Nutritional Status and Hormone Balance

Marion Owen, MD

27 January 2016

The views and opinions expressed herein are solely those of the presenter and do not necessarily represent those of Genova Diagnostics. Thus, Genova Diagnostics does not accept liability for consequences of any actions taken on the basis of the information provided.
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Whole Family Medicine
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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.

DISCLAIMER: Please note that any and all emails provided may be used for follow up correspondence and/or for further communication.
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Ensure you have an account!
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Objectives

• To understand ways to minimize risk while providing appropriate hormone replacement therapy to men and women
  – Understand metabolic pathways of hormone clearance
  – Understand the impact of key nutrients and how to support
  – Understand causes for continued symptoms despite good hormone levels and how to address those without increasing hormone burden

• Understand ways to promote healthy cells especially as it applies to breast tissue in women on Hormone Therapy (HT), and prostate tissue in men on Testosterone replacement
Before Starting Hormone Therapy (HT)

- Optimize diet
- Address sedentary lifestyle if needed
- Address adrenal imbalances
- Address elevated blood sugar/insulin resistance
- Address any thyroid imbalances
- Assess methylation/sulfation
- Open all exits for detoxification
  - 1-3 bowel movements daily
  - Enough water to ensure bladder voiding every 2-3 hours
  - Increase sweating (sauna or exercise)
The NutrEval is a comprehensive nutritional evaluation designed to identify nutritional imbalances that help to overcome chronic disease and promote optimal health and wellness.

It assesses:

- Amino Acids (Plasma or FMV)
- Organic Acids (FMV)
- Essential Fatty Acids (packed RBCs)
- Oxidative Stress (blood and urine)
- Toxic and Nutrient Elements (packed RBCs)
**Optimize Diet**

### Suggested Supplement Schedule

<table>
<thead>
<tr>
<th>Supplements</th>
<th>Daily Recommended Intake (DRI)</th>
<th>Patient's Daily Recommendations</th>
<th>Provider Daily Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antioxidants</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A / Carotenoids</td>
<td>2,333 IU</td>
<td>5,000 IU</td>
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</tr>
<tr>
<td>Vitamin C</td>
<td>75 mg</td>
<td>250 mg</td>
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<tr>
<td>Vitamin E / Tocopherols</td>
<td>22 IU</td>
<td>200 IU</td>
<td></td>
</tr>
<tr>
<td>α-Lipoic Acid</td>
<td></td>
<td>100 mg</td>
<td>60 mg</td>
</tr>
<tr>
<td>CoQ10</td>
<td></td>
<td>60 mg</td>
<td></td>
</tr>
<tr>
<td><strong>B-Vitamins</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiamin - B1</td>
<td>1.1 mg</td>
<td>25 mg</td>
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</tbody>
</table>

### Amino Acid

<table>
<thead>
<tr>
<th>Amino Acid</th>
<th>mg/day</th>
<th>Amino Acid</th>
<th>mg/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arginine</td>
<td>0</td>
<td>Methionine</td>
<td>0</td>
</tr>
<tr>
<td>Asparagine</td>
<td>0</td>
<td>Phenylalanine</td>
<td>0</td>
</tr>
<tr>
<td>Cysteine</td>
<td>55</td>
<td>Serine</td>
<td>0</td>
</tr>
<tr>
<td>Glutamine</td>
<td>0</td>
<td>Taurine</td>
<td>0</td>
</tr>
<tr>
<td>Glycine</td>
<td>0</td>
<td>Threonine</td>
<td>0</td>
</tr>
<tr>
<td>Histidine</td>
<td>0</td>
<td>Threonine</td>
<td>0</td>
</tr>
<tr>
<td>Isoleucine</td>
<td>0</td>
<td>Tryptophan</td>
<td>0</td>
</tr>
<tr>
<td>Leucine</td>
<td>0</td>
<td>Tyrosine</td>
<td>0</td>
</tr>
<tr>
<td>Lysine</td>
<td>0</td>
<td>Valine</td>
<td>0</td>
</tr>
</tbody>
</table>

### Other Vitamins

- **Probiotics**: 25 billion CFU
- **Pancreatic Enzymes**: 5,000 IU
- **Vitamin D**: 600 IU
The Decision to Start Hormone Therapy (HT)

• Women:
  – Severe hot flushes
  – Sleep disturbance
  – New onset emotional disturbance
  – Increased joint pain and muscle stiffness impacting healthy lifestyle
  – Noticeable loss of attention, processing speed, memory

• Men – in the setting of low T and normal estrogen levels only:
  – Loss of “wanna”
  – Weight gain/muscle loss
  – New, unusual depression/anxiety
Initial Monitoring

• Women and Men:
  – CBC
  – CMP
  – Estradiol, estrone, estriol, progesterone, testosterone in serum
  – Sex-hormone binding globulin (SHBG)
  – Thyroid studies (not always)
  – Assess symptoms
  – Assess for weight changes
Sex Hormone Binding Globulin (SHBG)

- If elevated, consider adjusting dose of HT down
- Consider whether hyperinsulinemia is an issue
- Assess for elevated thyroid levels
- Malnutrition (very elevated in anorexia)
- Heavy alcohol use and liver damage can elevate SHBG
- Is high cortisol an issue?
- Higher when HT given with beta-tocopherol or linolinic acid.
Elevated Estrogen in a Man on Testosterone?

Aromatase...

Solutions

• Weight loss, hard to do with high estrogen, just ask any woman...
• Metformin or if you prefer herbs, berberine both at 500 mg TID
• Aromatase blockers:
  – Natural: Grape seed extract, mangosteen, EGCG, Quercetin, Resveratrol (maybe) Chrysin, Ohio buckeye, mushrooms, gum palm, If you are an herbalist check out this paper with a huge listing of natural products with aromatase activity:
    • Natural Products as Aromatase Inhibiters: Balunas et al: Anticancer Agents Med Chem Aug 2008; 8(6) 646-682
  – Prescription: I use anastrozole 0.1 mg a day to start
Follow-up Testing

- Urine metabolites: Everyone
- Adrenal stress test: If still not sleeping or emotional symptoms predominate
- Organic acids with red blood cell minerals (RBC) minerals to monitor for nutrient depletions that can happen with estrogen therapy (in women and men with high E levels)
  - Folic acid
  - Vitamin B12
  - Vitamin B6
  - Magnesium (Mg)
  - Chromium
  - Vitamin C
  - Zinc/Copper balance
Urine Metabolites: Everyone

Estrogen Metabolites: Urine
Follow-up Testing

### Vitamin Markers

<table>
<thead>
<tr>
<th>Marker</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>α-Ketoacidic Acid</td>
<td>&lt;= 1.7</td>
</tr>
<tr>
<td>α-Ketoisovaleric Acid</td>
<td>&lt;= 0.81</td>
</tr>
<tr>
<td>α-Ketoisocaproic Acid</td>
<td>&lt;= 0.89</td>
</tr>
<tr>
<td>α-Keto-β-Methylvaleric Acid</td>
<td>&lt;= 2.1</td>
</tr>
<tr>
<td>Formiminoglutamic Acid (FICu)</td>
<td>&lt;= 1.5</td>
</tr>
<tr>
<td>Glutaric Acid</td>
<td>&lt;= 0.51</td>
</tr>
<tr>
<td>Isovalerylglycine</td>
<td>&lt;= 3.7</td>
</tr>
<tr>
<td>Methylmalonic Acid</td>
<td>&lt;= 1.9</td>
</tr>
<tr>
<td>Xanthurenic Acid</td>
<td>&lt;= 0.96</td>
</tr>
<tr>
<td>3-Hydroxypropionic Acid</td>
<td>5-22</td>
</tr>
<tr>
<td>3-Hydroxyisovaleric Acid</td>
<td>&lt;= 29</td>
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</table>

### Nutrient Elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Reference Range</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper</td>
<td>0.004</td>
<td>0.466-0.721 mcg/g</td>
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<tr>
<td>Magnesium</td>
<td>44.6</td>
<td>30.1-56.5 mcg/g</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.013</td>
<td>0.007-0.038 mcg/g</td>
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<tr>
<td>Potassium</td>
<td>2.815</td>
<td>2.220-3.626 mcg/g</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.63</td>
<td>0.25-0.76 mcg/g</td>
</tr>
<tr>
<td>Zinc</td>
<td>10.2</td>
<td>7.8-13.1 mcg/g</td>
</tr>
</tbody>
</table>

### Toxic Elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Reference Range</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>0.044</td>
<td>&lt;= 0.048 mcg/g</td>
</tr>
<tr>
<td>Mercury</td>
<td>&lt;dl</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>&lt;dl</td>
<td>&lt;= 0.0009 mcg/g</td>
</tr>
</tbody>
</table>

- Magnesium (Mg)
- Zinc/Copper balance
- Folic acid
- Vitamin B12
- Vitamin B6
### NutrEval Results Overview

#### Antioxidants

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

#### B-Vitamins

- **Thiamin - B1**
- **Riboflavin - B2**
- **Niacin - B3**
- **Pyridoxine - B6**
- **Biotin - B7**
- **Folic Acid - B9**
- **Cobalamin - B12**

#### Minerals

- **Magnesium**
- **Manganese**
- **Molybdenum**
- **Zinc**

---

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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thiamin - B1</td>
<td>1.1 mg</td>
<td>50 mg</td>
<td></td>
</tr>
<tr>
<td>Riboflavin - B2</td>
<td>1.1 mg</td>
<td>50 mg</td>
<td></td>
</tr>
<tr>
<td>Niacin - B3</td>
<td>14 mg</td>
<td>30 mg</td>
<td></td>
</tr>
<tr>
<td>Pyridoxine - B6</td>
<td>1.6 mg</td>
<td>10 mg</td>
<td></td>
</tr>
<tr>
<td>Biotin - B7</td>
<td>30 mcg</td>
<td>100 mcg</td>
<td></td>
</tr>
<tr>
<td>Folic Acid - B9</td>
<td>400 mcg</td>
<td>800 mcg</td>
<td></td>
</tr>
<tr>
<td>Cobalamin - B12</td>
<td>2.4 mcg</td>
<td>1,000 mcg</td>
<td></td>
</tr>
<tr>
<td><strong>Minerals</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>320 mg</td>
<td>600 mg</td>
<td></td>
</tr>
<tr>
<td>Manganese</td>
<td>1.8 mg</td>
<td>5.0 mg</td>
<td></td>
</tr>
<tr>
<td>Molybdenum</td>
<td>45 mcg</td>
<td>75 mcg</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>8 mcg</td>
<td>10 mg</td>
<td></td>
</tr>
<tr>
<td><strong>Essential Fatty Acids</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Omega-3 Oils</td>
<td>500 mg</td>
<td>500 mg</td>
<td></td>
</tr>
<tr>
<td><strong>Digestive Support</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Probiotics</td>
<td></td>
<td>25 billion CFU</td>
<td></td>
</tr>
<tr>
<td>Pancreatic Enzymes</td>
<td></td>
<td>10,000 IU</td>
<td></td>
</tr>
<tr>
<td><strong>Other Vitamins</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin D</td>
<td>600 IU</td>
<td></td>
<td></td>
</tr>
</tbody>
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*Note: RDI values are based on general recommendations. Patient's needs may vary.*
2/16 OH Estrogen Ratio

- Early case-control studies (1980s-1990s) were encouraging as to the clinical utility of the Estrogen Metabolism Ratio (EMR), reporting lower 2/16 ratio levels among breast cancer cases compared to controls, particularly in premenopausal women.

- There appears to be no strong evidence in the literature that a higher urinary 2/16 ratio protects postmenopausal women from breast cancer, and only weak evidence of a protective effect in premenopausal women.

- The 2/16 ratio continues to be a generally informative tool; however, the overall relationships between individual and total 2-, 16-, and 4-pathway metabolites must be taken into consideration for the broadest clinical utility.

Estrogen Metabolites – 2 & 16 Pathways

• 2-Hydroxy Estrogens
  – While the traditional EMR clinical utility for cancer risk may not be as robust as previously thought, a majority of findings indicate that metabolism of parent estrogens through 2-hydroxylation (independent of any relationship to 16α-OHE1) may be considered as a benign or even protective pathway
  – Moderation should be used, however, in up-regulating the “lesser estrogenic” 2-hydroxylation pathway, particularly in women with a family history of osteoporosis, since excessive 2-hydroxylation has been associated with decreased bone mineral density

• 16α-Hydroxyestrone
  – Studies are mixed, with some associating higher levels with increased risk for certain cancers (cervix, breast, endometrium, and head and neck, as well as HPV-related tumors); however, many have found no significant association
  – Inadequate 16α-hydroxylation (the “more proestrogenic” pathway) has been associated with lower bone mineral density
Estrogen Metabolites – 4 Pathway

• 4-Hydroxy (Estrone + Estradiol)
  – Research focus is shifting toward 4-hydroxyestrone which is thought to have greater estrogenic and genotoxic potential than either 2OH(E1+E2) or 16α-OH.

• 4-Methoxy (Estrone + Estradiol)
  – COMT conversion of 4-hydroxyestrogens to 4-methoxyestrogens minimizes subsequent production of damaging 4-pathway-derived DNA adducts
Hydroxy-estrogens

- Have been noted to cause direct DNA damage in cell research
- Evidence to suggest that intra-prostatic conversion of estrogens to hydroxy-estrogens in men increases DNA damage
- Methylation of estrogens is an important aspect of managing an HT patient
  - Ratio of hydroxy to methyl estrogens

### Estrogen Metabolites

<table>
<thead>
<tr>
<th>Metabolite</th>
<th>Level (mcg/g Creat.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Hydroxyestrone (FMV urine)</td>
<td>16.3</td>
</tr>
<tr>
<td>16α-Hydroxyestrone (FMV urine)</td>
<td>7.2</td>
</tr>
<tr>
<td>4-Hydroxyestrone (FMV urine)</td>
<td>&lt;= 5.3</td>
</tr>
<tr>
<td>2-Methoxyestrone (FMV urine)</td>
<td>&gt;= 1.7</td>
</tr>
<tr>
<td>4-Methoxyestrone (FMV urine)</td>
<td>&lt;dl</td>
</tr>
</tbody>
</table>

Clearing Hydroxy-estrogens

• Keep overall doses as low as possible
• Methylation support
  – Active B complex
  – Consider COMT and MTHFR testing
• Since 4 OH seems to be more aggressive in its ability to damage DNA, encourage 2 OH formation with cruciferous vegetables
• Prevent reabsorption after detox
  – High fiber diet, especially flax lignans
• Support Sulfation
  – NAC, methylation support, glutathione supplementation
  – Consider NutraEval

MTHFR Genetics

- Impacts are myriad
- Estrogen detoxification
- Bypass with 5-MTHF: 1-5mg
- Replace with care if suspect COMT problem

Gene activity decreased
Neither chromosome carries the genetic variation.
COMT Genetics

- Effects estrogen detoxification and neurotransmitter balance
- If a patient has COMT issues, often they will have high anxiety
- Must take care if providing methyl support
- I start with a low dose B Complex
- Then B12 to allow methyl group to be handed on
- Then 5MTHF starting at very low doses, titrate up
- Some recommend SAM-e, I have not had luck with this
Still with Symptoms After Good Levels and Detox Support?

• Heavy metals? Bone mobilization with menopause
• Adrenal stress?
• Sleep disorder?
• Is there a dysbiosis causing estrogen metabolites to be re-circulated?
• Hyperglycemia/insulin blocking hormone signaling?
• Nutritional deficiencies causing poor metabolic responsiveness to hormone signaling
• Consider precursor hormone levels: DHEA, Pregnenolone
Cancer Prevention

- Lower Oxidative Stress
- Optimize Mitochondrial Health
- Avoid Triggers: Toxins
- Support Immune System
- Optimize Blood Sugar

Huang J, Plass C, Gerhäuser C. Curr Drug Targets. 2010 Dec 15
Oxidative Stress

• Regular exercise
  – There is convincing evidence that physical activity is associated with a reduced risk of cancers of the colon and breast
  – Chronic exercise elicits protective adaptations against oxidative damage

• Antioxidant support
  – Oxidative stress damages DNA
  – No clear studies that blanket support prevents cancer
  – BUT...targeted, individualized support? Can’t hurt...
  – Consider NutrEval or more targeted Oxidative Stress Analysis
# Oxidative Stress Analysis

## Oxidative Stress Markers

<table>
<thead>
<tr>
<th>Marker</th>
<th>Value</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glutathione (whole blood)</td>
<td>798</td>
<td>&gt;=669 micromol/L</td>
</tr>
<tr>
<td>Lipid Peroxides (urine)</td>
<td>12.4</td>
<td>&lt;=10.0 micromol/g Creat.</td>
</tr>
<tr>
<td>8-OHdG (urine)</td>
<td>113</td>
<td>&lt;=16 mcg/g Creat</td>
</tr>
<tr>
<td>Coenzyme Q10, Ubiquinone (plasma)</td>
<td>1.16</td>
<td>0.43-1.49 mcg/mL</td>
</tr>
</tbody>
</table>

![Genova Diagnostics logo]
Oxidative Stress and Estrogen Metabolism

- Oxidative stress depletes methyl donors
- Connects back to final neutralizing step of estrogen metabolism via methylation
Mitochondrial Health

- Immune system health
- Reduction of oxidative stress
- Think mitochondria when your patient has energy issues:
  - Poor exercise recovery
  - Brain fog
  - Weak immune system
- Easily assessed with an organic acid profile with lipid peroxides
# Mitochondrial Assessment

## Cellular Energy & Mitochondrial Metabolites

<table>
<thead>
<tr>
<th>Carbohydrate Metabolism</th>
<th>Reference Range</th>
<th>Energy Metabolism</th>
<th>Amino Acids</th>
<th>Fats</th>
<th>Proteins</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactic Acid</td>
<td>1.8</td>
<td>Citric Acid</td>
<td>220</td>
<td>40-520</td>
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</tr>
<tr>
<td>Pyruvic Acid</td>
<td>19</td>
<td>Cis-Aconitic Acid</td>
<td>12</td>
<td>10-36</td>
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<tr>
<td>β-OH-Butyric Acid (BHB)</td>
<td>0.3</td>
<td>Isocitric Acid</td>
<td>26</td>
<td>22-65</td>
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<tr>
<td>α-Ketoglutaric Acid (AKG)</td>
<td>0.3</td>
<td>Succinic Acid</td>
<td>5.1</td>
<td>0.4-4.8</td>
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</tr>
<tr>
<td>Malic Acid</td>
<td>1.5</td>
<td>Malic Acid</td>
<td>13</td>
<td>&lt;= 3.0</td>
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</tr>
<tr>
<td>β-OH-β-Methylglutaric Acid (BMG)</td>
<td>&lt;= 15</td>
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<td>Fatty Acid Metabolism</td>
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<td>Adipic Acid</td>
<td>1.2</td>
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</tr>
<tr>
<td>Suberic Acid</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Krebs Cycle At-A-Glance

- **Carbohydrates**
  - Pyruvic Acid
  - α-Ketoglutaric Acid (AKG)
  - Lactic Acid
- **Fats**
  - Suberic Acid
  - Adipic Acid
- **Proteins**
  - Lipoic Acid
  - Aconitic Acid
  - Malic Acid
- **Amino Acids**
  - Citric Acid
  - Fumaric Acid
  - Oxaloacetic Acid
- **Electron Transport and Oxidative Phosphorylation**
  - NADH / FADH₂
  - O₂
  - H₂O

---

**ABBREVIATION KEY**

- AA: Alanine
- As: Aspartic Acid
- Glu: Glutamic Acid
- Lys: Lysine
- Leu: Leucine
- Val: Valine
- GSH: Glutathione
- Mg²⁺: Magnesium
- Mn²⁺: Manganese
- Zn²⁺: Zinc

**KEY**

- m = cofactor
- = inhibitor
Toxic Triggers

Many environmental triggers for mutagenesis

- Phthalates
- Parabens
- Plasticizers like Bisphenol-A
- Animal fat
- Alcohol
- Anti-fungals
- Anti-bacterials like Triclosan
## Toxic Effects CORE

### 0740 Phthalates & Parabens Profile - Urine

**Methodology:** Gas Chromatography/Mass Spectrometry

<table>
<thead>
<tr>
<th>Results (mcg/gm creatinine)</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phthalates - Metabolites of DEHP (Di-2-ethylhexyl phthalate)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. MEHHP</td>
<td>19</td>
<td>41</td>
<td>99</td>
<td>179</td>
</tr>
<tr>
<td>2. MEHP</td>
<td>2.4</td>
<td>5.2</td>
<td>11.8</td>
<td>22.1</td>
</tr>
<tr>
<td>3. MEOHP</td>
<td>42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. MEP</td>
<td>178</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Parabens**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Butylparaben</td>
<td>23.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Ethylparaben</td>
<td>78.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Methylparaben</td>
<td>1000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Propylparaben</td>
<td>234</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Creatinine = 205 mg/dL**

### 0764 Bisphenol A (BPA) Profile - Urine

**Methodology:** Gas Chromatography/Mass Spectrometry

<table>
<thead>
<tr>
<th>Results (mcg/gm creatinine)</th>
<th>50th</th>
<th>75th</th>
<th>90th</th>
<th>95th</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. 4-Nonylphenol</strong></td>
<td>4.25</td>
<td>&lt;DL</td>
<td>1.11</td>
<td>4.69</td>
</tr>
<tr>
<td></td>
<td>1.95</td>
<td>3.45</td>
<td>6.09</td>
<td>10</td>
</tr>
<tr>
<td><strong>2. Bisphenol A</strong></td>
<td>10.44</td>
<td>50</td>
<td>233</td>
<td>443</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Triclosan</strong></td>
<td>64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Percentile**
Phthalates: Adverse Effects

• Possible steroid hormone disruption
  – Synergistic effect may enhance estrogen receptor response
  – Impaired male reproductive development
  – Endometriosis

• Have been linked to obesity in research


Parabens

• Dermally absorbed via cosmetics and pharmaceuticals
• Thought to be weakly estrogenic
• Methyl and propyl mitochondrial toxins
  – Possible role in male infertility

Oishi S, Toxicol Ind Health 2001; 17:31-9
Immune Support

- Exercise and Stress Reduction
- Eat Mushrooms
- Support GI Health
- Adequate Vitamin D (to me this means 55-75ng/mL)
- Anti-oxidant rich diet
Cancer cells require glucose for metabolism, they cannot use ketones

Maintaining a low blood sugar with a low glycemic diet is anti-cancer, as well as better for your brain

Continually monitor fasting insulin, glucose and hemoglobin A1c
Case Study:

• 59 y.o. white female, menopausal for 8 years. No HT
• Social: works as a psychotherapist
• Long term relationship with partner with health problems which is stressful but at a stable place
• Stress: no real change
• Doing very well until onset hot flushes
• From patient’s perspective health issues happened, “out of no where”
Case Study:

• Regular exercise, tennis and walking
• Diet: low vegetable intake, high simple carb, mostly “organic”
• In recent physical, found to have elevated homocysteine and A1c of 5.7
• Has begun B complex — Had not adjusted diet to lower sugar intake
Clinical Recommendations

• For 1 year, we focused on adrenal support and blood sugar management in addition to adjusting B complex, and 5MTHF to get homocysteine under 8

• This approach was very helpful for daytime symptoms but nights were worsening with continual night sweats – Waking from sleep drenched
  – With loss of sleep patient was getting increasingly anxious and depressed
    • Patient chose Ambien for sleep support over HRT trial. Initially Ambien was very effective but gradually stopped working. Bone density test showed osteopenia with rapid decline from 2 years prior

• Decision to start HT after 18 months
Started HT

• Initial lab serum
  – E: < 5

• Symptoms immediately better, significantly reduced Ambien for sleep
  – Serum
    • E 21.9 (menop < 50)
    • P 0.2 (menop < 0.7, I aim for 10:1 with E)
    • T 22 (0-75)
    • SHBG 82 (18-114)
Follow-up

- Metabolism checked once symptoms better and on a stable transdermal dose (March, 2013)
- Addressed methylation and estrogen clearance with flax seed in AM, encouraged cruciferous vegetable intake
- Added more methyl B12, 5MTHF (despite homocysteine of 7.7)
- Patient felt much better with good sleep and reduced hot flushes
## Estrogen Metabolism Plus (FMV) March, 2013

<table>
<thead>
<tr>
<th>Estrogen Metabolites</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Hydroxyestrone (FMV urine)</td>
<td>9.2-76.6 mcg/g Creat.</td>
</tr>
<tr>
<td>16α-Hydroxyestrone (FMV urine)</td>
<td>2.4-20.3 mcg/g Creat.</td>
</tr>
<tr>
<td>2-Methoxyestrone (FMV urine)</td>
<td>&gt;= 1.7 mcg/g Creat.</td>
</tr>
<tr>
<td>4-Methoxyestrone (FMV urine)</td>
<td>&gt;= 1.9 mcg/g Creat.</td>
</tr>
<tr>
<td>4-Hydroxyestrone (FMV urine)</td>
<td>&lt;= 5.3 mcg/g Creat.</td>
</tr>
<tr>
<td>2-Hydroxyestrone/16α-Hydroxyestrone Ratio (FMV urine)</td>
<td>1.7-2.8</td>
</tr>
<tr>
<td>2-Methoxyestrone/2-Hydroxyestrone Ratio</td>
<td>&gt;= 0.09</td>
</tr>
</tbody>
</table>
Continued Follow-up

• Then had a wrist injury with tendonopathy and had steroid injections, hot flushes increased markedly, with breast tenderness
• Suspected dysbiosis and estrogen metabolism shifts
  – Patient had increased dietary sugar, reduced methylation support and stopped flax seed
• Addressed this and checked metabolism (June, 2014)
  – Still high 4OH
  – Added I3C to encourage 2 OH pathway
• All breast tenderness resolved, sleep issues continued on and off but much better
• After “divorce,” all sleep issues resolved
  – Patient on reflection admits that at onset of severe symptom relationship concerns were beginning to become apparent, but she was in denial
# Estrogen Metabolism Plus (FMV) June, 2014

## Urine Tests

<table>
<thead>
<tr>
<th>Estrogen Metabolites</th>
<th>Reference Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Hydroxyestrone (FMV urine)</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>9.2-76.6 mcg/g Creat.</td>
</tr>
<tr>
<td>16α-Hydroxyestrone (FMV urine)</td>
<td>3.6</td>
</tr>
<tr>
<td></td>
<td>2.4-20.3 mcg/g Creat.</td>
</tr>
<tr>
<td>2-Methoxyestrone (FMV urine)</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>&gt;= 1.7 mcg/g Creat.</td>
</tr>
<tr>
<td>4-Methoxyestrone (FMV urine)</td>
<td>&lt;dl</td>
</tr>
<tr>
<td></td>
<td>&gt;= 1.9 mcg/g Creat.</td>
</tr>
<tr>
<td>4-Hydroxyoestrone (FMV urine)</td>
<td>5.2</td>
</tr>
<tr>
<td></td>
<td>&lt;= 5.3 mcg/g Creat.</td>
</tr>
<tr>
<td>2-Hydroxyestrone/16α-Hydroxyestrone Ratio (FMV urine)</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>1.7-2.8</td>
</tr>
<tr>
<td>2-Methoxyestrone/2-Hydroxyestrone Ratio</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>&gt;= 0.09</td>
</tr>
</tbody>
</table>
Questions?

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LIVE GDX – Previous webinar recordings
GI University – Focused learning modules
Conferences – Schedule of events we attend
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Marion Owen, MD
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Filomena Trindade, MD, MPH
Teacher, author, and recognized international lecturer in Functional, Anti-Inflammatory, and Integrative Medicine

Andrea Girman, MD, MPH
Director of Medical Education
Genova Diagnostics

EVENT SCHEDULE
8:00-8:30: Registration / Exhibit Break
8:30-9:00: Introduction/Event Overview (Leadership Team)
9:00-10:30: The Microbiome in Clinical Practice: Dysbiosis (Filomena Trindade)
10:30-10:45: Snack/Exhibit Break
10:45-11:45: GI Effects Report Review (Andrea Girman)
11:45-12:00: Exhibit Break/LUNCH (Provided)
1:00-2:00: GI Effects in Clinical Practice: Interactive Case Study Review
2:00-2:30: Strategies for Incorporating Specialty Diagnostics into Clinical Practice (Filomena Trindade)
2:30-3:00: Q & A Session
3:00-4:30: Exhibit Break and Lab Tours

EVENT LOCATION:
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References


• Huang J, Plass C, Gerhäuser C. Curr Drug Targets. 2010 Dec 15


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Nutritional Status and Hormone Balance

Marion Owen, MD

27 January 2016

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