



## SPRING SEMINAR SERIES

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### ***Adiposity 101: Why We Get Fat and the Alternative Hypothesis of Obesity***

- Published book: Good Calories Bad Calories
- Writes controversial science
- It's hard to do science right and get a right answer.
- His mission is to convince us that the way we understand obesity and why we get fat are incorrect.
- First recommendation: Don't complicate a simple hypothesis if you don't need to.
- **What causes obesity?**
  - Current hypothesis is that obesity is caused by calorie imbalance.
  - To avoid obesity, energy in must equal energy out, but we are consuming more energy than we expend, resulting in obesity.
  - This is a hypothesis, but can it explain observations?
- **What is the cause of the obesity epidemic?**
  - We don't work for our food like our ancestors did.
  - We live in a toxic environment.
- **A look at obesity in *non-toxic environments*:**
  - Pima Indians:
    - Initially in good health and had an abundance of food, but by 1880 they were starving because western settlers took their food. Now you see images of obese Pima Indians.
    - Went from being affluent to being in poverty and from being thin to being obese – how can this be?
    - This is an example of obesity related to extreme poverty in a non-toxic environment.
  - Trinidad:
    - Mothers of starving children were obese, but these mothers were taking in less than 2,000 calories a day—how can this be?
  - Mexican-Americans in Starr County, TX:

- 50% of women and 40% of men are obese, but they work in oil and agriculture fields. They are physically active but obese. How do you explain this?
      - Why are these populations fat?
- This is not a new problem. There has always been obesity but rates are now rising.
- **The coexistence of malnutrition and obesity poses a challenge to public health programs, or to our hypothesis that calorie intake causes obesity.**
  - If obesity is caused by eating too much, why is it so hard to lose weight by eating less? Results often are not long lasting.
  - A meta-analysis of weight loss found that reduction in calories doesn't work.
- **Could exercising more be a solution?** The hypothesis of exercising more to lose weight is 100 years old, but the data to support it is not compelling.
  - In science if you can't find data over time to support your hypothesis then your hypothesis is **INCORRECT**.
- **How can you maintain weight?** If you eat 11 more calories per day than you need, you'll gain 10 lb in a decade. It's impossible to accurately control your calorie intake, so how do we maintain weight?
  - In the 1930s clinicians looked at thin and obese twins. Overeating may explain why one pair of twins is thin and the other obese, but it doesn't explain why the obese twins have fat in the exact same places.
  - Men gain weight in their gut and women gain weight in their thighs and breasts. Our theory of overeating doesn't explain this.
  - Progressive Lipodystrophy: a disorder where you lose weight from the neck down but then gain weight below the waist. You can't blame over-eating for the obese half and under-eating for the thin half of the body.
- These examples reveal that our hypothesis fails
- Our hypothesis is based on the law of conservation of energy and the law of thermodynamics (if you take in more energy you need to expend more). However, this tells us nothing about **causality**.
- The hypothesis makes a physiological problem a behavioral one.
- **Alternate Hypothesis**: obesity is a disorder of excess fat accumulation.
- **Cause**: What drives fat? What makes our fat storage cells to change?
  - A baby grows into a child. It gets bigger not because its overeating but because of growth hormones.
  - We pick causality one way (height) but not the other (weight). You don't grow 7 feet because you overate, so why do we think otherwise with horizontal growth?
- **How is fat tissue regulated?** This is important to know if we are to understand the cause of obesity.
  - Eating too much and being sedentary are side effects of the cause.

- The only effective treatment is to remedy the defect.
- If you remove the ovary from a rat she will become fat, not because she overeats, but because of the removal of estrogen.
- **What regulates fat accumulation?**
  - There is beautiful science that shows fat is metabolically active that we ignore.
  - Insulin is the one hormone that works to put fat in the body. If we want to get fat out of our tissue then we must decrease insulin levels.
  - If you inject insulin in people with type I diabetes they will get fatter; people with type II diabetes tend to already be fat, but with insulin injections they can get fatter.
  - **Carbs drive insulin which drive fat.**
    - Fructose sugar makes you fat.
    - Even if you eat fat you cannot store it as fat without carbs.
    - Thus, it is the carbs, not the calories, which make us fat.
    - Problem is that carbs are the cheapest most affordable calories, which is why there is such a high correlation between poverty and obesity.