The Ins and Outs of Coping and Overcoming Adverse Food Reactions

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Objectives

• Define various types of adverse food reactions and discuss their unique characteristics.

• Review elimination diet protocols, focusing on tips to enhance practicality and success.

• Discuss effective maintenance strategies to prevent reoccurrence of adverse food reactions.
Healthy Digestive Pathway

• Digestion of food begins in the mouth, then travels to the stomach

• Food/proteins interact with gastric acid and enzymes, turning into smaller particles ready for absorption

• Once the particles (antigens) pass the epithelium barrier, the immune system typically expresses oral tolerance
Oral Tolerance

- Definition: Active systemic suppression of cellular or humoral immune responses to an antigen following prior administration of the antigen by the oral route
  - Prevents immune system from overreacting
- Changes throughout the lifetime
- Loss of oral tolerance triggers immune reactions that may cause adverse food reactions and pathological conditions
Gut Immunology

- Constant exposure to chemicals, proteins, bacteria, & antigens

- Separation between the external environment and the internal environment

- The gut-associated lymphoid tissue (GALT or gut immune system) is tightly regulated to prevent excessive immune responses

The gut ultimately must decide:
Intestinal Permeability

• A functional entity separating the gut lumen from the inner host

  ◦ **Normal**: stable permeability found in healthy individuals with no signs of intoxication, inflammation or impaired intestinal functions

  ◦ **Impaired (leaky gut)**: a disturbed permeability being non-transiently changed compared to the normal permeability leading to a loss of intestinal homeostasis, functional impairments and disease
Conditions Associated with AFRs

**Triggering Mechanisms**
- Food antigens
- Food chemicals
  - Haptons
  - Amines
  - Pharmacologic
- Immune Complexes
  - IgG
  - IgM
  - Lectins

**Cellular Activation**
- Lymphocytes
  - Sensitized T-cells
  - T-Cells
  - NK Cells
  - K Cells
- Eosinophils
- Basophils
- Monocytes
- Neutrophils

**Mediator Release**
- Cytokines
  - Interleukins
  - Chemokines
  - TNFs
- Interferons
  - Leukotrienes
  - Histamine
  - ECP, MPE, Amines
  - Prostaglandins
  - Others

**Pathophysiologic Effects**
- Inflammation
  - Subclinical
  - Clinical
- Tissue damage
- Pain receptor activation
- Smooth muscle contraction
- Edema
- Excess mucus
- Neurological
- Endocrine
- Increased gut permeability

**Conditions Related to AFRs**
- Migraine
- Depression
- Autism Spectrum Disorder
- Urticaria (chronic)
- Fibromyalgia
- Arthritis (Inflammatory)
- Ulcerative Colitis
- Crohn’s Disease
- Atopic Dermatitis
- Polycystic Ovary Syndrome
- ADD/ADHD
- Epilepsy
- Otitis Media
- GERD
- Asthma
- Cyclic Vomiting Syndrome
- Metabolic Syndrome
- Irritable Bowel Syndrome
- Interstitial Cystitis
Adverse Food Reactions (AFR):

Toxic

Food Contaminant

Immune mediated
- Allergy
- Sensitivity
- Celiac

Non Toxic

Non-immune mediated
- Intolerance
- Aversion
Non-Immunologic Reactions

- Irritants
- Histamine
- Lectins
- SIBO/Dysbiosis
- Enzyme Deficiencies
- Toxic Reactions
- Malabsorption (FODMAPS)
IMMUNE REACTIONS

ALLERGIES

TYPE 1
Antibody mediated (IgE)

TYPE 3
Antibody Mediated (IgG, IgM)

TYPE 4
Cell Mediated

SENSITIVITIES
Food Allergy - Type 1 Hypersensitivity

Histamine, tryptase
Kininogenase, ECFA
Leukotriene-B4, -C4, -D4
Prostaglandin-D2, PAF
Food Allergy

• Impacts ~6% of children and 3.7% of adults

• Risk factors:
  ◦ family history
  ◦ male sex
  ◦ genetic polymorphisms
  ◦ early infectious exposure
  ◦ rural upbringing with exposure to animals and livestock (protective)
  ◦ pathogenic microorganisms
  ◦ gut mucosa
  ◦ antigenic characteristic of food proteins (size, abundance, resistance to acidic and enzymatic denaturation and digestion, immunogenicity)
  ◦ sanitary living

• No prevention strategies known at this time
Food Allergy

Most common allergens (account for >90% of cases in children):

- Peanuts
- Egg
- Milk
- Fish
- Shellfish
- Wheat
- Soy
- Tree Nuts
Food Allergy

Symptoms

- **Skin** - itching, hives, angioedema, flushing
- **GI** - oral itching, nausea, vomiting, diarrhea
- **Nasal/respiratory tract** - nasal congestion,runny nose, itchy eyes/nose, sneezing, laryngeal edema, wheezing, shortness of breath
- **Cardiovascular system** - light headedness, syncope, hypotension

- **Oral Allergy Syndrome**
  - Most common food allergy in adults (associated with pollen)
  - Examples: birch-fruit/veggie, celery-birch-mugwort, ragweed-melon/banana
  - Generally more mild symptoms primarily in the oropharynx
    - Lip/mouth itching, swelling, hoarseness, rhinitis, etc.
Food Allergy - Testing

Oral Food Challenge - the definitive, gold standard diagnostic

In vivo testing (SPT/Scratch test): skin test
- sterile needle
- suspected allergen
- a number of suspected allergens are tested on the arm at the same time
- positive test: area becomes red and swollen

In vitro testing (RAST/ELISA): blood test
- The blood test measures the levels of allergy antibody, or IgE, produced when your blood is mixed with a series of allergens in a laboratory
Food Allergy - Treatment

• Remove food from the diet completely, including cross contamination exposure

• Consider medically supervised oral food challenge (ideally double-blind, placebo-controlled)
Food Sensitivity - Type III & IV Hypersensitivity
Food Sensitivity

• Type 3 & 4 immune-mediated reaction
• Develops after loss of oral tolerance
• No set list of common reactive foods
• Dose-dependent reaction
• Delayed reaction time (4-72 hours post-ingestion)
• Likely to have more than one reactive food (typically 10-20)
• Systemic, variable symptoms
• Difficult to identify/diagnose - more research is needed
Food Sensitivity (FS)

May be associated with:
- Intestinal dysbiosis
- Intestinal hyper-permeability
- Stress
- Anxiety/depression
- Immunological and local factors
FS Symptoms

I don’t feel well and I don’t know why...

<table>
<thead>
<tr>
<th>CONSTITUTIONAL</th>
<th>NASAL/SINUS</th>
<th>MUSCULOSKELETAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatigue (sluggish, tired)</td>
<td>Post nasal drip</td>
<td>Joint pains</td>
</tr>
<tr>
<td>Hyperactive (nervous energy)</td>
<td>Sinus pain</td>
<td>Stiff joints</td>
</tr>
<tr>
<td>Restless (can’t relax/sit still)</td>
<td>Runny nose</td>
<td>Muscle aches</td>
</tr>
<tr>
<td>Daytime sleepiness</td>
<td>Stuffy nose</td>
<td>Stiff muscles</td>
</tr>
<tr>
<td>Insomnia at night</td>
<td>Sneezing</td>
<td>Ticks (facial or otherwise)</td>
</tr>
<tr>
<td>Malaise (feeling lousy)</td>
<td></td>
<td>Muscle spasms</td>
</tr>
<tr>
<td>Seizures</td>
<td>TOTAL (0-28)</td>
<td>Muscle cramps</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>EMOTIONAL/MENTAL</td>
<td>MOUTH/THROAT</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>Sore throat</td>
<td>TOTAL (0-28)</td>
</tr>
<tr>
<td>Anxiety (fears, uneasiness)</td>
<td>Swollen throat</td>
<td></td>
</tr>
<tr>
<td>Mood swings (rapid changes)</td>
<td>Swelling/burning lips/tongue</td>
<td>Irregular heartbeat</td>
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<tr>
<td>Irritability</td>
<td>Gagging/throat clearing</td>
<td>High blood pressure</td>
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<tr>
<td>Forgetfulness</td>
<td>Canker sores</td>
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<tr>
<td>Lack of concentration/Brain fog</td>
<td>Difficulty swallowing</td>
<td></td>
</tr>
<tr>
<td>Low sex drive</td>
<td>TOTAL (0-28)</td>
<td></td>
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<tr>
<td>HEAD/EARS</td>
<td>LUNGS</td>
<td></td>
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<tr>
<td>Headache (not migraine)</td>
<td>Wheezing</td>
<td>Heartburn/reflux</td>
</tr>
<tr>
<td>Migraine</td>
<td>Chest congestion</td>
<td>Stomach pains/cramps</td>
</tr>
<tr>
<td>Earache</td>
<td>Dry cough</td>
<td>Intestinal pains/cramps</td>
</tr>
<tr>
<td>Ear infection</td>
<td>Wet cough</td>
<td>Constipation</td>
</tr>
<tr>
<td>Ringing in ears</td>
<td>Shortness of breath</td>
<td>Diarrhea</td>
</tr>
<tr>
<td>Itchy ears</td>
<td>TOTAL (0-20)</td>
<td>Bloating sensation</td>
</tr>
<tr>
<td>Discharge from ears</td>
<td></td>
<td>Gas (of any kind)</td>
</tr>
<tr>
<td>Sensitivity to sound</td>
<td></td>
<td>Nausea</td>
</tr>
<tr>
<td>TOTAL (0-32)</td>
<td></td>
<td>Vomiting</td>
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<tr>
<td></td>
<td>EYES</td>
<td>Painful elimination</td>
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<tr>
<td></td>
<td>Red or swollen eyes</td>
<td>TOTAL (0-40)</td>
</tr>
<tr>
<td></td>
<td>Watery eyes</td>
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<tr>
<td></td>
<td>Itchy eyes</td>
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<td></td>
<td>Dark circles or “bags”</td>
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<td></td>
<td>Sensitivity to light</td>
<td></td>
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<tr>
<td></td>
<td>Aura</td>
<td></td>
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<tr>
<td></td>
<td>TOTAL (0-24)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SKIN</td>
<td></td>
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<tr>
<td></td>
<td>CURRENT WEIGHT:</td>
<td></td>
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<td></td>
<td>WEIGHT MANAGEMENT</td>
<td></td>
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<tr>
<td></td>
<td>Fluctuating weight</td>
<td></td>
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<tr>
<td></td>
<td>Food cravings</td>
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<td></td>
<td>WATER RETENTION</td>
<td></td>
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<tr>
<td></td>
<td>GENITOURINARY</td>
<td></td>
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<tr>
<td></td>
<td>Binge eating or drinking</td>
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<tr>
<td></td>
<td>Purging (all methods)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL (0-20)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LIST OTHER SYMPTOMS:</td>
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</tbody>
</table>

4/21/2015

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Health & Wellness Conference 2015
Food Sensitivity- Testing

- No test is currently supported by strong evidence
  - **ELISA IgG or IgG4 Antibodies**
    - Quantifies the level of IgG response to specific foods
    - Tests foods only, not food chemicals
    - Elevated IgG may be harmful or protective
  - **Antigen Leukocyte Cellular Antibody Test (ALCAT)**
    - End-point blood test that quantifies mediator release (i.e. histamine, cytokines, prostaglandins, etc.)
    - Tests both foods and food chemicals
    - Poor split sample reproducibility, low accuracy, outdated technology
  - **Mediator Release Test (MRT)**
    - Similar, but updated ALCAT technology
    - Tests both foods and food chemicals
    - 94.5% sensitivity, 91.7% specificity (high accuracy) and >90% split sample reproducibility (high reliability)
Food Sensitivity - Treatment

• Elimination Diet (at least two weeks)
  ◦ Specific Foods
    ◦ Low FODMAPS, gluten, dairy, nightshades, soy, etc.
  ◦ Oligoantigenic/Selected Foods
    ◦ LEAP protocol
    ◦ Elemental

• Oral Food Challenge

• Heal/repair the gut

• Rotation Diets?
Examples of Elimination Diets

Rowe Elimination Diet:
- 5-10 foods only

Institute of Functional Medicine Diet:
- avoid gluten, corn, soy, dairy, shellfish, beef, pork, peanuts, eggs, oranges, refined sugar

Lifestyle Eating And Performance Diet (LEAP)
- 6 Phase-diet based on results of MRT testing and clinical history

SWAG Diet:  
Scientific Wild-Ass Guess - Wikipedia, the free encyclopedia  
en.wikipedia.org/wiki/Scientific_Wild-Ass_Guess  
Scientific Wild-Ass Guess, or SWAG, is American slang meaning a rough estimate made by an expert in the field, based on experience and intuition. It is similar ...
## Commonly Eliminated Foods

<table>
<thead>
<tr>
<th>✓ Fatty meats: beef, pork, veal</th>
<th>✓ Eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Dairy and products made from dairy</td>
<td>✓ Gluten and products made from gluten</td>
</tr>
<tr>
<td>✓ Corn and products made from corn</td>
<td>✓ Alcohol/Caffeine</td>
</tr>
<tr>
<td>✓ Foods containing yeast or promoting yeast overgrowth: processed foods, refined sugar, cheese, peanuts, vinegar</td>
<td>✓ Simple carbohydrates: sugar, “white” flour, processed foods, soda</td>
</tr>
<tr>
<td>✓ Unhealthy fats: margarine, shortening, butter</td>
<td>✓ Peanuts</td>
</tr>
<tr>
<td>✓ Strawberries and citrus fruit</td>
<td>✓ Foods with high FODMAPs: apples, onions, dairy, legumes, etc.</td>
</tr>
<tr>
<td>✓ Additives and preservatives</td>
<td>✓ Soy and products made from soy</td>
</tr>
</tbody>
</table>
Let’s get to work!

Implementing an Elimination Diet
Steps:

1. Fill out Symptom Survey to elucidate problematic symptoms.

2. Use a Food & Symptom Diary for 2 weeks to begin drawing connections between foods and symptoms.

3. Create a list of suspected problematic foods.

4. Define your elimination diet protocol based on accessible information.

5. Follow the diet for >3 weeks followed by a reassessment of symptoms.

6. After significant symptom reduction is achieved (ranging from 3-8+ weeks) implement an oral food challenge on each eliminated food.

7. Develop a maintenance plan- healthy, balanced, & varied
Step 1:

• How have you been feeling over the past month?

• Where do your symptoms cluster?

• What treatments do you use to mask symptoms?
Step 2:

Use a food and symptom diary for at least 2 weeks:

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Meds/supplements taken</th>
<th>Food Eaten, Amounts and Description: brand preparation, etc.</th>
<th>Symptoms?</th>
<th>What and how severe (1-10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4/20- Day #7 8:00am</td>
<td></td>
<td>2 large organic eggs cooked in 1tsp coconut oil with ½ cup chopped spinach, ¼ cup chopped onion, ¼ large avocado. 16oz water with lemon. ½ medium apple.</td>
<td>Headache- 2 Stomach bloating- 8 (lasted until lunch)</td>
<td></td>
</tr>
<tr>
<td>12:30pm</td>
<td></td>
<td>2 large celery stalks with 2 tbsp raw almond butter. 6oz plain Greek yogurt with ½ cup organic wild blueberries, 1 packet truvia.</td>
<td>BM- loose stool Stomach bloating- 5</td>
<td></td>
</tr>
<tr>
<td>3:00pm</td>
<td></td>
<td>2 servings of Doritos, diet coke</td>
<td>Headache- 10 Stomach bloating- 10</td>
<td></td>
</tr>
</tbody>
</table>

*Ideally avoid meds/supplements that are not medically necessary during the elimination diet to avoid any confusion related to the primary intervention (diet)!
Step 3: 
Create a list of suspected problematic foods

• Do you tolerate lactose and other high-FODMAP foods?
• Do you have any immediate reactions after consuming foods (OAS or FA)?
• Does food preparation style have any impact on how you feel (i.e. spicy or fried foods may cause gastric distress/reflux)?
• Do any immediate family members have AFRs that may be problematic for you as well?
• Have you been tested for food allergies, sensitivities, intolerances, and/or celiac disease?
Step 4: Define your elimination diet protocol based on accessible information

- Specific food elimination diet:
  - no milk, citrus fruit, or fried foods
  - Dairy or gluten free

- Oligo-antigenic diet:
  - LEAP protocol (based on results of MRT testing)
  - Eliminate most foods and start with a baseline diet of 5-25 foods

- Low/no FODMAP diet:
  - Low/no intake of highly fermentable carbohydrates (useful for GI concerns)
Step 5:
Follow the protocol for >3 weeks followed by a reassessment of symptoms.

EASIER SAID THAN DONE!
Adherence Tips/Tricks

- Find an ideal TIME to complete the elimination diet
- Properly prepare:
  - Clean out the kitchen and restock with allowed food choices
  - Create a realistic meal plan
  - Prepare recipes and freeze for later use
- Inform others about your new diet to gain social support
- Research and purchase “convenience” items to use during the diet
- Do not go hungry
  - Eat before going out
  - Bring food with you
  - Do not focus on weight management during this time
## Preparing the Kitchen & the Mind

<table>
<thead>
<tr>
<th>Kitchen</th>
<th>Mind</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Remove or properly label eliminated foods to avoid temptation</td>
<td>▪ Know your WHY</td>
</tr>
<tr>
<td>▪ Cook from scratch in bulk</td>
<td>▪ Focus on short-term goals</td>
</tr>
<tr>
<td>▪ Buy awesome containers! Prep, label, and store food</td>
<td>▪ Gain social support</td>
</tr>
<tr>
<td>▪ Get a working blender and/or food processor</td>
<td>▪ Focus on stress management</td>
</tr>
<tr>
<td>▪ Organize your recipes</td>
<td>▪ Understand your relationship with food– much more than nourishment</td>
</tr>
</tbody>
</table>
Useful Resources

✓ Websites:
  • Shopwell.com: look up products and read the full label online or on your phone
  • Pinterest: LEAP/MRT page to learn about recipes and products that worked for others
  • katescarlata.com and ibsfree.net: dietitians who specialize in FODMAPs
Step 6:  
*Perform an oral food challenge on each eliminated food*

- Retake your symptom survey to assess for significant improvement

- Create a food re-introduction plan:
  1. List all the foods eliminated that you are interested in reintroducing
  2. Prioritize this list based on:
     - Foods least likely to be problematic first
     - Foods you miss the most first
     - Foods most likely to be problematic last
  3. Add one new food, in its pure form, every 3 days (*exception during LEAP protocol)*
     - Try the new food on day 1
     - Refrain from the new food on day 2 and day 3
     - By day 4, decide if the food has “passed” the oral food challenge
     - Record the experience
Step 7:

**Develop a maintenance plan - healthy, balanced, & varied**

**EATING TIPS**

**WHAT:**
- Colorful vegetables and fruits
- Lean protein
- Healthy fats
- Fiber-rich foods, 25-35g/day
- Protein and fat with each meal
- Organic foods

**HOW MUCH:**
- Small, frequent meals
- 3 meals, 2 snacks
- Appropriate portions
- MINIMUM per day:
  - Legumes, 1 serving
  - Nuts & Seeds, 1 serving
  - Vegetables and Fruits:
    - 1 red, 1 orange, 1 yellow,
    - 1 green, 1 blue-purple

**WHEN:**
- Start the day with breakfast
- Approximately every 3 hours

**HOW:**
- Enjoy your food
- Eat mindfully, peacefully
- Share meals with friends/family

**CORE FOOD PLAN**

**WHAT:**
- Fats and Oils
- Protein + Fat
- Plant Proteins
- Animal Proteins
- Legumes
- Non-starchy Vegetables
- Carbohydrate
- Fruits
- Snacks
- Grains

**DAILY FOOD INTAKE**

**DAILY FLUID INTAKE**

½ of your desirable weight (lbs) in ounces
- **Best Choice:** Purified water
- **Other Options:**
  - Unsweetened beverages low in salt/sodium and caffeine
Inflammatory Triggers

Psychological
- Stress, depression, anxiety

Environmental
- Mold, pollution, lack of outdoors/sunlight, allergens, toxin exposure

Lifestyle Choices
- Sedentary lifestyle, tobacco/drug/alcohol use, lack of sleep

Dietary choices
- Adverse food reactions, inadequate nutrient intake, excessive intake of poor quality/processed foods

Other
- Overweight/obesity, genetic predisposition
Anti-Inflammatory Recommendations:

- **Fats**
  - Omega 3s, monounsaturated fats
  - Avoid fried foods and hydrogenated fats

- **Whole foods**
  - Antioxidant/colorful foods, herbs, spices
  - High fiber
  - Reduce intake of processed foods

- **Physical activity**
  - Avoid a sedentary lifestyle
  - 10,000 steps per day
  - Flexibility, strength, aerobic exercise

- **Sleep**
  - 7-9 hours of good quality sleep
  - Nap as needed

- **Reduce toxin exposure**
  - Limit caffeine and alcohol
  - Live a “natural” life

- **Stress management**
  - Practice mindfulness each day

- **Drink plenty of purified water**
- Achieve a healthy weight
Conclusion

1. Adverse food reactions may manifest in various forms and it is important to know the types, symptoms, diagnostics, and treatment options.

2. A short-term elimination diet followed by an oral food challenge is the gold-standard for identifying AFRs. It is best to perform this under the supervision of a health professional.

3. Maintain your health through sound nutrition, following an anti-inflammatory diet and lifestyle approach.
References


7. Pasula, Mark J.; The Patented Mediator Release Test (MRT); A Comprehensive Blood Test for Inflammation Caused by Food and Food-Chemical Sensitivities. Townsend Letter, January 2014
Thank you!

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