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# June 2025 **Nutrition News**

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## Dairy-Derived Nutrients May Help Protect Brain Health Through the Gut

Cognitive decline is a growing concern as the U.S. population ages, with nearly 7 million Americans currently living with Alzheimer's disease. While early-life nutrition is known to support brain development—particularly components like the milk fat globule membrane (MFGM)—researchers are now exploring whether similar dairy-derived compounds can help preserve cognitive function later in life.

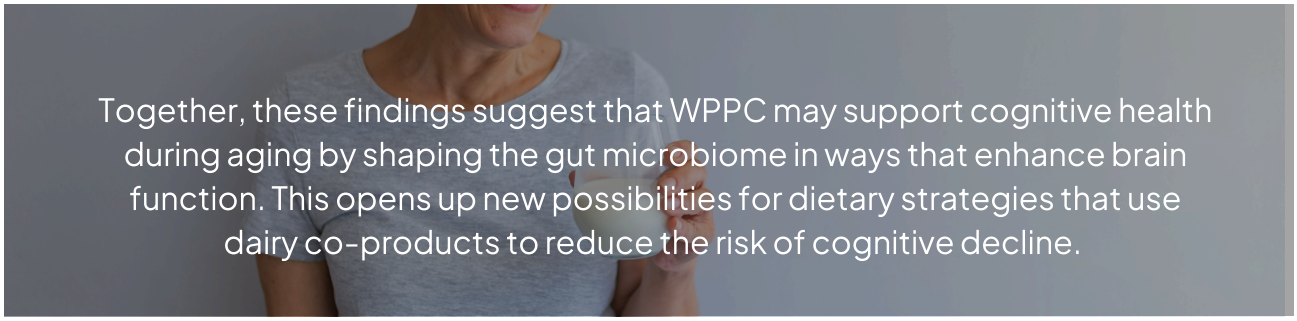
This study focused on whey protein phospholipid concentrate (WPPC), a dairy co-product rich in MFGM glycoconjugates. In earlier research, supplementing the diets of aging rats with WPPC prevented cognitive impairment typically triggered by a high-fat diet. The current study aimed to understand how WPPC might provide this protection by analyzing changes in the gut microbiome.

Aged male Wistar rats were fed either a low-fat diet, a high-fat diet, or a high-fat diet supplemented with 1.6% or 10% WPPC. Gut microbiome analysis revealed that the high-fat diet reduced levels of *Faecalibaculum rodentium*, a beneficial gut bacterium in the Erysipelotrichaceae family. However, WPPC supplementation—particularly at 10%—helped restore *F. rodentium* levels. Notably, this increase was linked to improved memory function, as shown by a positive correlation with hippocampal memory markers.

Further lab tests confirmed that *F. rodentium* thrives on WPPC's unique glycoconjugates. When grown in these conditions, the bacterium upregulated genes involved in amino acid metabolism and fatty acid oxidation—pathways that may support host brain function through the gut-brain axis.

Together, these findings suggest that WPPC may support cognitive health during aging by shaping the gut microbiome in ways that enhance brain function. This opens up new possibilities for dietary strategies that use dairy co-products to reduce the risk of cognitive decline.

Schalich et al. bioRxiv 2025.04.02.646113



## Lactoferrin: A Natural Molecule with Emerging Potential in Cancer Therapy

Lactoferrin, an iron-binding protein found abundantly in milk and other bodily fluids, is gaining attention for its potential role in cancer prevention and treatment. A recent review highlights how this naturally occurring compound could play a meaningful part in future oncology strategies.

Researchers have found that lactoferrin exhibits multiple anti-cancer properties. It can inhibit tumor growth by slowing cell division, trigger programmed cell death in cancer cells, suppress tumor-feeding blood vessels, and modulate the immune system to better recognize and attack tumors. It also appears to reduce the ability of cancer cells to invade surrounding tissues and metastasize.

Evidence spans several cancer types—including breast, colon, liver, lung, glioblastoma, and leukemia—with promising results in both lab studies and animal models. In some cases, lactoferrin also enhances the effectiveness of chemotherapy or immunotherapy, and may help overcome drug resistance.

Beyond its biological activity, lactoferrin is being explored as a delivery vehicle for cancer drugs. Because it can naturally target tumor cells and cross biological barriers like the blood-brain barrier, it has been used in nanoparticle formulations to carry treatments directly to hard-to-reach tumors.

Early clinical trials suggest that lactoferrin is safe and well tolerated, with a few Phase II studies reporting modest improvements in immune markers and survival in cancer patients. However, larger, long-term trials are still needed to confirm its clinical benefits.

Overall, lactoferrin offers a compelling case as a multi-functional molecule in cancer care—working not just as a therapeutic agent, but also as a platform for targeted drug delivery. As research continues, it may become a valuable tool in the next generation of more personalized and less toxic cancer treatments.

Hu et al. Biochim Biophys Acta Rev Cancer. 2025 Jul;1880(3):189330

## Whey Protein Isolate May Offer Brain Cell Protection in Parkinson's Disease Models

Parkinson's disease involves the loss of dopamine-producing neurons in the brain, largely due to oxidative stress—a harmful imbalance caused by excess reactive oxygen species (ROS). This study explored whether whey protein isolate (WPI), known for its high levels of glutamic acid, aspartic acid, and leucine, could help protect these vulnerable neurons.

Researchers used SH-SY5Y cells, a human cell line often used to model dopamine-producing neurons. The cells were exposed to MPP+ (1-methyl-4-phenylpyridinium ), a neurotoxin that mimics the damaging effects seen in Parkinson's disease. When co-treated with WPI at concentrations between 5 and 1000 µg/mL, the cells showed no signs of toxicity. Remarkably, even the lowest dose of WPI (5 µg/mL) significantly reduced ROS levels after 24 hours.

Further analysis revealed that WPI enhanced the expression of antioxidant enzymes HO1 and GPx—both regulated by the Nrf2 pathway, a key cellular defense mechanism. WPI also increased nuclear translocation of Nrf2, confirming activation of this protective pathway.

These findings suggest that WPI can help reduce oxidative stress in dopaminergic-like neurons and may have potential as a neuroprotective strategy in early-stage Parkinson's disease research.

Rungruang et al. Molecules. 2025 May 18;30(10):2207

## Whey Protein May Protect the Heart from Chemical-Induced Damage

Thioacetamide (TAA) is a chemical widely used in research to study liver disease, but it's also known to cause damage to other organs, including the heart. It contributes to oxidative stress, inflammation, and cell death—factors that can lead to serious heart injury. This study explored whether whey protein (WP), known for its rich amino acid profile and health-supporting properties, could protect the heart from TAA-induced damage in rats.

Forty male rats were divided into four groups: control, TAA only, WP only, and a group receiving both WP and TAA. Over three weeks, researchers measured markers of oxidative stress, inflammation, and cell damage in heart tissue. Rats treated with TAA showed significantly reduced antioxidant activity and increased levels of inflammatory and apoptotic markers, including TNF-α, IL-1β, Bax, and caspase-3. Their heart tissue also showed signs of damage and fibrosis.

In contrast, rats that received WP alongside TAA had improved antioxidant enzyme levels, lower inflammation, and reduced signs of heart cell damage. Histological analysis also showed less tissue injury and fibrosis. These results suggest that whey protein may help protect the heart by reducing oxidative stress, inflammation, and cell death caused by toxic exposure—highlighting its potential as a heart-supportive dietary supplement.

Almohawes et al. Front Vet Sci. 2025 May 19;12:1590722.

## Rethinking Lactose: Why Milk's Sugar Deserves a Comeback

A "healthy sugar" might sound like a contradiction—but lactose, the natural sugar in milk, is starting to challenge that idea. Long viewed as a digestive problem for many adults, lactose is gaining attention for its potential benefits to gut health, blood sugar control, and even bone strength.

Lactose evolved as a unique feature of mammalian milk, formed by joining glucose and galactose. This structure allowed milk to carry more energy with less osmotic pressure, while also offering protection from microbial overgrowth by limiting the types of bacteria that could digest it. Though many adults lose the ability to produce lactase, the enzyme needed to digest lactose, research shows most can still tolerate up to 12 grams per day—about one glass of milk—without symptoms. More surprisingly, small, regular doses may help reshape the gut microbiome, encouraging bacteria that digest lactose without causing gas or bloating, and supporting the production of short-chain fatty acids that reduce inflammation and improve gut function.

These prebiotic effects are especially notable in lactose non-persistent (LNP) individuals, but may also benefit those who do produce lactase. Because lactose digests more slowly than simple sugars, it has a glycemic index of just 46—less than half that of glucose—offering better blood sugar control and longer-lasting energy. It also appears to reduce levels of ghrelin, the hunger hormone, which may help support appetite regulation and weight management.

There's evidence lactose may also aid calcium absorption, either by lowering intestinal pH or by shifting the microbiome in ways that enhance mineral uptake—particularly important for aging adults at risk of calcium loss. While results are mixed on whether this effect extends beyond infancy, the potential benefits warrant further investigation.

With the rise of plant-based milks and carb-conscious diets, it's important to recognize that not all sugars are created equal. Unlike added sugars, which can disrupt the gut and spike blood glucose, lactose may actually protect against these effects. For many, especially those with LNP, moderate daily intake could improve tolerance and deliver real nutritional gains. Rather than avoiding lactose altogether, it may be time to welcome it back—with a fresh perspective.

IMGC, 2025 No Need To Sugarcoat It: Lactose Is a Healthy Sugar



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