Weight Management:
Hormones and Nutritional Status

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Technical Issues & Clinical Questions

Please type any technical issue or clinical question into either the “Chat” or “Questions” boxes, making sure to send them to “Organizer” at any time during the webinar.

We will be compiling your clinical questions and answering as many as we can the final 15 minutes of the webinar.
Need More Resources?

Ensure you have an account!
Weight Management: Hormones and Nutritional Status

Melanie Dorion, AGNP
Objectives

• To discuss the multifaceted nature of weight gain and obesity
• To review a comprehensive evaluation of the overweight and obese patient
• To review specialty diagnostic testing to reveal potential areas of dysfunction in obesity
• Introduce therapeutic options focusing on adrenal and thyroid dysfunction, and nutritional status, to aid successful weight management
Pathophysiology of Weight Gain

The National Institute of Diabetes and Digestive and Kidney Disease states that:

“Overweight and obesity result from an energy imbalance. The body needs a certain amount of energy (calories) from food to keep up basic life functions. Body weight tends to remain the same when the number of calories eaten equals the number of calories the body uses or “burns.” Over time, when people eat and drink more calories than they burn, the energy balance tips toward weight gain, overweight, and obesity.”

This is an oversimplification and erroneous way of thinking about weight gain!
Weight Gain in a Nutshell

Calories In
+ @%$#^$??^&* \
+ #$%??^%&$
+ Calories Out

= Weight
Factors Leading to Weight Gain are Multifactorial!

- Diet and Lifestyle
- Hormonal Influence
  - Thyroid, Insulin, Cortisol, Leptin
- Nutrient status
  - Vitamin D, Omega-3 fatty acids
- Immune and Gut Microbiota dysbiosis
- Genetics/Epigenetics
- Neurobehavioral
- Medical
Integrative Approach to Weight Management

- Comprehensive evaluation
  - Use a multi-system questionnaire
  - Screen EVERY patient for sleep disorders (Berlin, Epworth)
  - Diet diary
- Setting realistic goals
- Labs and Specialty diagnostics
Comprehensive Evaluation in Weight Management

The following recommendations are based on the guidelines from *The Obesity Algorithm* (Seger, 2016) and clinical experience

**Management goals are 3-fold**

- Improve patient health
- Improve quality of life
- Improve body weight and body composition
Diet Diary: Quantity vs Quality . . . BIG Difference

Clearly it is NOT just about calories

• Tracking calories or points are not sustainable models for most patients
• Track and teach macronutrients
  – Grams of net carbohydrates, proteins, and fats
Diet Recommendations: Lower Carbohydrates, Moderate Protein, and Higher Fat

• Carbohydrate conscious: about or < 120 g of net carbs/day
• Low carbohydrate: < 100 g of net carbs/day
• Ketogenic: < 60-40 g of net carbs/day

Net carbs: (total carbohydrate – fiber)

Read the food labels!!
Realistic Goals

• This is key to successful weight management!!!
• Weight in the last 10 years?
• 5–10% weight loss to begin then maintenance
Testing: My Weight Management Work-Up

Hormonal Panels
• Full thyroid evaluation: Comprehensive Thyroid Assessment
  – TSH, freeT4, freeT3, reverseT3, thyroid antibodies
• Adrenals: Complete Hormones w/ cortisol add-on or Adrenocortex Stress Profile

Metabolic Evaluation
• CBC, fasting chem, A1c, fasting insulin and leptin, lipid profile, and advanced lipid profiles

Nutritional Evaluation
• Vitamin D, ferritin (even w/o anemia), B vitamins (B12 and folate), RBC magnesium
• NutrEval
Utilizing Specialty Diagnostics

• Hormone Panels
  – Complete Hormones
  – Adrenocortex Stress Profile
  – Comprehensive Thyroid Assessment

• Nutritional Panels
  – NutrEval

• Others (not discussed today)
  – GI Effects Comprehensive Profile
  – CV Health Plus Genomics
Hormonal Testing and Management
Why This Is Important in Weight Management...

• Fat cells are endocrine secretors
• HPA axis dysfunctions are common in obese patients
• Thyroid dysfunction can cause weight gain and prevent successful weight loss and weight loss maintenance
  – Treating thyroid dysfunction can improve glycemic control!
• Healthy levels of sex steroid hormones support normal body fat
• Diet and nutritional deficiencies affect our hormones
  – Low fat craze from the 80’s and the obsession with low cholesterol = 😞
• One third of men with type 2 diabetes are now recognized as testosterone deficient
We Need Cholesterol...

Steroidogenic Pathways
The Complete Hormones Panel

• Always add-on cortisol!
• Examines the role of stress and cortisol on hormone metabolism
• Helps describe hormone metabolism to evaluate symptoms and disease risk
• Helps interpret the hormone balance at baseline and in monitoring hormonal replacement
Adrenocortex Stress Profile

- A salivary hormone test measuring 4 separate salivary samples over the course of the day
- It provides insight into cortisol levels throughout the day as well as one early morning DHEA measurement
Diurnal salivary cortisol is associated with body mass index and waist circumference.
Adrenal Support

• Botanical Adaptogens
  – Ashwagandha (Withania somnifera)
  – Rhodiola (Rhodiola rosea)
  – Schisandra (Schisandra chinensis)
  – PhytoADR or EnergyXtra by PureEncapsulation
  – Gaia’s Adrenal Health
Adrenal Support

Nutrients

• Vitamins
  – Pantothenic acid (Vitamin B5): 250 mg/d
  – Vitamin A: 10 - 25,000 IU/d
    • Please use birth control! This is a high dose and can give birth defects
  – Vitamin C (NOT chewable): 4 - 5,000 mg/d to GI tolerance, liposomal often better tolerated
  – Vitamin D: 4 - 5,000 IU/d

• Minerals
  – Selenium: 200 mcg/d
  – Zinc: 5 mg/d
  – Magnesium (citrate, chelate or glycinate forms): 600 mg/d in pm to GI tolerance,
    (Calm [magnesium citrate] brand is a nice one, get glycinate form if loose stool/diarrhea develops)
  – Chromium: up to 4,000 mcg (think insulin resistance support)
Adrenal Support

• “Tired and wired” patient
  – Phosphatidylserine (Cortisol manager)
  – GABA
  – CalmsForte (Hyland’s)

• Mind/Body Therapies
  – Heart Math
  – Meditation
  – Cognitive Behavioral Therapy, EFT
  – Movement Therapies (Yoga, Tai Chi, Qi Gong)

• Short-term low-dose hydrocortisone (Cortef) when needed
Thyroid Testing

Look for Optimal Levels, not Simply “Normal”

- TSH < 2.5
- FT4 > 1.3
- FT3 > 3.0
- rT3 < 20

Reverse T3

- Occupies same receptor sites as FT3
- Increased in:
  - Mitochondrial dysfunction (Insulin Resistance, DM, Lyme, fibro, etc.)
  - Elevated cortisol
  - Se and Fe deficiencies (want ferritin > 50)
Relationship between Adrenals & Thyroid

HPA Axis

Hypothalamus & Pituitary

ACTH

Adrenal Cortex

DHEA (anabolic)

Cortisol (catabolic)

STRESS

HPT Axis

Hypothalamus & Pituitary

TSH

Thyroid

T4

Liver & Kidney

rT3

T3

Cell Nucleus
Factors that Affect Thyroid Function

Factors that contribute to proper production of thyroid hormones
- Nutrients: iron, iodine, tyrosine, zinc, selenium vitamin E, B2, B3, B6, C, D

Factors that inhibit proper production of thyroid hormones
- Stress
- Infection, trauma, radiation, medications
- Fluoride (antagonist to iodine)
- Toxins: pesticides, mercury, cadmium, lead
- Autoimmune disease: Celiac

Factors that increase conversion of T4 to RT3
- Stress
- Trauma
- Low-calorie diet
- Inflammation (cytokines, etc.)
- Toxins
- Infections
- Liver/kidney dysfunction
- Certain medications

Factors that increase conversion of T4 to T3
- Selenium
- Zinc

RT3 and T3 compete for binding sites

Factors that improve cellular sensitivity to thyroid hormones
- Vitamin A
- Exercise
- Zinc
Thyroid Support

• Nutrient support
  – Se, Zn, iodine, Fe, etc
  – Methylated B vitamins
  – Thorne’s Thyrocsin
  – Pure Encapsulations’ Thyroid Support Complex

• Decrease toxins and cortisol

• Cleanse and support the liver

• Consider getting female patients off estrogen contraceptives

• Medication management:
  – Adding T3 (Cytomel)
  – Using combo medication (Nature Throid, Armour)
  – Lower T4 dose or stop T4 all together for a period
Nutritional Panels
Why is a Nutritional Panel Useful?

- Humans are not great at information recall (especially food intake) thus hard to accurately assess nutrient intake
- There are low correlations between dietary questionnaires and actual levels for many nutrients
- Nutritional deficiencies can be caused by many medications
  - Statins: CoQ12
  - Metformin: B12 and magnesium
  - PPIs: B12, folate, zinc, magnesium, iron, gut microbiome disruption
# Medications Associated with Nutrient Depletion

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<tr>
<th>Drug</th>
<th>Nutrients at risk</th>
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<tbody>
<tr>
<td>Cardiac Glycosides</td>
<td>Ca++, Mg++, PO4-, Thiamine</td>
</tr>
<tr>
<td>Beta Blockers</td>
<td>CoQ10 (melatonin)</td>
</tr>
<tr>
<td>Thiazide Diuretics</td>
<td>CoQ10, Mg++, PO4-, K+, Na+, Zn</td>
</tr>
<tr>
<td>Loop Diuretics</td>
<td>Ca++, Mg++, K+, Na+, Zn+, Thiamine, Pyridoxine, Vitamin C</td>
</tr>
<tr>
<td>Potassium Sparing</td>
<td>Ca++, Zn, Folic acid</td>
</tr>
<tr>
<td>Miscellaneous (Chlorthalidone)</td>
<td>Mg++, PO4-, K+, Na+, Zn</td>
</tr>
<tr>
<td>ACE Inhibitors</td>
<td>Zn, Na+</td>
</tr>
<tr>
<td>ARB</td>
<td>Zn</td>
</tr>
<tr>
<td>Centrally acting Antihypertensives</td>
<td>CoQ10</td>
</tr>
<tr>
<td>HMG-CoA Reductase</td>
<td>CoQ10, Vitamin E, D, Carnitine, EFA, Zn, Se, Cu</td>
</tr>
<tr>
<td>Metformin</td>
<td>CoQ10, Folic acid, Vitamin B12</td>
</tr>
</tbody>
</table>
The NutrEval can help individualize nutritional and metabolic assessments that can specifically identify imbalances which may contribute to and promote overweight and obesity

• It assesses:
  - Vitamins and Minerals
  - Metabolic Analysis Markers
    • Antioxidants
    • B Vitamins
    • Digestive Support
  - Amino Acids
  - Fatty Acids
  - Oxidative Stress Markers
  - Heavy Metals
  - Add-On Testing includes:
    • Nutrient & Toxic Elements (RBC)
    • Vitamin D
### Results Overview

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<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Borderline</th>
<th>High Need</th>
<th>Supplementation of High Need</th>
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<tr>
<td><strong>Antioxidants</strong></td>
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<tr>
<td>CoQ-10</td>
<td>✔️</td>
<td>✔️</td>
<td>❌</td>
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<td>Lipoic Acid</td>
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<tr>
<td>Vitamin A, β-carotene</td>
<td>❌</td>
<td>❌</td>
<td>✔️</td>
<td>Vitamin A, β-carotene - Dose = 15,000 IU</td>
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<td>Vitamin C</td>
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<td>Vitamin C - Dose = 1000 mg</td>
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<td><strong>B-Vitamins</strong></td>
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<tr>
<td>Thiamin - B1</td>
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<tr>
<td>Riboflavin - B2</td>
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<td>Folic Acid - Dose = 1200 mcg</td>
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<td>B12 - Dose = 1000 mcg</td>
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<td>Biotin</td>
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<td>Manganese</td>
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<td>Magnesium - Dose = 800 mg</td>
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<td>Molybdenum</td>
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<tr>
<td>Supplements</td>
<td>Daily Recommended Intake (DRIs)</td>
<td>Patient’s Daily Recommendations</td>
<td>Provider Daily Recommendations</td>
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<td>Anti-Oxidants</td>
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<td>Vitamin A &amp; β-Carotene</td>
<td>2,000 IU</td>
<td>15,000 IU</td>
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<td>Vitamin C</td>
<td>25 mg</td>
<td>500 mg</td>
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<td>Vitamin E &amp; Mixed Tocopherols</td>
<td>13 IU</td>
<td>1200 IU</td>
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<td>α-Lipoic acid</td>
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<td>200 mg</td>
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<td>CoQ10</td>
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<td>30 mg</td>
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<td>B-Vitamins</td>
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<tr>
<td>Vitamin B1 (Thiamin)</td>
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<td>10 mg</td>
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<tr>
<td>Vitamin B-2 (Riboflavin)</td>
<td>0.6 mg</td>
<td>10 mg</td>
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<tr>
<td>Vitamin B-3 (Niacin)</td>
<td>6 mg</td>
<td>10 mg</td>
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<td>Vitamin B-5 (Pantothenate)</td>
<td>8.8 mg</td>
<td>10 mg</td>
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<tr>
<td>Vitamin B-6 (Pyridoxine)</td>
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<td>10 mg</td>
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<tr>
<td>Vitamin B-9 (Folate)</td>
<td>200 mcg</td>
<td>1000 mcg</td>
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<tr>
<td>Vitamin B12 (Cobamin)</td>
<td>1.2 mcg</td>
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<tr>
<td>Biotin</td>
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<td>100 mcg</td>
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<td>Minerals</td>
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<td>Manganese</td>
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<td>4 mg</td>
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<tr>
<td>Magnesium</td>
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<td>Molybdenum</td>
<td>22 mcg</td>
<td>75 mcg</td>
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<tr>
<td>Zinc</td>
<td>5 mcg</td>
<td>20 mcg</td>
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<tr>
<td>Essential Fatty Acids</td>
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<tr>
<td>Omega-3 Fats</td>
<td>560 mg</td>
<td>1000 mg</td>
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<td>Digestive Support</td>
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<tr>
<td>Probiotics</td>
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<tr>
<td>Digestive Enzymes</td>
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<td>24,000 IU</td>
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<tr>
<td>Other Vitamins</td>
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<tr>
<td>Vitamin D</td>
<td>400 IU</td>
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<table>
<thead>
<tr>
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<th>mg/day</th>
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<td>Arginine</td>
<td>0</td>
<td>Methionine</td>
<td>205</td>
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<td>Asparagine</td>
<td>218</td>
<td>Phenylalanine</td>
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<tr>
<td>Cysteine</td>
<td>105</td>
<td>Serine</td>
<td>224</td>
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<tr>
<td>Glutamine</td>
<td>888</td>
<td>Threonine</td>
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<tr>
<td>Glycine</td>
<td>952</td>
<td>Tryptophan</td>
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<td>Histidine</td>
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<td>Tyrosine</td>
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<tr>
<td>Isoleucine</td>
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<td>Valine</td>
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<tr>
<td>Leucine</td>
<td>922</td>
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</tr>
<tr>
<td>Lysine</td>
<td>1119</td>
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</table>

*The Vitamin, Mineral, and Amino Acids Supplement Schedule presented above is based upon a comparison of the measured values with an optimal level. Thus, a given vitamin, mineral, or amino acid level for supplementation may be different for this individual, or it may be within the reference range but still a suboptimal level.*

*The Supplemental Schedule has been provided at the request of the ordering physician. Actual treatment recommendations should be made by the ordering practitioner.*
### Essential and Metabolic Fatty Acids Markers (RBCs)

#### Omega 3 Fatty Acids

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Reference Range</th>
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<tbody>
<tr>
<td>α-Linolenic (ALA)</td>
<td>1.3%</td>
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<tr>
<td>Eicosapentaenoic (EPA)</td>
<td>3.74%</td>
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<tr>
<td>Docosapentaenoic (DPA 22:5)</td>
<td>1.14%</td>
</tr>
<tr>
<td>Docosahexaeic (DHA 22:6)</td>
<td>2.1%</td>
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<tr>
<td>% Omega 3s</td>
<td>3.8</td>
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#### Omega 6 Fatty Acids

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linoleic (vegetable oil, grain, meats, dairy)</td>
<td>12.7%</td>
</tr>
<tr>
<td>γ-Linolenic</td>
<td>0.2%</td>
</tr>
<tr>
<td>Dihomo-γ-linolenic (DGLA 20:3)</td>
<td>1.15%</td>
</tr>
<tr>
<td>Arachidonic</td>
<td>1.1</td>
</tr>
<tr>
<td>Docosatetraenoic (DPA 22:4)</td>
<td>1.2%</td>
</tr>
<tr>
<td>Eicosapentaenoic (EPA 20:5)</td>
<td>0.21%</td>
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<tr>
<td>% Omega 6s</td>
<td>3.03</td>
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#### Omega 9 Fatty Acids

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<tbody>
<tr>
<td>Oleic</td>
<td>11%</td>
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<tr>
<td>Nervonic</td>
<td>2.1-3.5%</td>
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<tr>
<td>% Omega 9s</td>
<td>13.3-16.6%</td>
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#### Monounsaturated Fats

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<tr>
<th>Analyte</th>
<th>Reference Range</th>
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<tbody>
<tr>
<td>Palmitoleic</td>
<td>&lt;= 0.54%</td>
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<tr>
<td>Vacnic</td>
<td>0.9%</td>
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<tr>
<td>% Trans Fat</td>
<td>&lt;= 0.59%</td>
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#### Saturated Fatty Acids

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<tr>
<td>Palmitic</td>
<td>19-23%</td>
</tr>
<tr>
<td>Stearic</td>
<td>14-17%</td>
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<tr>
<td>Arachidonic</td>
<td>0.22-0.35%</td>
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<tr>
<td>Behenic</td>
<td>0.90-1.00%</td>
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<tr>
<td>Tricosanoic</td>
<td>0.12-0.16%</td>
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<tr>
<td>Lignoceric</td>
<td>2.1-3.0%</td>
</tr>
<tr>
<td>% Saturated Fats</td>
<td>39.8-43.8%</td>
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#### Delta - 6 Desaturase Activity

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<th>Analyte</th>
<th>Reference Range</th>
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<tbody>
<tr>
<td>Linoleic / DGLA 18:2 (n-6) / 20:3 (n-3)</td>
<td>11.5%</td>
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#### Cardiovascular Risk

<table>
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<th>Analyte</th>
<th>Reference Range</th>
</tr>
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<tbody>
<tr>
<td>Omega 6s / Omega 3s</td>
<td>1.7%</td>
</tr>
<tr>
<td>AA / EPA 20:4 (n-6) / 20:5 (n-3)</td>
<td>12-125</td>
</tr>
<tr>
<td>Omega 3 Index</td>
<td>12.8%</td>
</tr>
</tbody>
</table>
Why Test for Omega-3s?

• May help with weight loss
• Increases satiety
• Decreases inflammation

EPA/DHA Rheumatoid Arthritis

EPA/DHA as effective as Humira in pain reduction (2.7-5.2g/d x 3 mo)

• 47% reduction in rx use w/fish oil vs 15% in placebo group.

• Early intervention with EPA/DHA associated with higher rate of remission and lower use of NSAIDs (OR 2.14).
A diet rich in long chain omega-3 fatty acids modulates satiety in overweight and obese volunteers during weight loss

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b Unit for Nutrition Research, Landspítali-University Hospital & Faculty of Food Science and Nutrition, University of Iceland, Iceland
c IPMAR, Lisbon, Portugal
d Department of Food and Nutritional Sciences, University College Cork, Ireland

ABSTRACT

Long chain omega-3 fatty acids (LC n-3 FA) are considered nutritional factors with a potential to modulate food intake. Thus, the aim of the current study was to determine whether appetite could be affected by LC n-3 FA when included in a calorie-restricted diet to treat overweight or obesity.

Appetite was explored in volunteers (31 ± 5 years; BMI: 28.3 ± 1.5 kg/m²) during the last 2 weeks of an 8-week energy-restricted balanced diet (weight loss = -5.9 ± 3.1%) providing either a low (<260 mg/day; n = 112) or a high amount (>1300 mg/day; n = 121) of LC n-3 FA. Erythrocyte membrane fatty acids were measured to detect diet-related changes in fatty acids and a validated visual analogue scale (VAS) was used to measure hunger sensations directly after and 2 h after a test dinner.

The LC n-3 FA content in erythrocyte membrane was lower in the low LC n-3 FA group (10.5 ± 2.5% vs. 12.5 ± 2.6%; p < 0.001) after the intervention. The VAS assessment revealed lower hunger sensations in the high LC n-3 FA group immediately after the test dinner (fullness: p = 0.045) and after 120 min (fullness: p = 0.008; hunger: p = 0.039). Correlation analysis showed a positive relation between n-3 FA/n-6 FA ratio in erythrocyte membrane and fullness 2 h postprandial (r = 0.139; p = 0.032).

In conclusion, LC n-3 FA intake modulates postprandial satiety in overweight and obese volunteers during weight loss. Further research is needed to investigate whether LC n-3 FA improve compliance to the nutritional treatment of overweight and obesity as well as weight loss maintenance.
Oxidative Stress Markers

<table>
<thead>
<tr>
<th>Oxidative Stress Markers</th>
<th>Reference Range</th>
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<tbody>
<tr>
<td>Glutathione (whole blood)</td>
<td>&gt;= 669 micromol/L</td>
</tr>
<tr>
<td>Lipid Peroxides (urine)</td>
<td>&lt;= 10.0 micromol/g Creat.</td>
</tr>
<tr>
<td>8-OHdG (urine)</td>
<td>&lt;= 16 mcg/g Creat.</td>
</tr>
<tr>
<td>Coenzyme Q10, Ubiquinone (plasma)</td>
<td>0.43-1.49 mcg/mL</td>
</tr>
</tbody>
</table>

Images: Creative Commons
Vitamin D
Diseases associated with sub-optimal Vitamin D levels

- Osteoporosis and Osteopenia
- 17 varieties of Cancer (including breast, prostate and colon)
- Heart disease
- High blood pressure
- Obesity
- Metabolic Syndrome and Diabetes
- Autoimmune diseases
- Multiple sclerosis
- Periodontal disease
- Psoriasis
- Rheumatoid arthritis
- Osteoarthritis
- Bursitis
- Gout
- Infertility and PMS
- Parkinson's Disease
- Depression and Seasonal Affective Disorder
- Alzheimer's Disease
- Chronic fatigue syndrome
- Fibromyalgia
- Chronic Pain

![Vitamin D levels chart]
Summary

Our role in weight management is to dig deeper and look for underlying causes!

• Obesity is a complex disease and weight management should include a multifaceted approach

• A number of tests provide insight into underlying causes of weight gain
  – Hormone Tests
    • Complete Hormones
    • Adrenocortex Stress profile
    • Comprehensive Thyroid Assessment
  – NutrEval
    • Vitamin D

• Many of the underlying causes can be treated using relatively low-cost therapies
Case 1

42 Year Old Male Presented with Weight Gain, Low Testosterone and Fatigue
Case History

• Vitals WNL but BMI 25.6
• Past History
  – Years of fatigue and low testosterone, put on DHEA (25mg) and Zn by previous provider about 2 years ago – did not note any difference
  – Asthma, environmental allergies: multiple inhalers and antihistamines
  – On/off abdominal pain of unknown origin and elevated triglycerides
• Tried to exercise regularly, mostly running, had little energy and stamina for exercise
• Work: Analyst w/ high stress position
• Took a few supplements: vitamins and cinnamon
• Diet: no specific diet, ate grains including gluten, lots of fruit and vegetables
Management

Phase 1

- Increase original DHEA dose 50 mg and slowly continue increasing by 25 mg every other week as tolerated
- Change diet to lower carbohydrates, cut sugars, and limit caffeine
- Start B complex supplement with methylated B vitamins

Subsequent blood work showed higher triglycerides but testosterone still low

- Start compounded testosterone 40 mg/mL, applied 1 mL to skin daily
- Start cholesterol supplement (Triplichol by OrthoMolecular)
An elevated 17-hydroxysteroids total and/or cortisol total may be caused by stress, strenuous exercise, inflammation, hypoglycemia, insulin resistance, hypothyroidism, or licorice ingestion.

Indicated therapeutics include stress management, adequate sleep, reducing stimulants such as caffeine, reducing high glycemic load foods, as well as considering adrenal nutritional and botanical (adaptogenic) support. From the lab report!
Energy slightly better, weight gain has stopped with slight weight loss but stress remains a significant complaint

Phase 2

- Stress management and Adrenal support with adaptogens
- Food-based aromatase inhibitors green tea, nettles daily, ground flaxseed
- Tribulus by PureEncapsulation: combo of Tribulus, chrysin, hesperitin and D-aspartic acid
Case 2

52 Year Old Male Presents for Exercise Intolerance, Fatigue, and Slow Weight Gain
Case History

- Lifelong runner, noticed for about 3 years that his stamina is decreasing
- Was running marathons and now would not even consider doing a 10K
- Does yoga and reports breathing is harder
- Saw pulmonologist and CV, stress test was WNL
- Was given albuterol and using before running and reports no relief, not using spacer
- Work: Analyst last 6 years, no exposure to chemical, works in an old building, reports “dirty attic”
  - Moved to upper level about 3 years ago, had new central air put in 5 years ago
- GI: History of constipation, takes Metamucil daily, BM daily
- Family History: CV both sides, Celiac
• Vitals: 159#, **BMI 24.5, 122/90**

• Labs: order CBC, chem, ferritin, B12 & folate, Celiac genetics (HLA DQs), A1c, TSH, FT4, FT3
  – Abnormal Labs: A1c 5.6, +Celiac HLA DQ2

• Do 7-10 day diet diary

• **Ordered the NutrEval and MTHFR gene**
  – Homozygous (2 copies) MTHFR C677T
  – Multiple deficiencies
  – Elevated mercury level

---

**MTHFR**

Location:
Chromosome 1
C677T

Your Genotype:

- - Neither chromosome carries the genetic variation.
+ + One chromosome (of two) carries the genetic variation.
++ Both chromosomes carry the genetic variation.
**NutEval Results Overview**

### Antioxidants
- **Normal**
  - Vitamin A / Carotenoids
  - Vitamin E / Tocopherols
  - CoQ10
- **Borderline**
  - Vitamin C
  - α-Lipoic Acid
- **High Need**

### B-Vitamins
- **Normal**
  - Thiamin - B1
  - Riboflavin - B2
  - Niacin - B3
  - Pyridoxine - B6
  - Folic Acid - B9
  - Cobalamin - B12
- **Borderline**
  - Biotin - B7
- **High Need**

**Supplementation for High Need**

- Biotin - B7: Dose = 400 mcg

### Minerals
- **Normal**
  - Magnesium
  - Zinc
- **Borderline**
- **High Need**
### Oxidative Stress Markers

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<tr>
<td>8-OHdG (urine)</td>
<td>&lt;= 0.35 mcg/g Creat.</td>
</tr>
<tr>
<td>Coenzyme Q10, Ubiquinone (plasma)</td>
<td>0.46-1.72 mcg/mL</td>
</tr>
</tbody>
</table>

The Oxidative Stress reference ranges are based on an adult population.

### Elemental Markers (RBCs)

#### Nutrient Elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Reference Range</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>0.593</td>
<td>0.468-0.721 mcg/g</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.48</td>
<td>39.1-56.5 mcg/g</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.012</td>
<td>0.007-0.038 mcg/g</td>
</tr>
<tr>
<td>Potassium</td>
<td>2.844</td>
<td>2.220-3.626 mcg/g</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.46</td>
<td>0.25-0.76 mcg/g</td>
</tr>
<tr>
<td>Zinc</td>
<td>10.3</td>
<td>7.8-13.1 mcg/g</td>
</tr>
</tbody>
</table>

The Elemental reference ranges are based on an adult population.

#### Toxic Elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Reference Range</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>0.025</td>
<td>&lt;= 0.048 mcg/g</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.0136</td>
<td>&lt;= 0.0039 mcg/g</td>
</tr>
<tr>
<td>Antimony</td>
<td>0.001</td>
<td>&lt;= 0.002 mcg/g</td>
</tr>
<tr>
<td>Arsenic</td>
<td>0.012</td>
<td>&lt;= 0.071 mcg/g</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.001</td>
<td>&lt;= 0.001 mcg/g</td>
</tr>
<tr>
<td>Tin</td>
<td>nd</td>
<td>&lt;= 0.0009 mcg/g</td>
</tr>
</tbody>
</table>

The Toxic Elements reference ranges are based on an adult population.
Management

• Diet: lower carbohydrate levels, cut gluten and most grains, add good fats and reduce mercury fish intake
• Start gut healing protocol
• B complex with sublingual methylated B vitamins
• Trace mineral complex
• Liposomal glutathione
Questions?

Moderator: Christine Stubbe, ND

Presenter: Melanie Dorion, AGNP

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GI University – Focused learning modules
Conferences – Schedule of events we attend
Test Menu – Detailed test profile information
MY GDX – Order materials and get results
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- Diagnostic profiles featured in this webinar
- How Genova’s profiles might support patients in your clinical practice
- Review a profile that has already been completed on one of your patients

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September 2016

– Modulating the Gut Microbiome – the Role of Probiotics and Prebiotics
  • Stephen Olmstead, MD

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Weight Management: 
Hormones and Nutritional Status 
Melanie Dorion, AGNP 

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**Citations**

**Hormones**

**Omega-3**

**Vitamin D**