INE | INSTITUTE OF NUTRITIONAL ENDOCRINOLOGY

INSULIN RESISTANCE SOLUTION PRACTITIONER TRAINING

Timing

With Dr. Ritamarie Loscalzo

Medical Disclaimer: The information in this presentation is not intended to replace a one-on-one relationship with a qualified health care professional and is not intended as medical advice. It is intended as a sharing of knowledge and information from the research and experience of Dr. Ritamarie Loscalzo, drritamarie.com, and the experts who have contributed. We encourage you to make your own health care decisions based upon your research and in partnership with a qualified health care professional.

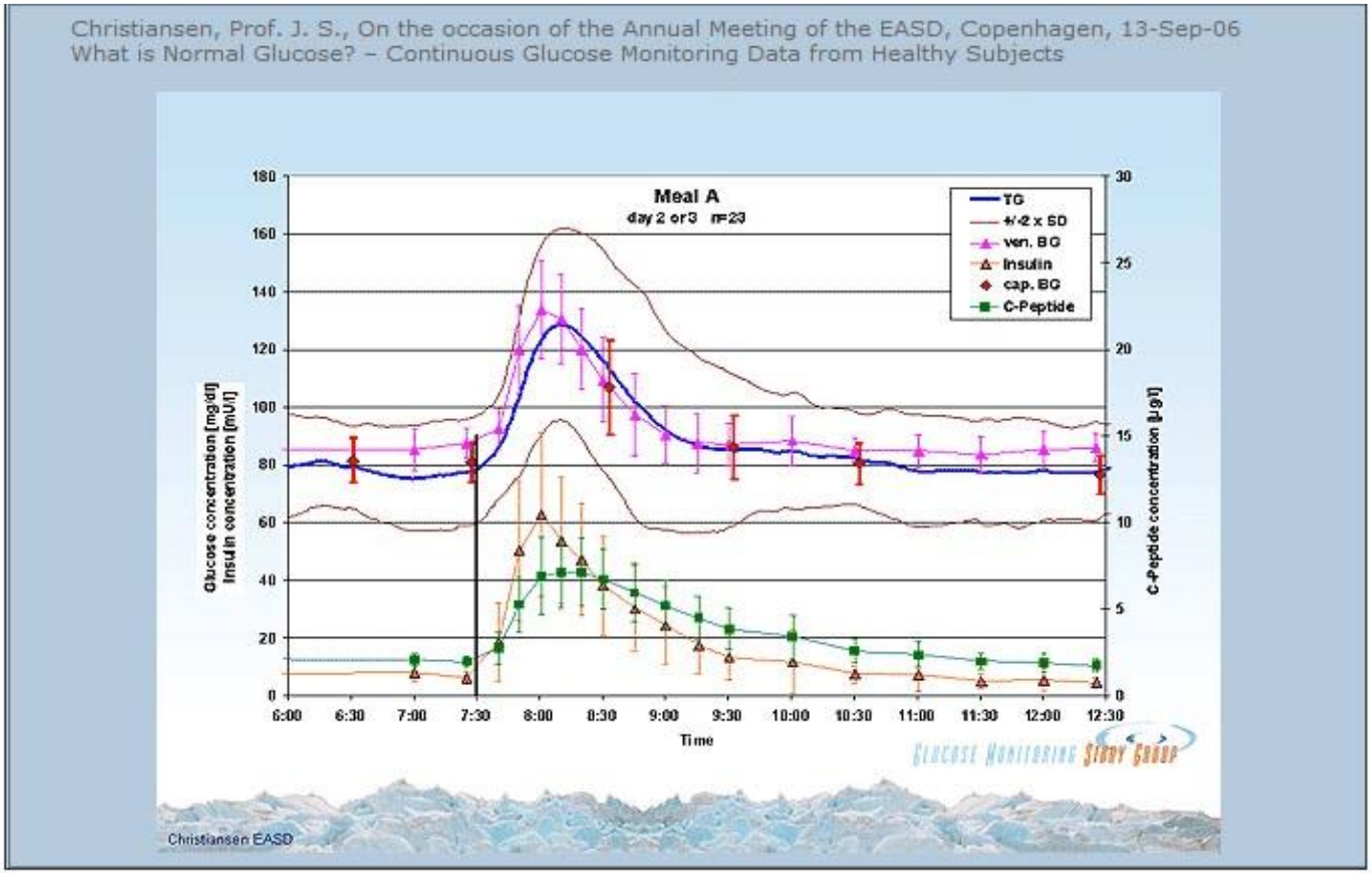
Insulin Resistance Solution

- Introduction
- Assessment
- Nutrition
- Stress
- Fitness
- Sleep
- Timing
- Implementation
- Education and Marketing

5 Key Steps to Restore Balance

Increase	• insulin sensitivity
Decrease	• insulin need
Reduce	• inflammation
Optimize	• fat burning and lean mass building
Minimize	• impact of “candy bar eating” effects of stress

What is Normal Blood Sugar?



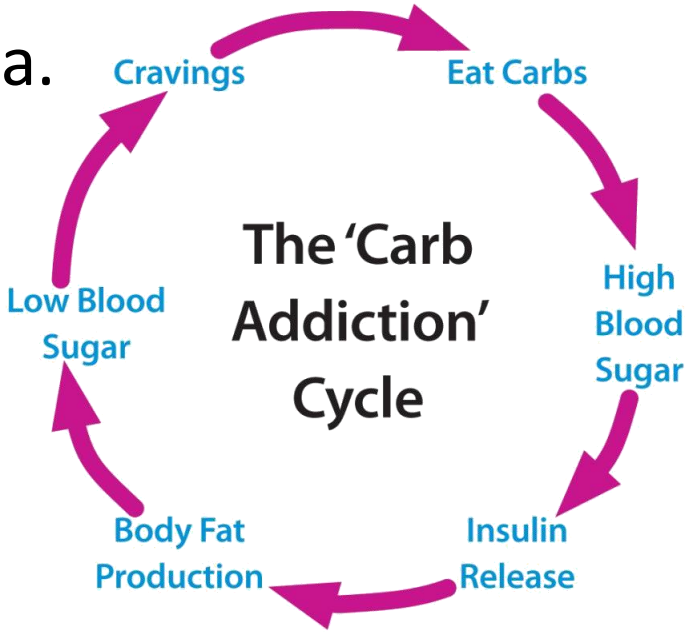
What is a Normal Blood Sugar?

Normal blood sugars after a high carbohydrate breakfast eaten at 7:30 AM. The blue line is the average for the group. The brown lines show the range within which most readings fell (2 standard deviations). Bottom lines show Insulin and C-peptide levels at the same time.Graph is a screen shot from Dr. Christiansen's presentation cited below.

What is Normal Glucose? Continuous Glucose Monitoring Data from Healthy Subjects.
Professor J.S. Christiansen, presented at the Annual Meeting of the EASD.

Break the Vicious Cycle of High-Glycemic Carbohydrate Addiction

- ✓ High-glycemic carbs promote excess insulin.
- ✓ Normal cells adapt to the high levels by "turning off" and thus require a very large amount of insulin to open up.
- ✓ High insulin leads to hypoglycemia.
- ✓ Hypoglycemia leads to cortisol and/or adrenaline spikes.
- ✓ Adrenaline and cortisol spikes promote craving for high-glycemic carbs.



Key Lifestyle Areas to Address

Meal Timing

- ✓ **No snacking:** prolonged insulin curves or more frequent insulin spikes plus decreased leptin promote obesity.
- ✓ **No getting famished,** weak , or jittery.
- ✓ **No eating at night:** it increases insulin and decreases growth hormone and leptin.
- ✓ **No high carbohydrate breakfast:** it causes a premature spike in leptin and food cravings.
- ✓ **Eat protein within an hour of waking:** it promotes growth hormone and regulates insulin.
- ✓ **Gradually increase** meal spacing.

What's "Timing" All About Anyway?

Hormones

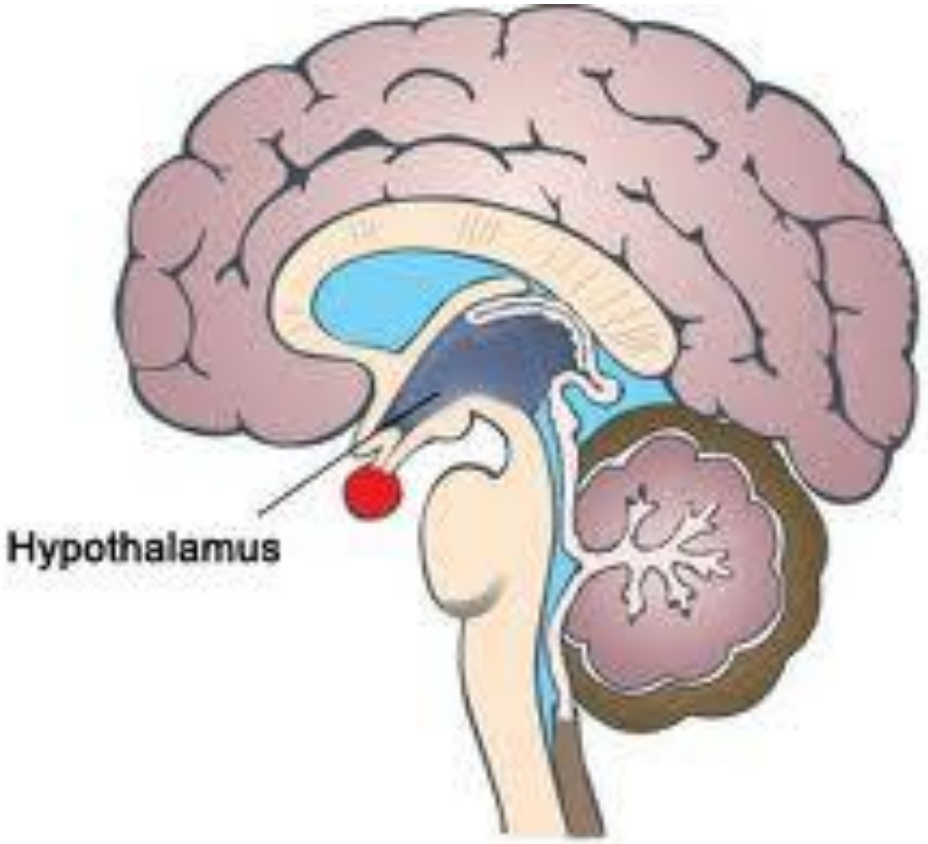
- ✓ Leptin
- ✓ Ghrelin
- ✓ Growth Hormone
- ✓ Insulin
- ✓ Melatonin
- ✓ Cortisol

Activities

- ✓ Sleep/Wake
- ✓ Full/Hungry
- ✓ Exercise/Rest

When You Eat is as Important as What You Eat

- ✓ Control center is **hypothalamus** which responds to signals
  - ➢ Sleep pattern
  - ➢ Light
  - ➢ Food
  - ➢ Exercise
  - ➢ Stress



Hormone Resistance, Timing, and Blood Sugar

✓Insulin resistance ✓Adrenaline resistance

✓Leptin resistance ✓Thyroid resistance

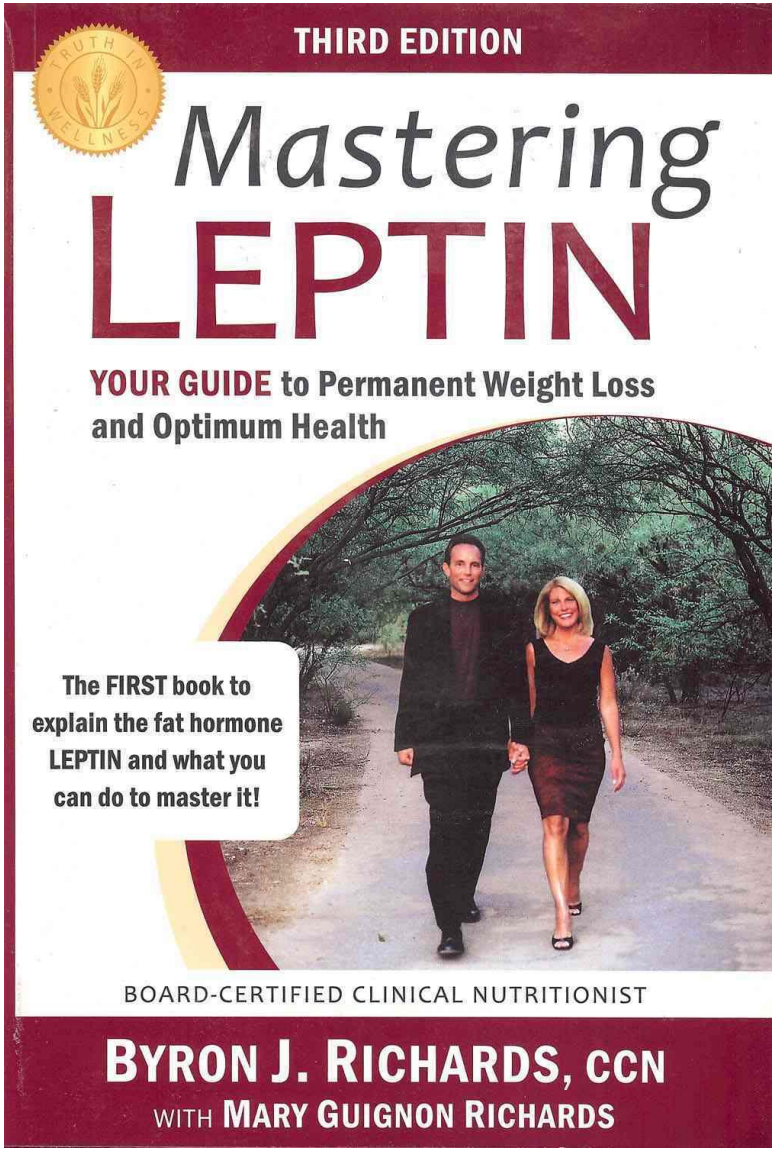
Leptin Cycle - Normal

- ✓ **Leptin peaks in the late evening** and is at its lowest point upon waking.
- ✓ Thus, normally, **appetite is lowest before bed** and fat burning is highest during sleep.
- ✓ **High-glycemic carbohydrates** ***early in the day*** cause leptin cycle to peak earlier in the day, then decline causing <u>larger appetite for dinner and food cravings after dinner and at bedtime.</u>

Leptin Optimization: 5 Rules

1. Do not eat after dinner.
2. Eat three meals a day.
3. Do not eat large meals.
4. Eat a high-protein breakfast.
5. Reduce the amount of carbs eaten.

Mastering Leptin Byron J. Richards, CCN with Mary Guignon Richards



Normal Leptin Function

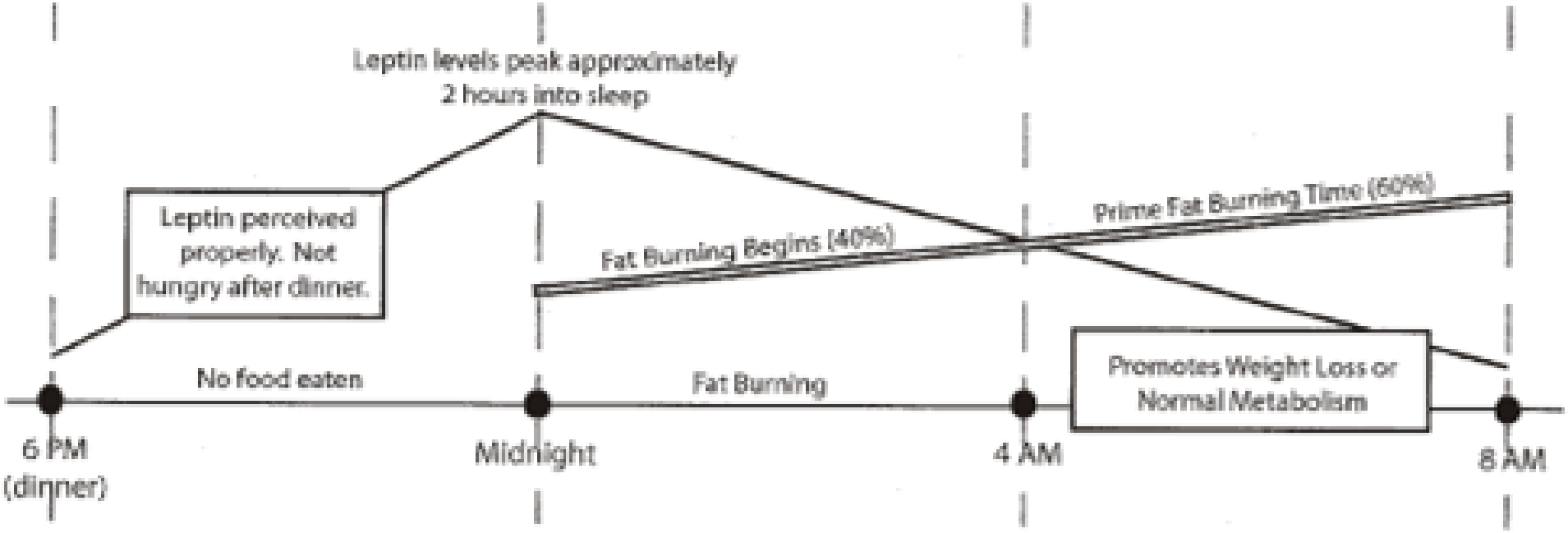


Chart from: Richards BJ. *Mastering Leptin.* Minneapolis: Wellness Resources Books, 2004

Leptin Resistance

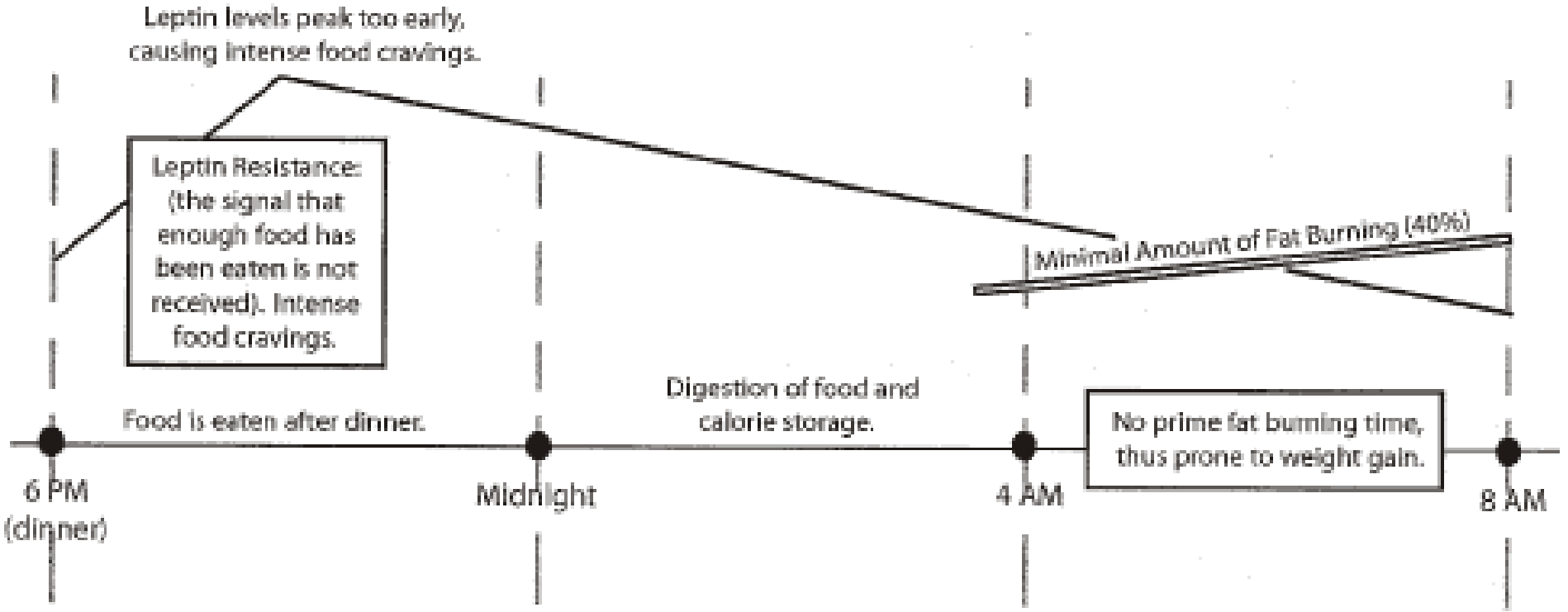
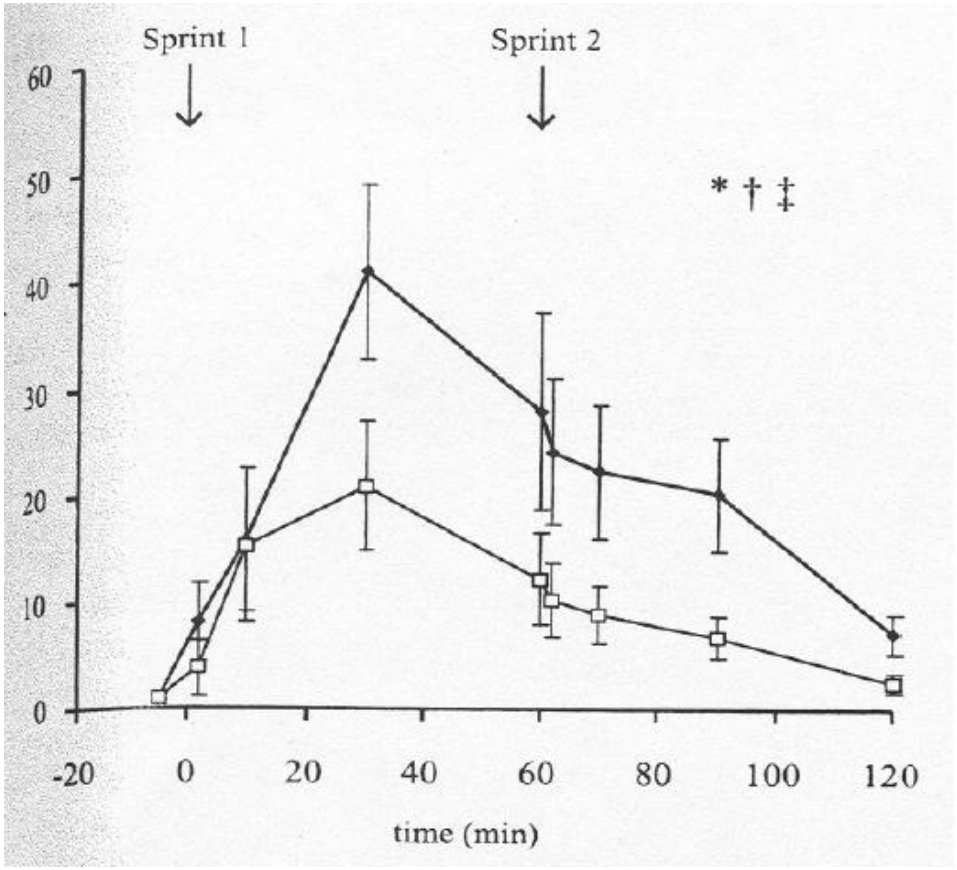


Chart from: Richards BJ. *Mastering Leptin.* Minneapolis: Wellness Resources Books, 2004

Growth Hormone Normal Cycle

- ✓ **Peaks after intense exercise** (bursts) and stays elevated for 90 minutes
- ✓ Peaks at midnight
- ✓ Is antagonized by insulin
  – lower levels when insulin is high

Effect of Exercise on Growth Hormone (GH)

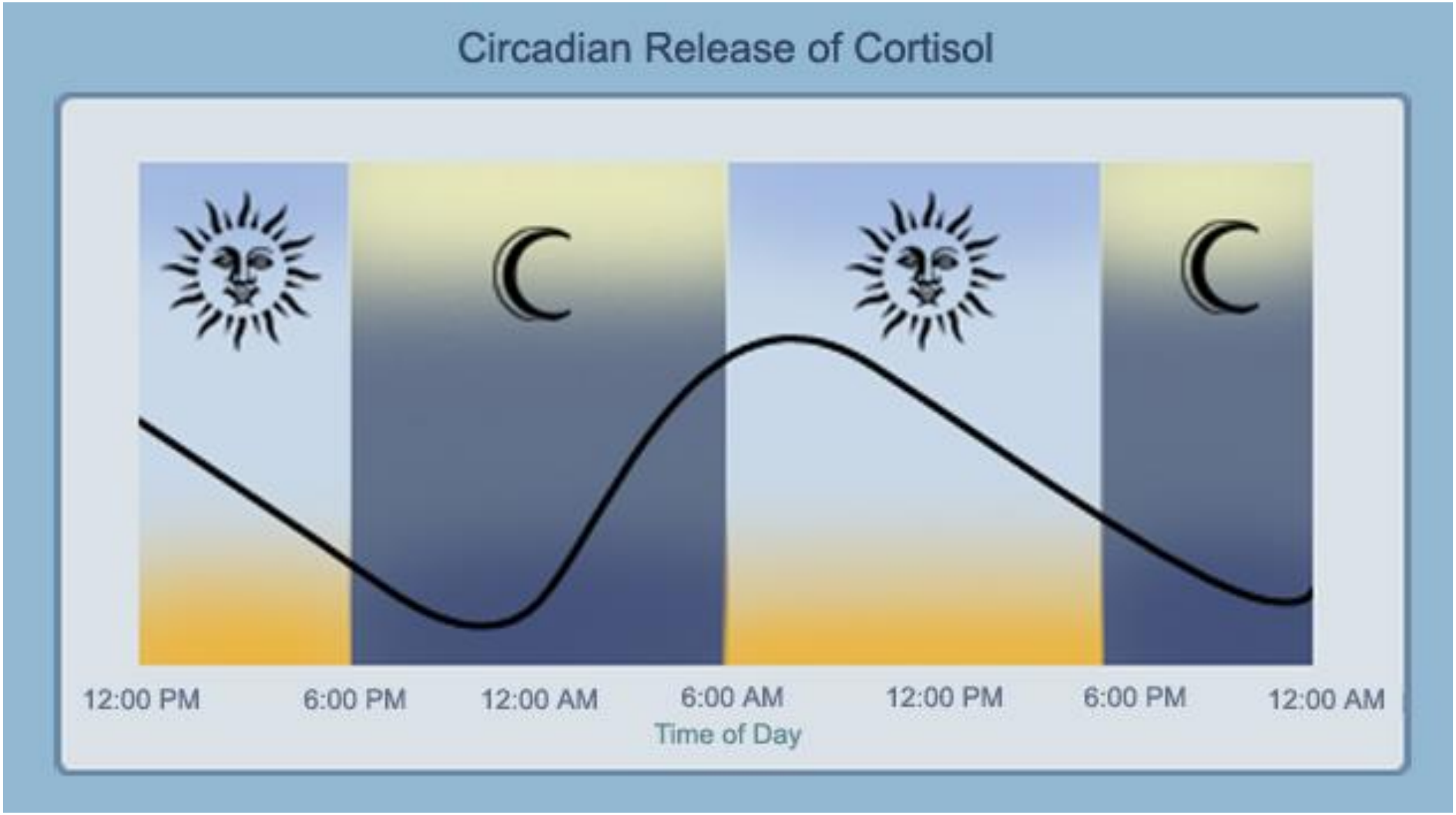


- ✓ Upper curve is a 30-second all out burst (sprint)
- ✓ Lower curve is 30 minutes of aerobics
- ✓ Notice the amount of GH secreted is higher with 30 second sprint
- ✓ A second sprint at 60 minutes does nothing to GH
- ✓ The optimal timing of sprints (bursts) appears to be 120 minutes

Cortisol Rhythm and Timing

- ✓ Peak: 8:00 a.m.
- ✓ Low: midnight
- ✓ Sharp decline between 8 a.m. and noon and gradual decline until midnight
- ✓ Begins to rise at 4:00 a.m.

Circadian Rhythm



Insulin and Protein Timing

- ✓ Insulin increases protein synthesis.
- ✓ If **protein is available in the bloodstream** and your blood sugar is normal, insulin almost completely stops the process of breaking down your muscles for your protein needs.
- ✓ If **protein is unavailable in the bloodstream** and glucose is normal, muscle breakdown is stopped partially.
- ✓ If **blood sugar is high, insulin stimulates muscle breakdown** throughout your body.

And here's the takeaway:

Every time you stimulate insulin production by eating carbohydrates, you need to eat some complete protein with it or instead of rebuilding your muscles and tissues, your body will continue to disassemble itself to get that protein.

Leptin and Insulin

- ✓ High-glycemic diet, high insulin surges, and too much stored fat from overeating causes **excess leptin.**
- ✓ The hypothalamus and pancreas ***develop leptin resistance*** by shutting down receptors. Reads it as empty.
- ✓ Increased appetite, decreased metabolism.
- ✓ The pancreas, which normally reduces its insulin in response to rising leptin, also develops leptin resistance, **and continues to secrete insulin when it would normally stop.**

Protein Timing

- ✓ Protein within 1 hour of getting up
- ✓ Some say 30 grams of protein within 30 minutes of rising
- ✓ Balances leptin, insulin, and cortisol

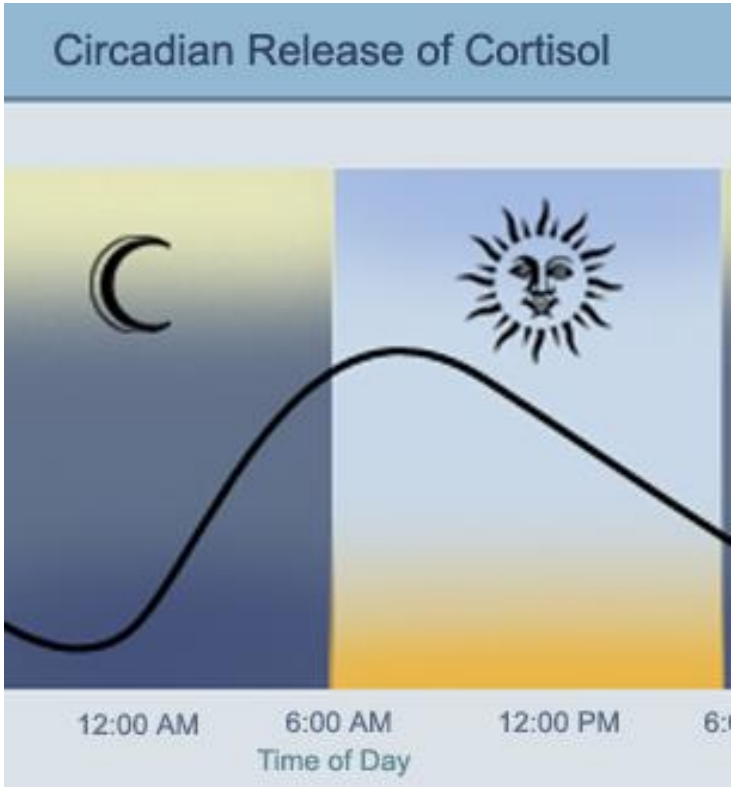
Eat a Protein-Rich Breakfast to Reduce Food Cravings

COLUMBIA, Mo. – A University of Missouri researcher has found that **eating a healthy breakfast, especially one high in protein,** increases satiety and reduces hunger throughout the day. In addition, using functional magnetic resonance imaging the researchers found that eating a **protein-rich breakfast reduces the brain signals controlling food motivation and reward-driven eating behavior.**

- MU Researcher Finds

Protein at Breakfast

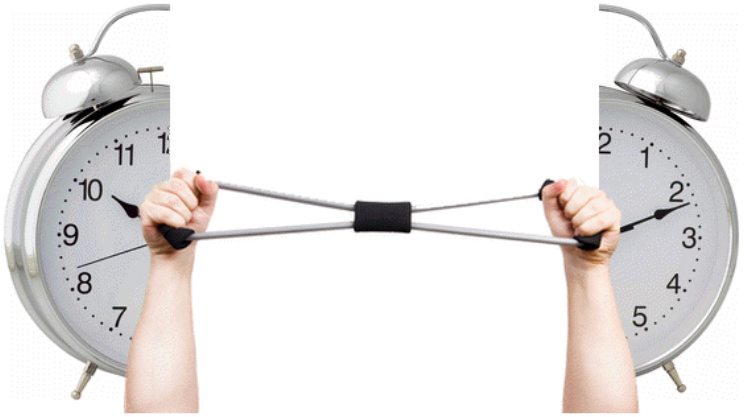
- ✓ Cortisol peaks at 8 a.m.
- ✓ Cortisol's role is to create **new glucose** from storage.
- ✓ If you eat protein, it's used as **fuel** rather than breaking down your muscle.
- ✓ Protein in the a.m. has been said to **reduce leptin resistance**.



Meal Spacing

- ✓ Experiments at Salk Institute revealed that the daily waxing and waning of thousands of genes in the liver, your body's metabolic factory, **is mostly controlled by food intake** and not by the body's circadian clock as conventional wisdom had it.
- ✓ Panda points out that the **activity of fat-burning genes is highest when you haven't eaten for a while**. Thus, extending time between meals and not eating after dinner actually **turns on liver genes that enhance your ability to lose weight or maintain a healthy weight.**

Christopher Vollmers, Shubhroz Gill, Luciano Di Tacchio, Sandhya R. Pulivarthy, Hiep D. Le, and Satchidananda Panda Time of feeding and the intrinsic circadian clock drive rhythms in hepatic gene expression Proceedings of the National Academy of Sciences 2009 November Salk Institute for Biological Studies



Feeding Timing

- ✓ "If feeding time determines the activity of a large number of genes completely independent of the circadian clock, **when you eat and fast each day will have a huge impact on your metabolism**," says the study's leader, Satchidananda (Satchin) Panda, Ph.D., an assistant professor in the Regulatory Biology Laboratory.

Meal Frequency and Weight Loss

Increased meal frequency **does not promote greater weight loss** in subjects who were prescribed an 8-week equal calorie, energy-restricted diet.

Br J Nutr. 2010 Apr;103(8):1098-101. Epub 2009 Nov 30. Cameron JD, Cyr MJ, Doucet E

Ghrelin and Growth Hormone Timing Rules

is secreted by cells in the stomach wall.

- ✓ Eating suppresses ghrelin.
- ✓ **An empty stomach secretes ghrelin freely.**
- ✓ Ghrelin stimulates appetite.
- ✓ Ghrelin is **a potent stimulator of growth hormone**.
- ✓ Therefore, waiting to eat until you are very hungry and your stomach is empty stimulates fat burning and muscle sparing.

Timing Rules for Leptin and Insulin

- ✓ Never eat after dinner.
- ✓ Eat only **three meals a day**.
- ✓ Allow **five to six hours** between meals.
- ✓ Do not eat large meals and **eat slowly.**
- ✓ Eat a breakfast containing protein.
- ✓ Reduce the amount of starchy carbohydrates you eat.

Timing Guidelines Review

- ✓ **Quit eating 3 hours before bedtime** to optimize growth hormone and promote fat burning while you sleep.
- ✓ "Burst and Burn" before bed: About 2 hours after your last meal of the day and at least 1 hour before bed, do a **2-minute burst of high intensity exercise**.
- ✓ Plan **fitness bursts** 2 hours after each meal.
- ✓ Extend the time between your meals to 5 hours.
- ✓ Consume **protein within an hour of waking.**
- ✓ Avoid high-carbohydrate breakfasts : Morning carb overdoses cause a premature spike in leptin and food cravings.
- ✓ Practice **breathing and appreciation before your meals.**
- ✓ Commit to getting to **sleep no later than 11:00 p.m.**