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NUTRITION + WELLNESS

Obesity, Insulin Resistance and Metabolic Health

The presence of obesity and obesity related conditions in the United States has been rapidly increasing. Nearly 75% of the U.S. adult population is considered overweight or obese, with nearly 43% being obese. It is predicted that by 2030, nearly half of the adults in the United States will be classified as obese. Obesity is defined as an excessive amount of body fat. Weight loss resistance is a term used to describe an inability to lose fat despite following a health, exercise and eating program.

(Perlmutter 2022)

Obese individuals have a life expectancy that is, on average, five to seven years shorter than that of normal weight individuals. This is because obesity affects all major systems in the body. Some health effects associated with obesity include cardiovascular problems such as high blood pressure, high cholesterol levels and atherosclerosis; skin problems such as cellulitis, lymphedema and stretch marks; endocrine and reproductive problems including diabetes and PCOS; cancer; gastrointestinal problems such as gallstones and fatty liver disease; neurological problems such as dementia, migraines, multiple sclerosis; joint problems; osteoarthritis; respiratory problems such as sleep apnea and asthma; rheumatological and orthopedic problems such as gout and osteoarthritis; gential and urinary problems such as erectile dysfunction and urinary incontinence; and mental health problems such as depression.

(Murray & Pizzorno 2012)

Theories on Obesity

Several theories have been proposed to explain why obesity develops and why weight loss can be so difficult to sustain. The Set Point Theory suggests that each person has a biologically predetermined weight range, regulated by the brain and hormones, that the body defends over time. According to this model, when weight is lost, metabolic and hormonal adaptations, such as

increased hunger and reduced energy expenditure, push the body back toward its "set point," making long-term weight loss challenging.

Another perspective focuses on hormonal regulation of appetite and metabolism. The adipokine and gut-derived hormone alteration theory emphasizes that changes in hormones like leptin, ghrelin, adiponectin, GLP-1, and peptide YY disrupt normal appetite signaling and fat storage. In obesity, resistance to leptin's appetite-suppressing effects or excess ghrelin secretion can promote overeating, while altered adipokine levels contribute to inflammation and insulin resistance.

Energy metabolism may also play a role. The Diet-Induced Thermogenesis Theory suggests that the ability to convert food energy to heat plays a role. Studies have shown that lean people may stimulate up to a 40% increase in diet induced thermogenesis, whereas overweight individuals often display an increase of 10% or less. Thus, in overweight individuals, the food energy is stored rather than being converted to heat.

Finally, the Low Serotonin Theory proposes that imbalances in the neurotransmitter serotonin affect appetite control, mood, and cravings. Serotonin influences satiety and carbohydrate intake; lower levels have been linked with increased desire for calorie-dense foods and reduced impulse control. This theory overlaps with observations that stress, sleep disturbances, and depression - conditions often associated with altered serotonin activity - can drive overeating and weight gain.

Whether the contributing factors are hormonal, metabolic or neurological, they all converge on insulin resistance, indicating that improving insulin sensitivity may be a primary component to preventing and/or reversing obesity.

Insulin Resistance and Obesity

The relationship between obesity and insulin resistance is complicated. Although they tend to occur together, it is difficult to say whether obesity causes insulin resistance or whether the reverse is true. Nevertheless, there is no signal that promotes fat cells to grow as much as insulin does. Studies have clearly shown that when insulin is up, body fat goes up. If insulin is down, body fat goes down. In his book, *Why We Get Sick*, Ben Bikman, PhD discusses how insulin drives obesity by looking at type 2 diabetics who are prescribed insulin to control blood glucose. These individuals will gain weight, but the insulin injections continue to make their bodies more insulin resistant, and even eating less is not sufficient to prevent the insulin induced fat gain. Insulin directs nutrients to be stored as fat.

When examining how obesity drives insulin resistance, Bikman addresses patterns of fat storage to demonstrate his point. The gynecoid fat pattern is fat stored beneath the skin, referred to as subcutaneous fat, and accumulates around the hips and thighs. The android fat pattern may have subcutaneous fat but also has fat inside the trunk of the body and surrounding the organs.

Studies have shown that storing fat inside the core of the body is harmful because there are differences in how fat behaves when it is visceral. In rodent experiments, visceral fat transplanted into lean rats caused the lean rats to become insulin resistant, but when subcutaneous fat is transplanted into lean animals, they remain insulin sensitive. This is because visceral fat increases inflammation and oxidative stress.

These findings suggest that both insulin resistance and the type of fat storage pattern play critical roles in the obesity - insulin resistance cycle, reinforcing each other in ways that make long-term weight management challenging.

(Bikman 2021)

Key Dietary and Lifestyle Factors Contributing to Weight Gain

Multiple factors contribute to weight gain and obesity, including poor diet, chronic stress, inadequate sleep, physical inactivity, and environmental toxins. Together, these influences promote insulin resistance, systemic inflammation, and gut dysbiosis, all of which are key drivers of obesity and of weight loss resistance.

When considering dietary factors, perhaps there is no bigger contributor to obesity than fructose. Fructose is found naturally in fruit and honey, but is also present in table sugar and high fructose corn syrup. Fructose has a low glycemic index, meaning that it does not directly trigger a rise in blood sugar and thus does not trigger the release of insulin. Rather than raising blood sugar levels, fructose is immediately absorbed in the blood stream and sent to the liver to metabolize. This metabolization process actually depletes energy resources (a cell's ATP levels can plummet by up to 50%), which signals to the body that energy is low and needs to be conserved. This triggers the body to switch into energy preservation mode - metabolism slows to reduce energy expenditure and incoming calories go to fat storage. The process of lipogenesis leads to the formation of triglycerides. All of this is occurring while, as a survival signal, fructose triggers hunger and thirst.

(Perlmutter 2022)

Like fructose, insulin also plays a critical role in fat storage. Insulin is not only a blood sugar lowering hormone, but also a powerful regulator of fat metabolism. When insulin levels are elevated, even moderately, the body's ability to break down stored fat (lipolysis) is essentially shut off. This means that as long as blood sugar remains unstable and insulin is chronically high, the body is locked in "storage mode" rather than "burn mode." Addressing obesity, therefore, requires restoring healthy blood sugar regulation and lowering insulin levels. This often involves a low glycemic diet and a focus on nutrient dense whole foods, as opposed to processed foods and refined grains.

(Feuz 2025)

Other dietary strategies for obesity include ensuring adequate protein intake. Two grams per kilogram of body weight are recommended. A diet higher in protein helps combat obesity through several key mechanisms. First, protein is the most satiating macronutrient, meaning it helps people feel fuller for longer and reduces overall calorie intake without conscious restriction. Second, protein has a higher thermic effect of food - the body burns more calories digesting and metabolizing protein compared to carbohydrates or fats. Third, adequate protein intake helps preserve and build lean muscle mass, especially when combined with resistance training. Muscle tissue is metabolically active, so maintaining more of it increases resting energy expenditure and supports long-term weight management. Finally, protein helps stabilize blood sugar by slowing the absorption of carbohydrates, which reduces large insulin spikes and keeps the body in a more favorable state for fat burning rather than fat storage.

(Murray & Pizzorno 2012)

In addition to a high protein diet, dietary fiber has been shown to promote weight loss by enhancing satiety, delaying gastric emptying, and attenuating postprandial glucose and insulin responses. Additionally, fermentable fibers serve as substrates for beneficial gut microbiota, leading to the production of short-chain fatty acids that improve insulin sensitivity, modulate energy homeostasis, and reduce low-grade inflammation associated with obesity.

Meal frequency and timing are important components to weight loss strategies. Studies suggest that people who consume small, frequent meals are less likely to become obese than people who eat larger, less frequent meals. The time of day that food is eaten also influences total daily caloric intake. People who eat a relatively large proportion of their daily calories in the morning tend to consume fewer total calories per day, whereas people who consume a relatively large proportion of their daily calories late in the evening tend to consume more total calories per day. In addition, studies show that the timing of energy consumption affects body weight independently of its influence on caloric intake.

(Gaby 2023)

Dr. Alan Gaby, an expert in nutritional therapy, suggests that environmental toxins and endocrine disrupting chemicals (EDCs), such as BPA, have a negative effect on weight. EDCs disrupt the endocrine system by tricking hormone receptors to think that they are the hormone. They trigger a response normally activated only by natural hormones, like thyroid, estrogens and androgens.

(Gaby 2023)

Gaby also notes that, as early as the 1940's, studies began demonstrating that food allergies are a common cause of obesity. People are often unknowingly addicted to the same foods to which they are allergic. According to Gaby, people with "food allergy addiction" may experience an improvement in chronic symptoms immediately after eating an allergenic food, but within a few hours, the symptoms become worse. People often learn to avoid withdrawal symptoms by eating the foods to which they are allergic at frequent intervals. The most common allergens include corn, wheat and milk and are all high in calories.

(Gaby 2023)

Both stress management and sleep are important lifestyle factors for reducing obesity. Chronic stress contributes to elevated cortisol levels, which in turn, increases the presence of glucose and insulin in the blood stream. And because lipolysis and insulin are opposing forces, it is difficult for lipolysis to occur when insulin is in the blood stream. Like stress, lack of sleep also contributes to cortisol circulating in the blood stream. Sleep, and its significance to obesity, has been well documented in studies. People who sleep less are more likely to be overweight or obese. In very basic terms, when there is a lack of sleep, the body is reluctant to give up fat (it will actually give up muscle first). In addition, short sleep will increase hunger and appetite, compromise impulse control, increase food consumption of high calorie foods and decrease feelings of food satisfaction after eating

(Walker 2018)

Emerging research shows that the gut plays a powerful role in weight regulation. An imbalance in the gut microbiome can disrupt metabolism, increase systemic inflammation, and alter how the body extracts and stores energy from food. These changes not only promote weight gain but can also make it harder to lose weight, even with calorie restriction or regular exercise. Certain gut bacteria have been linked to increased cravings, insulin resistance, and hormonal imbalances that further drive obesity. By restoring gut balance and supporting digestive health, individuals may support weight loss and management.

Supplements and Nutraceuticals for Weight Management

As outlined above, fiber is an important component to any weight loss program. The best supplemental fiber for weight loss is PolyGlycopleX (PGX). Glucomannan, gum karaya, psyllium, chitin, guar gum and pectin are also good supplemental fibers. When taken with water before meals, these fibers become gelatinous and induce a sense of satiety. They also enhance blood sugar control, reduce the glycemic index of foods, lower cholesterol, reduce the amount of calories absorbed by the body, and feed beneficial gut bacteria. PGX is a powerful

fiber, producing volume and viscosity far greater than other fibers. A dose of 1.5 to 5 g PGX, taken with a glass of water before meals, has demonstrated efficacy.

(Murray & Pizzorno 2012)

Supplements that help improve insulin sensitivity are often beneficial for weight loss. Chromium plays a key role in supporting cellular sensitivity to insulin and supplementation at 200 mcg to 400 mcg/day has been shown to lower body weight and increase lean body mass. Berberine has also been shown to be effective at decreasing blood sugar levels.

5-Hydroxytryptophan (5-HTP), a precursor to serotonin, has also proven beneficial to supporting weight loss. This appears to be most effective when there is a reduced capacity for converting tryptophan into 5-HTP. 5-HTP works by promoting satiety, leading to consumption of fewer calories at meals.

(Murray & Pizzorno 2012)

Green tea contains catechins and in some studies, has been shown to improve weight loss by improving energy expenditure. Green tea is rich in antioxidants and its effects include metabolic support, cardiovascular benefits and improved gut health.

(Gaby 2023)

Medium chain triglycerides, extracted from coconut oil, may promote weight loss by increasing thermogenesis and energy expenditure.

(Murray & Pizzorno 2012)

Ginger supplementation exhibits the potential to prevent and treat obesity. Clinical trials examining ginger have demonstrated improved lipid profiles, improvement in insulin sensitivity, reductions in inflammatory markers and reduced body weight. Likewise, curcumin and turmeric have also proven beneficial in weight loss management, due to their antioxidant and anti-inflammatory properties. Curcumin improves mitochondrial function and prompts the browning of white adipose tissue. It also leads to decreased lipogenesis.

(Marina, et al. 2025; Preciado-Ortiz, et al. 2025)

Finally, prebiotics and probiotics are effective strategies for weight management because they directly influence the composition and activity of the gut microbiota. Prebiotics stimulate the growth of beneficial bacteria that produce short-chain fatty acids (SCFAs). These SCFAs improve insulin sensitivity, regulate appetite through gut–brain signaling, and reduce low-grade inflammation associated with obesity. Probiotics can help restore microbial balance, decrease

intestinal permeability, and modulate hormones involved in hunger and satiety, such as ghrelin, leptin, and GLP-1. Together, prebiotics and probiotics improve metabolic efficiency, support fat loss, and make it easier to maintain a healthy weight.

Conclusion

Obesity is a multifactorial condition, driven by interactions among genetics, hormones, metabolism, environment, and lifestyle. Factors like poor diet, stress, sleep deprivation, and toxin exposure further complicate long-term weight management. Central to many of these mechanisms is insulin resistance, which not only fuels fat storage but also perpetuates inflammation and metabolic dysfunction.

Fortunately, evidence demonstrates that obesity is reversible. Through targeted dietary strategies, such as reducing fructose and processed food intake, emphasizing protein and fiber, supporting gut health, and improving insulin sensitivity, individuals can shift their metabolism toward fat burning and greater energy balance. Lifestyle interventions further reinforce these outcomes. When combined with select nutraceuticals, these approaches offer a comprehensive framework for preventing and reversing obesity.

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