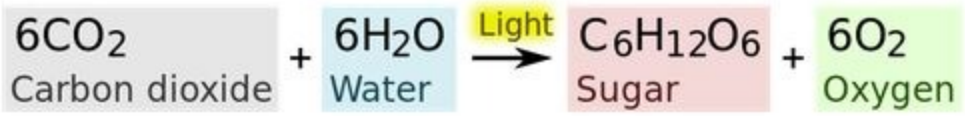
Why Humans Can't Live Off Sunlight

by ReadWorks



photosynthesis equation

In 2013, a resident of Seattle, Washington, named Naveena Shine decided that she would embark on an experiment. Shine had become fascinated with photosynthesis, the process by which plants are able to make their own food using sunlight. Sunlight contains a significant amount of energy, which plants are able to use to convert water, carbon dioxide, and minerals into oxygen and organic compounds, including nutrients like glucose. Shine reasoned that the human body, if forced to, could do the same thing. So Shine set out to test her hypothesis. In May, she declared that, for the next six months, she would not eat food. Instead, she would limit her diet to only sunlight, water, and tea.

Shine saw her experiment as an important moment in human history, perhaps even a next step in the evolutionary process. On her website, she outlined the many potential advantages of humans being able to produce their own food from sunlight: people would not have to work as hard to earn money to buy food; instead of cooking and shopping, they would have more time to do other things, and many of the earth's natural resources used in the production and preparation of food would be saved for future generations. And why wouldn't it work?

"Plants live on light, and then we eat plants," she concluded. "Are we simply not accessing our inherent ability to live on light?"

Shine also claimed that several people had successfully lived on light before her. She cited a German chemist named Michael Werner, who claims to have eaten no food since 2001, and Ellen Greve, an Australian spiritual leader-known to her followers as Jasmuheen-who said she had not touched a meal since 1993. (These claims were never proven true.) To prove that she was not sneaking food to eat, Shine said she would set up eight video cameras in her trailer to record her every movement. On May 3, 2013, with her predecessors in mind, Shine began her experiment.

The results were dramatic, although perhaps not in the way Shine had planned. Over the next five weeks, Shine lost 30 pounds, dropping from 160 pounds to 130. She felt weak and occasionally had difficulty standing. She reported that when she went outside to get her daily regimen of sun, her hands were cold. Shine predicted that this would be the moment when her body would produce its own food.

"I have the feeling my body has reached a point where it has used up all its stored fats, and is now looking around for what to consume next," she wrote on Facebook. "I suspect this might be the point where it decides either find and hook into the source where it is able to live on light, or consume the body for sustenance."

Shine's experiment received a lot of criticism. Many of her detractors pointed out that, even if her hypothesis was valid, famously cloudy Seattle might not have been the best place to test it out.

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On June 19, after 47 days of the experiment, Shine called it quits. She had lost 33 pounds and was having difficulties holding down water in her stomach. However, Shine did not rule the experiment a failure. Instead, she blamed the early termination on several other, more practical factors, including a lack of funds. Shine had charged the cameras in her trailer to her credit cards. She had expected that visitors to her website would donate funds to pay for the cameras and sustain her experiment. However, after 45 days, she had received only $435, forcing her to leave her trailer and return to work. She also cited the overwhelmingly negative reaction to her experiment as another reason for its termination.

"From the feedback I am getting," she wrote, "it is becoming patently clear that most of the world is by no means ready to receive the information I am attempting to produce."

Shine appears to have escaped from the experiment without permanent damage-although she did sustain a steep drop in her weight and some credit card debt. However, starving yourself can do serious harm to the body and is very dangerous. Others who have attempted the same experiment have not been so lucky. At least four people, inspired by similar teachings about the nutritional value of sunlight, have died from self-inflicted starvation. Starving is dangerous because when the body is deprived of vital nutrients, it begins to shut down some of its vital organs, greatly increasing the chances of illness. If deprivation lasts long enough, then the person can sustain long-lasting injuries or even die.

What was Shine's mistake? Well, she made several. Most importantly, she misunderstood how energy is produced in plants versus how it's produced in humans. While sunlight does indeed contain energy, only plants are able to render this energy into a usable form. Dr. Ronald Hoffman, a clinician and spokesman about health and nutrition, told the UK's *Guardian* newspaper that Shine's ideas were "delusional" and explained her error.

"Plants have what are called chloroplasts that contain chlorophyll, and they have the ability to capture energy from sunlight," Hoffman said. "Humans don't have chlorophyll or chloroplasts. No humans do. It is impossible for a human to have that."

A chloroplast is a structure that is able to produce a very specific chemical reaction in which plants use light energy and carbon dioxide to produce sugars. A chemical reaction is when atoms of one substance are rearranged to make a different substance. During photosynthesis, carbon dioxide atoms the plant draws from the air are split into carbon atoms and oxygen atoms. The carbon atoms are used by the plant to make sugar, a form of carbohydrate. (Carbohydrates are compounds made of carbon, hydrogen, and oxygen.) The plant then discards any oxygen it does not use as a waste product. This is much like how human beings breathe out carbon dioxide as a waste product of our own bodily system.

The sugars plants produce during photosynthesis are of a form that plants can use to survive and grow. In this way, the energy that is contained in sunlight is transformed into a different kind of energy. However, the structures capable of making this transformation-chloroplasts-are present only in plants, not humans. When Shine concluded that her experiment would work because plants live on energy from the sun and people eat plants, she was not recognizing that humans do not eat sunlight; people eat the sugars that plants produce. For example, if people eat sweet strawberries, they are not eating the energy from the sun. They are eating a kind of fruit sugar, called fructose, that the strawberry plant produces. If Shine had had a better understanding of photosynthesis and how the human body works, she probably would not have believed her experiment would work.

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