Welcome to the COPE Webinar Series for Health Professionals!

November 11, 2015 webinar

**Hormones: The Missing Link in Weight Loss Resistance**

**Time:** 12 noon – 1 PM EDT

**Moderator:** Lisa Diwoldt, MS, RD, LDN
Program Manager
MacDonald Center for Obesity Prevention & Education

Handouts of the slides are posted at: www.villanova.edu/COPE

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**Hormones: The Missing Link in Weight Loss Resistance**

**Nadia Ali, MD, MPH, ABHIM, FACP**
Founder and Lead Physician
Functional Holistic Healing

**Objectives:**
1. Understand the role of hormones in obesity and preventing weight loss.
2. Discuss the assessment of hormonal status in the context of obesity.

**Credits:**
This webinar awards 1 contact hour for nurses, and 1 CPEU for dietitians. Suggested CDR Learning Need Code 5370 and 4000; Level 2.

**Notice:**
Villanova University College of Nursing is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center Commission on Accreditation.

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Neither the planners or presenter have any conflicts of interest to disclose.

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**Outline**

- Definition of Weight Loss Resistance
- Definition of Hormones
- Role of Hormones on Obesity
Definition of Weight Loss Resistance
Inability to lose weight despite repeated attempts of calorie restriction and following a regular exercise program.

BMI: Body Mass Index
- Formula: weight (kg) / [height (m)]²

<table>
<thead>
<tr>
<th>BMI</th>
<th>Weight Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18.5</td>
<td>Underweight</td>
</tr>
<tr>
<td>18.5 – 24.9</td>
<td>Normal or Healthy Weight</td>
</tr>
<tr>
<td>25.0 – 29.9</td>
<td>Overweight</td>
</tr>
<tr>
<td>30.0 and Above</td>
<td>Obese</td>
</tr>
</tbody>
</table>

All BMI’s are not equal
- On average, older adults tend to have more body fat than younger adults for an equivalent BMI.
- On average, women have greater amounts of total body fat than men with an equivalent BMI.
- Muscular individuals, or highly-trained athletes, may have a high BMI because of increased muscle mass.

Limitations of BMI
- Body Fat %
- Age Difference
- Gender Difference
- Fat Distribution

Definition of Visceral Obesity
The accumulation of fat around abdominal viscera and inside intraabdominal solid organs.
Waist to Hip ratio

<table>
<thead>
<tr>
<th>Females</th>
<th>Estimated health risk</th>
<th>Estimated body shape</th>
<th>Males</th>
<th>Estimated health risk</th>
<th>Estimated body shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.80 or below</td>
<td>Low</td>
<td>Pear</td>
<td>0.95 or below</td>
<td>Low</td>
<td>Pear</td>
</tr>
<tr>
<td>0.81 to 0.85</td>
<td>Moderate</td>
<td>Avocado</td>
<td>0.96 to 1.0</td>
<td>Moderate</td>
<td>Avocado</td>
</tr>
<tr>
<td>0.85+</td>
<td>High</td>
<td>Apple</td>
<td>1.0+</td>
<td>High</td>
<td>Apple</td>
</tr>
</tbody>
</table>

Why Visceral Obesity matters?

• Type DM
• CAD-accelerated atherosclerosis
• HTN
• High Triglycerides
• Low HDL
• Non-Alcoholic Fatty Liver Disease
• Hyperuricemia

Visceral Obesity: Hormone factory

Visceral Fat and Hormones

Definition of Hormones

A hormone is a substance (peptide or steroid) produced by a tissue (organ) and transported by the blood stream to another part of the body where it exerts its effect.

Normal Insulin Function

• Glucose uptake by skeletal muscle
• Decreased hepatic gluconeogenesis
• Decreased Lipolysis
• Decreased LDL
• Decreased appetite
Vicious Cycle of Insulin Resistance

- Visceral Fat
- Insulin Resistance
- Increase appetite
- Dec skeletal muscle uptake
- Lipolysis with LDL
- Inc hepatic gluconeogenesis
- Cytokines
- Inflammation

Stress and weight change in university students

- 2007
- 268 Students
- First year
- Women > men
- Similar results in US


Cortisol

- 2009 Journal of Obesity
- 3 groups: SRO, NSRO and Normal weight controls
- 24 urinary free cortisol
- Relationship b/w visceral obesity and urinary cortisol secretion


Overall, these findings suggest that obesity may be the consequence of a chronic maladaptation to environmental, physical or psychological stress factors in susceptible individuals.
Hypothyroidism

- Fatigue
- Increased sensitivity to cold
- Constipation
- Dry skin
- Unexplained weight gain
- Puffy face
- Hoarseness
- Muscle weakness
- Elevated blood cholesterol level
- Muscle aches
- Joint Pain, stiffness or swelling
- Heavier menstrual periods
- Thinning hair
- Slowed heart rate
- Depression
- Impaired memory

Relationship between Cortisol and Thyroid Hormone

- High Cortisol
- High TBG
- Receptor Sensitivity
- Hypothyroidism
- Peripheral Conversion
- HPA Axis

What are Endocrine Disruptors?

Endocrine disruptors are chemicals that may interfere with the body’s endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife.

National Institute of Environmental Health Sciences
http://www.niehs.nih.gov/health/topics/agents/endocrine/

How do Endocrine Disruptors cause Obesity?

- Mimic or partly mimic naturally occurring hormones.
- Bind to a receptor within a cell and block the endogenous hormone from binding.
- Interfere or block the energy metabolic pathways.

Examples of Endocrine Disruptors

<table>
<thead>
<tr>
<th>Sources</th>
<th>Types</th>
<th>Examples of Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incineration</td>
<td>Industrial by-products</td>
<td>PCBs, dioxins</td>
</tr>
<tr>
<td>Atmospheric transport</td>
<td>Organochlorine pesticides</td>
<td>DDT, lindane, dieldrin</td>
</tr>
<tr>
<td>Agricultural runoff</td>
<td>Pesticides currently in use</td>
<td>Atrazine</td>
</tr>
<tr>
<td>Harbors</td>
<td>Antifoulants from paint applied to hulls of ships</td>
<td>TBT</td>
</tr>
<tr>
<td>Industrial/municipal effluents</td>
<td>Alkylphenols, natural estrogens</td>
<td>Nonylphenol, estradiol</td>
</tr>
<tr>
<td>Pulp mill effluents</td>
<td>Plant estrogens</td>
<td>Genistein</td>
</tr>
<tr>
<td>Consumer products</td>
<td>Flame Retardants</td>
<td>PBDEs</td>
</tr>
<tr>
<td>Consumer products</td>
<td>Plasticizers</td>
<td>Di(2-ethylhexyl) phthalate</td>
</tr>
</tbody>
</table>
BPA

- Canned Foods
- Plastic Containers
- Cookware
- Baby Bottles
- Premixed Infant Formula
- Hand sanitizer speeds BPA absorption

Endocrine Disruptors in daily use

- House Hold Cleaners
- Cosmetics
- Fragrance
- Sunscreens
- Shampoos/soaps/tooth pastes

Executive Summary to EDC-2: The Endocrine Society’s Second Scientific Statement on Endocrine Disrupting Chemicals
September 28, 2015

Strong Association between EDC AND
- Obesity
- Diabetes
- Female reproduction
- Male reproduction
- Hormone sensitive cancers in female
- Thyroid Disease
- Prostate cancer
- Neurodevelopment
- Neuroendocrine System

Role of EDC in fetus and infants

Exposures to EDCs especially in the fetus and infant, because these are critical life stages during which perturbations of hormones can increase the probability of a disease or dysfunction later in life.

Hormonal Assessment

- Thyroid
- Adrenal
Thyroid Assessment

- TSH
- Free T3
- Free T4
- Reverse T3
- Antibodies: Anti TPO and Anti TG

Adrenal Assessment

- Salivary Cortisol
- DHEA
- DHEA:Cortisol

References

- Metabolism. 1998 Aug;47(8):929-33. Effect of visceral fat accumulation on uric acid metabolism in male obese subjects: visceral fat obesity is linked more closely to overproduction of uric acid than subcutaneous fat obesity.

Contact Information

www.theholistichealing.org
email@theholistichealing.org
Evaluations and CE Certificates

• Everyone who has completed the webinar will be emailed a link to the evaluation.

• The email will be sent to the email address that you used to register for the webinar.

• Please complete the evaluation soon after you receive the email. The evaluation does expire after 3 weeks. Once expired, you cannot obtain a certificate.

• Once the evaluation is completed, the CE certificate will be emailed separately within 2 business days.

COPE’s December Professional Webinar

Jamie Stang, PhD, MPH, RD
Helene Kent, RD, MPH

Nutrition and Preconception Health

Date: Tuesday, December 15, 2015
Time: 12:00PM - 1:00PM EST
CE Credit: 1.0 contact hour, 1.0 CPEU

Questions and Answers!

Moderator: Lisa Diewald, MS, RDN, LDN
Email: cope@villanova.edu
Web site: www.villanova.edu/COPE

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