

Thin evidence behind 'revolutionary' blood sugar diet: scientists

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A new "personalised" diet based on your blood sugar level is being promoted by a team of scientists from the Department of Nutrition, Exercise and Sports at the University of Copenhagen.

The scientists propose using [blood sugar](#) levels to categorise people as A, B, or C types – a rough estimate of how close they are to developing diabetes – which will then indicate what type of foods are best to consume if they want to lose weight.

People close to developing diabetes should reduce their carbohydrates in favour of fats to experience satiation faster – and generally eat high-fibre foods – to lose weight, say the scientists behind the diet.

The new diet received widespread [coverage](#) in Danish and [international media](#), and the scientists have already published the book "Eat yourself slim according to your [blood sugar](#)" (Danish: "Spis dig slank efter dit blodsukker"), which is currently available to Danish readers only.

The diet was described as a ["revolution"](#) to end all other diets by the University of Copenhagen in the wake of the book publication.

Diabetes scientist: "You can't draw these conclusions"

A number of established scientists that our Danish sister site Videnskab.dk have spoken with say the science behind the 'blood sugar diet' does not provide evidence that you can lose weight by eating according to your blood sugar.

"Frankly, you cannot draw the conclusions that they do," says Allan Flyvbjerg, director at the Steno Diabetes Center Copenhagen, and professor at the University of Copenhagen.

In fact the principles of the Danish blood sugar diet is challenged by larger scientific studies, which we will return to later, along with comments from the scientists behind the new diet.

Dieters are assigned to one of three groups

The new blood sugar diet was developed by Professor Arne Astrup and Assistant Professor Mads Fiil Hjorth from the Department of Nutrition, Exercise and Sports, University of Copenhagen, with input from Christian Bitz, a nutritionist and Danish media personality.

Its scientific foundation is [a study](#) published in the *American Journal of Clinical Nutrition* in July 2017, co-authored by Astrup and Fiil Hjorth. It is a review of three earlier studies, where trial participants followed healthy diets to lose weight.

By reviewing old data and conducting new analyses, the scientists found a correlation between participant's [weight loss](#) and blood sugar level on an empty stomach – the so-called fasting blood sugar level.

According to the study, the fasting blood sugar level can reveal whether you will lose weight by following one of the following diets:

A) More carbohydrates and less fat (typically for those who are not too overweight)

B) More protein and dietary fibre (typically for pre-diabetics)

C) Fewer carbohydrates and more fat (typically for patients with type-2 diabetes)

The study was presented as "ground-breaking" by the University of Copenhagen – a phrase reused on the website www.blodsukkerkuren.dk (English: The blood sugar diet), where Astrup, Fiil Hjorth, and Bitz offer personal diets based on your blood sugar level for a monthly fee.

"Our scientific studies document that most people will achieve a weight

loss upward 6 kilograms in 6 months by following the blood sugar diet," they write on their website.

Uncertainties in the study makes it unsuitable basis for dietary advice

But it is not certain whether you can categorise people into three types and give particular dietary advice based on blood sugar levels, says Flyvbjerg.

Flyvbjerg points to two sources of uncertainty in the study:

- In the study, participants' blood sugar is measured with a method that reports blood sugar at that time, there and then. It was used years back. But blood sugar fluctuates, and doctors today measure blood sugar over a long time with a method known as HbA1c, which reports the level over the course of two months. This removes the risk of measuring anomalously high or low [blood sugar levels](#).
- The study compares three different studies, each with different participants. Only one study includes patients with type-2 diabetes. Some of the participants' diets focused on carbohydrates, others on wholegrains. Age, body weight, and other parameters that can increase blood sugar, differ across the three studies. The more variables there are, the harder it becomes to conclude anything concrete from the correlations found in the results.

"You stitch together a patchwork of information from different studies, which don't correlate. You can use the study to find some indications that there could be something interesting to follow up on. But indications are not a smoking gun, it's not proof, and it's an oversell to call it 'new

ground breaking research.' It's not a message that I would shout around town," says Flyvbjerg.

"I don't want us, as doctors, scientists, and health professionals, to confuse more than we give. To use the study to recommend dietary changes for the average Joe or Jane is too much," he says.

Be careful using data obtained from sub-groups of earlier studies

Professor in childhood obesity Claude Marcus has also read the study, and notes in particular that the scientists study sub-groups of the three previously published studies.

When you pluck data in this way, you should always be wary of the conclusions and research behind them, writes Marcus in an email to Videnskab.dk. He is head of the Department of Clinical Science, Intervention and Technology at the Karolinska Institute, Sweden.

He points to [a 2004 study](#) published in the Journal of Clinical Epidemiology, which found that these types of studies are unreliable.

The study reads:

"Although guidelines state that subgroup findings should be considered exploratory in nature and that only in exceptional circumstances should they affect the conclusions drawn from the trial, they are commonly over-emphasized. This has potentially serious implications because erroneous identification of differential subgroup effects may lead to inappropriate provision or withholding of treatment."

"Although it is generally recognized that subgroup analyses can produce

spurious results, the extent of the problem may be underestimated," they write.

Marcus adds:

"I actually saw Fiil Hjorth's and Astrup's study in 2017 when it came out, and I thought it was fun. We discussed it in a so-called 'journal club,' but we were already sceptical about the conclusions at that point. I cannot imagine that a serious scientist would use them as a supporting argument for controlling the diet according to blood sugar and insulin."

Scientists behind the diet: We intentionally dropped trials

Astrup's group say they had devised several study designs when they discovered that similar studies already existed – except nobody had looked at weight loss across the three groups A, B, and C.

"So instead of using 20-50 million DKK and five years on repeating a study that already existed, we found it more ethically correct to establish a very concrete hypothesis and gain permission to reanalyse the existing studies," write the scientists in an email to Videnskab.dk.

"At the same time, it has the important scientific strength that neither the scientists nor the patients in the studies knew about our hypothesis, which would otherwise typically lead to bias," they write.

Diabetes patients lost weight on carbohydrate-rich diet

Previous and recent scientific literature far from agrees with Astrup and Co.'s conclusions.

A [large study](#) published in *The Lancet* in February 2018, for example, concluded that patients with type-2 diabetes lost weight by eating more carbohydrates, not fewer, as Astrup's group recommends.

Another [large study](#) from the U.S. similarly contradicts the teachings of the new blood sugar diet.

The U.S. study, where 600 participants either followed a low carbohydrate diet or a low fat diet for one year, concluded that people lost weight equally well – no matter if they ate healthy food with few carbohydrates (low carb) or with just a little fat (low fat).

According to the study conclusions, published in the *Journal of the American Medical Association*, neither genetics nor insulin, which influences our blood sugar, changed the results.

Marcus thinks that the result entirely contradicts the message from the scientists at the University of Copenhagen. He points out that both the U.S. study and the U.K. study in *The Lancet* are based on much stronger evidence than the Copenhagen group's research.

This is partly due to the long duration of the studies (one year), compared to the six month timespan of the previous studies reviewed by the Copenhagen researchers, and partly due to the fact that it uses original data to test a hypothesis on people who are regularly monitored.

Professor: "Irresponsible to make recommendations"

Marcus points out that the *JAMA* study was written after earlier studies had observed a correlation between diet and genetics. This correlation is not reproduced in the newer, well-designed study, says Marcus.

These doubts alone should discourage Astrup's group from making such

strong statements, says Marcus.

"If a scientist uses their position for commercial goals, then you should be extra careful that what you're marketing is based on evidence-based medicine. That requires randomised trials," he says.

"Note that I'm not saying Astrup is wrong, but I'm pointing out that there isn't convincing evidence that he's right, and that it's irresponsible to make recommendations," says Marcus.

Astrup's group however, disagree.

"At the Department for Nutrition, Exercise and Sports we also inform the public about new published results via press releases and more, as we, as a university, have a duty to communicate our knowledge."

"If it's relevant and there's interest in it, we also produce popular science literature and other forms of communications," writes Astrup and Fiil Hjorth in an email to Videnskab.dk.

Relevant and evident knowledge, which can benefit society, should not be held back, but should reach a broader audience, they say.

Drop sugar and eat lots of vegetables

Professor Cristopher Gardner, who co-authored the *JAMA* study, says his study shouldn't be seen as an automatic deathblow to the new blood sugar diet.

"What may have happened in our study is that we strongly advised both the low-fat and low-carb group to go as low as they could in added sugars and refined grains, and as high as both of them could in vegetables. This was, in essence, the foundational diet, and from here

they then worked on including more steel cut oats and lentils (low-fat), or more avocados, nuts and fatty salmon (low-carb)," writes Gardner, who is a research professor at the Stanford Prevention Research Center at Stanford University, in an email to Videnskab.dk.

"It may have been that the insulin response to these two dietary approaches, with a foundation in low added sugars and refined grains, and high in vegetables, diminished the importance of personal insulin metabolism," writes Gardner.

In other words, you might lose weight by cutting down on sugar and increasing the amount of vegetables you eat – regardless of whether a blood sugar test categorises you as type A, B, or C on the Copenhagen group's scale.

Not that simple, say Copenhagen group

Astrup and Fiil Hjorth disagree. They say the effects of their recommended diet program cannot be explained by merely cutting out sugar and eating more vegetables.

"The concept of the blood sugar diet is that people respond differently to the satiety effects of carbohydrates, depending on insulin resistance and production, and thereby react with very different amounts of weight loss for different types of diets," they write – despite the fact that Gardner's trial indicates that this isn't the case.

"However, Gardner's trial did not analyse for fasting glucose and fasting insulin, so we are currently analyzing his data in a collaborative project. Other scientists are very welcome to contact us to ask about our comprehensive research on this topic and get copies of the original publications and reviews," they add.

Professor criticises book sales

According to Professor Michael Lean, lead-author on the *Lancet* [study](#) and head of the Department for Human Nutrition at the University of Glasgow, UK, such contradictory messages about weight loss illustrate why we need more information before recommendations can be made for specific types of dietary compositions.

Therefore, he disagrees with the University of Copenhagen's description of the new diet as a "revolution".

"We just haven't sorted out the science yet. I think we all agree that a range of diet compositions are acceptable and that [if] there [are] special effects of a particular composition for a particular subset of people then those effects are quite small," he writes in an email to Videnskab.dk.

"There is no revolution and I would not be writing popular books about it. That tends to compromise scientific honesty and balance," he writes.

Diet study conducted in collaboration with US firm

The Copenhagen group's study was conducted in collaboration with the U.S.-based firm Gelesis Inc., where Astrup is employed as an advisor.

The University of Copenhagen updated their initial press release for the study to reflect this fact after Videnskab.dk had described the connection.

But [the press release](#) still omits the fact that Astrup, Fiil Hjorth, and a third scientist from the University of Copenhagen, have together with Gelesis Inc. applied for a patent on the use of biomarkers to predict weight loss based on fasting blood sugar and insulin levels.

Astrup is an associate editor at *The American Journal of Clinical Nutrition* where the blood sugar [diet](#) study is published.

In an email to Videnskab.dk, Astrup writes that the article submission process is overseen by an independent editor and independent evaluators.

Scientists stand to profit from new blood sugar diet

Astrup, Fiil Hjorth, and Gelesis Inc. have also established a company that teaches nutritionists how to eat according to your blood sugar level.

These nutritionists then advise patients to help them change their dietary habits.

In Denmark, people can pay for access to the website [blodsukkerkuren.dk](#) to learn more about the concept. The money goes to the scientists and Gelesis Inc.

The University of Copenhagen holds the patent for the scientist's research, which means that they too take some money from these activities.

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