Custom-made Meals

A stable blood sugar level is the key to a healthy life, says Professor Christian Sina. He's a physician who advocates for personalized nutrition plans that are tailored to match an individual's metabolism—yet require a minimum of effort

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Professor Sina, your analyses show that different individuals who are consuming the same foods react differently to them and end up with different levels of blood sugar. For example, some individuals have higher blood sugar levels after eating tomatoes, while others do not. Why is that?
We still can't explain that with one hundred percent certainty. But at least we do know that our intestinal microbiome—the millions of bacteria that live in our intestines—have a very big influence on the way we process the food we eat. Every individual has a different array of intestinal bacteria and therefore reacts differently to various foods.

Is that why you're advocating for personalized nutrition plans?
That's right. For years now, we've been asking, "What's the right diet for people in general?"—rather than "What's the right diet for me in my individual situation?" Having a specific diet is a bit like taking medication: Something that works well for one person may have no impact on another or may even have negative side effects. We can use data to find out what kind of diet is more beneficial for my individual metabolism or less beneficial. That way I can make informed choices.

Does this mean that the traditional rules about good nutrition are outdated?
No, they're still valid. It's still important to have as varied a diet as possible and to consume an adequate amount of nutrients. The key factors are dietary fiber, trace elements, vitamins, and minerals—and large amounts of these substances can be found in vegetables. These factors are important for the proper functioning of the metabolism and the immune system. In addition, we should enjoy all the food we eat in moderation in order to avoid gaining weight. In other words, we should consume only as many calories as we burn. But that alone is not enough.

What kind of data do you collect for your analysis of metabolic processes?
In our "Million Friends" program, we can record the changes in an individual's blood sugar levels after food consumption over a period of 14 days. The recording is done by a small sensor attached to the upper arm. A thin filament measures the glucose content of tissue by monitoring the extracellular matrix between cells. We also use the information our test subjects provide in a questionnaire. All of this information taken together helps us to give individualized recommendations about diet. We now have about 2,000 participants all over Germany in our program. The youngest participant is 18 years old, the oldest is 82. →

Prof. Christian Sina, 43, is the Director of the Institute of Nutritional Medicine at the University Hospital of Schleswig-Holstein in Lübeck. An internist and gastroenterologist, he has focused on intestinal health for many years. In order to offer better nutrition-based prevention programs and treatment concepts, a team of physicians, bioinformaticists, system biologists, and nutrition researchers developed the "Million Friends" program at the Institute. The program's participants measure their blood sugar levels and can adapt their diets accordingly. The program, whose name refers to the millions of intestinal bacteria, is operated by Perfood, a startup based in Lübeck. Prof. Sina sits on its scientific advisory board. He also advises Evonik on issues related to nutrition and food ingredients. Together with Evonik, he also monitors joint research projects focusing on intestinal health.

1 Research findings show that people react differently to the various constituents of their diets. These findings are the basis of a study conducted by Professor Christian Sina and his team. **2** About 2,000 men and women have been taking part in this study since the fall of 2018. The researchers in Lübeck are gaining more information almost every day. **3** The participants in the study wear a sensor on their upper arm. Inside the sensor is a thin filament that measures the glucose content of the subcutaneous tissue and transmits the measured values to a reading device.

“The goal is to make an intelligent selection of the foods you like to eat”

Why is the blood sugar level so significant for our health?
It provides important indicators of the development of diabetes and other metabolic diseases, and possibly even for certain types of cancer. We also know that there’s a connection between the blood sugar level and many other health problems, which range from migraines to inflammations in the abdominal region. We hope that in the future we can prevent these health problems more effectively and provide better therapies for precursor stages such as prediabetes if patients adapt their diet to their individual metabolism. This would also have a positive effect on the patient’s general sense of well-being, because if our blood sugar level is stable we feel well-balanced, no longer get tired during the day, and are more productive in general.

However, many people find it difficult to change their eating habits.
Yes, they do. That’s what we’ve learned from our daily work at the clinic, and we all know that about ourselves. Only a very few people manage to radically transform their individual diet over the long term. Nonetheless, if it’s only a matter of small adaptations, there’s a bigger chance of achieving sustainable success. The goal is to make an intelligent selection of the foods you like to eat. As a rule, you only have to adapt between five and ten percent of the food you eat in order to optimize your individual metabolism.

What does that mean in concrete terms?
For example, the data might show that an individual has consumed inadequate amounts of dietary fiber in the past. As a result, certain intestinal bacteria have stopped growing or multiplying, and that may be having negative effects on the person’s metabolism. We can encourage this person to consume more dietary fiber. The time of day when you eat something also plays a role in your blood sugar level. One type of metabolic pattern metabolizes carbohydrates more effectively in the morning, another type in the evening. It would be advisable for the “morning type” to have a substantial breakfast and to compensate by avoiding carbohydrates at suppertime. For the “evening type,” it would make sense to reverse this pattern.

What differences between metabolic patterns have you identified so far?
At the moment we’re gaining more information almost every day, and as the data volume grows this data is becoming increasingly precise. We can determine how an individual reacts to proteins and fats. We can also find out how his or her blood sugar level reacts to different sources of sugar. That way we can tell whether potatoes, rice or pasta is a better side dish for that person. And we also know whether coffee has a positive or negative effect on a person’s blood sugar reaction.

Not everyone finds it easy to give up bread and rolls…
In many cases it helps to eat the roll with butter—in other words, a fat—or a source of protein such as quark or cheese. Both types of food can prolong the period of time the food stays in the stomach—and that prevents a steep increase of blood sugar. Our data shows that some people achieve stable blood sugar values by increasing their intake of fat, while others benefit from more protein. However, for about 20 percent of people, this modulation of blood sugar via protein or fat doesn’t work at all. To improve their blood sugar level, they’d be better off having bread or rolls only on Sundays. Our test shows people which group they belong in.

What can the food industry learn from your research?
It can make its products better. For example, a cereals producer could use our findings to do something more effective than merely reducing its products’ sugar content. It could offer three different variants of its product on the market: the original product, one with a higher protein content, and one with a higher fat content. Consumers of different metabolic types could choose the right cereal for maintaining a stable blood sugar level. That would be more healthy for consumers. Our goal is to make it as simple as possible for people to have a beneficial diet without any pressure or sets of rules.

Do you envision a future in which kitchen robots automatically prepare the healthiest possible meal for each family member?
Why not? Prototypes of such kitchens already exist. Our goal is to provide the kitchens of the future with recipes that are adapted to the individual metabolic types. That way, everyone will sit down to a custom-made meal. This is an approach that will revolutionize nutrition.

Have you changed your own diet on the basis of your findings?
I’ve given up eating bread, and I now eat oatmeal porridge for breakfast. If I do eat bread I have it with quark or cheese, because I’m a “protein type.” In addition, I try to vary my diet as much as possible and to consume lots of dietary fiber. An important aspect of my diet is that I don’t have to deny myself anything. I can put together my meals in line with my own food preferences. —