dietary nutrients play a crucial role in providing your body with energy, building blocks, and regulatory molecules. How all these nutrients work together is not always clearly understood; however, this recent research from the University of Chicago and Emory University shows a nutrient found in meat can help your immune system fight cancer.

What is TVA?

TVA, or trans-vaccenic acid, is a long-chain fatty acid found in meat and dairy from grazing animals, like cows and sheep. Published in the journal Nature, the research focused on the impact of TVA on CD8+ T cells, a critical component of the immune system responsible for infiltrating tumors and destroying cancer cells.

The study found that higher levels of TVA in the blood correlated with a better response to immunotherapy treatments, suggesting TVA’s potential as a nutritional supplement in cancer therapy.

Dr. Jing Chen, the study’s senior author, emphasized the importance of understanding how nutrients and metabolites from food influence health and disease. Chen’s lab and postdoctoral fellows Hao Fan and Siyuan Xia assembled a library of 235 bioactive molecules derived from food and screened them for their ability to activate anti-tumor immunity in CD8+ T cells.

This is when researchers discovered something pretty interesting about the natural fat called TVA, found in beef, dairy, and even human breast milk. Notably, our bodies don’t make it, but when we consume it, most of it sticks around in our bloodstream. This fat seems to have a knack for switching off a specific part in our cells that is usually turned on by other fats we get from our diet. When TVA flips this switch, it sets off a chain reaction that helps our body cells grow and stay alive.
What’s really exciting is that when scientists gave mice a special diet with extra TVA, their tumors grew much slower, and their immune systems got better at invading and attacking these tumors. This could be great news for cancer treatments. In fact, in early tests with people who were getting advanced cancer therapy, those with more TVA in their blood seemed to respond better to the treatment.

This could mean that TVA might one day be used to help our immune system fight cancer more effectively, although there’s still a lot to learn.

What we do know is that this research could change the way we think about certain fats in our diets and their role in keeping us healthy.

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Key findings on TVA
Boosting Cancer Treatment with TVA:

- People with higher levels of TVA in their blood responded better to a type of cancer treatment called immunotherapy, suggesting that TVA might be applicable in helping cancer treatments work better.

Activating Important Immune Cells:

- The researchers looked at many different molecules from food to see which could help the immune system fight cancer. They found that TVA is good at activating a specific type of immune cell called CD8+ T cells. These cells are essential because they help hunt down and destroy cancer cells.

Reducing Tumor Growth in Mice:

- In experiments with mice, the ones that ate food with more TVA had smaller and slower-growing tumors, especially for melanoma and colon cancer. This shows that TVA might help slow down or reduce the growth of some types of cancer.

How TVA Works at the Molecular Level:

- The study used advanced scientific methods to figure out exactly how TVA works. They discovered that TVA turns off a certain receptor on the cell surface, which is usually activated by other types of fatty acids from the gut. By doing this, TVA starts a chain reaction in the cells that’s important for cell growth and survival.

Making Immune Cells More Effective:

- TVA changes the way genes work in CD8+ T cells, making these cells better at getting into tumors and fighting them. In experiments, when this specific receptor was removed from these cells, they weren’t as good at fighting tumors anymore, which shows how important TVA’s role is.

Real-World Evidence from Cancer Patients:

- When they looked at blood samples from people getting a type of cancer treatment called CAR-T therapy for lymphoma, they found that those with higher levels of TVA responded better to the treatment. Also, in lab tests, TVA helped make a cancer drug more effective at killing leukemia cells.

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Sources of TVA

The findings from the University of Chicago study on TVA and its impact on the immune response to cancer offer intriguing insights into the complex relationship between diet and health. However, translating
these findings into practical lifestyle and dietary changes requires careful consideration.

TVA has some potentially substantial health benefits, suggesting that specific components of these foods could have beneficial health properties, which challenges the blanket notion that all aspects of dairy and meat are detrimental to health.

Despite its potential benefits, it’s crucial to remember that the study does not endorse excessive consumption of red meat and dairy. Most dietary guidelines advocate for a balanced diet that includes a variety of food sources. If you’re considering increasing your intake of dairy and meat to incorporate more TVA, it should be done in moderation and as part of a balanced diet.

### Sources of TVA

TVA, or trans-vaccenic acid, is a long-chain fatty acid found in meat and dairy from grazing animals. Recent research has shown its efficacy with destroying cancer cells.

**Dairy**

<table>
<thead>
<tr>
<th>Food</th>
<th>TVA amount per serving, in milligrams (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whole milk, 8 oz</td>
<td>5.40 mg</td>
</tr>
<tr>
<td>Cheddar cheese, 1 oz</td>
<td>3.5 mg</td>
</tr>
<tr>
<td>Butter, 1 tbsp</td>
<td>3.6 mg</td>
</tr>
<tr>
<td>Plain yogurt, 8 oz</td>
<td>3.6 mg</td>
</tr>
<tr>
<td>Cream, 1 tbsp</td>
<td>2.4 mg</td>
</tr>
</tbody>
</table>

**Meat**

<table>
<thead>
<tr>
<th>Meat</th>
<th>TVA amount per 3oz cooked meat, in milligrams (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef steak</td>
<td>4.8 mg</td>
</tr>
<tr>
<td>Ground beef</td>
<td>4.7 mg</td>
</tr>
<tr>
<td>Lamb chop</td>
<td>5.9 mg</td>
</tr>
<tr>
<td>Pork chop</td>
<td>3.6 mg</td>
</tr>
<tr>
<td>Chicken breast</td>
<td>&lt;1 mg</td>
</tr>
</tbody>
</table>

**Applying these findings**

...
The study contributes in a meaningful way to the evolving understanding of meat and dairy in our diet. While overconsumption, particularly of processed meats and high-fat dairy products, has been linked to various health issues, this research indicates that certain components of meat and dairy can have meaningful health benefits. It underscores the need for a nuanced view of these food groups, focusing on quality, quantity, and the overall dietary pattern.

A well-rounded diet rich in fruits, vegetables, whole grains, lean proteins, and healthy fats is still the cornerstone of good nutrition. The potential benefits of one specific nutrient, like TVA, don’t negate the importance of a diversified diet. There are bioactive compounds in many fruits, vegetables, and legumes that are important for your health.

The study hints at the possibility of plant-derived fatty acids having similar beneficial effects. Those following a vegetarian or more plant-based diet might look into research on plant-based fatty acids and their impact on health—keeping in mind the bioavailability of fatty acids in plants vs. animal proteins.

And for those with specific health concerns, such as high cholesterol or heart disease, consulting with a healthcare provider or a registered dietitian before making significant dietary changes is advisable.

Hayley Phillip is a graduate of the University of California Santa Barbara with degrees in Sociology and Marketing. Hayley leads the team in debunking popular fad diets, fast-nutrition, and myths about ‘quick’ dietary fixes. Hayley also researches and writes about the intersectionality of regeneration and sustainable growing methods that will safely produce enough food for future generations. Find Hayley on X @HayleyNPhilip

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