

# Hypoglycemia, Low Blood Sugar



The airline pilot washed down a sugared doughnut with a cup of black coffee and jetted off on a cross-country flight. Five hours later he blacked out and the copilot completed the flight. Tests showed that the pilot's blood sugar had dropped too low. Hypoglycemia had knocked him out.

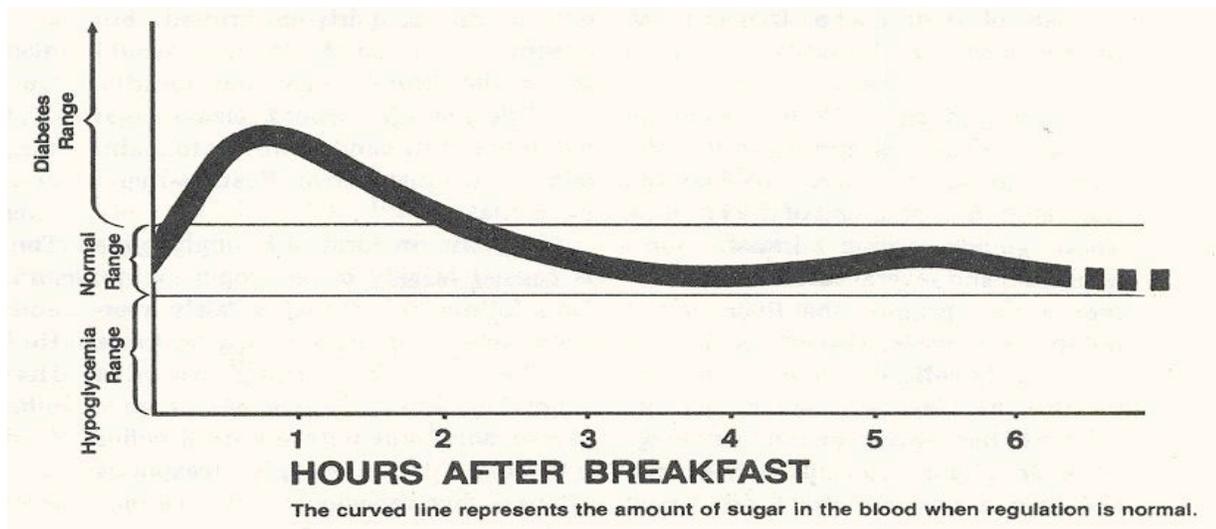
A psychologist who has had tests run on patients referred to him for emotional and mental problems reports that a considerable number of them suffered from hypoglycemia.

The story is told of a high school principal who just couldn't stand the kids anymore. A change in diet corrected his hypoglycemia. Strange how quickly the behavior of the kids improved!

## What is hypoglycemia?

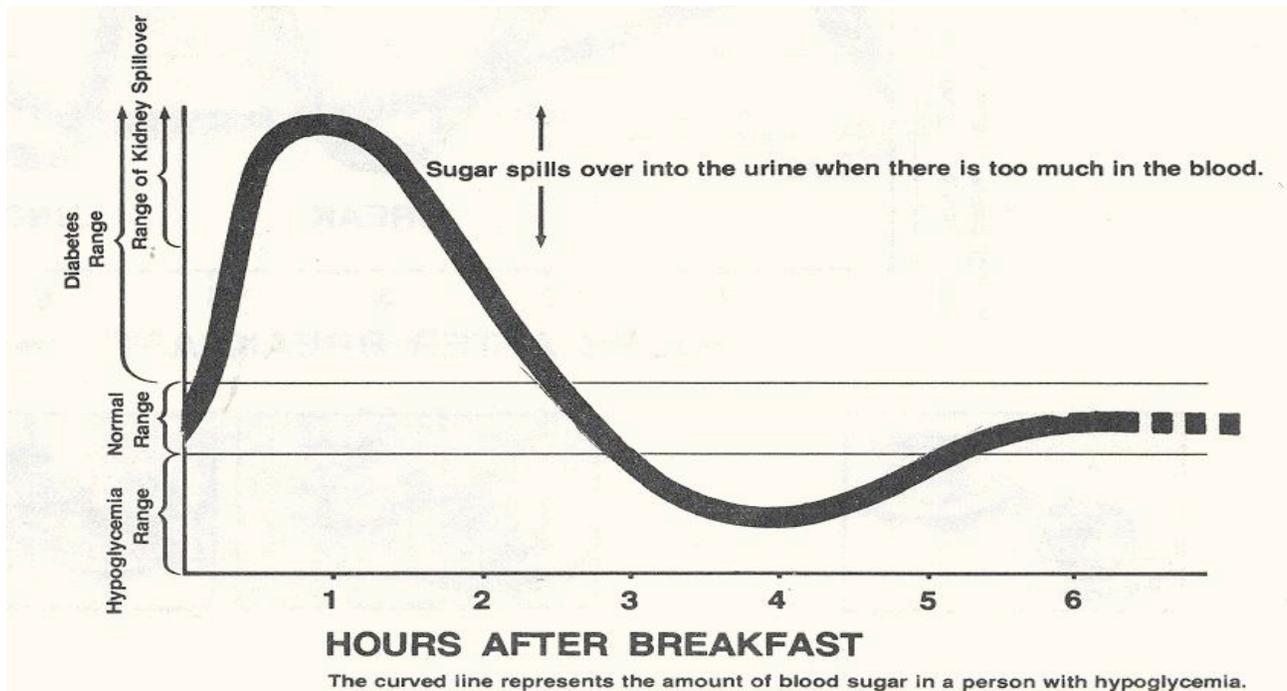
The sugar in one's blood normally amounts to about one-third teaspoon per quart. It is measured in milligrams per 100 cubic centimeters, known as milligrams per cent (mg%). The range in healthy people is from 70 mg% before a meal to 160 mg% after a meal. In people with a tendency to hypoglycemia, symptoms may occur any time the level drops too low. Hypoglycemia means 'too little *sugar* in the blood.' The opposite extreme, *hyperglycemia*, means too much sugar in the blood," and is commonly called sugar diabetes. Every move you make, every thought you think, every response of your senses, is influenced by the amount of sugar in your blood. When the concentration shifts much above or below the normal level, body functions become deranged.

## Normal regulation of blood sugar



The fuel energy your body needs is supplied by your food, usually by the sugars and starches [carbohydrates]and fats. When these are not sufficient, proteins also may be used for fuel. It is highly important for the blood-sugar level to remain within a range consistent with good health. To maintain this range the body has a whole team, of **regulators** at work chief of which are the liver and pancreas. During the process of digestion the sugar, mainly glucose, is absorbed and carried to the liver, where about 25 per cent is retained. The rest passes into the general circulation. As the concentration in the blood rises, the pancreas ups its output of insulin, which stimulates the sugar-reducing mechanisms to take care of the over overload. The insulin increases the burning of sugar by the tissues, and stimulates its storage by the liver as liver glycogen and by the muscles as muscle glycogen. If the blood-sugar content is still too high, the fat deposits, as too many of us know from experience, increase! The kidneys also may help by passing sugar out in

the urine. What prevents the blood sugar from dropping too low? The energy for life and activity comes from the oxidation or burning of glucose by the coils. This continuing use gradually lowers the sugar content of the blood. As the level drops, the pancreas increases its production of another hormone—glucagon—which stimulates the liver to convert glycogen back to glucose and put it into the circulation. Should this measure ‘not be enough, the fat stores respond by giving up part of their cache, If necessary, protein also may be broken down to help supply the need. Assisting glucagon in this balancing act are substances produced by the adrenal glands which sit, like cocked hats, atop the upper end of the kidneys. These glands secrete adrenalin (epinephrine) and several cortisonelike hormones that prompt the liver to put out more glucose, discourage its use by the body cells, cut down its storage by the muscles, and encourage the release of fats for conversion to glucose. Another gland, the pituitary, pours out two hormones that also assist in this fantastic balancing of the sugar level of the blood.

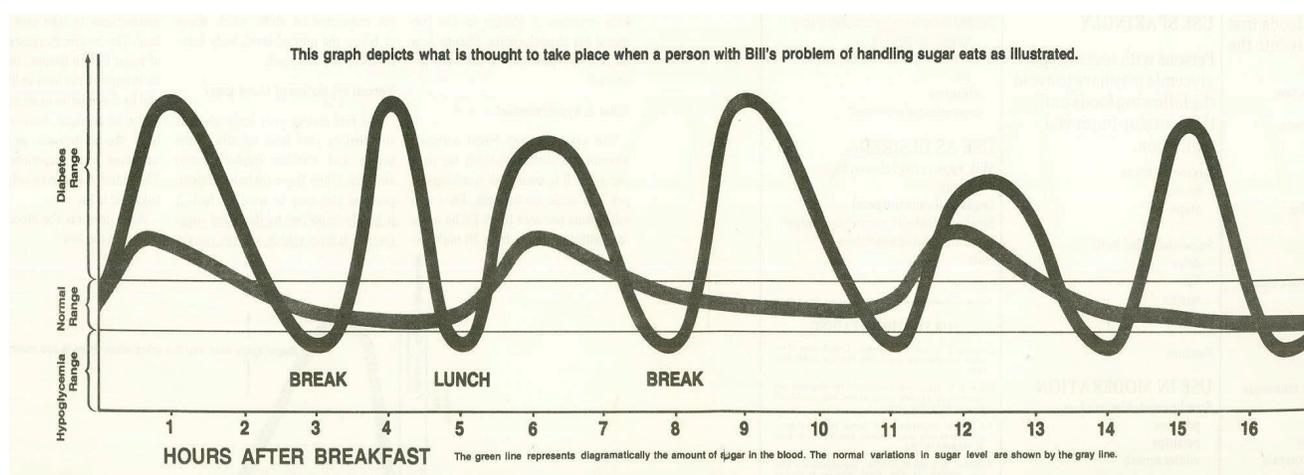


### What goes wrong in hypoglycemia?

In hypoglycemia something goes wrong with this beautiful teamwork and because the malfunction may involve any of the team members, it is sometimes difficult to pinpoint the cause of the trouble. It may be that the production of insulin or of glucagon is not properly controlled. For example, too much insulin would lower the blood sugar too rapidly; too little glucagon would release sugar to the blood stream too slowly to maintain an adequate level. Result—hypoglycemia

The common form of hypoglycemia is caused largely by improper eating. Let's follow Bill Brown, a fairly average businessman, around for a day to see how he eats. In the morning, instead of a good breakfast, he washes down a glazed doughnut with a cup of coffee syrupe with a couple teaspoons of sugar. For conscience sake, he may top off this meal with a glass of orange juice. Then he races to work. Does he feel bad? No. He feels great! Why not? This sugar-rich breakfast, abetted by the coffee, has poured a large amount of glucose into his blood stream in just a few minutes. His blood sugar may soon peak at 180, 200 or more mg%. His brain is richly supplied. It purrs in overdrive. But—high blood sugar can be dangerous. So the alarm goes out to the balancing mechanisms: We are deluged with sugar. Quick! Give us more insulin! The pancreas responds with a quick surge of insulin. Within the next hour or two the excess sugar is stored in liver cells and hidden in body tissues. The level in the blood drops sharply and with it the businessman's energy and alertness. He can't think straight. He is nervous, irritable, anxious. Why? His blood sugar is too low. Remember what he had for

breakfast? Mostly foods that were quickly broken down to glucose and that flooded the blood stream, calling out an extra amount of insulin that not only speeded up the storing of the sugar as glycogen but also the burning of it in the cells. Bill's meal had provided him with nothing that would turn to glucose gradually between meals, such as whole-grain cereal or whole-wheat toast with peanut butter or nuts, an apple or other fruit, and maybe glass of milk or an egg. So now Bill is jittery. 'Whatever can be bringing on these spells?' he worries. But, then—ah, just in the nick of time—the coffee break! What a relief to sit down to another cup of coffee—or soft drink—and a sweet roll, candy bar, or piece of pie or cake. Once more his blood is flooded with sugar. He feels wonderful! But what about his internal chemistry? Is everything wonderful there? Hardly! Again the alarm signals shriek, and the liver and pancreas move on the double to bring the blood-sugar level down. By lunch time, the bottom is again ready to fall out. Unfortunately, lunch is only a quick pickup of whatever strikes the fancy—perhaps a white-bun sandwich, a dessert, and another cup of coffee. The high-to-low fluctuation is repeated. The afternoon coffee break tides him over until time to leave the office. All day he has alternated between a sense of well-being and an inevitable letdown. How good to enjoy a sumptuous dinner at the end of the day and an evening of TV before bedtime. So go the lives of too many Americans. Habitual poor eating habits have played yo-yo with their blood sugar. Up and down. Down and up. Too much blood sugar—too little blood sugar. Mood elevated—mood depressed. Lots of pep—lack of pep, cycling through the day. And Bill's type of hypoglycemia, that goes too high before it goes too low, is often a symptom of developing diabetes.



## Symptoms of hypoglycemia

The symptoms of hypoglycemia can ape ever so many other conditions. Perhaps the most dramatic symptoms are produced when the brain or nervous system malfunctions. Brain cells, except in the most dire starvation, run only on glucose. If the blood supply of this sugar is too low, strange and bizarre things can happen. A 16-year-old girl became so confused she was diagnosed as mentally ill and confined to a mental institution as 'not too bright,' severely neurotic, and possibly epileptic. Blood tests revealed hypoglycemia. Dietary correction changed her to a charming, cooperative young woman with more than average intelligence.

Some of the symptoms that might suggest this type of hypoglycemia are nervousness, mental confusion, change of behaviour, restlessness, rapid heartbeat, sweating, paleness, even faintness occurring within two to five hours after eating. The test that will tell whether you have hypoglycemia is known as the "glucose tolerance test" taken on a doctor's order. Simple, safe, and not hard to take, it shows your body's ability to handle large amounts of blood sugar. The technician at the laboratory will take a sample of your blood before you eat your breakfast. Then he will give you a measured amount of glucose to drink and take another sample of blood within thirty minutes and again in half an hour. After that he will sample it every our or five hours. The amounts of glucose in these successive samples will tell your physician whether you have hypoglycemia or not.

# Treating Hypoglycemia

## **1. Restrict intake of sweets**

- Avoid refined sugar in all forms, particularly hidden sugars
- Replace these with very limited amounts of more natural sweeteners (honey, molasses & maple syrup – 1 tsp/day)
- Limit even fruit sugar to the equivalent of 2 pieces per day
- Be especially careful with fruit juices and dried fruit
- If this change is too radical, do a more gradual substitution, using more liberal amounts of natural sweeteners, or better, fruit sugars.
- Artificial sweeteners are a poor compromise.

## **2. Avoid drugs which cause a reaction similar to sugar**

- Alcohol – Substitute with low alcohol malt brews, white grape juice and club soda or club soda on the rocks
- Caffeine (coffee, tea, cola, chocolate) – Substitute these with herbal teas, carob and water processed decaf coffees
- Tobacco

## **3. Avoid white flour products – use whole grains and legumes**

- Emphasize the use of whole grains and other unrefined starches

## **4. Eat regular meals – Do NOT skip meals**

- Breakfast and lunch should both be substantial meals

## **5. Additional snacks are often necessary**

- Mid-morning, mid-afternoon and evening snacks as needed. Initially quite substantial, later somewhat lighter

## **6. Learn which foods and food combinations are more sustaining.**

- High-protein foods are the most sustaining proteins. Can be combined with other foods to make the meal as a whole more sustaining (eg. Eggs in a salad, trail mix for snacks etc)

## **7. Vitamin / Mineral supplements help**

- B Complex, chromium and others

## **8. Regular physical exercise**

- Helps normalize blood sugar and neutralizes stress.

## **9. Adequate rest, relaxation and sleep**

- Make time each day and each week to “unwind”. Hypoglycemia can be one symptom of burnout.

## **10. Consider hypoglycemia an addiction to sweets**

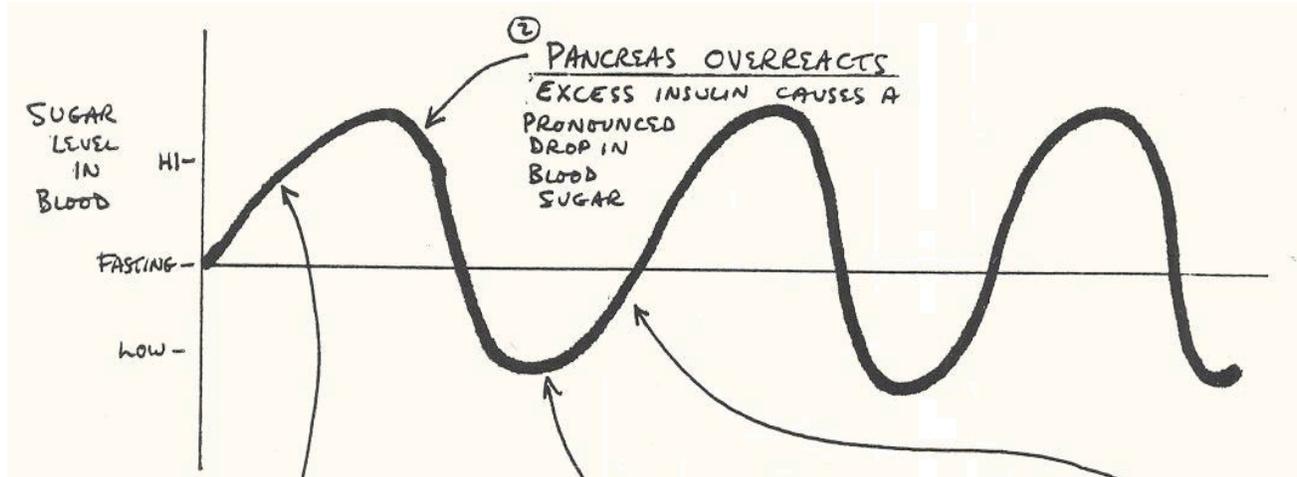
- Cutting out sweets completely is the best approach. Some people experience withdrawal symptoms if they do so, and have to reduce sweets more gradually.

## **11. Check for underlying food allergies if necessary**

- Food sensitivity reactions can cause low blood sugar reactions.

# The timing of hypoglycemic symptoms

This is a very oversimplified, but still useful, explanation of the timing of symptoms that occur with low blood sugar. Understanding this process can help a person use these symptoms as a guide in order feel well again.



## 1. Steep Rise in Blood Sugar

Results from:

- Rapid intake of sugar:
  - Sweet Junk
  - Excess Natural Sweets
  - Excessively large starchy meals
- Drugs (cause liver to rapidly release sugar into the bloodstream, giving a short “high”, followed by a prolonged “low”)
  - Caffeine
  - Alcohol
  - Tobacco
- Emotion – Causes excessive release of adrenal hormones, as in step 4
- Food Allergy

## 2. Pancreas Overreacts

Excess insulin causes a pronounced drop in blood sugar

## 3. Low Blood Sugar (relative to fasting level)

Results from:

- Overreaction of pancreas (steps 1 & 2)
- Prolonged periods without eating
- Vigorous activity without eating

Symptoms:

- Fatigue
- Depression
- Headache
- Dizziness
- Lightheadedness
- Sleepiness
- Faintness
- Poor Coordination
- Numbness
- Confusion
- Cravings
- Ravenous Hunger

## 4. Adrenal Panic Reaction

(The body’s effort to raise blood sugar levels)

Results from:

- Low Blood Sugar (step 3)
- Emotional Stress

Symptoms

- Anxiety
- Panic
- Restlessness
- Tremor
- Heart Pounding
- Anger
- Paleness
- Cold hands or feet
- Feeling short of breath
- Sweating

## 5. The rest of the involuntary nervous system overreacts to the adrenal “panic” reaction.

Symptoms:

- Stomach Cramps
- Nervous diarrhea
- Nausea, loss of appetite
- Heartburn

# Classes of different foods

## Sweet foods (in order of sweetness)

|  |  |
|--|--|
| White sugar<br>Brown sugar   | Eliminate totally  |
| Honey<br>Molasses  | About 3 tsp a day maximum combined with other foods. ½ tsp max at one time |
| Fruit Juices<br>Dried Fruits<br>Fresh Fruits   | About 2 pieces a day (or equivalent) maximum                               |
| NB The pancreas reacts just as much to natural sugar as to junk food sugar, best is to limit even the natural sweets |  |

## Starches

Potatoes  
Brown rice  
Whole wheat flour  
Starchy vegetables

## Proteins (in order of protein content)

Meat  
Fish  
Eggs  
Cheese  
Milk  
Seeds & nuts  
Beans

## Think of these foods as fuel for a woodstove

Sugar into the human body is like gasoline poured into a woodstove. It is explosive and gives a quick burst of energy, but this burst does not last very long.

Fruit into the human body is like a kindling in a woodstove. It gives quick energy, especially when the fire is running low, but the energy does not last very long (about one hour)

Starch into the human body is like DRY, SPLIT WOOD into a woodstove. It burns cleanly, and lasts fairly long time (about 3 hours or more for whole grains). It should be the major energy source.

Proteins into the human body are like green wood into a woodstove. It burns a long time (5 hours or more) and so is the most sustaining, but it also makes more metabolic “smoke” (especially meat) than other foods. A high protein diet in some people will “plug the pipes” faster than a diet high in complex carbohydrates.