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How Insulin Resistance Causes Weight Gain

What Is Insulin *Supposed* to Do?

Insulin's job is to:

- Move glucose from your blood into your cells
- Tell your liver to stop releasing sugar
- Tell your fat cells to store energy
- Keep blood sugar within a narrow range

When your cells respond normally to insulin, your body uses energy efficiently.

What Happens in Insulin Resistance

When you become insulin resistant, your cells don't respond well to insulin anymore. The pancreas compensates by releasing more insulin. This state—chronically high insulin, called hyperinsulinemia—drives weight gain through several mechanisms:

1. High Insulin Locks Fat Inside Fat Cells

Insulin is the body's main fat-storage hormone.

- It tells fat cells to store triglycerides
- It inhibits lipolysis (the breakdown of fat)
- It signals the body: "We have plenty of energy right now, so store more!"

When insulin is chronically elevated: You store fat easily but burn fat poorly. Even when eating fewer calories, high insulin makes accessing stored fat difficult.

2. Higher Insulin Increases Hunger and Cravings

Insulin resistance often leads to:

- Blood sugar spikes
- Followed by sharp drops

When blood sugar crashes, your brain triggers:

- Strong hunger
- Sugar/carb cravings
- Low energy → desire to eat again

This drives overeating, especially of high-carb foods.

3. Insulin Resistance Disrupts Normal Hormone Signals

High insulin affects other hormones involved in weight regulation:

Leptin (satiety hormone)

- Insulin resistance → leptin resistance
- Brain doesn't receive the "I'm full" signal
- Leads to overeating

Cortisol (stress hormone)

- High insulin + high cortisol promotes abdominal fat storage

Ghrelin (hunger hormone)

- Blood sugar swings disrupt ghrelin control
- Hunger increases

4. Excess Energy Is Diverted Into Fat Storage

When insulin remains high:

- Cells don't take up glucose properly
- Liver converts extra sugar → fat (de novo lipogenesis)
- Fat accumulates in the belly, liver, and visceral fat

This creates a cycle: More fat → worse insulin resistance → more fat.

5. Insulin Resistance Lowers Metabolic Rate

Mitochondria become less efficient at using glucose for energy. You burn fewer calories at rest, so:

- You feel tired
- You move less
- Your basal metabolic rate drops

Even if you don't eat more, calorie expenditure falls, contributing to weight gain.

6. Insulin Resistance Alters Where Fat Is Stored

High insulin pushes fat storage toward the abdomen, leading to:

- Visceral fat
- Liver fat (NAFLD)
- “Apple-shape” obesity

Visceral fat is especially connected to further insulin resistance.

Summary: Why Insulin Resistance Causes Weight Gain

- Raises insulin → stores fat + stops fat burning
- Increases hunger and cravings
- Disrupts satiety and hunger hormones
- Promotes liver fat production
- Slows metabolism
- Creates a self-reinforcing cycle of fat gain

This is not a willpower issue—it’s a hormonal/metabolic system stuck in fat-storage mode.