

Nutrients can mimic pharmacological effects of medicines

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Dr. Saskia Braber. Credit: Utrecht University

Nutrients can work in surprisingly similar ways as medicines. Pharmacologists from Utrecht University conclude that more knowledge of the similarities between food and medicines could help develop diets to combat diseases.

A Mediterranean diet, high-fiber food, and whole fruits and vegetables are well-known elements of healthy nutrition. But in many cases, it remains unclear what exactly makes them so healthy. Researchers from Utrecht University are aiming to change this. They found a surprisingly large number of nutrients that have the same medical effects as pharmaceutical compounds.

The scientists analyzed more than 200 studies that showed how nutrients affect cells in our body. Specifically, they focused on how nutrients can bind to cells, and consequently affect the immune system. The cells can respond to the binding of specific nutritional components, for example by inhibiting inflammation or allergic reactions. Many pharmaceutical drugs work the same way. Both the nutritional compounds and the [pharmaceutical drugs](#) are able to bind to cells, using the same "docking stations" called cell receptors, and have similar effects on the immune system.

Focus on inflammation

The researchers focused on inflammation because [inflammatory responses](#) are involved in most non-[communicable diseases](#), such as cancer, diabetes and heart and lung diseases. These diseases are the leading cause of death worldwide, accounting for about 71 percent of all deaths.

Positively affecting cell processes

"We have known for a long time that our diet plays an important role in our health," says primary investigator Saskia Braber, researcher at Utrecht University's Department of Pharmaceutical Sciences. "But that knowledge is quite broad. It encompasses the entire [diet](#) and includes all kinds of food. We see that certain nutrients can bind very precisely to specific receptors of particular [cells](#), just like medicines do. The fact that nutrients can positively affect cell processes in such a specific way is surprising."

To create a better picture of this, the researchers made an inventory of fifteen types of cell receptors and the nutrients that bind to these receptors. This resulted in an extensive overview comprising dozens of nutrients, the [receptors](#) they bind to, the specific immune responses that are modulated.

Personalized nutrition and better diets

According to Braber and colleagues, this knowledge could lead to better and more specific diets, tailored to combat certain diseases. Braber: "For example, when facing a certain disease, you could determine which immune responses are involved. Then you can find out which [cell receptors](#) are linked to these responses. Once you know the receptor, you can also find the associated nutrients to combat or even prevent the disease."

Bridging the gap

Braber and colleagues now aim to bridge the gap between pharmacologists and nutritionists. Braber: "For a long time, pharmacologists mostly ignored insights from nutritional research. They

considered food to be a mishmash of substances that all exhibit different effects. Now it is time for pharmacologists to realize that food can indeed have very specific medicinal effects."

The new publication could enable such a step forward, says Braber. "Our research is about nutrition and has now published in a pharmacological journal. That would have been impossible five or ten years ago. With this publication, we have really managed to break a barrier."

More information: Marthe T. van Daal et al, Pharmacological Modulation of Immune Responses by Nutritional Components, *Pharmacological Reviews* (2021). [DOI: 10.1124/pharmrev.120.000063](https://doi.org/10.1124/pharmrev.120.000063)

Provided by Utrecht University

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