013 Oct 21. doi:10.4137/CMAMD.S13001
2. Patel B, Schutte R, Sporns P, Doyle J, Jewel L, Fedorak RN. Potato glycoalkaloids adversely affect intestinal permeability and aggravate inflammatory bowel disease. Inflamm Bowel Dis. 2002 Sep;8(5):340-6. PubMed PMID: 12479649.
3. Jensen-Jarolim E, Gajdzik L, Haberl I, Kraft D, Scheiner O, Graf J. Hot spices influence permeability of human intestinal epithelial monolayers. J Nutr. 1998 Mar;128(3):577-81. PubMed PMID: 9482766.

Solanidine & tomatidine can trigger scar pruritus

- Demonstrated the usefulness of a diet excluding edible solanaceae (nightshades = potatoes, tomatoes, peppers and aubergines - eggplant) in patients with antihistamine-resistant scar pruritus.

- **Alkaloids in nightshades may be the cause** of pruritus as well as joint pain/stiffness.

Alonso PE, Rioja LF. Solanidine and tomatidine trigger scar pruritus. *Burns*. 2016 May;42(3):535-40. doi: 10.1016/j.burns.2015.09.019.

Fruit

All fruits are allowed:

- Fresh, canned in own juices
- Cooked, poached, dried (unsulfured)
- Frozen
- Diluted juices

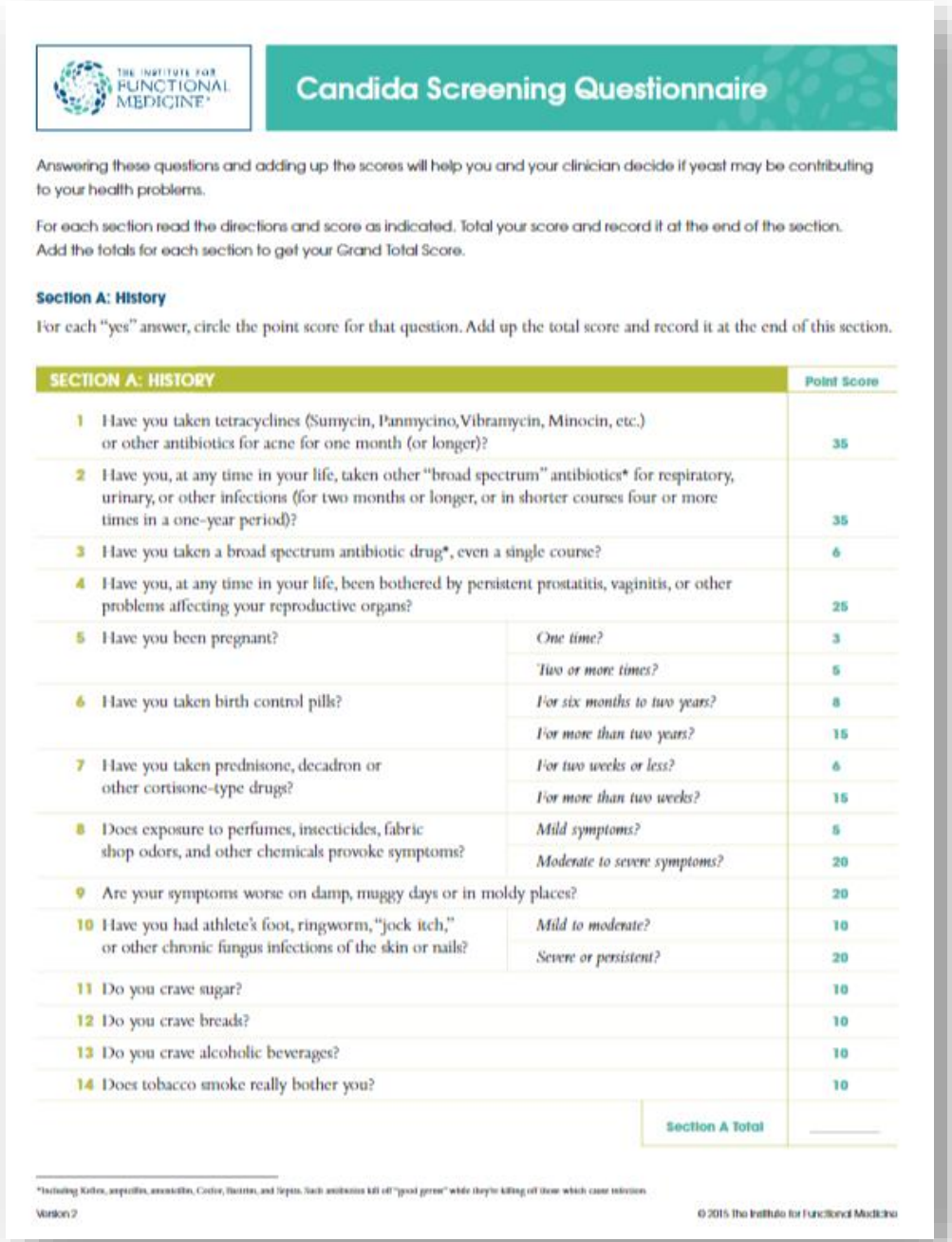
Exceptions:

If you suspect intestinal candida, limit fruits or avoid completely during these initial three weeks.

See References: Limit/Remove all Fruits for Candida

Candida Screening Questionnaire

In your Toolkit!



THE INSTITUTE FOR FUNCTIONAL MEDICINE

Candida Screening Questionnaire

Answering these questions and adding up the scores will help you and your clinician decide if yeast may be contributing to your health problems.

For each section read the directions and score as indicated. Total your score and record it at the end of the section. Add the totals for each section to get your Grand Total Score.

Section A: History

For each "yes" answer, circle the point score for that question. Add up the total score and record it at the end of this section.

SECTION A: HISTORY		Point Score
1 Have you taken tetracyclines (Sumycin, Panmycino, Vibramycin, Minocin, etc.) or other antibiotics for acne for one month (or longer)?		35
2 Have you, at any time in your life, taken other "broad spectrum" antibiotics* for respiratory, urinary, or other infections (for two months or longer, or in shorter courses four or more times in a one-year period)?		35
3 Have you taken a broad spectrum antibiotic drug*, even a single course?		6
4 Have you, at any time in your life, been bothered by persistent prostatitis, vaginitis, or other problems affecting your reproductive organs?		25
5 Have you been pregnant?	*One time?*	3
	Two or more times?	5
6 Have you taken birth control pills?	*For six months to two years?*	8
	For more than two years?	15
7 Have you taken prednisone, decadron or other cortisone-type drugs?	*For two weeks or less?*	6
	For more than two weeks?	15
8 Does exposure to perfumes, insecticides, fabric shop odors, and other chemicals provoke symptoms?	*Mild symptoms?*	5
	Moderate to severe symptoms?	20
9 Are your symptoms worse on damp, muggy days or in moldy places?		20
10 Have you had athlete's foot, ringworm, "jock itch," or other chronic fungus infections of the skin or nails?	*Mild to moderate?*	10
	Severe or persistent?	20
11 Do you crave sugar?		10
12 Do you crave breads?		10
13 Do you crave alcoholic beverages?		10
14 Does tobacco smoke really bother you?		10
	Section A Total	

*Including Keflex, ampicillin, amoxicillin, Ceclor, Bactrim, and Septra. Such antibiotics kill off "good germs" while they're killing off those which cause infection.

Version 2

Limit/Remove all Fruits for Candida

While there is limited research on this specific diet and decrease in the growth of candida specifically, it is known and well researched that candida species utilize glucose as an energy source.

- Glucose has also been found to be important in different virulence mechanisms including adhesion, oxidative stress resistance, biofilm formation, morphogenesis, and antifungal drug tolerance.[1]
- In vitro studies have found that dietary carbohydrates modulate biofilm development on denture surfaces utilizing these virulent mechanism.[2]
- Although it is not well known whether an anti-candida diet can modulate the microbiome, it may be a supportive therapeutic intervention to decrease the fuel source for Candida species. Candida has been associated with changes in microbial diversity in the small intestines and the oral microbiota, leading to dysbiosis.[3]
- Removal of sugar can also supportive in the inflammatory process and weakening the immune system. Immunosuppression in patients with diabetes in an important factor in the development of thrush and fungal infections.[4]

See References: Limit/Remove all Fruits for Candida

References: Limit/Remove all Fruits for Candida

1. Van Ende M, Wijnants S, Dijck PV. Sugar sensing and signaling in candida albicans and candida glabrata. *Front. Microbiol.* 2019; 10(99): 1-16.
2. Santana IL, Gonçalves LM, de Vasconcellos AA, da Silva WJ, Cury JA, Del BelCury AA. Dietary carbohydrates modulate Candida albicans biofilm development on the denture surface. PLoS One. 2013 May 30;8(5):e64645. doi:10.1371/journal.pone.0064645.
3. Bertolini M, Ranjan A, Thompson A, et al. Candida albicans induces mucosal bacterial dysbiosis that promotes invasive infection. *PLoS Pathog*. 2019;15(4):e1007717. Published 2019 Apr 22. doi:10.1371/journal.ppat.1007717
4. Martins N, Ferreira IC, Barros L, Silva S, Henriques M. Candidiasis:predisposing factors, prevention, diagnosis and alternative treatment.Mycopathologia. 2014 Jun;177(5-6):223-40. doi: 10.1007/s11046-014-9749-1.
5. Otašević S, Momčilović S, Petrović M, Radulović O, Stojanović NM, Arsić-Arsenijević V. The dietary modification and treatment of intestinal Candida overgrowth - a pilot study. J Mycol Med. 2018;28(4):623-627. doi:10.1016/j.mycmed.2018.08.002

Grains: **Rice**

All types: brown, white, basmati, jasmine, red, black, etc.

- 100% rice cakes
- 100% rice crackers
- rice noodles

Dry cereals:

- Puffed rice cereal, rice milk (read all ingredients, do not use if has corn or other prohibited ingredients)
- Crispy Brown Rice
- 100% rice bread

Other “Grains”

Rice keeps it simple. BUT can also add:

- **Quinoa** (highly recommended; actually a seed)
- **Millet**
- **Buckwheat** (actually a seed)
- **Amaranth** (actually a fruit)
- **Teff**
- **Tapioca**

Protein Sources

Allowed:

- Poultry
- Fish
- Lamb
- Wild meats
- Pine nuts, flax seeds, coconut
- Beans & lentils (except soy)

Exceptions:

Some clinicians exclude beans and lentils due to lectins.

Lectins: Summary

- Only in-vitro and animal studies
- Non-immune mediated reactions to wheat: FODMAPs or lectins?
- **Benefits of Lectins**:
  - Plant lectins have microbicidal activity.[1]
  - Certain lectins also enhance the phagocytic activity of macrophages during microbial infections.[1]
  - Plant lectins promote autophagy and apoptosis and induce immunomodulatory activates.[2]

1. Mishra A, et al. Structure-function and application of plant lectins in disease biology and immunity. Food Chem Toxicol. 2019 Sep 19;134:110827. doi: 10.1016/j.fct.2019.110827.
2. Bhutia SK, et al. Plant lectins in cancer therapeutics: Targeting apoptosis and autophagy-dependent cell death. Pharmacol Res. 2019 Jun;144:8-18. doi: 10.1016/j.phrs.2019.04.001

Histamine Intolerance

- High histamine foods – products of microbial fermentation. Aged cheese, sauerkraut, wine, processed meats, older foods, citrus. Dose dependent.
- Certain medication can worsen histamine intolerance. Analgesics, narcotics…
- Vitamins C and B6 can help, by supporting DAO production
- Supplements of DAO?
- 5 R program

1. Hagel AF, et al. Intravenous infusion of ascorbic acid decreases serum histamine concentrations in patients with allergic and non-allergic diseases. Naunyn Schmiedebergs Arch Pharmacol. 2013Sep;386(9):789-93. doi: 10.1007/s00210-013-0880-1.
2. Martner-Hewes PM, Hunt IF, Murphy NJ, Swendseid ME, Settlage RH. Vitamin B-6 nutriture and plasma diamine oxidase activity in pregnant Hispanic teenagers. *The American Journal of Clinical Nutrition.* 1986; 44(6): 907–913.
3. Schnedl WJ, Schenk M, Lackner S, et al. *Food Sci Biotechnol.* 2019; 28: 1779. https://doi.org/10.1007/s10068-019-00627-3

Getting Started

- Beginning the elimination diet **starts at least 1-2 weeks prior**, not at the last minute
  - Eliminate caffeine
  - Make a shopping list
  - Choose a support system
  - Consider using a Medical Food

Helpful Hints

- **Cook extra** chicken, sweet potatoes, and rice that can be reheated for snacking or another meal.
- If coffee consumed on a regular basis it is wise to **slowly reduce caffeine intake** rather than abruptly stop it (try drinking ½ caffeinated, ½ decaf for a few days)
- **Read labels** - only obtain cold pressed method, avoid all ingredients on “Hidden Foods”, choose organic
- Look for **free range animal protein**
- **Eat regular meals.** Be sure not to go hungry: It is not calorie-restricted!
- **Stay hydrated!**

Snacking

Examples:

- Fruit
- Left-over chicken
- Bowl of soup with rice crackers
- Vegetables and salsa

Carry food with you to keep blood sugar levels even

Planning

Stock & Unstock the kitchen

How to eat
out comfortably

Make snack food

Fresh food when possible

Plan Meals

Planned leftovers

Pitfalls

- **Hidden foods:** labeling now requires disclosure of milk, eggs, soy, wheat, peanuts, fish/shellfish
  - Labeling can either be in ingredients list or a “contains” statement (must read both)
  - E.g., Egg substitute is made with egg white protein; it is a useful substitute for those with concern re: cholesterol but not re: allergy

Franklin W, Pandolfo J. Latex as a food allergen. N Engl J Med. 1999;341(24):1858. doi:10.1056/NEJM199912093412419

Pitfalls

Common Misconceptions

- That you can't eat enough and that you'll be hungry
- That it is expensive
- That you have to be 100% compliant to gain benefit

Pitfalls

Cross-contamination

- Cutting boards, grills, bulk bins, utensils, manufacturer
- Latex allergy can cause symptoms with consumption of foods handled with latex gloves

Franklin W, Pandolfo J. Latex as a food allergen. N Engl J Med. 1999;341(24):1858. doi:10.1056/NEJM199912093412419

Common Questions

Let’s make a deal!

Motivations

Emotions

Success Stories

Discuss Barriers

3-4 Weeks

Broker The Deal

Science

Tools & Support

Practical Information

- Follow “foods to include and exclude” page and/or the 7-day dietary menus.
- Prepare the kitchen to be successful.
- Educate patients on:
  - ✓hidden sources of allergens
  - ✓substitutions and snacks
  - ✓very strenuous exercise may need to be curtailed
  - ✓potential reactions
- Consider support with nutritional supplementation or food supplement.

Screen Carefully

- Emaciated
- Children
- Women - pregnant or lactating
- Individuals with Eating Disorders

Hidden Foods

Hidden Ingredients

- **Milk** - casein, caseinate, lactose and whey are all milk derivatives (non-dairy substitutes may contain these)
  - Assume milk is present in bread, margarine, ice cream, even when labeled “non-fat,” sausage, hamburger, plain chocolate, sherbert and other sweets
- **Eggs** - vitellin, ovovitellin, albumin are all egg derivatives found in baking powder, cakes, croissants, pastries, salad dressings, luncheon meats, sausage

Hidden Ingredients

- **Wheat**- wheat grain, starch, food starch, flour, bran, farina
  - Hidden sources of wheat- baking powder, vanilla, sausage, vinegar, alcoholic beverages, rye and barley (cross contaminated)
- Milk, egg, and wheat elimination due to similarities
- **Corn** – corn meal, corn starch, corn syrup, dextrin, HFCS, maltodextrin, modified food starch, mannitol….
- **Example:** Salad dressings often have sugar, high fructose corn syrup, wheat, milk, etc.

Substitutions to Use in Elimination Diets

To replace:	Use:
Milk	Rice, almond, coconut, or homemade nut milk (1/2 cup nuts or seeds blended with 1 cup water until smooth)
Cheese	Rice or almond; read labels for casein-free brands.
Eggs	*Energe* egg replacer; or blend 1 T. flax seeds in ¼ cup water and allow to thicken.
P Butter	Pine tree nuts
Breading	Grind any allowable rice cracker and use for breading.
Ice Cream	Rice Dream; 100% frozen fruit juice bars (Dole or Tazo brands); Cascadian Farms berry sorbet
Soda	Knudsen, Tazo brands of fruit spritzers, seltzer and juice; water; diluted juice
Jams	All-fruit jams (read labels carefully)
Sugar	Fruit juice concentrate (Mystic Lake Dairy); brown rice syrup; Fruit Source (a combination of fruit juice concentrate and brown rice syrup); molasses
Pasta	Rice noodles (e.g., Mrs. Leepers, Risio, and Food for Life brands); 100% buckwheat udon noodles; cellophane noodles made from bean threads
Wheat	Rice cakes, rice crackers, rice almond and rice pecan breads, Energe brown rice or tapioca bread
Wheat cereals	Perky's Nutty Rice, Crispy Brown Rice, puffed rice, puffed millet, cream of rice
Wheat flour	Rice flour, amaranth, quinoa, millet, teff, arrowroot, tapioca bean; nut and seed flours (use in combination with others to replace the full amount of wheat flour)

Food Substitutions

The following is a list of substitutions for foods that are avoided while on the Elimination Diet.

When you want this...	...eat this
Milk (for cereal or shakes), yogurt, cheese	Milk substitutes: unsweetened rice, oat, hemp, almond, sunflower, hazelnut, and coconut milk; unsweetened coconut yogurt or kefir; read labels to ensure substitute is lactose/casein-free
Hot cereal, such as Wheatena or other hot cereal	Oatmeal or steel-cut oats, rice cereal, quinoa flakes, or Apple Cinnamon Amaranth Porridge*
Cold cereal	Puffed rice and millet, crispy brown rice, amaranth cereals; all labeled gluten-free (note that there tends to be corn in foods labeled gluten-free)
Bread, crackers, & pasta	Gluten-free breads, crackers, or pasta made with brown rice, oats, teff, millet, quinoa, amaranth, tapioca, buckwheat, sorghum, potato flour, and garbanzo bean flour; cellophane noodles from bean threads; check labels for gluten-free with acceptable sweeteners
Quick breads	Chia Seed Applesauce Bread*, Pumpkin Oatmeal Pancakes*
Breading	Grind any allowable rice crackers or bread, or use almond meal (any nut meal), ground chia seeds, coconut, or coconut flour
Eggs	Store-bought egg-replacer, or blend 1 Tbsp. flax meal or chia seeds in blender with ¼ cup water and allow to thicken for a few minutes
Peanut butter	Nut butters made from almonds, cashews, macadamias, walnuts, hazelnuts or pumpkin and sesame seeds (tahini)
Ice cream	Various brands of rice or coconut-based frozen desserts; read labels carefully for approved sweeteners
Soft drinks	Sparkling or mineral water, mixed with a squeeze of lemon or lime, or with a small amount of your favorite juice (¾ water, ¼ juice); filtered or purified water with slices of lemon or lime; unsweetened coconut water
Coffee/tea	Herbal teas
Butter or margarine	Coconut oil or ghee (clarified butter)
Sugar & sweeteners	Unsweetened apple butter, brown rice syrup, blackstrap molasses, pure maple syrup, raw honey, coconut sugar, agave nectar, lo han, erythritol, and stevia.

Table in the Elimination Diet Comprehensive Guide!

Healthy Substitutions

Typical Choice	Healthier Choice
• Soda	• Seltzer and juice
• Hamburgers	• Turkey burgers
• Hot dogs	• Chicken or turkey dogs
• Milk	• Oat, rice, or almond milk
• French fries	• Baked white or sweet potato fries
• Milkshakes	• Homemade fruit smoothies
• Ice cream	• Rice Dream “ice cream”
• Cookies	• Fruit-sweetened cookies made with rice and/or oat flour

Healthy Snacks

- Organic fresh fruits/dried fruits/fruit kabobs
- Homemade, unsweetened applesauce with cinnamon or baked apples
- Fruit smoothies
- Raw green beans, carrot, cucumber, and celery sticks (with or without salsa or hummus)
- Carrot chips or sweet potato chips and salsa

Practical Information

- **Clear written explanations** will save time.
- Expect initial overview and “how-to” to take approximately 30-45 minutes.
- Important to **follow up at 1 week to 10 days**: phone consult generally acceptable depending upon patient.

Remember…

to carefully screen pharmaceutical preparations (toothpaste, drugs- including oral contraceptives)

Look for food coloring, especially tartrazine.

Elimination Diet- Be Mindful of Potential Nutritional Deficiencies

Omission of certain foods can cause “gaps” in nutrition.

- **Milk and milk products:** a good source of calcium, riboflavin and one of few sources of iodine.
- **Wheat:** refined foods are a high source of B vitamins in SAD diet
- **Beef/Pork/Chicken:** a good source of iron
- **Eggs:** a good source of vitamin A, B vitamins, and cholesterol

1. Kim J, Kwon J, Noh G, Lee SS. The effects of elimination diet on nutritional status in subjects with atopic dermatitis. Nutr Res Pract. 2013;7(6):488–494. doi:10.4162/nrp.2013.7.6.488
2. Vici G, Belli L, Biondi M, Polzonetti V. Gluten free diet and nutrient deficiencies: A review. Clin Nutr. 2016;35(6):1236-1241. doi:10.1016/j.clnu.2016.05.002

IFM TOOLKIT – FOOD SOURCES CALCIUM

1 Cup Broccoli = 178 mg
3 oz. tofu with calcium = 400-600mg
3 oz. sardines = 324mg
2 T almond butter = 86mg
1 Cup greens = 100mg

Food Sources: Calcium

Calcium is a mineral, which is the primary component of bone and teeth. Calcium also participates in communication between cells, as well as, muscle function, blood clotting, and regulating heart rhythm.[1,3] The body works very hard to keep a steady level of calcium in the blood. If the blood level of calcium decreases, even slightly, the body will take calcium from the bones to ensure that the blood level remains steady.

When there is not enough in the diet, the body takes calcium from the bones to maintain a steady blood level and support other critical functions in the body. Over time, the depletion of calcium in the bones can result in low bone density, called osteopenia. Over time, osteopenia can lead to osteoporosis, which increases the risk of bone fractures.

Calcium is widely available from foods and supplements. Both calcium content and bioavailability should be considered when selecting food and supplemental sources of calcium. Beyond dairy sources, a variety of other foods such as certain plants, legumes, seeds, or soy products such as tofu, can meet calcium needs when consistently included the diet. Talk to your Functional Medicine provider about calcium supplementation, as there are complementary nutrients (vitamin D, magnesium, vitamin K) which may also be supportive for bone and overall health.[2]

The RDA for calcium is as follows:

- **Females, ages 19-50**: 1,000 mg per day
- **Females, ages 51-70+**: 1,200 mg per day
- **Males, ages 19-70**: 1,000 mg per day
- **Males, ages 71+**: 1,200 mg per day

Food, standard serving size	Average Calcium Content (in milligrams)
Plain yogurt, 8 ounces	415 mg
Canned sardines, 3 ounces	325 mg
Cheddar cheese, 1.5 ounce	300 mg
Milk, reduced fat or 2%, 1 cup	295 mg
Firm tofu, ½ cup	253 mg
Collard greens, 1 cup	198 mg
Canned salmon, 3 ounces	181 mg
Sesame seeds, 2 Tbsp.	175 mg
Kale, 1 cup	94 mg
Broccoli, 1 cup	86 mg
White beans, ½ cup	81 mg
Bok choy, 1 cup	74 mg
Dried figs, ¼ cup	61 mg
Orange, 1 medium	60 mg
Amaranth, 1/2 cup cooked	58 mg

References

1. Lewis, J. Merck Manual, Professional Version. Overview of Disorders of Calcium Concentration. https://www.merckmanuals.com/professional/endocrine-and-metabolic-disorders/electrolyte-disorders/overview-of-disorders-of-calcium-concentration?query=calcium#v1150111. Updated March 2018. Accessed March 18, 2020.
2. Oregon State University, Linus Pauling Institute. Micronutrient Information Center. Calcium. https://lpi.oregonstate.edu/mic/minerals/calcium. Updated September 2017. Accessed March 18, 2020.
3. U.S. Department of Health and Human Services, National Institutes of Health, Office of Dietary Supplements. Calcium. https://ods.od.nih.gov/factsheets/Calcium-HealthProfessional/. Updated February 14, 2020. Accessed March 18, 2020.

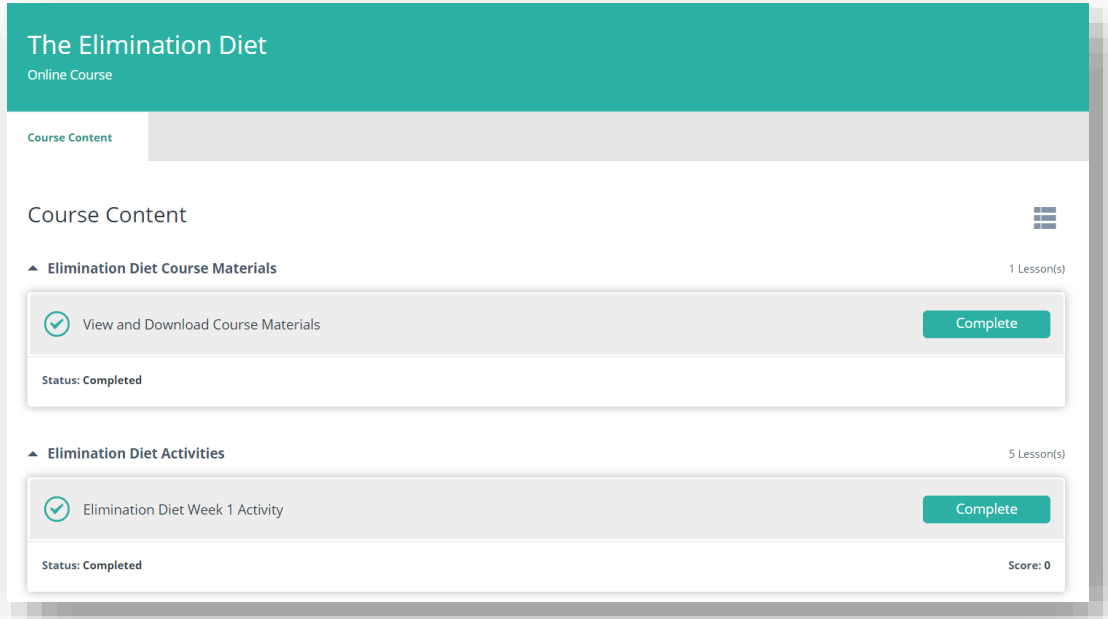
Version 3

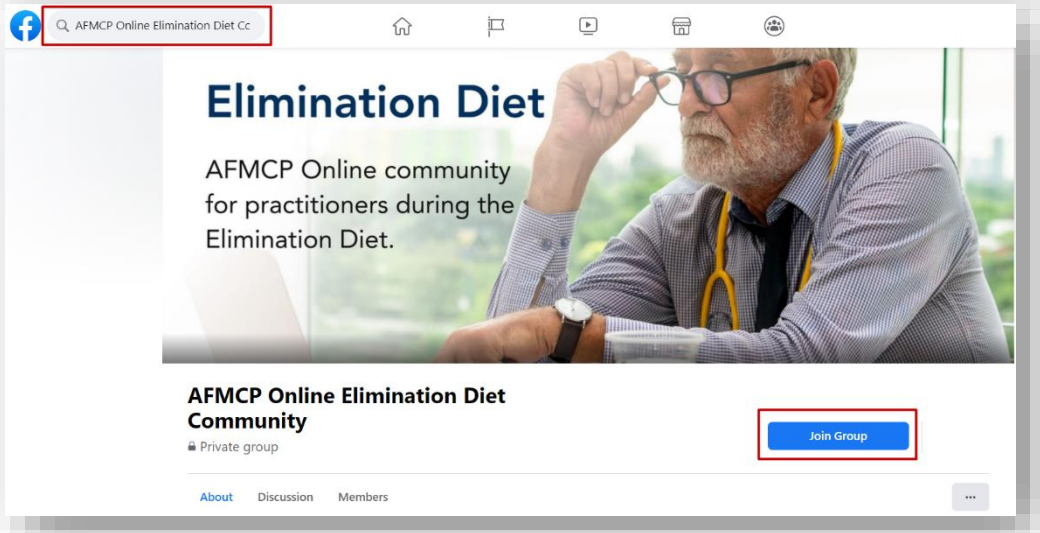
Elimination Diet Challenge

1. An opportunity to trial an elimination diet to identify common obstacles and strategies to overcome them
2. A unique chance to use this intervention with a group of colleagues to support you

Elimination Diet Challenge

1. Find the Elimination Diet course in your Course Materials.
2. Join the “AFMCP Online Elimination Diet Community” Facebook group for connecting with others doing the challenge and sharing stories/tips!





Part 3

Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Evaluate problems and implement practical solutions for patients on an elimination diet.

WHAT IF

Reactions on Elimination Diet

- How many of you have done an elimination diet on your patients?
- Do your patients have adverse reactions?
- When do they have that reaction?
  - Day 1?
  - Day 5-10?

Possible Reactions

- Herxheimer
- Withdrawal
- GI Function
- Hypoglycemia
- Coffee/Sugar
- Weight loss

Discussed more in the Post-Course Elimination Diet Challenge!

Herxheimer Reaction on Elimination Diets

- When you start an Elimination diet, you lower your exposure to toxins and your body starts to remove and release the harmful substances already present in your body (ie: microorganisms in the body such as fungi, yeasts and bacteria).
  - However, when an Elimination Diet is started quickly, it is normal for endotoxin release to occur faster than the body's detoxification system can allow leading to Herxheimer reactions.
- Herxheimer reactions: due to an increase release of endotoxins.

Heine H, Rietschel ET, Ulmer AJ. The biology of endotoxin. Mol Biotechnol. 2001 Nov;19(3):279-96. Review.

Herxheimer Reaction: Symptom Presentation

- **Die-off symptoms are normal and are a sign that things are on the right track.**
  - Toxins are being removed from your bloodstream and the various systems in your body are undergoing serious detoxification.
- **Common symptoms of die-off include**
  - Fatigue, Brain fog, GI symptoms (nausea, gas, diarrhea, bloating, constipation), cold symptoms (low-grade fever, headache, sore throat), flu-like symptoms, muscle/joint soreness or stiffness

1. Butler T. The Jarisch-Herxheimer Reaction After Antibiotic Treatment of Spirochetal Infections: A Review of Recent Cases and Our Understanding of Pathogenesis. Am J Trop Med Hyg. 2017;96(1):46–52. doi:10.4269/ajtmh.16-0434

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

Minimizing Reactions

Herxheimer

Withdrawal

GI Function

Hypoglycemia

Coffee/Sugar

Weight loss

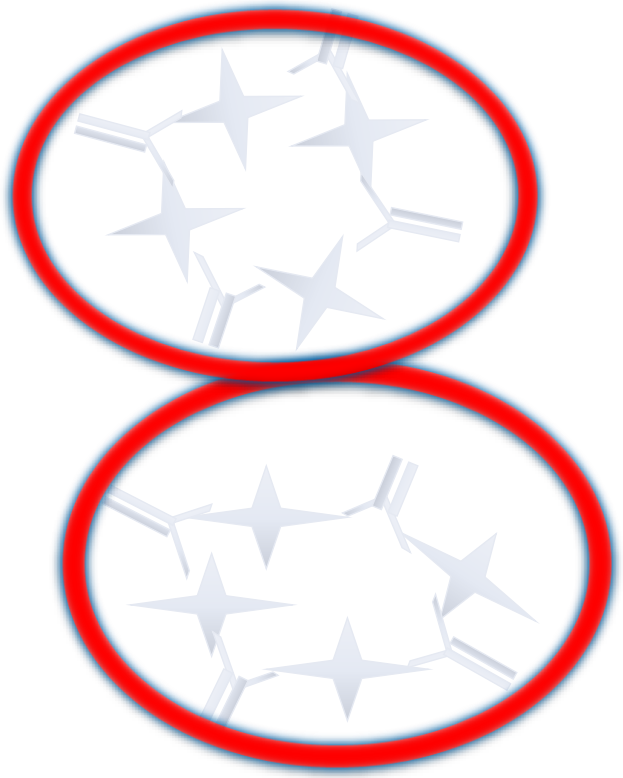
- Activated charcoal, 4 capsules 2-3x daily
- Buffered C, 1 g 3-4x daily
- Stay hydrated
- Keep your bowels moving (consider Mg Citrate and 2 tbsp flaxseed meal/day)
- Encourage restful sleep
- Optimize detoxification pathways before Elimination diet

Immune Complexes: ↑ Reactions on Elimination

Antigen Excess:

When antigens greatly outnumber antibodies, fewer immune complexes are formed.

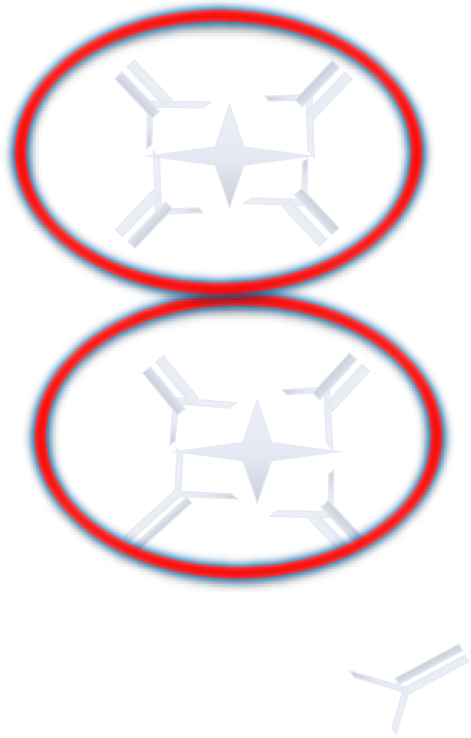
Symptomatology is lower.



Antigen/ Antibody Equivalency:

When antibodies and antigens are in equal amounts, large reactive Immune complexes are formed.

Symptomatology is higher.



Antibody Excess:

When antibodies are in excess, immune complexes again smaller and removed quickly.

Symptomatology is lower.

Immune complex stability:

driven by the binding between Fc domains and Fc domain sensors

Antibodies collaboratively form immune complexes that drive innate immune effector function: **sequestration and uptake of pathogens, clear toxins, eliminate infected cells, increase antigen presentation and regulate inflammation.**

1. **Antigen–antibody complex quality** is influenced by how *strongly* the antibody will bind to Fc receptors and **the ratio of antigen to antibody** (which will greatly affect the size and shape of immune complexes).
2. **The size and shape of the immune complex** influences both the number and conformation of Fc domain sensors that may be engaged on the surface of innate effector cells.

1. Lu LL, Suscovich TJ, Fortune SM, Alter G. Beyond binding: antibody effector functions in infectious diseases. *Nat Rev Immunol*. 2018;18(1):46–61. doi:10.1038/nri.2017.106

Immune complex stability:

driven by the binding between Fc domains and Fc domain sensors

- **In a state of antigen excess (and antibody scarcity) or antibody excess (and antigen scarcity), immune complex quality shifts towards small complexes that cluster fewer Fc domain sensors on the surface of innate immune cells.**
- **In the optimal antibody:antigen ratio state -** larger, more stable immune complexes are generated that are able to cluster a larger number of Fc domain sensors, thereby driving optimal immune reactions.

1. Lu LL, Suscovich TJ, Fortune SM, Alter G. Beyond binding: antibody effector functions in infectious diseases. *Nat Rev Immunol*. 2018;18(1):46–61. doi:10.1038/nri.2017.106

Minimizing Reactions

- Herxheimer
- **Withdrawal**
- GI Function
- Hypoglycemia
- Coffee/Sugar
- Weight loss

Alka-Seltzer® Gold

Minimizing Reactions

- Herxheimer
- Withdrawal
- **GI Function**
- Hypoglycemia
- Coffee/Sugar
- Weight loss

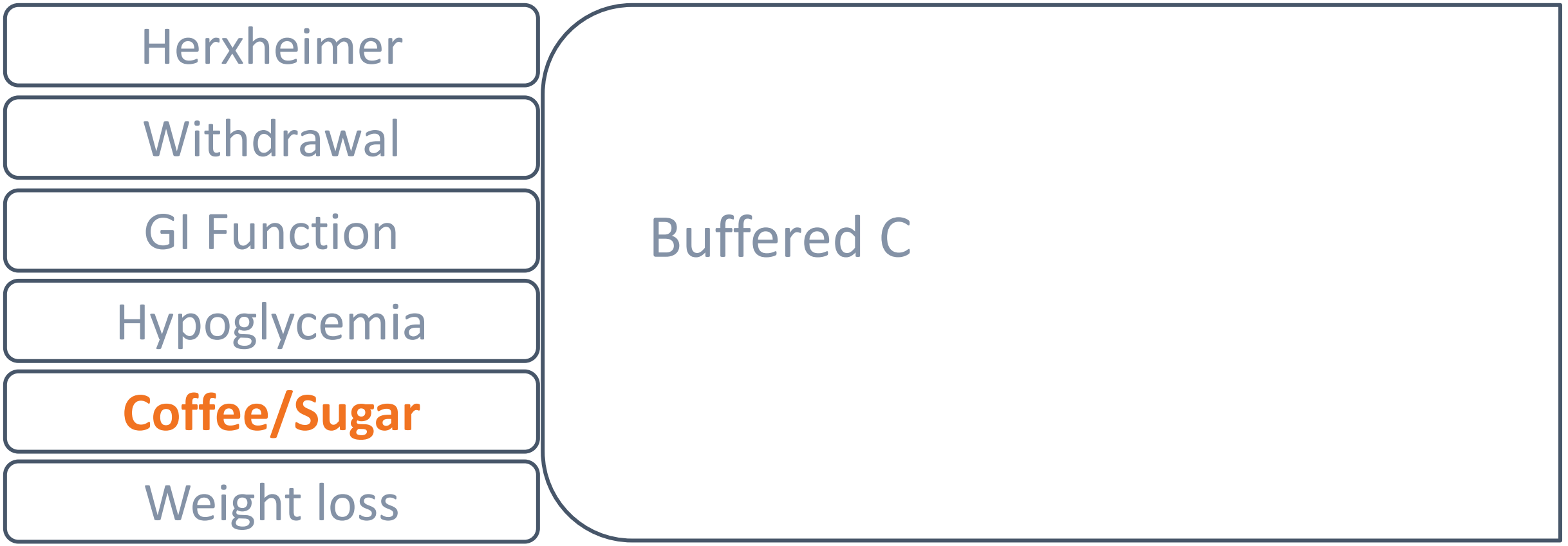
- Fiber
- Chamomile/peppermint tea
- Enteric-coated peppermint capsules
- Magnesium citrate and buffered ascorbic acid for constipation

Minimizing Reactions

- Herxheimer
- Withdrawal
- GI Function
- **Hypoglycemia**
- Coffee/Sugar
- Weight loss

Protein/fats, eating frequently

Minimizing Reactions



Minimizing Reactions

- Herxheimer
- Withdrawal
- GI Function
- Hypoglycemia
- Coffee/Sugar
- **Weight loss**

Minimizing Reactions

- **Herxheimer ("die off")**
  - Activated charcoal, 4 capsules 2-3x daily
  - Buffered C, 1 g 3-4x daily
- **Detoxification overload and "withdrawal" symptoms**
  - Premium digestive aid
- **Changes in GI function**
  - Fiber
  - Chamomile/peppermint tea
  - Enteric-coated peppermint capsules
- **Hypoglycemia**
  - Protein/fats; frequent meals
- **Coffee and simple sugar reactions**
  - Buffered C
- **Weight loss**

Performance Objectives

- What
- Why & When
- How
- What If
- Assess

Systematically assess patient response to an elimination diet.

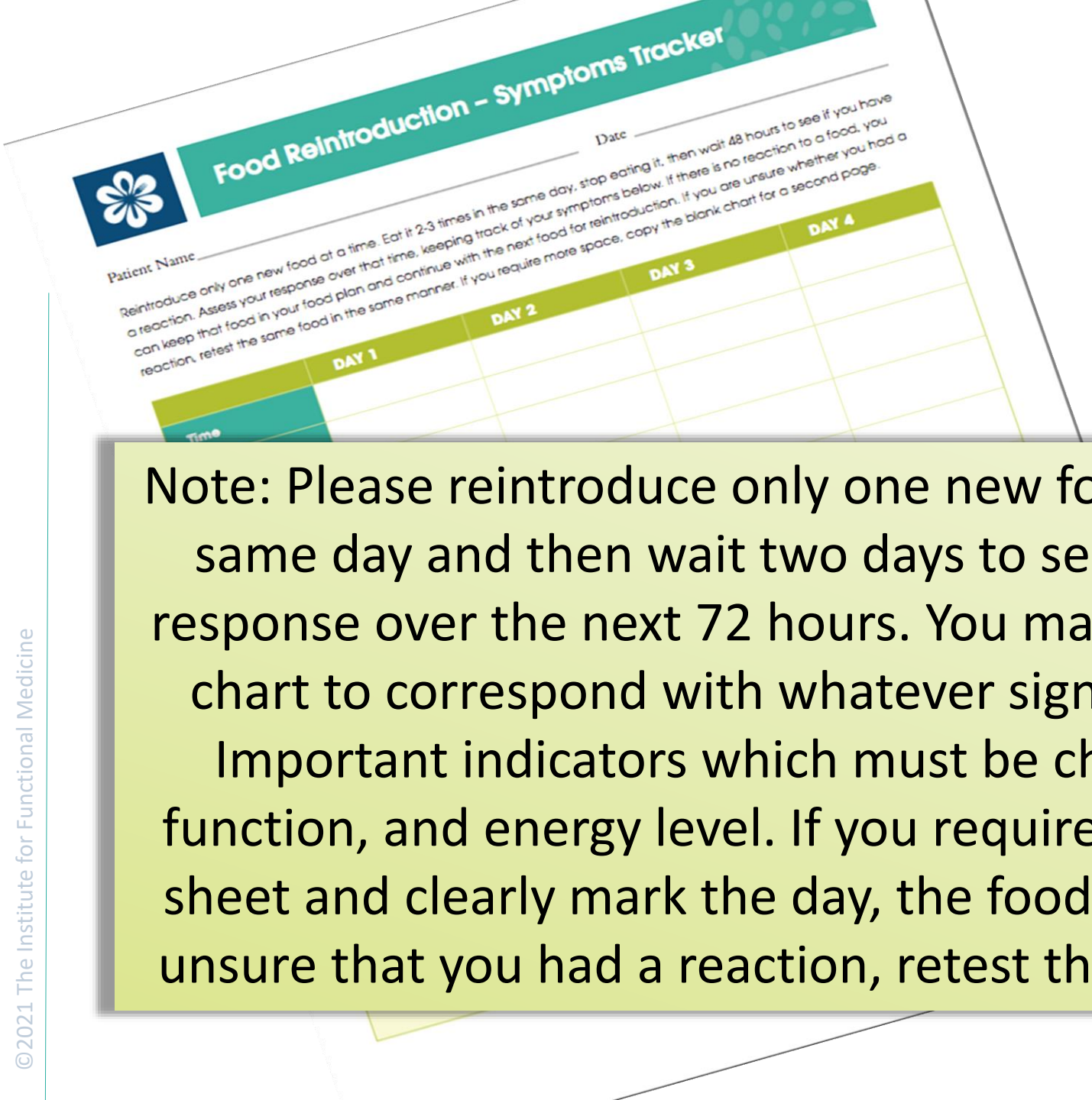
ASSESS

Reintroduction Steps

ASSESS AT 3-6 WEEKS (GENERALLY)

Reintroduction Steps

CAREFUL FOLLOW-UP IMPORTANT – FOOD INTRODUCTION RESPONSE CHART



Food Introduction Response Chart

Note: Please reintroduce only one new food at a time. Ingest it twice in the same day and then wait two days to see if have a reaction. Assess your response over the next 72 hours. You may insert different headings on this chart to correspond with whatever signs or symptoms you may display. Important indicators which must be charted include digestion, bowel function, and energy level. If you require more space, use the back of this sheet and clearly mark the day, the food, and your symptom(s). If you are unsure that you had a reaction, retest the same food in the same manner.

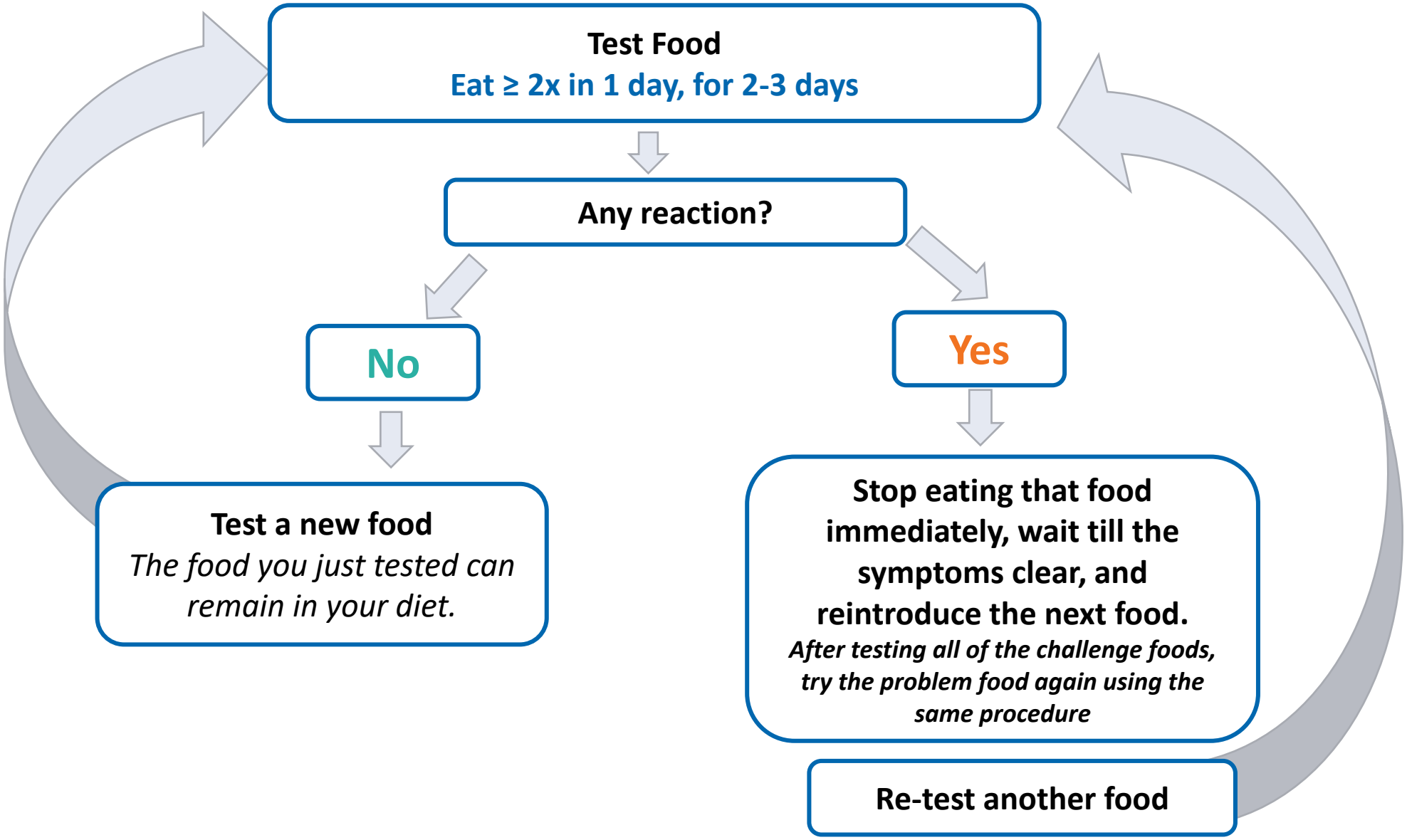
Common Reactions During Food Challenges

- Headache, sugar cravings
- Rashes, eczema
- Muscle and/or joint aches
- Digestive complaints
- Sinus congestion
- Mood swings, irritability, concentration problems
- Fatigue, insomnia, hyperactivity, rapid pulse

Reintroduction Considerations: Patients with Allergies (IgE)

- A patient who has had an actual or potentially severe reaction to a food such as anaphylaxis or laryngeal/tongue edema should not be allowed to undertake a challenge exposure with that food **except under very close supervision.**
- Those persons should also be supervised very carefully with challenges of food in same family.
- Subjects who suffer from IgE-mediated disease should be considered capable of developing anaphylaxis even if this has not previously occurred.

Reintroduction of foods after an elimination diet



Full or modified elimination diet: 2-4 weeks minimum

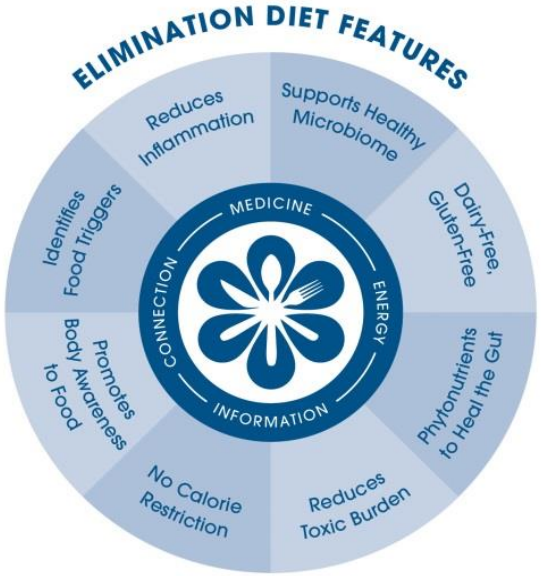
The next step…

REINTRODUCTION OF FOODS

Types and Amounts of Foods to Re-Introduce

Food/Group	Challenge Food (Examples)	Average Portion Size
Wheat/gluten	100% whole wheat cereal (e.g., Wheatena) 100% whole wheat noodles	½ cup 1 cup
Dairy	Milk (skim, 1%, 2%, or whole milk) Cheese (any whole milk cheese, no additives)	1 cup 1 ounce
Corn	Fresh or frozen corn kernels	½ cup or 1 small cob
Pork	Cooked meat, not in a casserole	3-6 ounces
Egg	Hard or soft boiled or poached	2 eggs
Peanuts	Raw or dry roasted peanuts Peanut butter made of 100% peanuts only	¼ cup nuts 2 T peanut butter
Soy	Edamame Soy milk Tofu, tempeh	½ cup 1 cup ½ cup
Shellfish	Challenge individual shellfish each time*	3-6 ounces
Barley, rye	Cooked barley or rye cereal 100% rye crackers	½ cup 2-3 crackers

It is not uncommon to react to only one type of shellfish, such as shrimp, but not others, so it is wise to challenge each separately.



Reintroduction Steps

CHALLENGE ONLY SINGLE FOODS AT A TIME

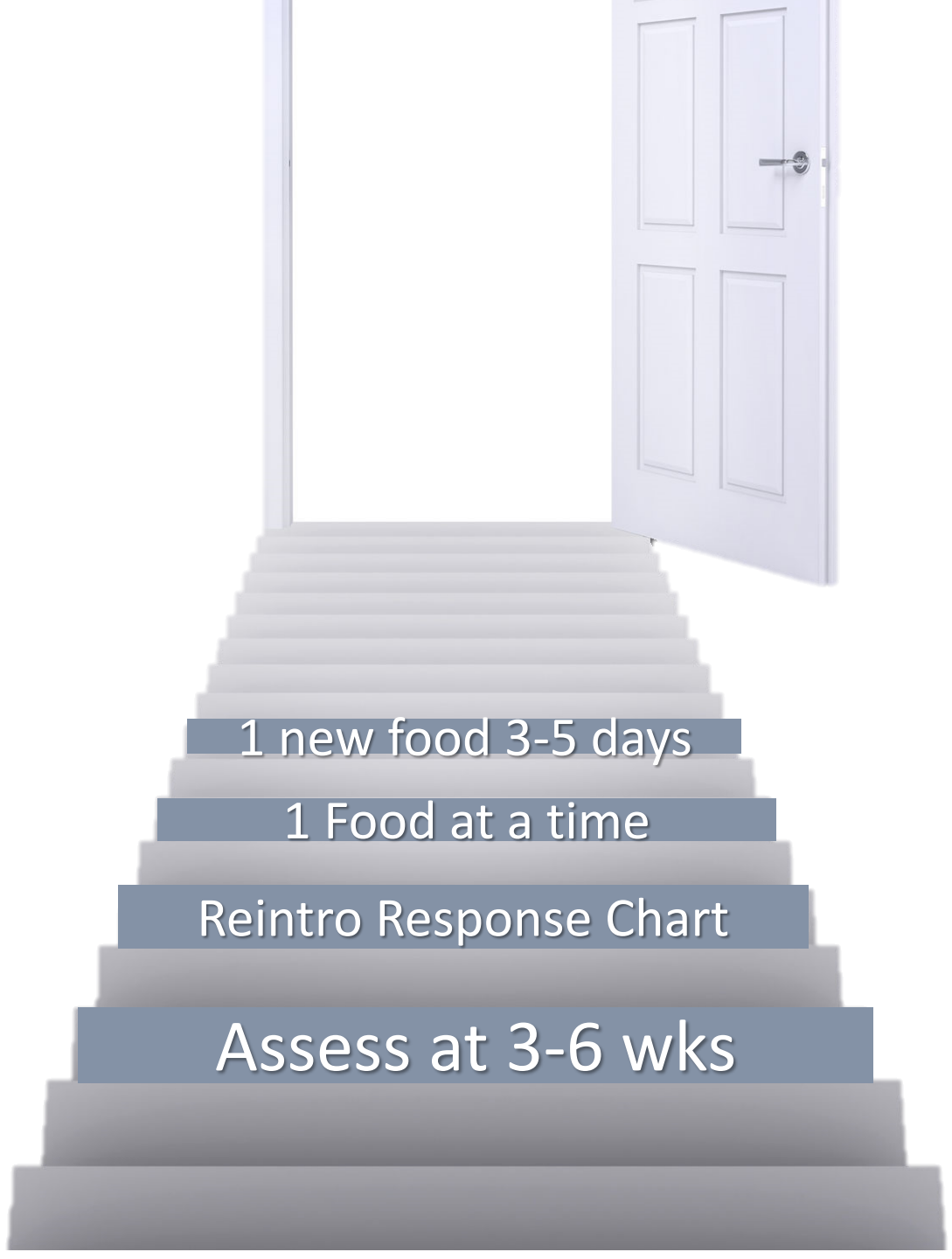
E.G., PASTA NOT PIZZA, OR MILK NOT ICE CREAM)

Reintroduction Steps

CHALLENGE **ONLY ONE NEW FOOD EVERY TWO TO THREE DAYS**.
(48 HOURS MINIMUM)

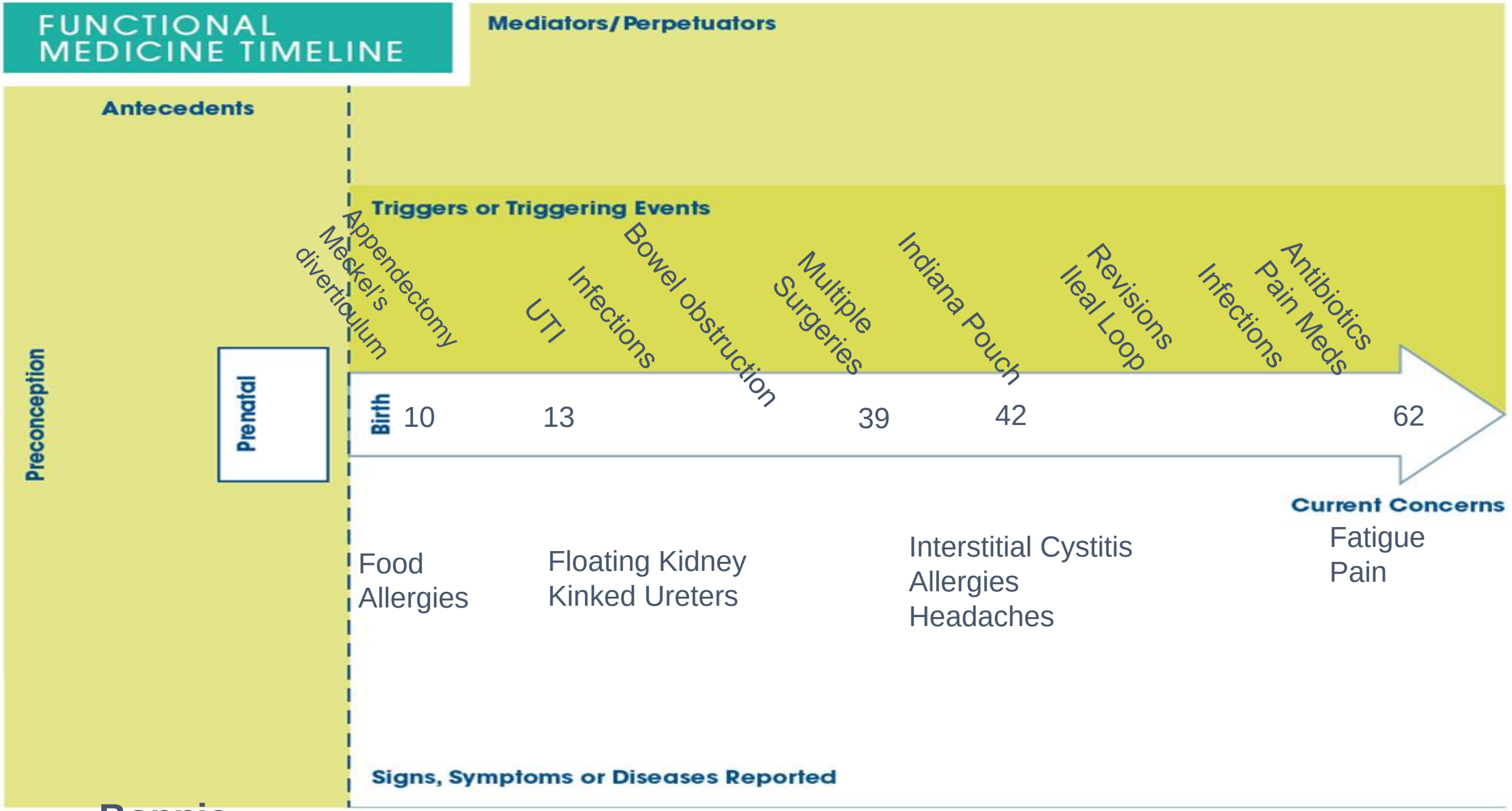
Reintroduction Steps

DO NOT CHALLENGE WITH A NEW FOOD IF STILL EXPERIENCING A REACTION



Reintroduction Steps

RECORD SYMPTOMS IN A DIET/SYMPTOM DIARY


FUNCTIONAL MEDICINE TIMELINE
Mediators/Perpetuators
Antecedents
Triggers or Triggering Events
Preconception
Prenatal
Birth
Meckel's diverticulum
Appendectomy
UTI
Infections
Bowel obstruction
Multiple Surgeries
Indiana Pouch
Revisions Ileal Loop
Infections
Antibiotics Pain Meds
10
13
39
42
62
Current Concerns
Fatigue
Pain
Food Allergies
Floating Kidney
Kinked Ureters
Interstitial Cystitis
Allergies
Headaches
Signs, Symptoms or Diseases Reported
Name: Bonnie
Date:
CC:
© 2015 Institute for Functional Medicine
Version 3
IFM

The ABCDs Of Nutritional Evaluation

Anthropometrics
Biomarkers & Labs
Clinical Indicators
Diet and Lifestyle Assessment

Bonnie {62 yo Female}

FATIGUE AND PAIN

- **A** – Ht 61.5 in., Wt- 172 lbs, BMI – 31.9, Waist – 37 in., Hip – 40.5 in., W/H – 0.91, BP – 141/76, BIA – 39% body fat
- **B** - to follow
- **C** - Ridges on nails, Brittle nails, Abdominal obesity, multiple scars on abdomen, 7 silver amalgams, pale conjunctiva
- **D** - …

Bonnie's Diet Evaluation

Diet, Nutrition, and Lifestyle Journal – 1 Day

Day Event	Food & Drink Intake (include type, amount, brand)	Macronutrients (PFC) and Phytonutrients
Rising Time		
Breakfast **Time**	¾ cup brown rice cereal, 2 tsp agave, ½ cup coconut milk, 1 cup coffee	_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Mid-AM Snack **Time**		_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Lunch **Time**	Whole wheat bread with butter,2 oz leftover steak, Arizona iced tea, green tea with honey, 2 squares dark chocolate	_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Mid-PM Snack **Time**	8 Crackers with cheese; ¼ cup unsalted cashews	_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Dinner **Time**	½ cup rice, ½ cup peas, 2 oz turkey, 2 T gravy, piece of chocolate cake, water	_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
PM Snack **Time**	8 Crackers with cheese, water	_____ P _____ F _____ C ☐ R ☐ O ☐ Y ☐ G ☐ B/P/BL ☐ W/T/BR
Bed Time		**Overall low phytonutrient intake**

P: Proteins; F: Fats; C: Carbohydrates; R: Red; O: Orange; Y: Yellow; G: Green; B/P/BL: Blue/Purple/Black; W/T/BR: White/Tan/Brown

FUNCTIONAL MEDICINE MATRIX

Retelling the Patient's Story

Antecedents

Food Allergies
Meckel's Diverticulum
Surgeries – adhesions
Kinked ureter – UTIs

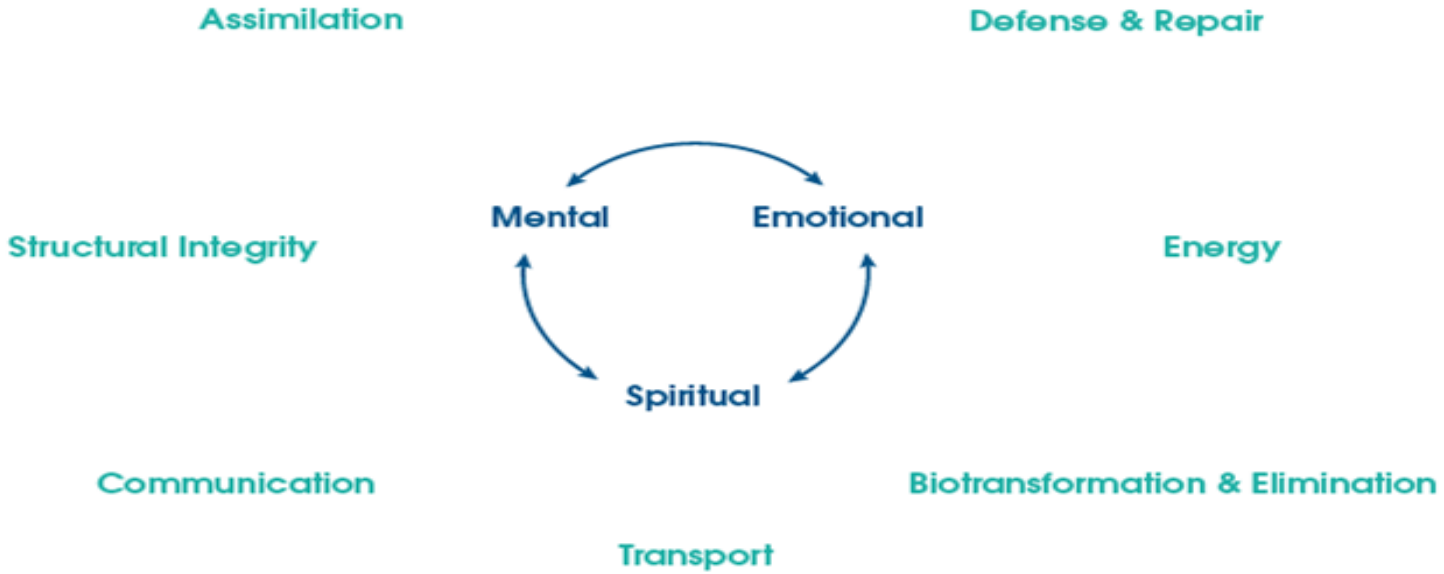
Triggering Events

UTIs
Antibiotics
Surgeries

Mediators/Perpetuators

Antibiotics
Surgeries
Pain medications

Physiology and Function: Organizing the Patient's Clinical Imbalances

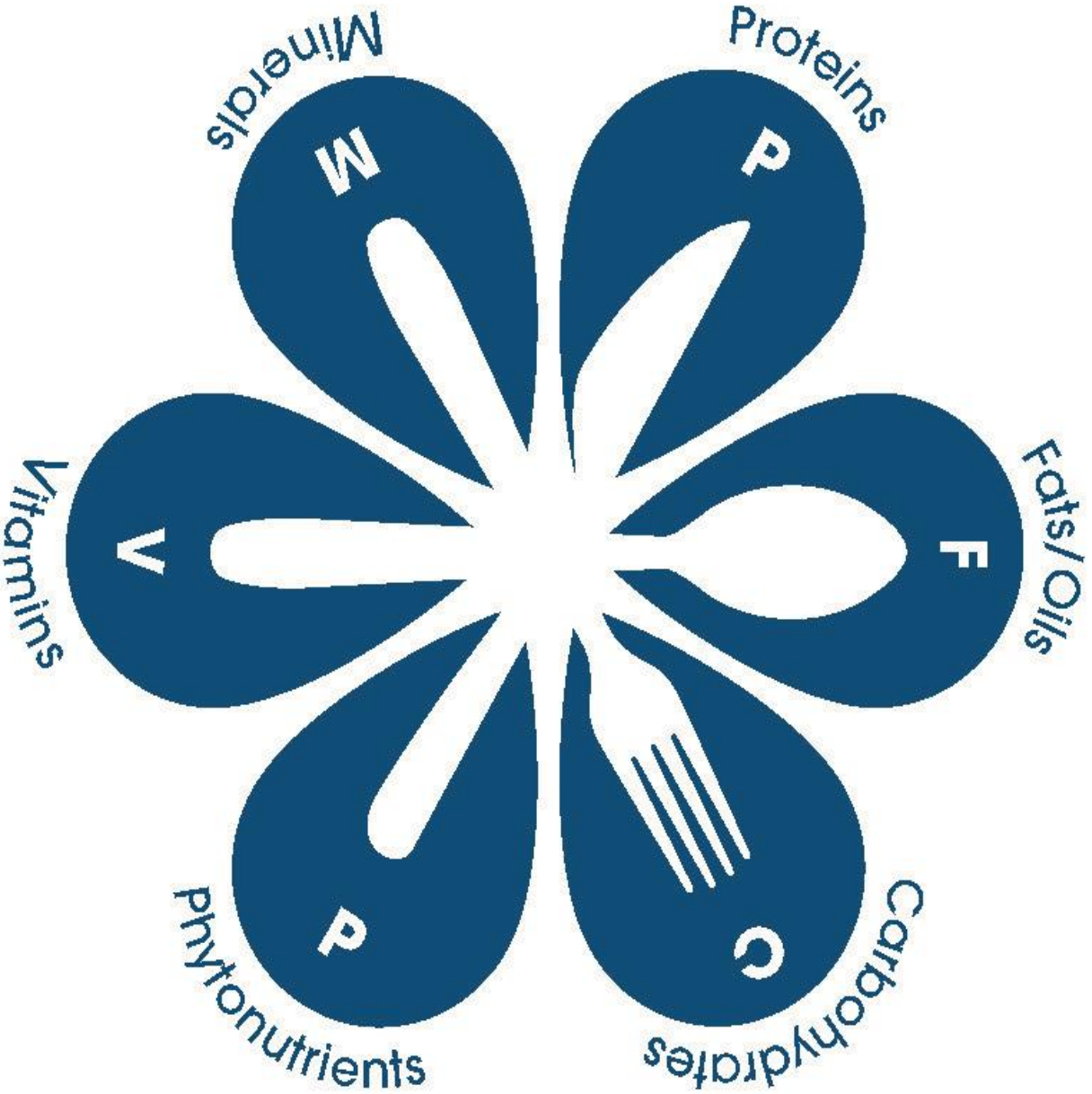


Modifiable Personal Lifestyle Factors

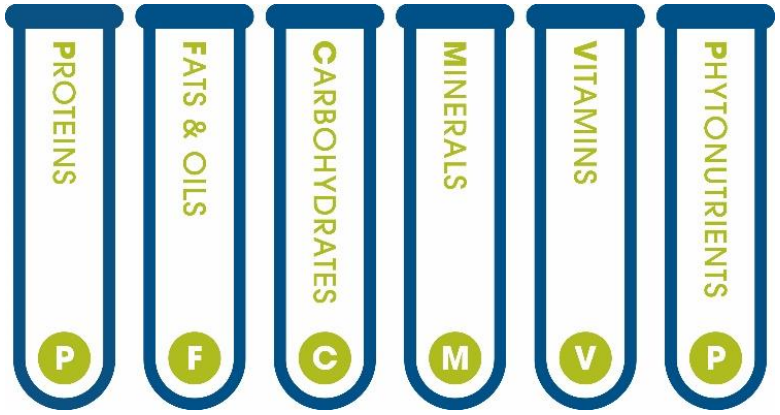
Sleep & Relaxation	Exercise & Movement	Nutrition	Stress	Relationships
Poor – Pain and Restless Leg	None	Tries to be healthy But quick foods	Stress with Illness	Limited with Pain and Illness

Name:___Bonnie_____ Date:_____ CC:_____

IFM



Bonnie {62 yo Female}

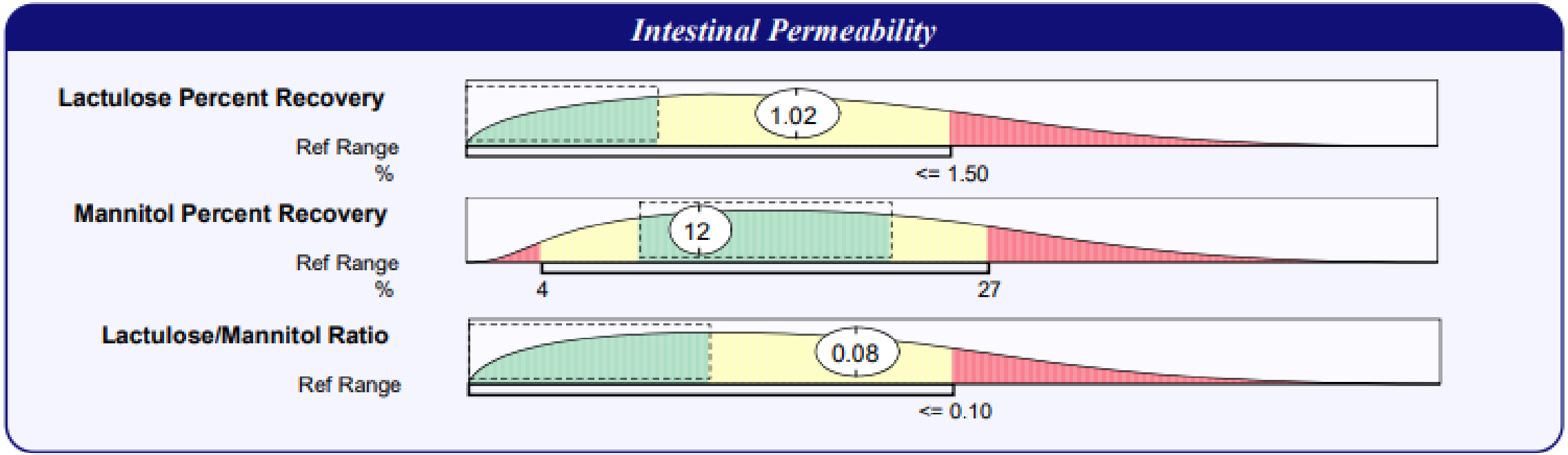


- **P** = normal
- **F** = High omega 6/omega 3, high trans fats
- **C** = fasting insulin 19, glucose 123, HgA1C 6.0, Triglycerides 389, AST and ALT mild elevation
- **M** = % iron sat 16%, ferritin 20, TIBC 265 (<200ng/dL), RBC Mag 3.1 (4.0-6.4 ng/dL)
- **V** = Vit D 29, MMA 207, HC 7.3
- **P** = high lipid peroxides, low beta carotene
- **Other** = CRP 11.7…

Bonnie {62 yo Female}

- **MSQ 59** – high in joint pain and fatigue
- Vaginal yeast
- Restless leg and muscle cramps
- Hypothyroid – on synthetic thyroid.
- AST 49 high and ALT 58 high - fatty liver
- Stool - Yersinia, yeast, strongyloides, and needs digestive enzyme
- IgG 11+ foods (total IgG level low)
- Lactulose / mannitol – elevated
- AM cortisol - low on saliva

Bonnie's Intestinal Permeability



FUNCTIONAL MEDICINE MATRIX

Retelling the Patient's Story

Antecedents

Food Allergies
Meckel's Diverticulum
Surgeries – adhesions
Kinked ureter – UTIs

Triggering Events

UTIs
Antibiotics
Surgeries

Mediators/Perpetuators

Antibiotics
Surgeries
Pain medications

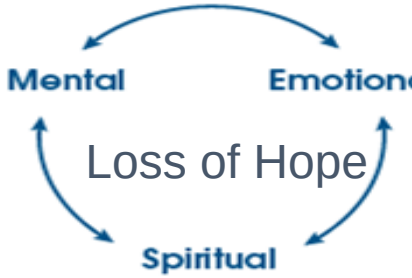
Physiology and Function: Organizing the Patient's Clinical Imbalances

Assimilation

Dysbiosis
Restless Legs / Cramps
Low mag, iron
Signs Malabsorption

Defense & Repair

High CRP – 11
Stool Dysbiosis -Vaginal Yeast
IgG + 11 foods (total IgG low)
IR– Visceral Adiposity



Structural Integrity

Pain preventing
Movement

Energy

Fatigue

Communication

IR– Insulin 19, high BS, high trig, fatty liver, visceral adiposity, Hypothyroid, Adrenal Fatigue – low am cortisol

Transport

Bowel Obstructions
Urine Flow

Biotransformation & Elimination

Pain Medication

Modifiable Personal Lifestyle Factors

Sleep & Relaxation	Exercise & Movement	Nutrition	Stress	Relationships
Poor – Pain and Restless Leg	None	Low Magnesium Low Iron Restless leg and cramps	Stress with Illness	Limited with Pain and Illness

Name: Bonnie Date: CC:

IFM

Bonnie

1 MONTH

- Comprehensive Elimination Diet / Cardiometabolic Food Plan
- Focus on increasing vegetable intake / phytonutrients
- Lost 10 lbs.
- Decreased pain meds by two-thirds
- Added iron chelate and magnesium glycinate

Bonnie

3 MONTHS

- **MSQ 10**
- Insulin 7 (from 19)
- AST and ALT - normal
- Glucose - 104
- Ferritin 31
- Magnesium RBC 4.4
- Pain decreased - continue to wean off of medication, sleep better, restless leg is decreased, no infections

Elimination Diet: Clinical Takeaways

- Evidenced-based medicine clearly supports use of elimination diets.
- Improved adherence if patient has individual support and education from a dietitian or trained nutrition professional.
- Following patients at 1-2 weeks and then at 3-4 weeks is useful and important for compliance.
- “Breaking” an elimination diet should be done carefully to provide useful information.
- The Elimination Diet is FREE.

Elimination Diet: **Monday Morning Tips**

- Print off 50 copies of elimination diet, MSQ and Symptom Tracker.
- Remember to look beyond “GI manifestations” for implementation.
- Coach the patient regarding the importance of strict adherence for 21 days but also discuss 80/20 rule.
- Be mindful of omitting whole food groups and nutrition deficiencies.

Gather/GOTOIT	Elimination Diet
Chief Complaint and Medical History	GI sxs-bloating, indigestion, Joint pain, Muscle aches Immune dysregulation, Fatigue
Conditions	**Gastrointestinal** • Irritable Bowel Syndrome • Intestinal Permeability **Immune/Inflammation** • Auto-immune Diseases • Asthma • Atopy &Skin Inflammation • Myalgias and Arthralgias **Mood Disorders** • Depression
Medical History	Allergies, Atopy, Asthma, GI Distress, Pain and Fatigue, AI Diseases
ATMs	Antibiotics, Multiple infections, Trauma, Stress, Familial allergies, Mother with Group B strep, Acid Blocking Medication, Maternal use of PPI during pregnancy
Anthropometrics	Increased BMI, Increased ECW/ICW
Biomarkers & Labs	IgG or IgE food reactions, Celiac, Autoantibodies, Dysbiosis
Clinical Indicators: Nutrition Physical Exam	Dry Skin, thin eyebrows, Fluid retention, and skin inflammation
Diet and Lifestyle	Food Triggers, Allergy Exposures. Excess reliance on one food
Matrix Patterns	Assimilation, Biotransformation, Communication/Defense and Repair

Elimination Diet

Addendum

Supporting Research for an Elimination Diet

1. A vegan diet free of gluten improves the signs and symptoms of rheumatoid arthritis: the effects on arthritis correlate with a reduction in antibodies to food antigens. Rheumatology 2001 Oct;40 (10):1175-9
2. Oral cromolyn sodium in comparison with elimination diet in the irritable bowel syndrome, diarrheic type. Multicenter study of 428 patients. Scand J Gastroenterol 1995 Jun;30 (6):535-41
3. The diet factor in pediatric and adolescent migraine. Pediatr Neurol. 2003 Jan;28(1):9-15.
4. Randomised controlled trial of advice on an egg exclusion diet in young children with atopic eczema and sensitivity to eggs. Pediatr Allergy Immunol. 1998 Feb;9(1):13-9
5. Crohn's disease: maintenance of remission by diet. Lancet 1985 Jul 27;2(8448):177-80
6. Immune sensitization to food, yeast and bacteria in Crohn's disease. Aliment Pharmacol Ther. 2001 Oct;15(10):1647-53
7. Food allergy and adult migraine: double-blind and mediator confirmation of an allergic etiology Allergy 1985 Aug;55(2):126-9

Supporting Research for an Elimination Diet

8. Fermentable Oligosaccharides, disaccharides, monosaccharides and polyols (FODMAPs) and non allergenic food intolerance: FODMAPs or food chemicals? *Gastroenterology* July 2012;5(4):261-268

9. Practical use of the new American Urological Association Interstitial cystitis Guidelines. *Curr Urol Rep* July 2012

10. Elimination diet effectively treats eosinophilic esophagitis in adults; food reintroduction identifies causative factors. *Gastroenterology* June 2012; 142(7):1451-1459

11. Non-Celiac wheat sensitivity diagnosed by the double-blind placebo controlled challenge: exploring a new clinical entity. *Am J Gastroenterol* Jul 2012

12. Spectrum of gluten related disorders: consensus on new nomenclature and classification. *BMC Med* 2012 10:13

13. Lucendo *et al.* Empiric 6-food elimination diet induced and maintained prolonged remission in patients with adult eosinophilic esophagitis: A prospective study on food cause of disease. *J Aller Clin Immunol*: 2013:131;797-804

Supporting Research for Elimination Diet

14. Irritable Bowel Syndrome: the role of food management in pathogenesis and management. Gastroenterol Hepatol 2014; Mar 10 (3):164-74.
15. Intestinal barrier function and the brain-gut axis.. Adv Exp Med Biol 2014; 817:73-113
16. High Prevalence of abnormal gastrointestinal permeability in moderate severe asthma. Clin Invest Med. 2014;Apr 1;37(2):E53-7.
17. Small Intestinal Permeability in Older Adults. Physiol Rep 2014; Apr 22;2(4)
18. Gastric Barrier and Toxic Damage. Dig Dis 2014;32(3):235-42.
19. Food Allergy in Irritable Bowel Syndrome: The Case of Non-celiac Wheat Sensitivity. *World J of Gastroenterol* June 21 2015;21(23) 7089-7091

Supporting Research for Elimination Diet

20. Gaby AR. The role of hidden food allergy/intolerance in chronic disease. Altern Med Rev. 1998 Apr;3(2):90-100.

21. Sullivan PB. Food allergy and food intolerance in childhood. Indian J Pediatr. 1999;66(1 Suppl):S37-45.

22. Parker SL, Sussman GL, Krondl M. Dietary aspects of adverse reactions to foods in adults. CMAJ. 1988 Oct 15;139(8):711-8.

23. Olendzka-Rzepecka E, Kaczmarski M, Lebensztejn D. Therapeutic effectiveness of treatment with an elimination diet in children with atopic dermatitis of different ages. Rocz Akad Med Bialymst. 1995;40(3):602-6.

24. Wüthrich B, Hofer T. [Food allergies. III. Therapy: elimination diet, symptomatic drug prophylaxis and specific hyposensitization]. Schweiz Med Wochenschr. 1986 Oct 11;116(41):1401-10.

25. Taylor JP, Krondl MM, Csima AC. Assessing adherence to a rotary diversified diet, a treatment for 'environmental illness'. J Am Diet Assoc. 1998 Dec;98(12):1439-44.

26. Bernardini R, Novembre E, Mugnaini L, Vierucci A. Diet regimen in the treatment of food allergy. Ann Ist Super Sanita. 1995;31(4):481-8.

Supporting Research for Elimination Diet

27. Yeung JM, Applebaum RS, Hildwine R. Criteria to determine food allergen priority. J Food Prot. 2000 Jul;63(7):982-6.

28. Oranje AP, Wolkerstorfer A, de Waard-van der Spek FB. Natural course of cow's milk allergy in childhood atopic eczema/dermatitis syndrome. Ann Allergy Asthma Immunol. 2002 Dec;89(6 Suppl 1):52-5.

29. Turjanmaa K. "Atopy patch tests" in the diagnosis of delayed food hypersensitivity. Allerg Immunol (Paris). 2002 Mar;34(3):95-7.

30. Kitts D, Yuan Y, Joneja J, Scott F, Szilagyi A, Amiot J, Zarkadas M. Adverse reactions to food constituents: allergy, intolerance, and autoimmunity. Can J Physiol Pharmacol. 1997 Apr;75(4):241-54.

31. Schwartz RH. Allergy, intolerance, and other adverse reactions to foods. Pediatr Ann. 1992 Oct;21(10):654-5, 660-2, 665-74.

32. Nsouli TM, Nsouli SM, Linde RE, O'Mara F, Scanlon RT, Bellanti JA. Role of food allergy in serous otitis media. Ann Allergy. 1994 Sep;73(3):215-9.

33. Sicherer SH. Food allergy: when and how to perform oral food challenges. Pediatr Allergy Immunol. 1999 Nov;10(4):226-34.

34. Niec AM, Frankum B, Talley NJ. Are adverse food reactions linked to irritable bowel syndrome? Am J Gastroenterol. 1998 Nov;93(11):2184-90.

Manifestations of Food Allergies/Sensitivities

- **Gastrointestinal:** GERD[1], Eosinophilic gastroenteritis, Diarrhea, Failure to Thrive, Constipation (60% unexplained constipation in infants is cows milk allergy)[2]
- **Extraintestinal:** chronic fatigue, fibromyalgia, musculoskeletal pain, depression[3,4]
- **Cutaneous:** Atopy ~1/3 atopic dermatitis have cow's milk allergy[5]/ 45% of milk-allergic infants have atopic dermatitis[5]/ Vasculitis
- **Respiratory:** Heiner syndrome[6], Chronic serous otitis media, Chronic sinusitis[7,8]
- **Other:** Systemic anaphylaxis, Irritability/Sleeplessness in Infants, Arthropathy, Nephropathy, Fatigue

References: See next slide "References: Manifestations of Food Allergies/Sensitivities"

References: Manifestations of Food Allergies/Sensitivities

1. Trikha A, Baillargeon JG, Kuo YF, et al. Development of food allergies in patients with gastroesophageal reflux disease treated with gastric acid suppressive medications. Pediatr Allergy Immunol. 2013;24(6):582–588. doi:10.1111/pai.12103

2. Dehghani SM, Ahmadpour B, Haghighat M, Kashef S, Imanieh MH, Soleimani M. The Role of Cow's Milk Allergy in Pediatric Chronic Constipation: A Randomized Clinical Trial. Iran J Pediatr. 2012;22(4):468–474.

3. Berstad A et al. Functional bowel symptoms, fibromyalgia and fatigue: A food-induced triad? Scandinavian Journal of Gastroenterology. 2012;47(8-9):914-919. doi:10.3109/00365521.2012.690045.

4. Mansueto P et al. Food allergy in irritable bowel syndrome: The case of non-celiac wheat sensitivity. World Journal of Gastroenterology : WJG. 2015;21(23):7089-7109.

5. Suh J, Lee H, Lee JH, et al. Natural course of cow's milk allergy in children with atopic dermatitis. *J Korean Med Sci*. 2011;26(9):1152–1158. doi:10.3346/jkms.2011.26.9.1152

6. Moissidis I, Chaidaroon D, Vichyanond P, Bahna SL. Milk-induced pulmonary disease in infants (Heiner syndrome). Pediatr Allergy Immunol. 2005;16(6):545-552. doi:10.1111/j.1399-3038.2005.00291.x

7. Connors, L., O'Keefe, A., Rosenfield, L. *et al.* Non-IgE-mediated food hypersensitivity. *Allergy Asthma Clin Immunol.* 2018;14, 56. doi:10.1186/s13223-018-0285-2

8. Zernotti ME, Pawankar R, Ansotegui I, et al. Otitis media with effusion and atopy: is there a causal relationship?. *World Allergy Organ J*. 2017;10(1):37. Published 2017 Nov 14. doi:10.1186/s40413-017-0168-x.

Mucosal Immune Cell Activation

- Attributed to exogenous factors- food antigens, resident microbial flora, endogenous chemical irritants, bile salts

- Results in changes of submucosal and myenteric neurons and is the **GENESIS** of intestinal permeability, absorption, blood flow, visceral sensitivity and motility

Mansueto P, D'Alcamo A, Seidita A, Carroccio A. Food allergy in irritable bowel syndrome: The case of non-celiac wheat sensitivity. World J Gastroenterol. 2015 Jun 21;21(23):7089-109. doi: 10.3748/wjg.v21.i23.7089.

Gastrointestinal Tract

- Food Allergic Motility Disorders
  - GERD
  - Colic
  - Constipation

  Heine RG. Allergic gastrointestinal motility disorders in infancy and early childhood. Pediatr Allergy Immunol. 2008;19(5):383-391. doi:10.1111/j.1399-3038.2008.00785.x

- Mucosal inflammatory disorders
  - Eosinophilic Esophagitis , other eosinophilic gastroenteritis
  - UC/Crohn's – responsive to elemental diets
  - Pancreatitis:

Infants with GERD

- 204 consecutive patients (median age, 6.3 months) with GERD on the basis of 24-hour continuous pH monitoring and histologic examination of the esophageal mucosa

- The cow's milk-free diet and two successive blind challenges confirmed the diagnosis of cow's milk allergy in 85 of the 204

Iacono G, Carroccio A, Cavataio F, et al. Gastroesophageal reflux and cow's milk allergy in infants: a prospective study. J Allergy Clin Immunol. 1996;97(3):822-827.

“Cow's milk intolerance and abdominal surgery: a puzzling connection”

- 9 infants (ranging from 1 to 6 1/2 months) with a surgical pathology (gastro-esophageal reflux and/or pyloric stenosis)
- Vomiting and/or failure to thrive did not disappear after surgery.
- Patients recovered only after dietary manipulation by cow's milk protein free diet. In 5 out of 9 cases, multiple food intolerances were present (soy and/or casein hydrolysates).

Ventura A, Pineschi A, Tasso M. Cow’s milk intolerance and abdominal surgery: a puzzling connection. Helv Paediatr Acta. 1986;41(6):487-494.

Gluten-free Diet in CD with GERD/NERD

Effect of gluten-free diet on preventing recurrence of gastroesophageal reflux disease–related symptoms in adult celiac patients with nonerosive reflux disease

Usai P, Manca R, Cuomo R, Lai MA, Russo L, Boi MF. Effect of gluten-free diet on preventing recurrence of gastroesophageal reflux disease–related symptoms in adult celiac patients with nonerosive reflux disease. Journal of Gastroenterology and Hepatology. 2008;23(9):1368-1372. doi:10.1111/j.1440-1746.2008.05507.x

Esophagitis as a Manifestation of Food Allergy

- Overlap of reflux and eosinophilic esophagitis

  Molina-Infante J, Ferrando-Lamana L, Mateos-Rodríguez JM, Pérez-Gallardo B, Prieto-Bermejo A-B. Overlap of reflux and eosinophilic esophagitis in two patients requiring different therapies: a review of the literature. World J Gastroenterol. 2008;14(9):1463-1466.

- Food intolerances and eosinophilic esophagitis in childhood

  Ozdemir O, Mete E, Catal F, Ozol D. Food intolerances and eosinophilic esophagitis in childhood. Dig Dis Sci. 2009;54(1):8-14. doi:10.1007/s10620-008-0331-x

Constipation

Cow milk allergy:

- 68% of kids with idiopathic constipation respond to d/c cow's milk

  Iacono G, Cavataio F, Montalto G, et al. Intolerance of cow's milk and chronic constipation in children. N Engl J Med. 1998;339(16):1100-1104. doi:10.1056/NEJM199810153391602

- 77.7% of kids with chronic constipation were found to have CMA

  El-Hodhod MA, Younis NT, Zaitoun YA, Daoud SD. Cow's milk allergy related pediatric constipation: Appropriate time of milk tolerance. Pediatric Allergy and Immunology: Official Publication of the European Society of Pediatric Allergy and Immunology. 2010;21(2p2):e407-e412. doi:10.1111/j.1399-3038.2009.00898.x

- Cow milk, egg, and soy identified as allergens contributing to "idiopathic" constipation.

  1. Borrelli O, Barbara G, Di Nardo G, et al. Neuroimmune interaction and anorectal motility in children with food allergy-related chronic constipation. Am J Gastroenterol. 2009;104(2):454-463. doi:10.1038/ajg.2008.109

IBS

20 people with IBS who failed standard therapies

- Food elimination diets based on food and mold panel test results, followed by controlled food challenge
- Also given probiotics
- Significant improvement:
  - stool frequency ($p < 0.05$), pain ($p < 0.05$), and IBS-QOL scores ($p < 0.0001$)

Drisko J, Bischoff B, Hall M, McCallum R. Treating irritable bowel syndrome with a food elimination diet followed by food challenge and probiotics. J Am Coll Nutr. 2006;25(6):514-522.

Mucosal Inflammation

- Crohn's – responsive to exclusion diet and nutraceuticals

Drisko J, Bischoff B, Hall M, McCallum R. Treating irritable bowel syndrome with a food elimination diet followed by food challenge and probiotics. J Am Coll Nutr. 2006;25(6):514-522.

- Pancreatitis:
  - Case report of 3 episodes pancreatitis after eating bananas; Ampulla infiltrated by mast cells on biopsy

Inamura H, Kashiwase Y, Morioka J, Kurosawa M. Acute pancreatitis possibly caused by allergy to bananas. J Investig Allergol Clin Immunol. 2005;15(3):222-224.

Rectal/Anal Mucosa

- Allergic proctocolitis
  - Bloody stool in infants with CMA

Maloney J, Nowak-Wegrzyn A. Educational clinical case series for pediatric allergy and immunology: allergic proctocolitis, food protein-induced enterocolitis syndrome and allergic eosinophilic gastroenteritis with protein-losing gastroenteropathy as manifestations of non-IgE-mediated cow's milk allergy. Pediatr Allergy Immunol. 2007;18(4):360-367. doi:10.1111/j.1399-3038.2007.00561.x

- Rectal bleeding in adults: 15% have lymphonodular hyperplasia as sole finding on colonoscopy; 90% resolve with oligoantigenic diet

Carroccio A, Iacono G, Prima LD, et al. Food Hypersensitivity as a Cause of Rectal Bleeding in Adults. Clinical Gastroenterology and Hepatology. 2009;7(1):120-122. doi:10.1016/j.cgh.2008.07.029

- Pruritus ani – Responds to elimination of caffeinated drinks, alcohol, milk products, peanuts, spices, citrus, grapes, tomato (histamine) and chocolate

1. Daniel GL, Longo WE, Vernava AM. Pruritus ani. Causes and concerns. Dis Colon Rectum. 1994;37(7):670-674.
2. Friend WG. The cause and treatment of idiopathic pruritus ani. Dis Colon Rectum. 1977;20(1):40-42.
3. Smith LE, Henrichs D, McCullah RD. Prospective studies on the etiology and treatment of pruritus ani. Dis Colon Rectum. 1982;25(4):358-363.
4. Mansueto P, D'Alcamo A, Seidita A, Carroccio A. Food allergy in irritable bowel syndrome: The case of non-celiac wheat sensitivity. World J Gastroenterol. 2015;21(23):7089-7109. doi:10.3748/wjg.v21.i23.7089

Asthma Prevention

Multimodal interventions (reducing inhaled as well as food antigens) were effective, NNT 17

Maas T, Kaper J, Sheikh A, et al. Mono and multifaceted inhalant and/or food allergen reduction interventions for preventing asthma in children at high risk of developing asthma. In: Cochrane Database of Systematic Reviews. John Wiley & Sons, Ltd; 2009. doi:10.1002/14651858.CD006480.pub2

Eczema

- 51% respond to elimination diets & food challenge tests.
- Food allergy prevalence was 70.8% (85/120) in the high eosinophil group and 34.7% (50/144) in the normal blood eosinophil group.

Noh G, Jin H, Lee J, Noh J, Lee WM, Lee S. Eosinophilia as a predictor of food allergy in atopic dermatitis. Allergy Asthma Proc. 2010 Mar-Apr;31(2):e18-24. doi: 10.2500/aap.2010.31.3312.

Exclusion Diet in Eczema

- **Exclude:**
  - milk and milk products
  - nuts and nut-containing foods
  - egg and egg-containing foods
  - seafish and prawns
  - brinjal (eggplant)
  - soyabean
- **Allowed:**
  - dal and dal products, rohu fish, chicken, and fruits.
- After 3 weeks: statistically significant lowering of all recorded parameters of disease activity after 3 weeks of elimination. P<0.001 for SCORAD, surface area, severity of itching

Dhar S, Malakar R, Banerjee R, Chakraborty S, Chakraborty J, Mukherjee S. An uncontrolled open pilot study to assess the role of dietary eliminations in reducing the severity of atopic dermatitis in infants and children. Indian J Dermatol. 2009;54(2):183-185. doi:10.4103/0019-5154.53187

Dietary Tacks in Migraine

Mostly idiosyncratic

- Tyramine, aged cheeses not a problem for most
- More likely dairy, corn, wheat; classic allergens
- Can also be food additives:
  - MSG – “natural flavorings”
  - Aspartame - mean number of headaches 1.55 placebo vs. 3.55 for aspartame 300 mg orally 4 times daily

Koehler SM, Glaros A. The effect of aspartame on migraine headache. Headache. 1988;28(1):10-14.

Food Allergy in Migraine - Kids

93% of 88 children with severe frequent migraine recovered on oligoantigenic diets.

- Double-blind controlled trial in 40 of the children.
- Most patients responded to several foods.
- Many foods were involved, suggesting an allergic rather than a metabolic pathogenesis.
- Associated symptoms which improved: abdominal pain, behaviour disorder, fits, asthma, and eczema.

Egger J, Wilson J, Carter CM, Turner MW, Soothill JF. IS MIGRAINE FOOD ALLERGY?: A Double-blind Controlled Trial of Oligoantigenic Diet Treatment. The Lancet. 1983;322(8355):865-869. doi:10.1016/S0140-6736(83)90866-8

Migraine and Oligoantigenic Diet

- Systematic Review:
  - 2 studies of oligoantigenic diet were successful
  - 1 study of low-tyramine diet showed no effect

Damen L, Bruijn J, Koes BW, Berger MY, Passchier J, Verhagen AP. Prophylactic treatment of migraine in children. Part 1. A systematic review of non-pharmacological trials. Cephalalgia. 2006;26(4):373-383. doi:10.1111/j.1468-2982.2005.01046.x

- Seizures improved in kids with migraine and epilepsy.

Egger J, Carter CM, Soothill JF, Wilson J. Oligoantigenic diet treatment of children with epilepsy and migraine. J Pediatr. 1989;114(1):51-58.

- Enuresis resolved in 12/21, improved in 4 more

Egger J, Carter CH, Soothill JF, Wilson J. Effect of diet treatment on enuresis in children with migraine or hyperkinetic behavior. Clin Pediatr (Phila). 1992;31(5):302-307. doi:10.1177/000992289203100508

Migraine and Food Allergy - Adults

- Major improvement for 80% of a migraine panel with nutritionally supported fast week followed by conventional food sensitivity management

Hughes EC, Gott PS, Weinstein RC, Binggeli R. Migraine: a diagnostic test for etiology of food sensitivity by a nutritionally supported fast and confirmed by long-term report. Ann Allergy. 1985;55(1):28-32.

- 9 patients with severe migraine refractory to drug therapy
  - Provocative foods were identified
  - Patients given either sodium cromoglycate or placebo orally in a double-blind manner with those foods
  - Gastrocrom was effective

Monro J, Carini C, Brostoff J. Migraine is a food-allergic disease. Lancet. 1984;2(8405):719-721.

ADHD

Food and diet:
8 controlled studies found either significant improvement following a “few-food” (oligoantigenic) diet compared with placebo or worsening of symptoms in placebo-controlled challenges of offending substances following an open challenge to identify the substance.

Arnold LE. Treatment alternatives for Attention-Deficit! Hyperactivity Disorder (ADHD). J Atten Disord. 1999;3(1):30-48. doi:10.1177/108705479900300103.

Mood

- **Allergic/immunologic mechanism:**
  - Gluten-free diet may alleviate depressive and behavioural symptoms in adolescents with coeliac disease: a prospective follow-up case-series study

    Pynnönen PA, Isometsä ET, Verkasalo MA, et al. Gluten-free diet may alleviate depressive and behavioural symptoms in adolescents with coeliac disease: a prospective follow-up case-series study. BMC Psychiatry. 2005;5:14. doi:10.1186/1471-244X-5-14
- **Non-allergic mechanism:**
  - One small study found nearly 50% of subjects had mood improvements with 2 weeks off caffeine and refined sucrose

    Krietsch K, Christensen L, White B. Prevalence, presenting symptoms, and psychological characteristics of individuals experiencing a diet-related mood-disturbance. Behavior Therapy. 1988;19(4):593-604. doi:10.1016/S0005-7894(88)80027-3

IgA Nephropathy

Gluten free diet:

- Decrease circulating IgA immune complexes
- Decrease level of IgA against dietary antigens
- Decrease proteinuria, microscopic hematuria Clin Nephrol. 1990 Feb;33(2):72-86;

1. Dietary Gluten and Primary IgA Nephropathy. New England Journal of Medicine. 1986;315(18):1167-1168. doi:10.1056/NEJM198610303151819

2. Coppo R, Basolo B, Rollino C, et al. Mediterranean diet and primary IgA nephropathy. Clin Nephrol. 1986;26(2):72-82.

Low-antigen diet:

- Decrease proteinuria
- Improved biopsy

Ferri C, Puccini R, Longombardo G, et al. Low-antigen-content diet in the treatment of patients with IgA nephropathy. Nephrol Dial Transplant. 1993;8(11):1193-1198. doi:10.1093/ndt/8.11.1193

Other Conditions Affected by Food

Overactive bladder and urge urinary incontinence

- **Caffeine**

1. Creighton SM, Stanton SL. Caffeine: does it affect your bladder? Br J Urol. 1990;66(6):613-614.
2. Lee JG, Wein AJ, Levin RM. The effect of caffeine on the contractile response of the rabbit urinary bladder to field stimulation. Gen Pharmacol. 1993;24(4):1007-1011
3. Arya LA, Myers DL, Jackson ND. Dietary caffeine intake and the risk for detrusor instability: a case-control study. Obstet Gynecol. 2000;96(1):85-89.

- **Carbonated beverages (aspartame)**

1. Dasgupta J, Elliott RA, Doshani A, Tincello DG. Enhancement of rat bladder contraction by artificial sweeteners via increased extracellular Ca2+ influx. Toxicol Appl Pharmacol. 2006;217(2):216-224. doi:10.1016/j.taap.2006.09.004

Osteoarthritis

1.Hailu A, Knutsen SF, Fraser GE. Associations between meat consumption and the prevalence of degenerative arthritis and soft tissue disorders in the adventist health study, California U.S.A. J Nutr Health Aging. 2006;10(1):7-14.

Fibromyalgia – “live foods” and vegetarian diets

1. Donaldson MS, Speight N, Loomis S. Fibromyalgia syndrome improved using a mostly raw vegetarian diet: An observational study. *BMC Complementary and Alternative Medicine*. 2001;1:7. doi:10.1186/1472-6882-1-7
2. Høstmark AT, Lystad E, Vellar OD, Hovi K, Berg JE. Reduced plasma fibrinogen, serum peroxides, lipids, and apolipoproteins after a 3-week vegetarian diet. Plant Foods Hum Nutr. 1993;43(1):55-61.
3. K. Kaartinen A-LR K Lammi, M Hypen, M Nenonen, O Hänninen. Vegan diet alleviates fibromyalgia symptoms. Scandinavian Journal of Rheumatology. 2000;29(5):308-313. doi:10.1080/030097400447697
4. Azad KA, Alam MN, Haq SA, et al. Vegetarian diet in the treatment of fibromyalgia. Bangladesh Med Res Counc Bull. 2000;26(2):41-47.
5. Hänninen null, Kaartinen K, Rauma AL, et al. Antioxidants in vegan diet and rheumatic disorders. Toxicology. 2000;155(1-3):45-53.