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 Diewold, MS, RD, LDN
Program Manager
MacDonald Center for Obesity Prevention & Education

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

MacDonald Center for Obesity Prevention and Education (COPE) Goals

- Provide Continuing Education
- Partner with agencies and organizations
- Participate in Research
- Enhance Education

Hormones: The Missing Link in Weight Loss Resistance

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

Objectives: The learner will be able to:
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.

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DISCLOSURE

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

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Hormones: The Missing Link in Weight Loss Resistance

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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>Waist to Hip ratio</th>
<th>Females</th>
<th>Estimated health risk</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></td>
<td></td>
<td>Low</td>
<td>Moderate</td>
<td>Pear</td>
<td></td>
<td>Low</td>
<td>Pear</td>
</tr>
<tr>
<td>0.80 or below</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.95 or below</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.81 to 0.85</td>
<td></td>
<td>Moderate</td>
<td>High</td>
<td>Avocado</td>
<td>0.96 to 1.0</td>
<td>Moderate</td>
<td>Avocado</td>
</tr>
<tr>
<td>0.85+</td>
<td></td>
<td>High</td>
<td></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

[Diagram showing various factors related to visceral fat, including DM (Diabetes Mellitus), HTN (Hypertension), Thrombosis, Adiponectin, Uric Acid, Gout, Resistin, Angiotensinogen, Lipoprotein lipase, IL6, TNF Alpha, Plasminogen activator inhibitor 1, and Inflammation.]
Visceral Fat and Hormones

Definition of Hormones

A hormone is a substance (peptide or steroid) produced by a tissue (organ) and transported by the bloodstream 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
- Inflammation
- Cytokines
- Lipolysis with LDL
- Increase appetite
- Inc hepatic gluconeogenesis
- Dec skeletal muscle uptake
- Increase appetite

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

Cortisol Production in Visceral Fat

Cortisol ↔ 11 beta-hydroxysteroid ↔ Cortisone
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
- Receptor Sensitivity
- Peripheral Conversion
- Hypothyroidism
- High TBG
- 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/
Endocrine Disruptors ➔ Obesity

Obesogens

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>Diethyl 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

- Household 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

Adrenal Curve
References

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• Ann N Y Acad Sci. 2006 Nov;1083:165-44. Tissue production of cortisol by 1beta-hydroxysteroid dehydrogenase type 1 and metabolic disease.
• Thyroid Res. 2012; 5: 13. Elevated thyroid stimulating hormone is associated with elevated cortisol in healthy young men and women.

Contact Information

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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!

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Web site: www.villanova.edu/COPE

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