

AI-02013 Glycemic Index Insulin Lipolysis

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What is Glycemic Index? What is Glycemic Load? Explain the relationship between Glycemic index, Lipolysis and Insulin. Explain and deep dive. List the Glycemic Index of the following:

- White Rice
- Brown Rice
- Spaghetti
- Wheat Spaghetti
- Oatmeal
- Egg
- White Bread
- Wheat Bread
- Pork
- Beef
- Egg

The **Glycemic Index (GI)** is a ranking of carbohydrate-containing foods based on how quickly they raise blood sugar (glucose) levels after they are eaten. Foods with a high GI are digested and absorbed quickly, causing a rapid spike in blood sugar, while low-GI foods are digested more slowly, leading to a gradual rise. The GI scale ranges from 0 to 100, with pure glucose arbitrarily given a value of 100.

The **Glycemic Load (GL)** is a more comprehensive measure that accounts for both the GI and the amount of carbohydrates in a typical serving of a food. It provides a more realistic picture of a food's effect on blood sugar. The GL is calculated by multiplying the food's GI by the number of available carbohydrates in a serving (in grams) and then dividing by 100. A high-GI food can have a low GL if it's consumed in a small portion or has a low carbohydrate content.

Glycemic Index, Insulin, and Lipolysis

The relationship between Glycemic Index (GI), Insulin, and Lipolysis is a key aspect of how our bodies process food and manage energy. It's a chain reaction that begins with the consumption of carbohydrates.

The Role of Insulin

When you eat a food with a high GI, the carbohydrates are rapidly broken down into glucose, which enters the bloodstream. This rapid increase in blood sugar triggers the pancreas to release a large amount of **insulin**. Insulin is a hormone that acts as a key, allowing glucose to enter cells for energy.

The Inhibition of Lipolysis

A crucial function of insulin is the **inhibition of lipolysis**. Lipolysis is the metabolic process where the body breaks down triglycerides (stored fat) in fat cells (adipose tissue) for energy. When insulin levels are high, it essentially tells the body that there is plenty of glucose available for energy, so it should stop breaking down its fat stores. High insulin levels thus put the brakes on lipolysis.

The Complete Cycle

Here's how the three concepts are interconnected:

1. **High-GI food consumption** ➡ Rapid increase in blood glucose.
2. **Blood glucose spike** ➡ Pancreas releases a large surge of insulin.
3. **High insulin levels** ➡ Glucose is taken up by cells for immediate energy or stored as glycogen in the liver and muscles.
4. **Simultaneously, high insulin levels** ➡ Lipolysis is inhibited. The body stops burning fat for energy.

Conversely, a diet rich in low-GI foods results in a slower, more gradual release of glucose and a smaller, more sustained insulin response. This prevents the strong inhibition of lipolysis, allowing the body to continue burning fat for fuel.

Glycemic Index of Common Foods

It's important to note that GI values can vary based on factors like ripeness, cooking method, and processing. Values listed are average approximations.

Grains

- **White Rice:** GI \approx 72
- **Brown Rice:** GI \approx 66
- **Oatmeal (rolled oats):** GI \approx 53
- **Spaghetti (white):** GI \approx 49
- **Wheat Spaghetti (whole grain):** GI \approx 48
- **White Bread:** GI \approx 75
- **Wheat Bread (whole grain):** GI \approx 74

Proteins

- **Egg:** GI \approx 0
- **Pork:** GI \approx 0
- **Beef:** GI \approx 0

Foods that do not contain carbohydrates, such as **meat, eggs, fish, and oils**, have a GI of 0 because they do not directly raise blood sugar levels.