

The four goals of dietary
interventions in NMO:
Anti-inflammatory,
Antioxidant,
Immunomodulation
and Repair

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Autoimmune Pathology - Review

- Immune cells are typically focused on “outside world”
- Target proteins associated with viruses, bacteria, parasites, “foreign” material
- “Self” proteins are usually recognized and ignored
- Autoimmune states occur when immune system targets “self proteins”
 - NMO – Aquaporins
- Damage occurs through inflammatory and oxidative pathways



Inflammation

- Normal immune response
- Necessary for protection, healing, adaptation
- In autoimmune states, “normal” process becomes “abnormal”
 - Targeting proteins that are “permanent”
 - Length of time of response is longer, more destructive due to persistent signal
 - Healing is compromised

Inflammation

- Inflammation can be mediated in the body by specific chemical messengers –
 - endogenous- self
 - exogenous- from outside.
- Most of us familiar with the “drugs” but these compounds often found in nature then extracted for most effective form

Oxidation

- Normal part of energy production/activity in the body – cost of using oxygen as fuel
- Immune system utilizes oxidation to fight infection, help dispose of diseased/aged cells
- Natural process of destruction/degradation in body tissue, results of aging
- Anti-oxidants help to control oxidative activity
- Antioxidants come from diet, can also be made by body

"Natural" Anti-inflammatories

- Salicylic acid – Mint spp
 - 1ml of wintergreen oil = 2 grams of aspirin (Johnson PN; Methylsalicylate/Aspirin Equivalence; Vet Hum Toxicology 1985 26:317-318
 - » Equivalent to 23 baby aspirin (87mg)
- NSAIDs – COX/LOX << NKb -> drugs:
Ibuprofen/Naproxen/Celebrex
 - Turmeric
 - Hops
- Omega 3/6/9 oils
 - Change cellular inflammatory signals through prostaglandin secretion
- Steroids
 - Cortisol response
 - » Caloric restriction

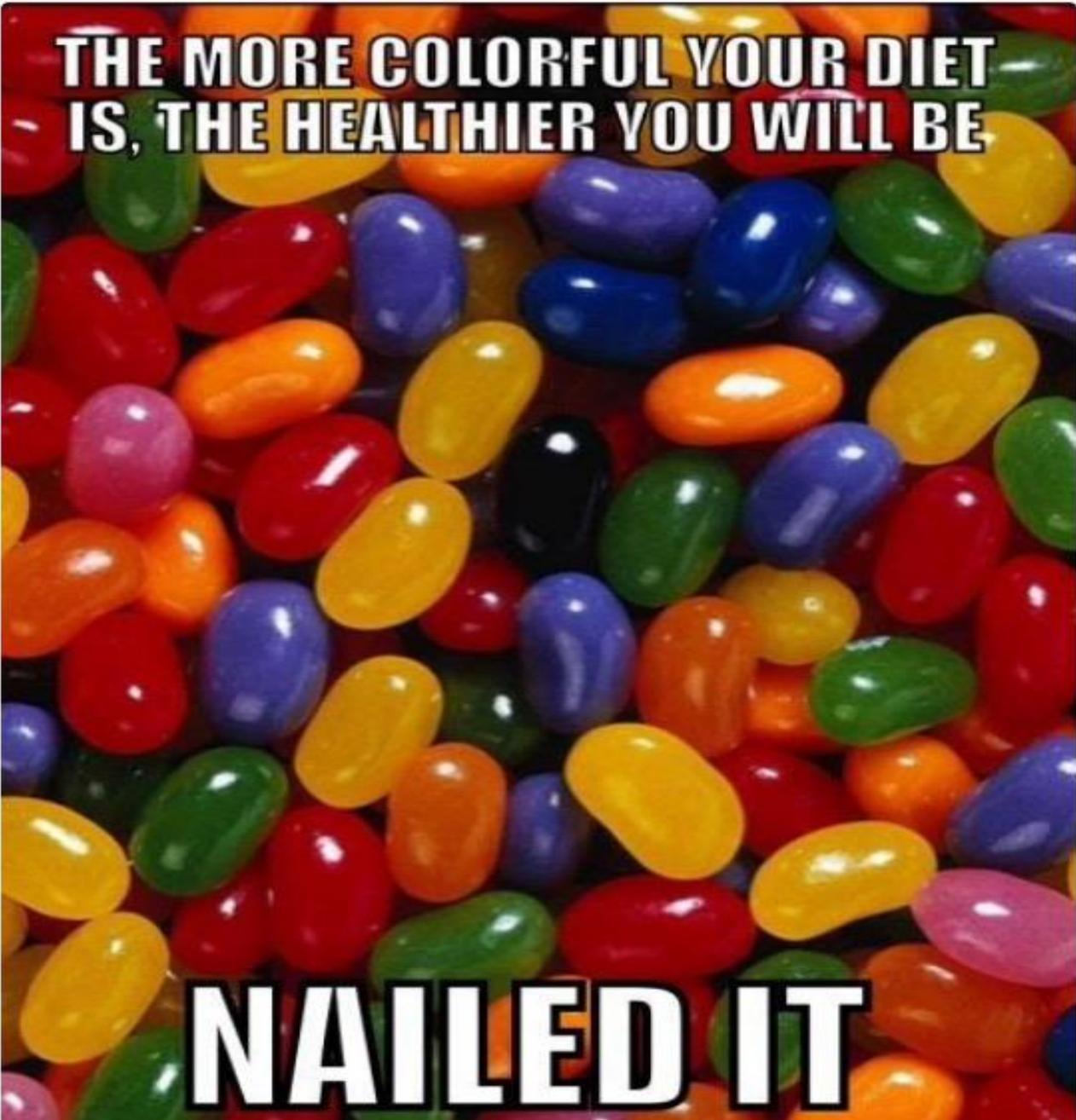


Modulation of inflammation through diet

- Foods can worsen inflammation
 - High sugar/Added sugars
 - Insulin response
 - Increased adipose development – IL-6
 - High saturated fats
 - Methods to adjust impact (Keto/Swank diets)
- Foods improve inflammation
 - High fiber
 - Reduce sugar uptake, fat uptake, removal of “toxins”
 - Fermented foods – probiotics
 - "Healthy" fats/oils
 - Omega 3, MCT oil



Antioxidant foods

A large, dense pile of multi-colored jelly beans in various colors including red, orange, yellow, green, blue, purple, pink, and black. The beans are glossy and fill the entire frame.

**THE MORE COLORFUL YOUR DIET
IS, THE HEALTHIER YOU WILL BE**

NAILED IT



Antioxidant foods

- Colors of the rainbow
 - Reds – Lycopenes
 - Orange – Beta-carotenes
 - Yellow - Bioflavonoids
 - Greens – Chlorophylls +
 - Blue/Violets - Anthocyanidins
- Production of internal antioxidant – Glutathione (GSH)
 - N-acetylcysteine, selenium
 - Brassicaes – sulforaphane
 - Melatonin – CNS specific antioxidant

Immunomodulation

- Coming wave of biological therapeutics for autoimmune. More precise targeting, less frequency of dosing, less damaging side effects
 - New approval for NMO - inebilizumab. CD-19 target. Only second approved therapy.
- Diet/lifestyle approaches to immunomodulation

Immunomodulation

- Making immune system smarter(?) - "less reactive to self"
- Vitamin D biochemistry
 - Hormonal influence of cell adhesion/cell signaling
 - "What am I? What do I fight?"
- Innate immune response – Border security
 - How many/what kind of security do we need in gut?
 - How "reactive" are they?

Immunochemistry

- Five types of cell-mediated immune proteins:
 - **IgE, IgA, IgG**, (IgM, IgD)
 - * all can be problematic in own way
- **IgE** – Histamine releasing – “true” allergy - anaphalaxis
- **IgA** – Mucus membranes – GI distress – can be severe – Celiac disease
- **IgG** – Immune “memory” – range of systemic reactions – “intolerance”
 - (IgG is thought to be source of most autoimmune targeting/attack)



Laboratory Tests for Food Reactions

- IgE
 - Skin "scratch" test
 - Blood levels
- IgA
 - Mucosal biopsy
 - Blood levels
- IgG
 - Blood levels

Repair

- **"As long as you are breathing, you are healing."**
- The body is equipped to protect and repair itself from damage. Always occurring.
- Metabolism = catabolism (damage/breakdown) + anabolism (building/repair)



Repair

- Natural mechanisms of support:
 - Sleep/rest
 - Stress reduction
 - Circulation/blood flow
 - Hydration (water is ultimate "cleanser" in body)
 - Nutrients/hormones that are focused on supporting repair
 - Methylation
 - "anabolic" hormones,
 - anti-inflammatory hormones – caloric restrictions



Supplementation

- Vitamin D
 - Immunomodulation
 - Th1 to Th2 response
 - Reduces systemic risks of infections/illness
- Probiotics
 - Microbiome
 - Innate immune responses
 - Defensin protein production
- Omega 3 oils
 - Anti-inflammatory
 - Repair of neural tissue
- Alpha Lipoic Acid
 - Antioxidant
 - Repair of neural tissue



Supplementation
continued...

- Methylation-
 - Process of repair, detoxification, cell development
 - Active forms of B vitamins are more effective
 - B12 – (cobalamin) - Methyl form
 - B9 (Folic acid) 5-methyltetrahydrofolate
 - B6 Pyrioxidine (P5P)

Summary



Diet/lifestyle can influence inflammatory and oxidative pathways which are part of autoimmune disease



Inflammation can be increased if immune system is also reacting to “immunogenic” foods



Antioxidants in diet have 1-2 punch – chemical reactions in body and replacement of “oxidizing” foods



Supplementation can augment a healthy diet/lifestyle by providing key nutrients to upregulate specific pathways of healing

Resources



Food allergy labs

Genova labs: www.gdx.net

Cyrex labs: www.cyrexlabs.com

USBiotech: www.usbiotech.com



Cookbooks

Whole Life Nutrition – T. Malterre

Feeding the Whole Family – C. Lair

Abascal Way – K. Abascal

Wahl Protocol – T. Wahl, MD

Grain Brain – D. Perlmutter, MD

Sample Recipes

Marco's Favorite Nut Burgers - Adapted from Feeding the Whole Family – Cynthia Lair, PhD

- 3/4 cup sunflower seeds (or cashews)
- 3/4 cup walnuts (or brazil nuts)
- 1 tsp. cumin
- 1 tsp. oregano
- 1/8 tsp. cayenne
- 2 cloves garlic, chopped
- 1 cup brown rice, *cooled, best if it has been slightly overcooked/softer
- 1 small carrot, finely grated
- 2 1/2 tbsp. tomato paste 1-2 tsp. cold pressed oil
- 4 whole grain hamburger buns

- Grind nuts and seeds into a fine meal with food processor. Pour into a bowl and add cumin, oregano, cayenne and garlic; mix well. Slowly fold in cooked brown rice; folding, not mixing vigorously will help keep the burgers together. Add tomato paste a little at a time until texture is stiff and workable. Form mixture into patties with moist hands.
- Refrigerate patties for 2 hours. Lightly coat a skillet with oil and brown patties on both sides. Serve on whole grain buns with favorite burger dressings (such as avocados, cucumbers, tomatoes, lettuce, spinach, kale, sprouts, pickles and/or condiments).



Sample Recipes co ntinued

Vegetable Soup

Ingredients

- 1 - 15 ounce can diced tomatoes
- 1 - 15 ounce can red kidney beans
- 2 cups broccoli (chopped)
- 2 zucchini (chopped)
- 2 cups kale or mustard greens (chopped)
- 2 carrots (chopped)
- 1 small onion (chopped)
- 4 garlic cloves (thinly sliced)
- 4 cups organic vegetable broth
- Red and black pepper

- Directions - Place all ingredients, including vegetable stock into a large stock pot. Bring to boil and simmer for 30-45 minutes. Add salt and pepper to taste.



Q and A

- THANK YOU FOR YOUR ATTENTION
- Thank you to the Guthy Jackson Charitable Foundation

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