

Low-Carb Diets in Sweden

The impact of LCHF and GI

Excess food carbohydrates including sugars and starch cause insulin resistance accompanied by fat accumulation and preceding both diabetes and obesity. The report clarifies how low-carb diets may remove and prevent these unnecessary threats to public health.

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The success of low-carb diets in Sweden

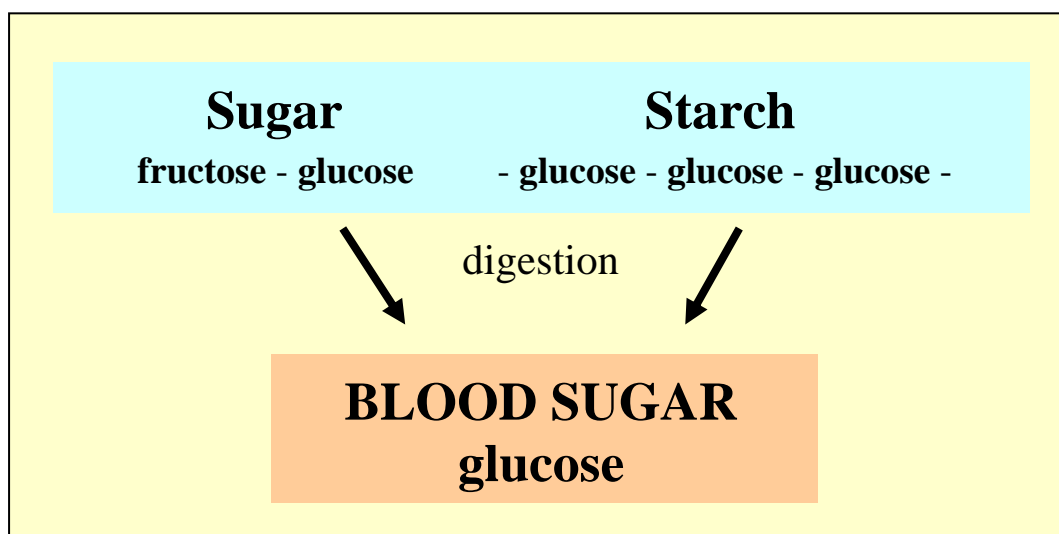
There are several explanations of the current rapid and broad breakthrough of low-carb diets in Sweden.

Pioneers: Personal experiences of recovery from obesity and diabetes 2 have been reported and spread widely by books, newspapers and popular journals. Links to pioneering books are given above.

Internet: The widespread use of the web in Sweden has speeded up warnings for sugar and carbs. Links are given to leading sites. Major newspapers now offer both web material and special paper issues.

Challenges: The success of low-carb diets challenges obsolete official dietary advice influenced by economical and market interests. The tragic prevalence of obesity and diabetes may be blamed on misleading recommendations.

Research: Traditional research is often linked to food industry and government institutions and cannot match rapid free web-based information. On the other hand free information tends to lack scientific depth. This report explains basic biochemical links between carbohydrates and the effects of low-carb diets.



Carbohydrates and Public Health

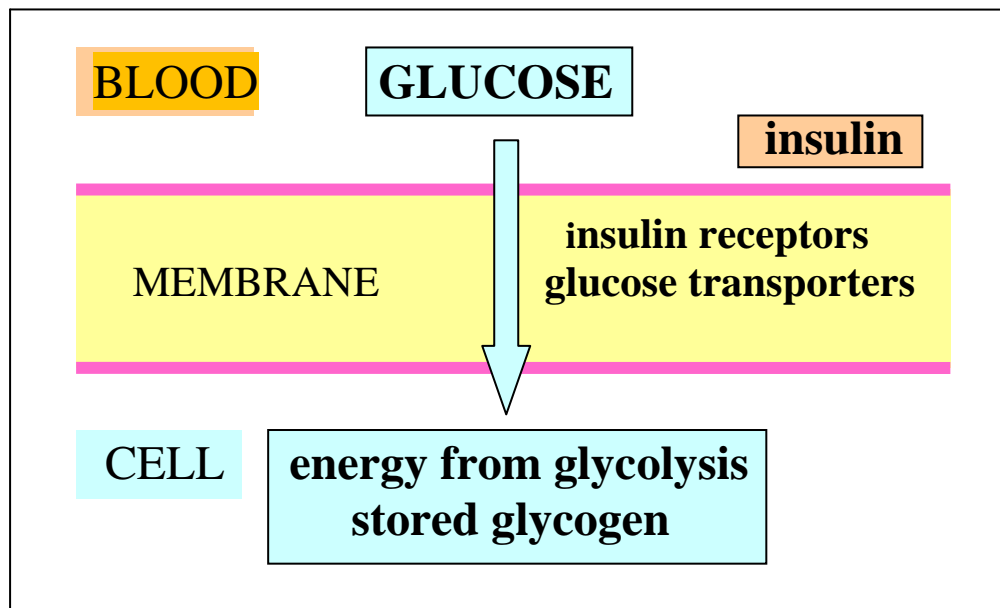
During the past ten years, dietary carbs have been clearly linked to the epidemic health threats from obesity and diabetes.

Popular diets: The public recognition of the issue in Sweden is due to successes of applied low-carb diets known as LCHF and GI. People are rapidly informed by web sites, journals and books. Official dietary recommendations lag behind.

Blood sugar: Dietary digestible carbs are mainly sugars and starches. The major sugar released by enzymes on digestion is glucose. Glucose is transferred to the blood circulation and known as blood sugar.

Imbalances: The obvious problem behind obesity and diabetes is an abnormal consumption of sugar and rapidly digested starch. The human metabolism is not adapted to current amounts of these foods. Resulting too high blood sugar levels stand out as the biochemical link.

Insulin resistance: Fast carbohydrates in excess often lead to insulin resistance followed by more severe health problems. It is then important to understand the biochemical nature of insulin resistance affecting millions of people.



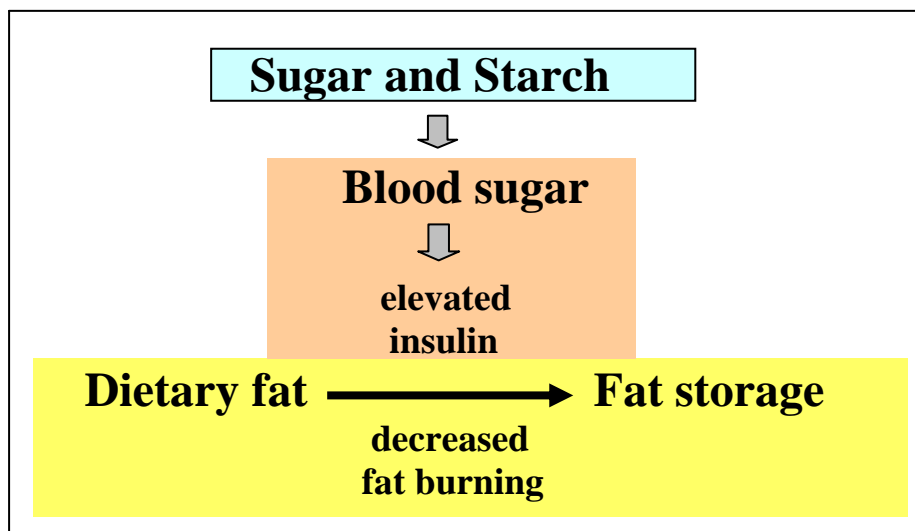
Glucose from Blood

Glucose is transferred from the blood vessels into living cells as illustrated. The transport mechanism is essential for understanding the problems of obesity and diabetes.

Insulin: Glucose delivers energy to the cell, both directly through the metabolic glycolysis and biochemically stored as glycogen. Glucose is water soluble and cannot easily pass through the lipid-rich membrane into a cell. The well-known hormone insulin mediates inward transport of blood glucose. This is initiated by insulin adhering to specific insulin receptors in the cell membrane.

Glucose transporters: The binding of insulin activates proteins termed glucose transporters. They migrate from the interior of the cell to the cell membrane and act as channels for transport of glucose. The major glucose transporter in muscle cells is known as [GLUT 4](#).

Control: The number of active glucose transporters is governed by the cellular needs. Frequent markedly elevated levels of blood glucose down-regulate the number. Conversely, high physical activity with an increased need of glucose and glycogen up-regulates. Remaining high blood sugar levels are unhealthy in several ways.



Carbs induce fat storage

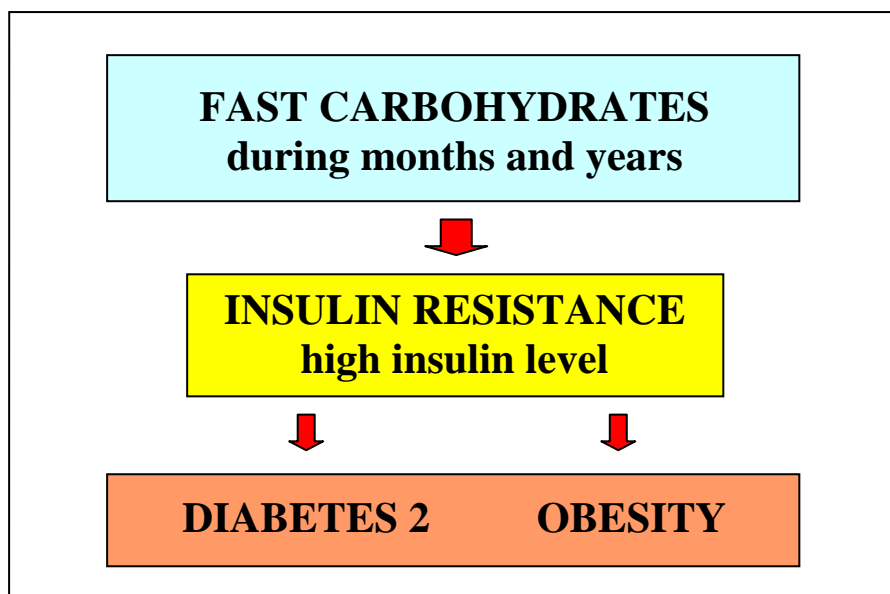
The illustration outlines how carbs increase fat storage via blood glucose and insulin in both the short and long term.

Insulin: The ingestion of carbohydrates typically raises blood sugar levels for about an hour. The elevated blood glucose induces secretion of the hormone insulin which allows for the transport of glucose into cells through glucose transporters.

Initial fat accumulation: Elevated insulin increases fat uptake in fat cells in several ways. When blood glucose is used for energy, fat is stored as reserve energy. The fat originates mostly from dietary fats. Fat storage proceeds as long as insulin levels remain elevated.

Severe fat accumulation: Continued supply of fast carbs requires a higher average insulin level to keep down blood sugar. Consequently visceral fat storage increases. Persistently increasing weight usually indicates inadequate blood sugar regulation.

Weight loss: Fast carbs thus increase abdominal fat and decrease fat burning. Efforts to lose weight just by cutting calories result in hunger that few people can handle for more than a short time. Conversely, a lower intake of fast carbs increases fat burning with neither hunger nor hormone-driven fat accumulation.



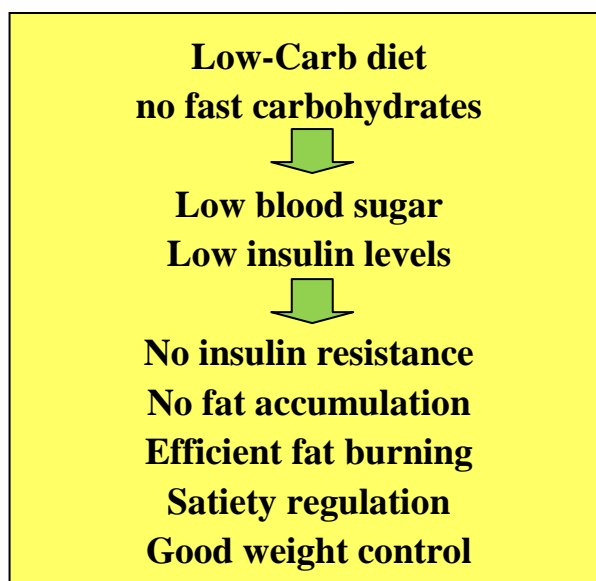
Insulin Resistance

Prolonged elevated blood glucose makes insulin resistance more severe. In the long run diabetes and abdominal obesity may result.

Glucose tolerance: Excessive intake of fast carbohydrates over time decreases uptake of blood glucose into cells by protective down-regulation of the number of active glucose transporters. After blood glucose spikes, normal low levels are reached slower. This is often referred to as an impaired glucose tolerance. This condition can partly be counteracted by physical activity.

Insulin resistance: Repeated elevated blood glucose levels are met by increased and prolonged insulin secretion. Insulin modulates high blood sugar levels in several ways including increased formation and storage of fats. But when the cells protect themselves against excessive glucose uptake this is not sufficient. Insulin resistance occurs, characterized by elevated insulin levels in the blood. Indications are unwanted weight gain and slightly elevated fasting glucose and glycosylated hemoglobin measured as HbA1c.

Diabetes 2: Finally, blood sugar may remain markedly elevated all around the clock defining diabetes 2 with many associated health dangers. The high level of insulin causes parallel worsening obesity.



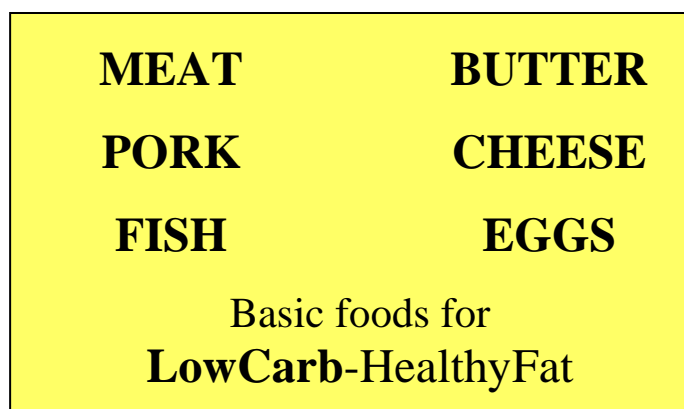
Low-Carb Diets

The obvious recipe to prevent and combat diabetes and obesity is to cut down on carbs in the diet. Remarkable health benefits are listed above.

Changes as needed: For those who just need to prevent insulin resistance it is often enough to cut down on major sources of sugar and fast carbs. Those who have developed diabetes and abdominal obesity need to apply a strict low-carb diet for a longer time.

Lose weight: As evident from the evening newspapers and health magazines, weight loss is now a common and highly prioritized desire. It is encouraging that avoiding fast carbs is very effective. Fat burning and weight control is improved. Calorie restriction, products for slimming, and obesity surgery are usually worse alternatives.

Overall health: In certain cases, diabetes and obesity have causes other than carbohydrates in the diet. Diabetes type 1 occurs because the pancreas cannot produce insulin. Both heredity and environment may contribute to obesity. It is important that low-carb diets often provide even greater health benefits in such cases.



Low-Carb and LCHF

In Sweden, LCHF is now a popular and widely used low-carb diet. It is based on foods lacking digestible carbs.

Denotation: The essence of the term LCHF is LowCarb indicating minimized carbs. The term HighFat can be regarded as opposing false previous guidelines recommending less fat. More important now is proper choice of healthy fats and HF may then conveniently be read HealthyFat.

Advantages: Strict LCHF is very effective for rapid and stable weight loss and thus widely attractive. The effect against insulin resistance prevents diabetic and cardiovascular dangers. Diabetic medication can often be decreased or removed, but this should be done under medical supervision.

Ketogenic diet: Strict low-carb diets add ketones formed from fat as an energy carrier in the blood. The diet is then termed ketogenic. A similar metabolic shift occurs during fasting, and ketogenic diets may be seen as carbohydrate fasting. A controlled [ketogenic diet against obesity and diabetes](#) is very efficient.

Difficulties: Applying a strict LCHF diet requires knowledge and dedication. A wide range of instructive books, newspapers and web sites are now available in Sweden. You need to know sources of carbohydrates and to be able to sort out them and say no thanks. You must also cover essential needs of antioxidants, minerals and other nutrients.

GI – Index of blood sugar elevation

(per weight amount; index 100 for glucose)

<i>Foods</i>	<i>GI</i>	
Glucose	100	
Sugar (sucrose)	70	High!
Fructose	20	
Bread , white	35	High!
Bread, whole grain	25	
Potatoes, boiled	12	
Potatoes, baked	25	High!
Green peas	4	Low!
Carrots, raw	3	Low!
Bananas	12	
Apples	4	Low!
Oranges	4	Low!

Guided by GI

The GI concept is widely known as an index of blood sugar elevation. The table shows GI for key foods containing carbohydrates.

Meaning: The level of GI reflects the magnitude of the increase in blood sugar. The reference value 100 is attributed to glucose. The table relates GI to the same weight amount of all the selected foods. Approximate figures are given since GI is slightly affected by several dietary factors.

Sugar: The need to cut down on sugar is now widely recognized. Nevertheless, large amounts of sugar are deceptively made invisible in soft drinks, chocolate, jam and ice-cream. Glucose syrup consists of glucose and is even worse than common table sugar.

Starch: An unhealthy source of carbs is white bread with a high proportion of easily digested starch. For bread as well as potatoes, pasta and rice, heating and disintegration increases GI. Whole grain provides a lower GI and more nutrition. Peas, beans, vegetables and most fruits are good choices with respect to GI and nutrition.

MEAT	BUTTER
PORK	CHEESE
FISH	EGGS
Rye bread	Vegetables
Boiled potatoes	Peas & Beans
Whole-grain	Fruit & Berries

The GI Diet

A GI diet usually combines foods lacking carbohydrates with foods containing carbohydrates with a low GI.

GI and LCHF: A GI diet suits most people and is easier than LCHF to apply consistently in the long run. It prevents insulin resistance and associated health problems. The stricter LCHF is more efficient and is needed to remove already developed problems with obesity and diabetes.

Selection of carbs: Proper GI food choices are characterized by slow and low increases of blood sugar. They should complement carb-free foods with regard to antioxidants and nutrients. Many fruits and vegetables meet this well. Both whole-grain foods and boiled potatoes with fairly low GI may be included.

Public health: From the biochemical perspective, insulin resistance, diabetes and obesity appear as largely unnecessary health problems. This can be seen as both frightening and encouraging. Those with good insights master carbs well while those lacking knowledge tend to run into difficult health problems.

Previous report: [Low CARB and GI](#)