Stress, Cortisol and Obesity
Len Kravitz, Ph.D., University of New Mexico, lkravitz@unm.edu, drlenkravitz.com

Suggested Readings:

I. Obesity: Definition, measurement, impact and statistics overview
   a. BMI >25 – 29.9 kg/m^2 for overweight
   b. BMI ≥30 kg/m^2 for obese
   c. Associated risk factors: hypertension, heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, respiratory problems, and breast/prostate/colon cancers
   d. Waist circumference: measure at narrowest part of torso (expiration)
   e. Men: ≥40 inches (102 cm)
   f. Women: ≥35 inches (88 cm)
   g. Globally, 1.5 billion overweight; 300 million women obese; 200 million men obese
   h. 43 million children under age of 5 are overweight
   i. WHY? Global Shifts: Rural populations to urban populations
   j. Diets high in carbohydrates to diets higher in fats, sat. fats, sugars
   k. Physically demanding work/lifestyle to automated transport, technology, leisure
   l. Diabetes link: 90% of people with diabetes are type 2, most overweight/obese
   m. 1988-2008 No leisure-time physical activity trend chart
   n. Causes (multi-factorial): social, behavioral, physiological, metabolic, genetic

II. Growing consensus of weight loss experts; environment rather than biology

III. Physiology of obesity
   a. Fat cells known to secrete hormones and inflammatory chemicals/disease
   b. Leptin: maintains energy balance, from Greek root leptos meaning thin
   c. Acts on hypothalamus telling how much energy is being stored
   d. Leptin levels higher in women: %body fat relation, fertility, losing weight
   e. Leptin and exercise: data inconsistent and inconclusive
   f. Adiponectin is the ‘good guy’ hormone
   g. Reduces cellular inflammation, increases insulin sensitivity
   h. Improves HDL-C and may lower LDL-C
   i. Often low in overweight and those insulin resistant
   j. Note: with aerobic and resistance ex: number and availability insulin receptors increase
   k. Metabolic syndrome: 3 of 5 factors (due to too much weight; too little exercise)
   l. Abdominal obesity: women >35-inch, men>40 inch (37-39 risk factor)
   m. Triglycerides: 150 or higher, HDL-C: women under 50, men under 40
   n. Blood pressure: systolic 130 or higher OR diastolic 85 or higher
   o. Fasting blood sugar: 110 or higher, 100-125 for “pre-diabetes”
   p. Grehlin: gut hormone of hunger
   q. With obese and insulin-resistance, ghrelin is significantly lower
   r. Normally suppressed after meals: not so in obese contributing to overeating
   s. Inflammatory proteins: cause low-level inflammation in body
   t. As fat cells increase, the cause more inflammation and cell damage
IV. Stress/Cortisol connection to obesity: Body reacts 3 different ways to stress
   a. When you feel challenged: Release norepinephrine (fight hormone)
   b. When you feel loss of control: Release epinephrine (flight/anxiety hormone)
   c. When you feel defeated: Release cortisol leading to cortisol cascade
d. Cortisol released from the adrenal cortex of the adrenal glands
e. Cortisol has many functions (energy regulation, mobilization, catabolism, etc)
f. Cortisol cascade: 1) Release fatty acids in blood which is a precursor to heart disease, 2) Mobilization of fat, relocating fat deposits to deep abdomen (visceral obesity), and 3) Enhancement of lipogenesis or new fat creation
g. Hypothalamic-pituitary-adrenocortical (HPA) axis activates ACTH (adrenocorticotropic hormone) which activates the release of cortisol and leads to overweight/obesity
h. Best way to defeat the cortisol cascade is not with pills but with exercise

V. Goals of weight loss and management: Behavioral techniques and cognitive strategies
   a. Short-term realistic goals
   b. Medium-term realistic goals
   c. Long-term realistic goals: (Flexible approach; You are not a Failure if a lapse or relapse occurs; Forgive yourself when something goes wrong; Fix what went wrong
   d. Self-monitoring: weight, dietary intake, exercise habits; Why track?
      1. Awareness of the amount and quality of food
      2. Look for eating or food triggers
      3. Look for high-risk situations that trigger eating
      4. Search for any patterns
   e. Problem solving/planning ahead
   f. Stress management
   g. Improve self-efficacy

VI. Goals of weight loss and management: Dietary intervention
   a. Reduce body weight up to 10% in 6 months
   b. Decrease of 300-500 kcal/day or 500-1000 kcal/day (1-2 lb loss)
   c. 5-10% reduction in initial weight significantly improves health

VII. Goals of weight loss and management: Physical activity
   a. Programmed and spontaneous lifestyle and NEAT Research/Applications

VIII. Source for ideas for moving: letsmove.gov
(walk to work, walk during your lunch hr, walk instead of drive whenever you can, take a family walk after dinner, skate to work instead of drive, mow the lawn with a push mower, walk to your place of worship instead of driving, walk your dog, replace Sunday drive with a Sunday walk, park safely in the back of the parking lot, work and walk around the house, take your dog to the park, wash the car by hand, run or walk fast when doing errands, pace the sidelines at your kid’s games, walk the airport while awaiting your flight, walk to a coworkers desk instead of emailing or calling, make time in your day for moving, bike with family and friends, if you find it difficult to be active after work, try it before work, take a walk break with a coffee break, perform gardening and/or home repairs, avoid sitting for more than 30 min at a time, move around more at the grocery market, play with your kids 30 minutes a day, dance to music, walk briskly in the mall, take the long way to the water cooler, take the stairs instead of the escalator, go for a hike.

ACSM 2009 Guidelines: To prevent weight gain 150-250 min/week; total range of exercise is 225-420 minutes/week; can accumulate in ≥10 min bouts at a somewhat hard intensity