

Erythritol May Impair Blood Vessel Function in the Brain and Raise Stroke Risk

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October 19, 2026

STORY AT-A-GLANCE

- › In a laboratory study, erythritol disrupted several functions in cultured human brain blood vessel cells, raising concerns that its effects extend beyond blood sugar and calorie content
- › Erythritol increased oxidative stress while reducing nitric oxide production by about 20%, interfering with a key process that helps your blood vessels relax and regulate blood flow
- › The sweetener increased production of endothelin-1, which promotes blood vessel constriction, by about 30%, further shifting the balance away from healthy blood vessel function
- › Erythritol-treated cells failed to activate their normal clot-clearing response when researchers exposed them to a clotting signal, suggesting another way the sweetener could interfere with healthy brain blood vessel function
- › Avoiding erythritol starts with checking ingredient lists — it appears in many products not obviously marketed as sugar-free — and choosing natural sweeteners like ripe fruit, raw honey or maple syrup in moderation rather than replacing it with another artificial substitute

A single 30-gram dose of erythritol — roughly the amount in one commercially sweetened beverage — was enough to disrupt several functions in human brain blood vessel cells, according to a study published in the *Journal of Applied Physiology*.¹

Erythritol has gained popularity as a sugar substitute because it delivers sweetness with minimal calories and little effect on blood glucose or insulin.

However, those features don't tell you enough about its overall biological effects. Your blood sugar response is only one piece of the picture. The new findings shift attention to a different question: What happens inside the cells that line your brain's smallest blood vessels after erythritol exposure?

Your brain depends on those tiny vessels to constantly adjust blood flow, clear clots and manage inflammation. When the researchers tested erythritol on those cells directly, the results pointed to trouble on every front they measured.

Erythritol Exposure Was Linked to Multiple Signs of Brain Blood Vessel Stress

The Journal of Applied Physiology study examined human cerebral microvascular endothelial cells, which form part of the inner lining of the tiny blood vessels that supply your brain.² The researchers wanted to see what erythritol actually did to these cells under controlled laboratory conditions. They compared untreated cells with cells exposed to erythritol and measured several processes involved in blood vessel health.*

This approach gave researchers a closer look at how the sweetener affected the cells themselves. The experiment used five experimental units, so this was a small laboratory study, not a clinical trial involving people. That distinction is important when you interpret the findings.

- **The cells responded to erythritol by activating their antioxidant defenses** — One revealing detail was what happened after oxidative stress increased. Two antioxidant proteins, superoxide dismutase-1, or SOD-1, and catalase rose by about 45% and 25%, respectively. Think of these proteins as part of the cell's cleanup crew. SOD-1 helps convert a highly reactive molecule called superoxide into hydrogen peroxide, while catalase then helps convert hydrogen peroxide into water.

At first glance, higher antioxidant activity sounds beneficial. In this case, however, researchers interpreted it as a compensatory response; the cells were boosting their defenses because they were under greater oxidative pressure. Those defenses weren't enough to neutralize the rise in reactive oxygen species, unstable molecules that damage cells when they accumulate.

- **Erythritol changed the molecular switches that control nitric oxide production —**
The researchers found an important detail behind the drop in nitric oxide. The total amount of endothelial nitric oxide synthase, or eNOS, didn't significantly change. Instead, erythritol altered chemical switches that control whether this enzyme works efficiently.

One activating signal was about 35% lower, while an inhibitory signal was about 40% higher. In simple terms, the cells still had the nitric oxide-making machinery, but the switches shifted toward "off." Nitric oxide production consequently fell by about 20%. This matters because eNOS also helps regulate brain blood flow, limit platelet clumping and control inflammation and clot formation.

- **The constriction signal rose without an increase in the enzyme that processes it —**
Erythritol-treated cells produced more of the precursor your cells use to make endothelin-1. Yet endothelin-converting enzyme, which helps process that precursor, didn't significantly differ between treated and untreated cells.

That finding adds detail to the mechanism. Erythritol didn't simply increase every component of the pathway. Instead, it selectively altered parts of a system that controls blood vessel constriction, ultimately producing substantially more endothelin-1.

- **Erythritol weakened the cells' response when clot-clearing help was needed —**
Under normal resting conditions, erythritol didn't significantly change t-PA, a substance your blood vessels release to help break down blood clots. The problem appeared when researchers exposed the cells to thrombin, which signals that clotting is taking place.

Untreated cells responded by releasing about 25% more t-PA, increasing from 90.1 to 110.2 picograms per milliliter. Erythritol-treated cells barely responded, rising from 87.4 to only 87.6 picograms per milliliter. The cells still had their clot-clearing defense, but erythritol interfered with their ability to activate it when it was needed.

- **The experiment identifies a mechanism, but it doesn't prove erythritol causes strokes in people** — The researchers specifically acknowledged that an isolated cell experiment can't establish clinical risk. They also tested an acute exposure, so the study doesn't reveal what repeated erythritol consumption does over months or years.

Still, the model has value because these human brain microvascular endothelial cells are used to study how brain blood vessels function. The researchers also noted that erythritol crosses the blood-brain barrier, meaning it reaches and interacts with the brain's vascular environment. These results provide biological evidence of vascular disruption under laboratory conditions, while long-term human studies are still needed to determine what those changes mean for actual stroke risk.*

**These findings are from laboratory research using cultured human brain blood vessel cells and may not directly apply to human health.*

Protect Your Brain's Blood Vessels by Removing the Stressor

These findings give you a concrete reason to look more carefully at what's sweetening the foods and drinks in your daily routine. Because erythritol was shown in this laboratory study to disrupt several processes your brain's blood vessels rely on for healthy blood flow and normal clot-clearing responses, reducing your exposure may be a reasonable precaution.

The good news is that doing so doesn't mean giving up sweet foods or the carbohydrates your body needs for energy. A few practical changes will help you reduce erythritol while still enjoying naturally sweet, whole-food options.

- 1. Remove products with added erythritol from your routine** — Start by checking ingredient lists on foods and drinks marketed as sugar-free, low-sugar or keto-friendly. Erythritol is often used as a bulk sweetener, so these products expose you to amounts far beyond the tiny quantities naturally present in some foods.

Also be aware that erythritol shows up in products you might not associate with sugar-free sweeteners, including protein bars, flavored waters, chewable supplements and even some toothpastes and mouthwashes.

If you regularly add erythritol to coffee or homemade foods, or eat packaged products containing it, removing those concentrated sources is the simplest place to start. You're eliminating the trigger studied by the researchers rather than trying to compensate for its downstream effects.

- 2. Don't replace erythritol with another artificial sweetener** — Swapping erythritol for another [artificial sweetener](#) doesn't address the larger problem of relying on highly processed substitutes for sweetness. Instead, retrain your palate by making naturally sweet whole foods your first choice.

Fresh fruit is one of the easiest options. You could have berries, an apple or an orange for dessert, for example. When you want an added sweetener, small amounts of raw honey or maple syrup are other options. Raw honey works well in tea or with grass fed yogurt, while maple syrup adds sweetness to oatmeal and other whole-food meals.

- 3. Choose natural carbohydrates instead of sugar-free processed foods** — Your body needs carbohydrates for energy, so avoiding erythritol doesn't mean avoiding carbs. Whole fruits such as oranges, apples, berries and ripe bananas provide natural sugars along with other nutrients. Sweet potatoes and other root vegetables are additional options.

I generally recommend about 250 grams of healthy carbohydrates per day for most adults, adjusted for your activity level and individual needs. White rice is another useful source, particularly if you don't tolerate large amounts of fiber well. Building

your carbohydrate intake around these foods reduces the need for artificially sweetened products in the first place.

- 4. Choose simpler sweeteners when you make foods at home** — If you still want extra sweetness beyond whole foods, making your own meals and desserts gives you much more control. I favor natural stevia from the plant and Luo Han Guo, also known as monk fruit. Pure dextrose derived from clean cane sugar is another option.

Check the ingredient list even when the front label says "stevia" or "monk fruit," many of these products use erythritol as a bulking agent. Look for a product without erythritol or other unwanted sweetener blends so you're actually making the substitution you intended.

- 5. Retrain your taste buds to need less sweetness** — If nearly every snack, drink or meal tastes intensely sweet, your palate becomes accustomed to that level of sweetness. Instead of focusing only on finding the perfect replacement for erythritol, gradually make your foods and drinks less sweet overall.

Try cutting the amount of sweetener you add to coffee, tea, yogurt or homemade foods in half for one week. Once that tastes normal, cut it in half again. Within a few weeks, you'll notice that fruit, roasted sweet potatoes and other whole foods taste sweeter than they used to. Over time, this helps you break the cycle of constantly seeking intensely sweet flavors, so avoiding erythritol and other processed sweeteners becomes easier rather than feeling restrictive.

This article is for informational purposes only and does not constitute medical advice. Consult a qualified healthcare provider before making changes to your health regimen.

FAQs About Erythritol

Q: What does the research show about erythritol and brain blood vessels?

A: In laboratory testing, erythritol disrupted several functions in human cells that line the brain's smallest blood vessels. It increased oxidative stress, reduced nitric oxide production, increased signals that constrict blood vessels and interfered with the cells' normal clot-clearing response.

Q: Does this study prove that erythritol causes strokes?

A: No. Researchers studied isolated human brain blood vessel cells rather than people, so the findings don't establish that consuming erythritol causes stroke. The study instead identified biological changes that help explain why erythritol's effects on cerebrovascular health deserve further investigation.

Q: How did erythritol affect the cells' ability to regulate blood flow?

A: Erythritol reduced nitric oxide production by about 20% while increasing endothelin-1 production by about 30%. Nitric oxide helps blood vessels relax, while endothelin-1 promotes constriction, so disrupting this balance is unfavorable for healthy blood flow.

Q: What happened to the cells' clot-clearing response after erythritol exposure?

A: When researchers stimulated untreated cells with a clotting signal, they released about 25% more t-PA, a substance involved in breaking down blood clots. Erythritol-treated cells showed virtually no increase, suggesting that erythritol interfered with their ability to activate this protective response when needed.

Q: What are better alternatives if you want to avoid erythritol?

A: Focus first on naturally sweet whole foods, including fruit, and get carbohydrates from foods such as ripe bananas, sweet potatoes, other root vegetables and white rice. For added sweetness, options include small amounts of raw honey or maple syrup, natural stevia, Luo Han Guo, or monk fruit, and pure dextrose derived from clean cane sugar. Check ingredient lists carefully because some stevia and monk fruit products also contain erythritol.

Sources and References

- ^{1, 2} [Journal of Applied Physiology, Volume 138, Issue 6](#)