

Dietary Approaches for Reducing Inflammation

Erica Julson, MS, RDN, CLT



There are 3 legitimate nutrition credentials:

- **Registered Dietitian Nutritionist (RDN)**
(or Registered Dietitian (RD))
- Certified Nutrition Specialist (CNS)
- Physician Nutrition Specialist (PNS)

These require....

- 4 to 8 years of college
- 1,000 hours of supervised practice
- Certifying exam
- Continuing education hours

Less reliable credentials....

- Certified Clinical Nutritionist (CCN)
- Certified Nutritionist (CN)
- Certified Nutritional Consultant (CNC)
- Certified Nutrition Educator (CNE)
- Certified Nutritional Therapist (CNT)
- Fitness Nutrition Specialist (FNS)

• People who call themselves:

- "Nutritionists"
- "Integrative Nutritionists"
- "Holistic Nutritionists"
- "Nutrition Specialists," or
- "Nutrition Coaches", with no accompanying credentials.



What are registered dietitians educated on?

- Clinical Nutrition / Medical Nutrition Therapy
- Food Service Administration
- Advanced Nutritional Science
- Food Science
- Counseling & Behavior Change
- Specialized Topics
 - maternal & child nutrition
 - integrative & functional nutrition
 - community nutrition
 - complementary and alternative nutrition

Where can I find an RDN?

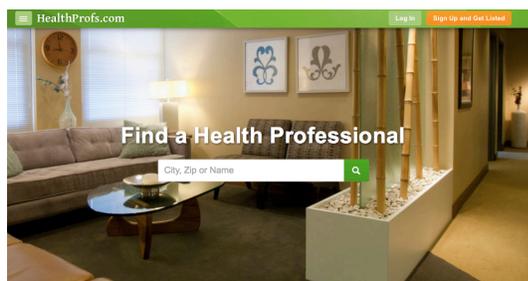
- hospital
- weight loss clinic
- bariatric center
- eating disorder clinic
- drug and alcohol rehabilitation center
- dialysis center
- prison
- grocery store
- research lab
- product development lab
- school district
- food bank
- gym
- sports team headquarters
- restaurant headquarters
- corporate wellness center
- private practice
- health/wellness/ or cooking magazine
- on a TV show
- at a book signing
- teaching at a college
- and many many more.

Are we covered by insurance?

- **Most of the time, yes!**
- Contact *your* insurance company to see how many visits are covered for “medical nutrition therapy” or “nutrition counseling”.
 - Usually, a certain # of visits are covered for a medical diagnosis, like celiac disease or diabetes
 - And an additional # of visits may be covered for preventative wellness.
 - The code for nutrition counseling is 97802
- **Not all dietitians contract w. insurance companies.**
- Many are private-pay only, but will provide a superbill for you to submit to your insurance for reimbursement.
 - Rates are typically \$150-\$200/hour.

To find a dietitian near you:

- www.healthprofs.com



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- www.healthprofs.com

Nutritionists and Dietitians in Palms - Los Angeles, CA 90034

The screenshot displays search results for dietitians in Palms, Los Angeles, CA 90034. The results are organized into a grid with filters on the left. The filters include 'Style/Type' (Clinical Dietitian, Community Dietitian, Consultant Dietitian), 'Treatment Techniques' (Diet Therapy, Medical Nutrition Therapy, Menu Planning, Meal Timing, Nutrition Coaching, Nutrition Counseling), and 'Issues' (Diabetes, Diet and Nutrition, Digestive Issues, Weight Management, Wellness Counseling). The results list three dietitians: Erica Julson, LeeAnn Smith Weintraub, and Mascha Davis, each with a profile picture, name, credentials, a brief bio, and contact information (phone number, 'View Profile', and 'Email' buttons).

To find a dietitian near you:

The Academy of Nutrition & Dietetics “Find an Expert” Tool
 • <http://www.eatright.org/find-an-expert>

Find an Expert

The screenshot shows the search interface for the Academy of Nutrition & Dietetics 'Find an Expert' tool. It features a search bar with the text 'Find a Registered Dietitian Nutritionist' and a search button labeled 'Search Now'. Below the search bar is a secondary search option: 'Or Search by expertise'. To the right of the search bar is a photograph of a woman wearing glasses and holding them up to her eyes. The background is a light gray color.

To find a dietitian near you:

The Academy of Nutrition & Dietetics “Find an Expert” Tool
 • <http://www.eatright.org/find-an-expert>

The screenshot shows a map view of dietitian search results from the Academy of Nutrition & Dietetics tool. The map is centered on Los Angeles, CA, and shows several red location pins. To the left of the map is a list of search results, each with a profile picture, name, credentials, address, phone number, and a 'VIEW DETAILS' button. The results include Erica Julson, Carrie Gabriel, Lee Ann Weintraub, Peilin Guo, and Dori Zerlin.

What do I do?

- **Private Practice Dietitian**
 - Certified LEAP Therapist (CLT)
 - Specializing in adverse food reactions
 - Background in research
- **Recipe Developer**
- **Blogger**
 - ericajulson.com



Today's Topics

1. **What is Inflammation?**
2. **How is it Related to Diet & Mental Health?**
3. **Pro-Inflammatory Diet Patterns**
4. **Anti-Inflammatory Diet Patterns**
5. **Food Sensitivities**
6. **Nutrient Deficiencies**
7. **Concluding Remarks**

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What is inflammation?

Inflammation is Natural & Protective, in Moderation

- It is our body's natural protective response to something that is hurting it.
- Inflammation is part of our immune's system arsenal of tools.
- When our immune system detects a threat, it creates inflammation.

The goal is to **neutralize the threat, and begin to heal.**

Inflammation in response to an actual threat is a **good** thing. Without it, we would never recover from an injury or infection.

What is inflammation?

Acute (short-term) inflammation:

1. **Blood vessels dilate to bring extra blood to the area.**
 - Helping bring more immune cells to the area, and makes it easier to clear out waste. (Redness & heat)
2. **Capillaries become more permeable**
 - Now fluid & proteins can more easily move out of the blood stream and into the space between your tissue's cells. (Swelling)
3. **Some white blood cells move out of the blood and into the space between the tissue's cells.**
 - These white blood cells help digest microorganisms and foreign material.

What is inflammation?

We get into trouble with long-term, chronic inflammation.

Why does long term inflammation happen?

1. Pathogens that we can't get rid of.
2. Foreign bodies in our system.
3. Over-active immune system flagging harmless things as threats.
 - Autoimmune diseases
 - (celiac disease, rheumatoid arthritis, Hashimoto's, etc.)
 - **Food sensitivities!**

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Diet & Depression

Pro-inflammatory diet patterns are linked to depression.

Pro-inflammatory diets are high in:

- Processed convenience foods
- Red meat
- Sweets
- Empty calories

And low in:

- Fruits and vegetables
- Whole grains
- Unsaturated fats
- Nuts and seeds
- Lean meats & seafood

- Typically described as "Western type" diets, or SAD (Standard American Diet).

Pro-inflammatory diets

How do these diets trigger inflammation?

Possible mechanisms:

1. Excessive calorie intake → more white adipose tissue
 - Releases pro-inflammatory mediators, "adipokines", (TNF, IL-6, IL-1)
2. Low fiber intake → negative changes in microbiome composition
 - Unhealthy gut microbiome reduces the integrity of the gut lining. Less short chain fatty acid production, increased intestinal permeability.
3. Unbalanced omega-6 / omega-3 fatty acid ratios
 - Tilt the prostaglandin pathway to promote inflammation. (Prostaglandins are lipid hormones that regulate blood clotting & inflammation)
 - Excess intake of refined oils (used in processed foods) corn, safflower, or sunflower oil
4. Excess intake of refined carbs & sugars
 1. Sugars bind with proteins & lipids to form advanced glycation endproducts (AGEs), which increase free radical production.
 2. High blood sugars trigger epigenetic modification of NFkB (master inflammatory regulator) to increase inflammation.

Manzel, And et al. "Role of Western diet in inflammatory autoimmunity as a model for psychiatric disorders." *Autism journal* 13(2014): 404-414.

Diet & Depression

Cross-sectional Studies:

- **Strong associations** between **poor diet quality** (low in fruits and vegetables, high in refined grains, highly processed and fried foods, and added sugars) and **increased risk of depression.**
- **Even after controlling for other factors**, like SES, parental education & work status, family conflict, BMI, physical activity, and smoking

Demonstrates a correlation between diet & depression.

1. Jacka, F. N., Kremer, P. J., Leslie, E. R., Berk, M., Patton, G. C., Toumbourou, J. W., & Williams, J. W. (2010). Association between diet quality and depressed mood in adolescents: results from the Australian Healthy Neighbourhoods Study. *Australian and New Zealand Journal of Psychiatry*, 44(5), 438-442.
2. Mikołajczyk, R. T., ElAnsari, W., & Maxwell, A. E. (2009). Food consumption frequency and perceived stress and depressive symptoms among students in three European countries. *Nutrition*, 25(1), 31.
3. Payne, M. E., Steck, S. E., George, R. R., & Staffens, D. C. (2002). Fruit, vegetable, and antioxidant intake as a buffer in older adults with depression. *Journal of the Academy of Nutrition and Dietetics*, 112(12), 2022-2027.

Diet & Depression

Prospective Cohort Studies:

Studies following healthy adults for 5-8 years to see who develops depression.

Those who ate the most:

- processed foods
- fast food
- commercial baked goods
- & followed a low-quality "western" diet

- **Were at the highest risk of developing depression during the study period.** (39-58% increased risk)

Stronger evidence for a link between diet & depression.

1. Akbaraly, T. N., Benzer, E. J., Ferris, J. E., Murrell, M. G., Kivimaki, M., & Singh-Manoux, A. (2009). Delayed onset depression symptoms in middle age. *The British Journal of Psychiatry*, 195(5), 408-413.
2. Sánchez-Riera, A., Toledo, G., de la Cruz, J., Martínez-González, M. A. (2012). Risk factors for incident depression in middle-aged and healthy individuals. *Public Health Nutrition*, 15(3), 226-230.
3. Jacka, F. N., Cotton, N., Ames, J., & Shepherd, P. (2015). Diet, Depression and Cognitive Symptoms over Time: Examining the Relationships with Socioeconomic Position, Health Status and Cognitive Reserve. *PLoS ONE*, 10(8), e0138000.

Diet & Depression

Conversely, a Mediterranean style diet may be protective.

- **Rich in:**
 - Fruits & Vegetables
 - Nuts
 - Whole Grains & Legumes
 - Olive Oil
 - Fish & Seafood (2x/week)
 - Spices
 - Moderate alcohol (1-2 servings daily, red wine)
 - Water
- **Moderate in:**
 - Poultry
 - Eggs
 - Cheese
 - Yogurt
- **Low in:**
 - Red meat (a few times per month)
 - Saturated fats
 - Processed foods
 - Refined grains
 - Sweets
 - Refined oils



How do anti-inflammatory diets work?

Proposed mechanisms:

1. Increased omega-3 fatty acids
 - Push the prostaglandin pathway towards anti-inflammatory processes.
 2. More antioxidants
 - Fights free-radicals / oxidative stress.
 3. Fewer pro-inflammatory carbohydrates
 - Reduces inflammation related to high blood sugars.
 4. High in fiber
 - Promotes a healthy microbiome & keeps your gut strong.
- Basically, they help lower inflammation & reduce oxidative stress.

Diet & Depression

Mediterranean Diet may be protective.

Prospective cohort studies:

Those who ate the most fruits, vegetables, and fish, or who followed a Mediterranean diet pattern were significantly less likely to develop depression over the course of the study.

1. Akbaraly, T. N., Brunner, E. J., Ferrie, J. E., Marmot, M. G., Kivimaki, M., & Singh-Manoux, A. (2009). Dietary pattern and depressive symptoms in middle age. *The British Journal of Psychiatry*, 195(5), 408-413.
2. Sánchez-Villegas, A., Delgado-Rodríguez, M., Alonso, A., Schlatter, J., Lahortiga, F., Mejem, L. S., & Martínez-González, M. A. (2009). Association of the Mediterranean dietary pattern with the incidence of depression: the Segurimento Universidad de Navarra/University of Navarra followup (SUN) cohort. *Archives of General Psychiatry*, 66(10), 1090-1098.

Diet & Depression

1st RCT just published! (Jan 30th, 2017)

- "A randomized controlled trial of dietary improvement for adults with major depression."
 - Jacka et al, *BMC Medicine*
- **Subjects:**
- 67 adults w. clinically diagnosed major depression
- Current "poor" dietary intake: Low in fruits & vegetables, fiber, and lean protein. High in sweets, processed meats, and salty snacks.

Diet & Depression

Intervention

- Seven hour-long sessions with a registered dietitian
 - 4 weekly sessions
 - 3 bi-weekly sessions
- Advice was personalized, and included motivational interviewing, goal setting, and mindful eating.

Control

- "Social support" condition
- Same # & length of sessions
- Spent discussing neutral topics of interest to participant
 - Sports, news, music, etc.
- Or playing card or board games

Diet & Depression

Recommended Diet Pattern:

- 5-8 daily servings of whole grains
- 6 daily servings of vegetables
- 3 daily servings of fruit
- 2-3 daily servings of low-fat & unsweetened dairy products
- 1 daily serving of raw unsalted nuts
- 3 tablespoons daily of extra virgin olive oil
- 3-4 weekly servings of legumes
- 2 or more weekly servings of fish
- 3-4 weekly servings of lean red meat
- 2-3 weekly servings of poultry
- Up to 6 eggs per week
- Up to 2 daily servings of red wine with meals
- No more than 3 servings per week of sweets, refined cereal, fried food, fast food, processed meats, or sugary drinks

Macronutrient Distribution:

- 18% protein
- 40% fat
- 37% carbs
- 2% alcohol
- 3% fiber/other

NOT focused on weight loss. Instructed to eat until satisfied.

Diet & Depression

Results

- Improvements in dietary quality were associated with **reduced depression scores** in the intervention group.
- For each 10% increase in dietary adherence, MADRS depression scores reduced by 2.2 points.
- **NOT due to changes in BMI, self-efficacy, or physical activity.**
 - There were no significant differences in BMI between groups after the intervention
- Also found that participants **spent less money** on the anti-inflammatory diet than their diet at baseline
 - AU \$138 per week before vs AU \$112 per week after
- **Key point:** Improving your diet could be an inexpensive way to reduce depression symptoms, even without weight loss!

Diet & Depression

Key Points:

1. "Western Style" diets are associated with higher risk for depression.
2. Mediterranean diets are associated w. lower risk for depression.
3. Making dietary changes & working with a dietitian can help reduce depressive symptoms.

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But Even "Healthy" Foods Can Make You Feel Bad

Types of Adverse Food Reactions

1. **Immune-Related Reactions**
 - Food Allergies
 - **Food Sensitivities**
2. **Non-Immune Related**
 - Food Intolerances

What Are Food Sensitivities?

When your immune system:

1. Reacts to a food or chemical antigen as a threat
2. Releases a cascade of pro-inflammatory mediators into circulation
3. Triggers chronic inflammation & associated symptoms.

Why/how do food sensitivities develop?

- Usually, **food sensitivities** are triggered by an event that is taxing on the body.
 - Ex) severe illness, food poisoning, imbalanced gut microbiome, child birth?!

The Immune System During Pregnancy

The immune system is altered by pregnancy.

- Pro-inflammatory during the 1st stage, as the mother's body adapts to the pregnancy
- Anti-inflammatory in the 2nd phase, mother & fetus are in symbiosis
- Pro-inflammatory right before birth, stimulates labor

Key Point: Pregnancy affects the immune system.

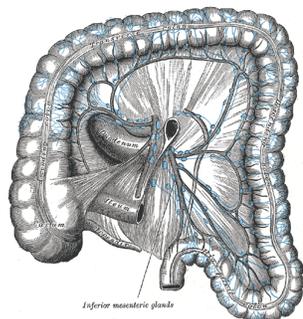
Mir, G., & Cardenas, I. (2010). The Immune System in Pregnancy: A Unique Complexity. *American Journal of Reproductive Immunology* (New York, N.Y.: 1989), 63(6), 428-433. <http://dx.doi.org/10.1111/j.1365-0265.00088.x>

Food Sensitivities 101

• In a healthy, functioning immune system...

1. The immune system decides what is "friend or foe".
2. **70% of the immune system** is located in the gut.
 - Gut-associated lymphoid tissue (GALT).

Gut-Associated Lymphoid Tissue

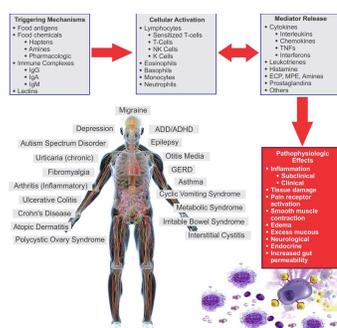


Henry Vandyke Carter (Public domain)

Immune System, Diet, & Inflammation

- In a healthy, functioning GI tract:**
 - Food is eaten, digested, and absorbed.
 - The GALT determines the food antigens are safe.
 - This is called "oral tolerance"
- When things go wrong...**
 - You "lose oral tolerance."
 - The immune system flags harmless food antigens as threats.
 - Kicks off a cascade of inflammation.

How Food Sensitivities Work



Source: Oxford Biomedical Technologies

Summary

- In food sensitivities, you've lost "oral tolerance" to certain foods or chemicals.
- Now your immune system detects them as threats.
 - White blood cells are triggered, either directly or via antibodies, to release pro-inflammatory mediators into the blood stream.
 - Lots of mediator release = inflammation & symptoms.

How do you tackle food sensitivities?

The old-school method:

- Elimination diets.**
 - Restrict diet to just a few foods.
 - Gradually reintroduce foods & watch for recurrence of symptoms.
- (+)**
 - Cheap
- (-)**
 - "SWAG" method
 - No way to know if your initial foods are non immune-provoking
 - Very time consuming
 - Low adherence
 - Hard to tell which foods are triggering your symptoms, since reactions can be delayed, dose-dependent, etc.

How do you tackle food sensitivities?

There is a better way!!

MRT (Mediator Release Testing)

- Oxford Biomedical
- Administered by some Registered Dietitians & Doctors
- Certified LEAP Therapists, CLTs
- How it works:**
 - Take a blood sample
 - Blood is mixed, separately, w. 120 different food antigens and 30 chemicals
 - Analyzed the degree of mediator release from white blood cells for each food/chemical

Word of Caution

2 HUGE Weaknesses of IgG testing:

- **Doesn't capture the whole picture:**
 - Inflammation from food can be triggered by MANY immune pathways, of which IgG is just one.
- **Not measuring what really matters:**
 - The presence of IgG antibodies to a food does not always translate to subsequent inflammation....
 - IgG formation just means that the food was "flagged" for inspection by the immune system, not that it was found to be a threat & then attacked w. Inflammatory mediators.

Even if IgG testing worked, it still doesn't test for reactions to chemicals in food (natural or added), which can be a huge missing piece of the puzzle.

Word of Caution

- IgG tests are basically expensive ways to check what you've been eating!

The **clinically relevant** information we need to measure is the release of **pro-inflammatory mediators** (cytokines, interleukins, etc.) from your white blood cells, since this is what actually **causes symptoms**.

Measuring the release of pro-inflammatory mediators, (instead of the individual mechanisms that may or may not trigger their release), is known as **common endpoint testing**.

And this is what the Mediator Release Test (MRT) is/does!

Recap

So far, we've established:

1. Mediterranean diets can reduce depressive symptoms.
 2. Excessive inflammation is related to perinatal depression.
 3. Some people have food sensitivities that increase systemic inflammation, & MRT testing + an elimination diet can help.
- Next, let's look at the importance of specific nutrients for maternal mental health.

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Nutrient Deficiencies Linked to Perinatal Depression

If your body is missing certain essential nutrients, it can't function at its best.

Pregnancy increases the risk of certain maternal deficiencies.

- If the body is low in certain nutrients, it will pull from the mother's stores to give to the baby.
- May be left depleted post-partum.
 - (This is only for some nutrients, not all)

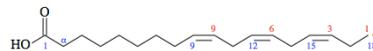
Nutrient Deficiencies Linked to Perinatal Depression:

1. Omega-3 fatty acids
2. Vitamin D

Omega-3 Fatty Acids

What are omega-3s?

- A type of *essential* unsaturated fatty acid.
 - "Essential" means you cannot synthesize omega-3s, and must get them from your diet.
- Contain a double bond 3 carbons from the "omega" end



Omega-3 Fatty Acids

There are 3 kinds:

Plant-based omega-3s:

- ALA
 - Walnuts, flax seed, chia seed, hemp seed

Animal-based omega-3s:

- EPA
 - DHA
- Both are found in fatty cold-water fish, like salmon, mackerel, sardines, halibut, tuna, or krill oil. Also in algae oil (vegan).
 - Also in grass-fed animal products, like pasture-raised eggs, butter and milk made from pastured cows, and grass-fed beef.
 - 100% grass-fed beef has 2x more omega-3s than conventional beef

Omega-3 Fatty Acids

- EPA & DHA (the animal & algae based omega-3s) are most beneficial for reducing inflammation & promoting mental health.

- ALA (the plant based fat) can be converted to EPA & DHA, but conversion is poor (~9% in pregnant women).

If you're not eating fish at least 2x per week, a *high-quality* fish oil supplement (or vegan version) is recommended.

- Pregnant women should not consume >12oz of fish/week due to concerns over heavy metal toxicity

My favorite brand is:

- Eskimo-3 by Enzymatic Therapy
- 500mg/day considered safe during pregnancy



Function of Omega-3s

- During pregnancy...**
 - EPA & DHA cross the placenta
 - Fetal concentrations > than maternal concentrations in 3rd trimester
 - Mothers may become depleted
- Functions of EPA:**
 - Reduce inflammation
 - Dilate blood vessels
 - Reduce blood clotting
- Functions of DHA:**
 - Important component of cell membranes of neurons and retina cells.
 - Adequate amounts are critical for optimal fetal brain & eye development

Depletion of Omega-3s

In general, pregnant women do not consume enough.

- Recent Canadian study found that only 27% of pregnant women met the recommended intake of 500 mg/day.
 - Xiaoming Jia, Mohammedza Paksereshi, Nour Wattar, Jamie Wildgrube, Stephanie Sontag, Murphy Andrews, Fatheema Begum Subhan, Linda McCarar, Catherine J. Field. Women who take n-3 long-chain polyunsaturated fatty acid supplements during pregnancy and lactation meet the recommended intake. *Applied Physiology, Nutrition, and Metabolism*. 2015;1

Low omega-3 levels & perinatal depression:

- Women with lower omega-3 levels in their 3rd trimester
 - Are 6 times more likely to become depressed post partum.
 - Significantly more likely to develop depression 3 months post partum.
 - Rees, Anne-Marie, et al. "Omega-3 deficiency associated with perinatal depression: case control study." *Psychiatry Research* 182 (2010): 254-256
 - Merkhus, Maria Wik, et al. "Low omega-3 index in pregnancy is a possible biological risk factor for postpartum depression." *PLoS one* 8.7 (2013): e67887.

Protective Effect of Omega-3s

- Associations w. lower rates of post partum depression:**
 - Higher concentrations of DHA in breast milk, and greater seafood consumption are linked with less post partum depression.
 - The converse is also true: lower DHA & lower fish consumption linked with higher rates of post partum depression.
 - Hibbeln, Joseph R. "Seafood consumption, the DHA content of mothers' milk and prevalence rates of postpartum depression: a cross-national, ecological analysis." *Journal of affective disorders* 69.1 (2002): 15-29.
- Supplements may be protective against antenatal depression:**
 - Pregnant women with antenatal depression who supplemented with fish oil (2.2g EPA + 1.2g DHA) had lower depression scores 6-8 weeks later, than those taking an olive oil placebo.
 - Lin, Peo-Yen, and Kuan-Pin Su. "A meta-analysis of double-blind, placebo-controlled trials of antidepressant efficacy of omega-3 fatty acids." *Journal of Clinical Psychiatry* 68.7 (2007): 106-108.

Key Points

- Omega-3 fatty acids (EPA & DHA) are **important for fetal development**.
- Mother may become deficient** during pregnancy, especially the 3rd trimester.
- Low omega-3 levels** are associated with **increased risk of post partum depression**.
- Adequate omega-3 intake/supplementation** is strongly linked to **reduced risk of post partum depression**.
- If you are **not eating fish 2x/week**, **supplementation is recommended**.
- Can get** your serum, plasma, or red blood cell membrane **omega-6 & omega-3 levels checked** through your physician, dietitian, or direct to consumer through OmegaQuant.com.

Vitamin D

What is vitamin D?

- Although we call it a vitamin, it actually acts as a hormone (chemical messenger) in the body!
- Our body can produce it in response to sunlight.

Functions:

- Regulates gene expression
 - Regulates calcium & phosphorus levels, important for bone health
 - Ensures that the immune system functions properly.
 - People with low vitamin D cannot stop the inflammatory cascade
- Yong Zhang, Donald Y. M. Leung, Britny N. Richers, Yusen Li, Linda K. Remigio, David W. Rides, And Elena Golara. Vitamin D Inhibits Monocyte/Macrophage Proinflammatory Cytokine Production by Targeting MAPK Phosphatase-1. The Journal of Immunology, March 1, 2012

Deficiency is very common:

- 1/3rd of American adults have 25(OH)D levels <50 nmol/L

Vitamin D

Vitamin D is not found naturally in many foods...

- Fatty fish (tuna, mackerel, salmon – 6oz has 600IU of vit D)
- Liver
- Egg yolk
- Mushrooms grown under UV light
- Fortified foods (milk, cereal, orange juice)

Vitamin D can be produced by the skin in response to sunlight.

- 15min – 2 hours of daily sun exposure, depending on skin pigmentation
- Rule of thumb: about half the time it takes you to sunburn

Function of Vitamin D

For the fetus:

- Bone & enamel development
- Immune function
- Healthy cell division

For the mother:

- Supports a normal functioning immune system
- Inhibits inflammation

Recommended intake during pregnancy & lactation:

- 600 IU of vitamin D3 per day (NIH Office of Dietary Supplements Recommendation)
- 2,000 IU of vitamin D3 per day (Linus Pauling Institute)

Goal:

- Serum 25(OH)D levels of...
 - 20 ng/mL? (ICM)
 - 30 ng/mL? (Endocrine Society)
 - 50 ng/mL? (Vitamin D Council)

Depletion of Vitamin D

How is vitamin D status related to maternal mental health?

1. Depression during pregnancy:

- Low vitamin D status in the 1st trimester is associated with increased depressive symptoms during pregnancy.
- Williams, Pamela K., et al. "An exploratory study of postpartum depression and vitamin D." *Journal of Women's Health: a multidisciplinary journal* 20(12): 1207-1212.

1. Depression post partum:

- Low vitamin D levels during pregnancy was associated with higher rates of post partum depression.
 - Low vitamin D status after birth linked to increased risk of post partum depression 3 months later.
 - Mothers with 25(OH)D levels <8.3ng/mL at highest risk.
- Fig. 1. Wu, Lina, et al. "Association between serum 25-hydroxyvitamin D levels measured 24 hours after delivery and postpartum depression." *PLoS ONE* 10(12): 1-7.

Key Points

- Vitamin D is a key nutrient for keeping inflammation in check.
- Mothers who are low in vitamin D may have a higher risk for perinatal depression.
 - (Correlational data only, so far)
- Testing for deficiency is probably a good idea.
- Replete w. a vitamin D3 supplement as needed.

Testing for Micronutrient Deficiencies

SpectraCell Micronutrient Testing

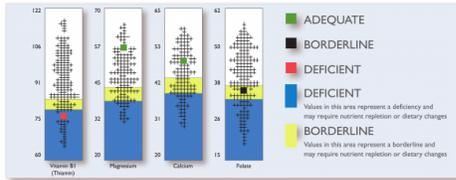
- Tests intracellular nutrient levels (WBCs)
- Long-term measure of nutrient status (last 3-6 months)

SpectraCell's Micronutrient test includes:

<ul style="list-style-type: none"> • Vitamin A • Vitamin B1 • Vitamin B2 • Vitamin B3 • Vitamin B6 • Vitamin B12 • Biotin • Folate • Pantothenate • Vitamin C • Vitamin D • Vitamin K 	<ul style="list-style-type: none"> • Minerals • Calcium • Magnesium • Manganese • Zinc • Copper 	<ul style="list-style-type: none"> • Antioxidants • Alpha Lipoic Acid • Coenzyme Q10 • Cysteine • Glutathione • Selenium • Vitamin E 	<ul style="list-style-type: none"> • Metabolites • Choline • Inositol • Carnitine
	<ul style="list-style-type: none"> • Amino Acids • Asparagine • Glutamine • Serine 	<ul style="list-style-type: none"> • Carbohydrate Metabolism • Chromium • Fructose Sensitivity • Glucose-Insulin Metabolism 	<p>SPECTROX™ for Total Antioxidant Function</p> <p>IMMUNDEX™ Immune Response Score</p>
	<ul style="list-style-type: none"> • Fatty Acids • Oleic Acid 		

Spectracell Micronutrient Testing

Sample Results:



Spectracell Micronutrient Testing

Pros:

- Great way to tell which specific nutrients you are deficient in, and how that may relate to your symptoms.
- Checks for *functional* deficiencies (How well the nutrients are being utilized by your cells, not just serum levels)
- You can do targeted supplementation, instead of just guessing what you might need.
- Patterns between nutrient levels can give great insight into your overall health.
- Gives you extra information about your ability to fight oxidative stress, strength of your immune system, ability to metabolize fructose, and glucose-insulin balance.

Cons:

- Expensive, \$190 w.insurance, \$390 without
- + additional cost for professional interpretation.

Concluding Remarks

Together, the following 3 interventions may reduce inflammation & associated depressive symptoms:

Dietary Approaches for Reducing Inflammation:

1. Consume a Mediterranean-style diet.
2. Decrease intake of pro-inflammatory foods.
3. Reduce inflammation from food/chemicals (MRT/LEAP)
4. Replete nutrient deficiencies, especially omega-3s and vitamin D. (Spectracell)

Always check with your doctor (and dietitian) before beginning any diet change or supplementation regimen!

- There are many factors to consider when making recommendations, including any co-morbid conditions & medications.

Reach Out Anytime

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