Fermented Dairy Foods Can Support Gut Health and Reduce Risk of Chronic Diet-Related Diseases

Overview

Fermented dairy foods are not new foods to consumers' diets. They have ancient origins with scientific evidence suggesting that milk products were incorporated into the diet around 10,000-5,000 BC.[1] Fermented dairy foods include yogurt, cheese, kefir and fermented milks and are characterized by a unique matrix of health-promoting nutrients and bioactive compounds. Fermented dairy foods contain live microorganisms and through fermentation, they produce bioactive peptides and lipids, short-chain fatty acids and various enzymes. Through the years, an emerging body of scientific research has linked fermented dairy food consumption with gut health benefits. Including fermented dairy foods in healthy eating patterns throughout the lifespan may not only support a healthy gut and microbiome but also reduce risk of chronic diet-related diseases.

Introduction

The gut (or the gastrointestinal (G.I.) system) includes the mouth, esophagus, stomach, small intestine, large intestine (or colon) and accessory organs such as the liver, gallbladder and pancreas.[2] Parts of the gut, including the stomach, small intestine and colon, contain bacteria, viruses and fungi; these microorganisms are commonly referred to as the gut microbiota. Most of the gut microbiota reside in the colon, with the entire gut housing at least 100 trillion organisms.[3] The microbiota have their own community within the gut and collectively they are part of the broader microbiome.[3] The microbiome refers to the collection of all microorganisms (microbiota) and their genes (genetic instructions) from the microbes living in the gut. These genes help control what the microbes do, including how they digest food or interact with the body. Each day, these microbes play a key role in a person's health and well-being, such as breaking down food and supporting nutrient absorption, synthesizing essential vitamins, providing immune system support and protecting the gut barrier. Gut microbiota and gut health are therefore closely linked and an important part of reducing risk of chronic diet-related diseases.

It turns out that what you eat, along with factors such as your age, genetics, exposure to the environment and lifestyle, can all affect the gut microbiota.[3] An emerging body of scientific evidence demonstrates that consuming fermented dairy foods, like yogurt, kefir and cheeses, as part of a balanced, healthy eating pattern, is a nutrient-dense way to support gut health.[4] Scientific research in the past ten years has revealed new health benefits in this space for infants and adults.

Getting to Know Gut Health: Key Terms and Definitions	
Gut health[3,5]	A term that encompasses the overall health of the G.I. system, its microbiome and the various functions that the gut performs on a day-to-day basis including digestion and absorption, regulation of the immune system, synthesizing vitamins and protecting the gut barrier/ gut lining.
Gut microbiota[3]	The community of tiny living things, like bacteria, viruses and fungi, which live in your digestive system, mostly in your intestines. These microbes help break down food and absorb nutrients, make certain vitamins and keep your gut healthy.
Gut microbiome[3]	The collection of all microorganisms (microbiota) and their genes (genetic instructions) from the microbes living in your gut. These genes help control what the microbes do, like how they digest food or interact with your body.
Microbial richness[3]	The total number of different types of microorganisms present in the gut.
Microbial variance[3]	The variety (total *number* of different types) as well as the abundance (the *amount* of each type) of microorganisms present in the gut.
Short-chain fatty acids (SCFAs)[3]	Metabolites or end products of routine fermentation by microbiota. Acetate, propionate and butyrate are the three main SCFAs commonly described in scientific literature that help support gut and whole-body health.

Defining Fermented Foods

Fermented foods are made with the help of live microorganisms and are found across many global cuisines (e.g. sourdough bread, kimchi, cheese). The International Scientific Association for Probiotics and Prebiotics (ISAPP) published the technical definition of fermented foods, "*Foods that are made through desired microbial growth and enzymatic conversions of food components*".[4] While fermented foods may or may not have live microorganisms within them at the time of purchase at the grocery store, these foods are created as the live microorganisms within them grow, divide, and – in the process – change the nutritional, bioactive and structural properties of a food.[4] For example, leavened breads are baked after fermentation, which kills microorganisms, while fermented dairy foods

(yogurt, kefir and most cheeses as well as fermented dairy products like sour cream) are recognized as fermented foods with live microorganisms present.[4]

Fermented Foods and Probiotics: What is the Difference?

It may surprise you that the terms "fermented" and "probiotic" have different meanings. Some fermented foods may contain live microbes at the end of production, but others may not since additional processing steps like pasteurization can kill live microbes.[4] Fermented foods can also be created by a variety of microorganisms, whereas there are stricter standards for microorganisms within probiotics. While both fermented foods and probiotics have been linked with health benefits, not all fermented foods are considered probiotics.

When a food is labeled as a probiotic, this means that: 1) there are living microorganisms present in a food at the time of purchase at the grocery store, 2) these living microorganisms are present in the food in adequate amounts and 3) that there is scientific evidence from a well-controlled intervention study (like a randomized controlled trial), that links these microorganisms ("probiotics") to a known health benefit.[4] There are thousands of different microorganisms that have been shown to be probiotics, and the specific type of probiotic within a food can vary depending on the food or brand. You can identify the type of probiotic in a food – and therefore the intended health benefit of that probiotic – by reading the ingredient list; sometimes this information is also provided in the nutrition or supplement facts panel.

There are cases where manufacturers add additional probiotic strains to yogurt after the initial fermentation process. These added probiotic strains can increase the variety and number of beneficial bacteria in yogurt. Some common probiotic strains that are added to yogurt after initial fermentation include strains from the *Lactobacillus* species (*Lactobacillus acidophilus*), and from the *Bifidibacterium* species.

Fermented Dairy Foods

Fermented dairy foods are unique from other fermented foods because microorganisms such as lactic acid bacteria ferment lactose, the main sugar specific to dairy milk,[6] as part of the process to create yogurt, kefir and cheeses.[4] Essentially, these bacteria feed on the lactose in dairy during fermentation, resulting in a lower lactose dairy food compared to nonfermented dairy options. Different fermented dairy foods like yogurt or hard cheeses vary in the amount of lactose within that food, depending on the fermentation process and aging time. Everyone tolerates lactose differently, and choosing fermented dairy foods that are lower in lactose or lactose-free can be a strategy to help Americans with lactose intolerance meet their dairy food recommendations with confidence.[7]

If and when probiotic microorganisms are added to fermented dairy foods, these live microorganisms must be provided in adequate amounts to confer a health benefit to the individual.[4] Probiotics from fermented dairy foods can support the gut microbiome because they can survive passage through the acidic environment of the stomach and find a home in the gut.[8] Probiotics can also compete with harmful bacteria and help support the production of immune regulatory cells. Additionally, fermented dairy foods contain a unique profile of bioactive components, produced either directly or indirectly through fermentation, and may include lactic acid, bioactive peptides, exopolysaccharides, bacteriocins, folate, vitamin B12, polar lipids, short-chain fatty acids, gamma-aminobutyric acid and various enzymes.[9,10] Consuming fermented dairy foods as part of a balanced and healthy diet is linked with improved health outcomes,[4,8,11] and research suggests that bioactive components found in fermented dairy foods can contribute to health benefits and support a healthy gut microbiome.[12]

Definitions of Fermented Foods, Probiotics and Probiotic Fermented Foods	
Fermented foods[4]	Foods that are made with the help of live microorganisms and are found across many global cuisines (e.g. sourdough bread, kimchi, cheese). These foods are created as the live microorganisms within them grow, divide, and – in the process – change the nutritional and physical properties of a food. Fermented foods may or may not have live microorganisms within them at the time of purchase at the grocery store. **Examples of fermented dairy foods with live microorganisms**: Yogurt, sour cream, kefir, most cheeses. **Examples of fermented non-dairy foods with live microorganisms**: Miso, tempeh, most kombuchas, and non-heated fermented vegetables. **Examples of fermented foods without live microorganisms**: Bread, wine, most beer, distilled spirits, coffee and chocolate beans (after roasting).
Probiotics[4]	Live microorganisms that, when consumed in adequate amounts, provide a health benefit.
Probiotic fermented foods[4]	For a food to be labeled as a probiotic fermented food, there must be sound scientific evidence from a well-controlled intervention study that the specific probiotic strain provides a health benefit, it is safe, and there are enough of those probiotics in the final product to confer a health benefit. **Example of a probiotic fermented dairy food and how it is labelled**: "Milk fermented by *L. casei*". **Example of a probiotic fermented food and how it is labelled:** "Probiotic sauerkraut, containing *L. plantarum* 299v might improve intestinal well-being".
"Contains probiotics"[4]	A claim commonly used on probiotic fermented food products. It means that the product has been enriched or contains living microorganisms.

Fermented Milk and Kefir

Fermented milk is produced by the fermentation of milk and contains viable, active and abundant microorganisms. Kefir is a type of fermented milk made from kefir grains as a starter culture for fermentation.[13] The regular consumption of kefir is linked with health benefits including support for immune health and improved digestion (e.g., minimizing troubling digestive symptoms such as bloating, occasional constipation and/or diarrhea).[8]

Yogurt

Yogurt is a fermented dairy food with a gel-like consistency and is considered a probiotic when it contains live and active cultures.[14] The most common bacteria found in yogurt are *Streptococcus thermophilus* and *Lactobacillus delbrueckii subsp. Bulgaricus* which can be naturally occurring or intentionally added as a starter culture before fermentation. The European Food Safety Authority (EFSA) notes that yogurts that contain at least 10^8 CFU of live starter microorganisms such as *Lactobacillus delbrueckii subsp. bulgaricus* and *Streptococcus thermophilus* help enhance the digestion of lactose.[15]

Yogurt Qualified Health Claim

A qualified health claim for yogurt was announced on March 1, 2024, by the U.S. Food and Drug Administration (FDA).[17] The claim identifies a potential link between regular yogurt consumption and a reduced risk of type 2 diabetes, stating, "Eating yogurt regularly, at least 2 cups (3 servings per week), may reduce the risk of type 2 diabetes according to limited scientific evidence."[17]

Some manufacturers add specific probiotics that provide health benefits like supporting gut health.[9] Some of the probiotic strains that are commonly added to yogurt, either before or after fermentation, include *Lactobacillus acidophilus*, *Lactoicasebacillus casei* and *Bifidobacterium animalis subsp. Lactis*. Since some yogurts may be pasteurized after fermentation, which kills bacteria, not all yogurts are probiotics. Consuming yogurt is linked with improved G.I. health outcomes, with a recent systematic review reporting findings that yogurt consumption can improve lactose digestion in the gut and overall digestive health.[16] Yogurt consumption has also been consistently linked with benefits for cardiometabolic health, including a lowered risk of cardiovascular disease and type 2 diabetes, and maintaining a healthy weight.[16]

In 2024, a new qualified health claim for yogurt was announced by the Food and Drug Administration (FDA). This claim takes into consideration the evidence on yogurt and diabetes risk.[17]

Cheese

Some examples of fermented cheese include: Parmesan, Cheddar, Feta, Brie, ricotta, blue cheese and Swiss.[10] The different types of cheese are produced by altering the types of bacteria and the aging time. Sour cream is also an example of a fermented dairy product. It is made by culturing cream with lactic acid bacteria which gives it its flavor and thick consistency.[10] In terms of specific gut health benefits, the nutrients and bioactive compounds found in cheese, coupled with beneficial bacteria, may help regulate the inflammatory response and reduce the action of pro-inflammatory proteins.[10]

Research on fermented cheeses is limited, but a recent scientific publication described that consuming fermented dairy foods, including cheeses, may be linked to a decreased risk for inflammation.[18] Another study described that microbiota from cheese may play a role in expanding the human intestinal microbiota following ingestion of dairy products.[19] More research is warranted to better understand the effects of fermented cheeses on gut health in diverse populations.

Yogurt or kefir consumption may help reduce diarrhea severity and duration in young children

Eating yogurt or kefir has been linked with benefits for young infants and toddlers that struggle with diarrhea.[20–24] Five randomized controlled trials show that yogurt or kefir consumption can help reduce diarrhea severity and duration in children ranging from 3-36 months old.[20–24] Studies from Algeria, Iran, Turkey and France found that children receiving yogurt experienced fewer diarrhea episodes, gained more weight, needed less oral rehydration and had improved lactose digestion compared to those receiving milk or standard care.[20–24] Other research shows that *L. bulgarius* and *S. thermophilus* strains consumed as part of fermented yogurt survive transit through the digestive tract of young infants (10-19 months old) and can help support gut health.[25,26] Given that the infant microbiome undergoes rapid changes in composition and variance in the first two years of life, fermented yogurt is a nutrient-dense food that may help shape the changing microbiome and support gut health during this critical period of growth and development.[27]

Fermented dairy foods may help to beneficially shape the gut microbiome in adults

Observational studies in healthy adults suggest that consuming fermented dairy foods like yogurt, cheese and probiotic milk is linked to a healthier gut microbiome.[28–30] Yogurt and cheese consumption were associated with higher levels of *Akkermansia, Bifidobacterium* and short-chain fatty acids that support gut health and metabolic function in males and females between the ages of 19-58 years.[28–30] A large multinational cohort study with 21,561 healthy adults (18-65 yrs.) from the U.K., Italy and U.S. examined long-term dietary habits and found that people who ate omnivorous diets (including dairy, meat and vegetables) had a more diverse gut microbiome compared to vegetarians and vegans. The study also found that diets with dairy foods were linked to certain beneficial microbes like *S. thermophilus* and *Lactobacillus* species which support gut health, digestion and immune function.[31]

Clinical studies suggest that fermented dairy foods including yogurt, cheese, kefir and probiotic fermented milk can support the gut microbiome and gut health more broadly in adults.[32,33] A randomized controlled trial in healthy adults (18-54 years old) demonstrated that plain Greek yogurt consumption for 42 days helped stimulate the growth of health-promoting bacterial strains such as *L. casei* and *L. rhamnosus* in 10 healthy adults.[32] Clinical trials conducted in adults with metabolic syndrome or hyperlipidemia showed benefits of kefir consumption on gut health markers, gut microbiota composition and SCFA levels.[33,34] These results indicate that kefir may help diversify gut microbiota composition and stimulate the production of beneficial SCFAs, which ultimately may play a role in metabolic conditions.[33,34] Other fermented milks, such as probiotic fermented milk, were also tested in a clinical study in healthy adults, with results showing that daily consumption for 17 days stimulated greater relative abundance of *Faecalibacterium*, a type of bacteria that helps produce butyrate, a beneficial SCFA, in the gut.[35] One study tested a probiotic fermented milk (not commercially available) in women with minor G.I. complaints and found that daily consumption for 4 weeks helped to improve overall G.I. well-being (defined as an overall reduction of G.I. symptoms scores).[36]

Diving into the magic of the dairy food matrix

Dairy foods (milk, cheese, yogurt and kefir) each have a different and unique food matrix – including nutrients, bioactives and structural characteristics – that may help explain the health benefits of dairy foods that go beyond individual nutrients and set them apart from other foods.[37–40]

Starting with dairy milk, fermented dairy foods are created through the fermentation activity of live and active cultures. This fermentation process creates and concentrates a unique profile of bioactive components including lactic acid, bioactive peptides and lipids and various enzymes. Consuming fermented dairy foods as part of a balanced and healthy diet is linked with improved health outcomes,[4,8,11] and research suggests that bioactive components found in fermented dairy foods can contribute to the health benefits and support a healthy gut microbiome.[12]

Do you know the 'whole' story on dairy fat?

Science suggests there is room to enjoy whole- and reduced-fat dairy foods as part of health eating patterns. The fat in dairy foods is the most complex of all naturally occurring fats, with dairy milk containing more than 400 types of fatty acids.[38–40] Dairy foods such as milk, yogurt and cheese – regardless of fat content – are linked with beneficial or neutral cardiometabolic and bone health outcomes.[38,39,41,42] The dairy food matrix may play an important role in the association between dairy foods at all fat levels with cardiometabolic health benefits.

Conclusion

The unique food matrix of fermented dairy foods provides a package of beneficial nutrients and bioactives that can be an important part of balanced, healthy eating patterns. Emerging scientific research in the past ten years has linked specific fermented dairy foods such as yogurt, cheese, fermented milk and kefir with benefits for the gut microbiome and markers of overall gut health.[4,43,44] Overall, fermented dairy foods have nutritional benefits that are hard to replace with other foods[50,61,62] and provide a simple and delicious way for consumers to help support gut health.

Translating the Science: Talking Points on Fermented Dairy Foods for Patients and Consumers

Children and adolescents:

- Yogurt is a nutrient powerhouse that helps keep kids healthy. The live and active cultures and essential nutrients help support a balanced gut and healthy immune system.[4,16,45–50]
- Your child's gut health is vital for overall health. The beneficial bacteria and essential nutrients in yogurt are important for proper digestion & immune function.[16,45,46,48–51]

Adults and older adults:

- Yogurt is a simple, yet powerful meal or snack. It's active cultures, protein and nutrients help keep a balanced gut and help maintain overall health.[4,32,45,50,52–55]
- Yogurt's high-quality protein and active cultures help support the gut barrier and may help reduce inflammation in the body.[16,32,50,52,56–60]

References

[1] Fisberg M, Machado R. History of yogurt and current patterns of consumption. Nutr Rev. 2015;73(suppl_1):4-7. doi:10.1093/nutrit/nuv020

[2] National Institute of Diabetes and Digestive and Kidney Diseases website. Access on June 25, 2025 at: https://www.niddk.nih.gov/health-information/digestive-diseases/digestive-system-how-it-works.

[3] Ursell LK, Metcalf JL, Parfrey LW, Knight R. Defining the human microbiome. Nutr Rev. 2012;70 Suppl 1(Suppl 1):S38-44. doi:10.1111/j.1753-4887.2012.00493.x

[4] Marco ML, Sanders ME, Gänzle M, et al. The International Scientific Association for Probiotics and Prebiotics (ISAPP) consensus statement on fermented foods. Nat Rev Gastroenterol Hepatol. 2021;18(3):196-208. doi:10.1038/s41575-020-00390-5.

[5] Van Hul M, Cani PD, Petitfils C, De Vos WM, Tilg H, El-Omar EM. What defines a healthy gut microbiome?. Gut. 2024;73(11):1893-1908. Published 2024 Oct 7. doi:10.1136/gutjnl-2024-333378.

[6] National Institute of Diabetes and Digestive and Kidney Diseases website. Access on July 9, 2025. https://www.niddk.nih.gov/health-information/digestive-diseases/lactose-intolerance/definition-facts.

[7] Li A, Zheng J, Han X, et al. Advances in Low-Lactose/Lactose-Free Dairy Products and Their Production. Foods. 2023;12(13). doi:10.3390/foods12132553

[8] Garcia-Burgos M, Moreno-Fernandez J, Alferez M.J., Diaz-Castro J L-AI. New perspectives in fermented dairy products and their health relevance. J Funct Foods. 2020;72:104059.

[9] Abdul Hakim BN, Xuan NJ, Oslan SNH. A Comprehensive Review of Bioactive Compounds from Lactic Acid Bacteria: Potential Functions as Functional Food in Dietetics and the Food Industry. Foods (Basel, Switzerland). 2023;12(15). doi:10.3390/foods12152850.

[10] Furse S, Torres AG, Koulman A. Fermentation of Milk into Yoghurt and Cheese Leads to Contrasting Lipid and Glyceride Profiles. Nutrients. 2019;11(9). doi:10.3390/nu11092178.

[11] Kok CR, Hutkins R. Yogurt and other fermented foods as sources of health-promoting bacteria. Nutr Rev. 2018;76(Suppl 1):4-15. doi:10.1093/nutrit/nuy056.

[12] Abdul Hakim BN, Xuan NJ, Oslan SNH. A Comprehensive Review of Bioactive Compounds from Lactic Acid Bacteria: Potential Functions as Functional Food in Dietetics and the Food Industry. Foods. 2023;12(15). doi:10.3390/foods12152850

[13] Garcia-Burgos M, Moreno-Fernandez J, Alferez M.J., Diaz-Castro J LAI. New perspectives in fermented dairy products and their health relevance. J Funct Foods. 2020;72:104059.

[14] Hadjimbei E, Botsaris G, Chrysostomou S. Beneficial Effects of Yoghurts and Probiotic Fermented Milks and Their Functional Food Potential. Foods. 2022;11(17). doi:10.3390/foods11172691

[15] European Food Safety Authority (EFSA). Scientific opinion on the substantiation of health claims related to live yoghurt cultures and improved lactose digestion (ID 1143, 2976), pursuant to Article 13 (1) of Regulation (EC) NO 1924/2006. EFSA Journal 2010;8(10):1763.https://doi.org/10.2903/j.efsa.2010.1763.

[16] Savaiano DA, Hutkins RW. Yogurt, cultured fermented milk, and health: a systematic review. Nutr Rev. 2020;0(0):1-16. doi:10.1093/nutrit/nuaa013.

[17] U.S. Food & Drug Administration. FDA Announces Qualified Health Claim for Yogurt and Reduced Risk of Type 2 Diabetes. March 1, 2024. https://www.fda.gov/food/cfsan-constituent-updates/fda-announces-qualified-health-claim-yogurt-and-reduced-risk-type-2-diabetes.

[18] Hess JM, Stephensen CB, Kratz M, Bolling BW. Exploring the Links between Diet and Inflammation: Dairy Foods as Case Studies. Adv Nutr. 2021;12(Suppl 1):1S-13S. doi:10.1093/advances/nmab108.

[19] Milani C, et al. Functional modulation of the human gut microbiome by bacteria vehicled by cheese Appl Environ Microbiol 2025; 91(3): e0018025.doi: 10.1128/aem.00180-25.

[20] Boudraa G, Touhami M, Pochart P, Soltana R, Mary JY, Desjeux JF. Effect of feeding yogurt versus milk in children with persistent diarrhea. J Pediatr Gastroenterol Nutr. 1990;11(4):509-512. doi:10.1097/00005176-199011000-00011

[21] Pashapour N, Iou SG. Evaluation of yogurt effect on acute diarrhea in 6-24-month-old hospitalized infants. Turk J Pediatr. 2006;48(2):115-118.

[22] Eren M, Dinleyici EC, Vandenplas Y. Clinical efficacy comparison of Saccharomyces boulardii and yogurt fluid in acute non-bloody diarrhea in children: a randomized, controlled, open label study. Am J Trop Med Hyg. 2010;82(3):488-491. doi:10.4269/ajtmh.2010.09-0529

[23] Pedone CA, Bernabeu AO, Postaire ER, Bouley CF, Reinert P. The effect of supplementation with milk fermented by Lactobacillus casei (strain DN-114 001) on acute diarrhoea in children attending day care centres. Int J Clin Pract. 1999;53(3):179-184.

[24] Dewit O, Boudraa G, Touhami M, Desjeux JF. Breath hydrogen test and stools characteristics after ingestion of milk and yogurt in malnourished children with chronic diarrhoea and lactase deficiency. J Trop Pediatr. 1987;33(4):177-180. doi:10.1093/tropej/33.4.177

[25] Guerin-Danan C, Chabanet C, Pedone C, et al. Milk fermented with yogurt cultures and Lactobacillus casei compared with yogurt and gelled milk: influence on intestinal microflora in healthy infants. Am J Clin Nutr. 1998;67(1):111-117. doi:10.1093/ajcn/67.1.111.

[26] Martino DJ, Currie H, Taylor A, Conway P, Prescott SL. Relationship between early intestinal colonization, mucosal immunoglobulin A production and systemic immune development. Clin Exp allergy J Br Soc Allergy Clin Immunol. 2008;38(1):69-78. doi:10.1111/j.1365-2222.2007.02856.

[27] Derrien M, Alvarez-A-S, de Vos W.M. The Gut Microbiota in the First Decade of Life. Trends in Microbiology 2019; 27(12): 997-1010.

[28] González S, Fernández-Navarro T, Arboleya S, de Los Reyes-Gavilán CG, Salazar N, Gueimonde M. Fermented Dairy Foods: Impact on Intestinal Microbiota and Health-Linked Biomarkers. Front Microbiol. 2019;10:1046. doi:10.3389/fmicb.2019.01046.

[29] Redondo-Useros N, Gheorghe A, Díaz-Prieto LE, Villavisencio B, Marcos A, Nova E. Associations of Probiotic Fermented Milk (PFM) and Yogurt Consumption with Bifidobacterium and Lactobacillus Components of the Gut Microbiota in Healthy Adults. Nutrients. 2019;11(3). doi:10.3390/nu11030651.

[30] Suzuki Y, Ikeda K, Sakuma K, et al. Association between Yogurt Consumption and Intestinal Microbiota in Healthy Young Adults Differs by Host Gender. Front Microbiol. 2017;8:847. doi:10.3389/fmicb.2017.00847.

[31] Fackelmann G, Manghi P, Carlino N, et al. Gut microbiome signatures of vegan, vegetarian and omnivore diets and associated health outcomes across 21,561 individuals. Nat Microbiol. 2025;10(1):41-52. doi:10.1038/s41564-024-01870-z.

[32] Lisko DJ, Johnston GP, Johnston CG. Effects of Dietary Yogurt on the Healthy Human Gastrointestinal (GI) Microbiome. Microorganisms. 2017;5(1). doi:10.3390/microorganisms5010006.

[33] Bellikci-Koyu E, Sarer-Yurekli BP, Akyon Y, et al. Effects of Regular Kefir Consumption on Gut Microbiota in Patients with Metabolic Syndrome: A Parallel-Group, Randomized, Controlled Study. Nutrients. 2019;11(9). doi:10.3390/nu11092089.

[34] St-Onge M-P, Farnworth ER, Savard T, Chabot D, Mafu A, Jones PJH. Kefir consumption does not alter plasma lipid levels or cholesterol fractional synthesis rates relative to milk in hyperlipidemic men: a randomized controlled trial [ISRCTN10820810]. BMC Complement Altern Med. 2002;2:1. doi:10.1186/1472-6882-2-1.

[35] Ejima R, Mishima R, Sen A, et al. The Impact of Fermented Milk Products Containing Bifidobacterium longum BB536 on the Gut Environment: A Randomized Double-Blind Placebo-Controlled Trial. Nutrients. 2024;16(21). doi:10.3390/nu16213580.

[36] Marteau P, Guyonnet D, Lafaye de Micheaux P, Gelu S. A randomized, double-blind, controlled study and pooled analysis of two identical trials of fermented milk containing probiotic Bifidobacterium lactis CNCM I-2494 in healthy women reporting minor digestive symptoms. Neurogastroenterol Motil. 2013;25(4):331-e252. doi:10.1111/nmo.12078.

[37] Cifelli C. Looking beyond traditional nutrients: the role of bioactives and the food matrix on health, Nutrition Reviews, Volume 79, Issue Supplement_2, December 2021, Pages 1–3, https://doi.org/10.1093/nutrit/nuab100.

[38] Taormina VM, Unger AL, Kraft J. Full-fat dairy products and cardiometabolic health outcomes: Does the dairy-fat matrix matter? Front Nutr. 2024;11:1386257.

[39] Comerford KB, Unger AL, Cifelli CJ, Feeney E, Rowe S, Weaver C, Brown K. Decrypting the messages in the matrix: The proceedings of a symposium on dairy food matrix science and public health opportunities. Crit Rev Food Sci Nutr. 2025 Mar 3:1-14. doi: 10.1080/10408398.2025.2460606.

[40] Unger AL, Astrup A, Feeney EL, et al. Harnessing the Magic of the Dairy Matrix for Next-Level Health Solutions: A Summary of a Symposium Presented at Nutrition 2022. Curr Dev Nutr. 2023;7(7):100105. Published 2023 Jun 1. doi:10.1016/j.cdnut.2023.100105.

[41] Drouin-Chartier J-P, Brassard D, Tessier-Grenier M, et al. Systematic Review of the Association between Dairy Product Consumption and Risk of Cardiovascular-Related Clinical Outcomes. Adv Nutr. 2016;7(6):1026-1040. doi:10.3945/an.115.011403.

[42] Fontecha J, Calvo MV, Juarez M, Gil A, Martínez-Vizcaino V. Milk and dairy product consumption and cardiovascular diseases: An overview of systematic reviews and meta-analyses. Advances in Nutrition; 2019;10:S164–89.

[43] Leeuwendaal NK, Stanton C, O'Toole PW, Beresford TP. Fermented Foods, Health and the Gut Microbiome. Nutrients. 2022;14(7). doi:10.3390/nu14071527.

[44] Badal VD, Vaccariello ED, Murray ER, et al. The Gut Microbiome, Aging, and Longevity: A Systematic Review. Nutrients. 2020;12(12). doi:10.3390/nu12123759.

[45] Hadjimbei E, Botsaris G, Chrysostomou S. Beneficial Effects of Yoghurts and Probiotic Fermented Milks and Their Functional Food Potential. Foods (Basel, Switzerland). 2022;11(17). doi:10.3390/foods11172691.

[46] Donovan S.M., Rao G. Health benefits of yogurt among infants and toddlers aged 4 to 24 months: a systematic review. Nutrition Reviews 2019; 77(7): 478-486.

[47] Powerhouse. (n.d.). Merriam Web Dictionary. Retrieved May 14, 2025, from https:www.merriam-webster.com/dictionary/powerhouse.

[48] Calder PC, Carr AC, Gombart AF, Eggersdorfer M. Optimal Nutritional Status for a Well-Functioning Immune System Is an Important Factor to Protect against Viral Infections. Nutrients. 2020 Apr 23;12(4):1181. doi: 10.3390/nu12041181. PMID: 32340216; PMCID: PMC7230749.

[49] Federal Register. Food Labeling: Nutrient Content Claims; Definition of Term Healthy. https://www.federalregister.gov/documents/2024/12/27/2024-29957/food-labeling-nutrient-content-claims-definition-of-term-healthy.

[50] USDA. FoodData Central. https://fdc.nal.usda.gov/index.html. FDC ID: Yogurt, vanilla, low fat: 170888.

[51] Guarner F, et al. Should yogurt be considered probiotic? Br J Nutr 2005; 93(6): 783-6. doi: 10.1079/bjn20051428.

[52] U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary guidelines for Americans, 2020-2025. 9th Edition. Accessed January 18, 2022. https://www.dietaryguidelines.gov/

[53] Simple. Merriam Web Dictionary. Retrieved May 15, 2025 from https:www.merriam-webster.com/dictionary/simple.

[54] Powerful. Merriam Web Dictionary. Retrieved May 15, 2025 from https: https://www.merriam-webster.com/dictionary/powerful.

[55] Hess JM, Jonnalagadda SS, Slavin JL. What is a snack, why do we snack, and how can we choose better snacks? A review of the definitions of snacking, motivations to snack, contributions to dietary intake, and recommendations for improvement. Advances in Nutrition. 2016;7(3):466-475. doi:10.3945/an.115.00957.

[56] Tome D. Criteria and markers for protein quality assessment - a review. Br J Nutr. 2012 Aug;108 Suppl 2:S222-9. doi: 10.1017/S0007114512002565.

[57] Fernandez M.A., Marette A. Potential Health Benefits of Combining Yogurt and Fruits Based on Their Probiotic and Prebiotic Properties. Adv Nutr 2017; 8(1): 155S-164S. doi: 10.3945/an.115.011114.

[58] Byrd, D.A., et al., Development and Validation of Novel Dietary and Lifestyle Inflammation Scores. J Nutr, 2019. 149(12): p. 2206-2218.

[59] Bordoni, A., et al., Dairy products and inflammation: A review of the clinical evidence. Crit Rev Food Sci Nutr, 2017. 57(12): p. 2497-2525.

[60] Ulven SM, Holven KB, Gil A, Rangel-Huerta OD. Milk and Dairy Product Consumption and Inflammatory Biomarkers: An Updated Systematic Review of Randomized Clinical Trials. Adv Nutr. 2019;10(suppl_2):S239-S250. doi:10.1093/advances/nmy072.

[61] USDA. FoodData Central. https://fdc.nal.usda.gov/index.html. FDC IDs: Cheddar: 1098009; Colby: 173416.

[62] Cifelli CJ, Auestad N, Fulgoni VL. Replacing the nutrients in dairy foods with non-dairy foods will increase cost, energy intake and require large amounts of food: National Health and Nutrition Examination Survey 2011-2014. Public Health Nutr. 2022 Feb;25(2):332-343. doi: 10.1017/S1368980020001937. Epub 2020 Jul 27. PMID: 32713399; PMCID: PMC8883599.