

Go With Your Gut

Feeding the Good Bacteria in Your Digestive Tract

NUTRITION CONNECTION



Discover what gut health is all about and how to translate these concepts in the kitchen

If you asked someone about gut health 30 years ago, you might have gotten a response about eating yogurt, or perhaps an anecdote about digestive issues after a round of antibiotics. While both of these are still relevant, the research around the microbiome has expanded rapidly in recent years. Discover what gut health is all about and how to translate these concepts in the kitchen.

WHAT IS THE MICROBIOME?

The human microbiome is a collection of bacteria, viruses, and other microorganisms that live throughout the body. You'll find them in places like the digestive tract, skin, and mouth. A healthy adult body contains many different species of bacteria.

THE GUT MICROBIOME AND YOUR DIET

The gut microbiome refers to the bacteria localized in the digestive tract, particularly the large intestine. Research shows this diverse array of bacteria may play a role in various aspects of human health, from immunity to weight management to mental health.

The foods you eat impact the type, amount, and activity of these bacteria – and as such, potentially play a role in these various health conditions.

For example, certain foods you eat are indigestible via human enzymes, but partially digestible by gut bacteria. When bacteria break these foods down, different compounds



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are released into the body. Scientists still don't understand all the ways this impacts health yet, but are starting to uncover connections.

One well-researched example is soluble fiber, found in foods like oats, apples, and beans. Gut bacteria partially ferment soluble fiber, and when this occurs, short chain fatty acids are produced. The intestines use these short chain fatty acids as an energy source, and they're also involved in immune system regulation.

Another interesting example is the digestion of xyloglucans, a component found in vegetables like lettuce and onions. Your human enzymes don't break this down, but certain species of the bacterial phyla *Bacteroides* are able to do so. Since 92 percent of humans have these species in their digestive tract, researchers believe this process must be beneficial to the body, and that xyloglucans may play a role in energy acquisition.

On the flip side, when you're eating less-healthy foods—like a high fat diet without much fiber-rich produce—the levels of good bacteria and their byproducts can decrease. This may negatively impact health.

AGING AND GUT HEALTH

No matter what area of food service you work in, gut health is universally important. For

patients in long-term care, though, it may be particularly significant to consider the relationship between diet, health, and gut bacteria.

The microbiota undergoes the largest changes in life as an infant and as an elderly adult—two times when the immune system is noticeably weaker. It's still unclear if the shifts in gut health with aging are the cause of certain health-related issues, or the consequence of such.

We do know that multiple prescriptions (especially antibiotics) are often a concern in older adults, and these can lead to changes in gut flora. Similarly, changes in diet and dentition may reduce fiber intake. Certain types of fiber are key for “feeding” these bacteria, so that can alter their composition and activity.

Indeed, research shows levels of healthy gut bacteria are typically reduced among older adults, while levels of potentially harmful bacteria tend to increase. The activity of healthy bacteria is also lower, with reduced levels of short chain fatty acids (a byproduct of bacterial action on certain carbohydrates) found in elderly patients.

These changes may be associated with increased inflammation, frailty, cognitive issues, and risk of certain chronic diseases. However, these have not been

definitively linked to gut health yet.

Gut bacteria is certainly involved in regulating health; scientists are just unsure of the exact mechanisms and links. Optimizing gut health for your clients may not have immediate identifiable benefits, but is wise to consider as part of their holistic wellness.

IN THE KITCHEN: HOW CDM'S CAN HELP

Trying to translate microbiome research to practical recommendations in the kitchen can seem a little overwhelming! After all, every person is very individualized as far as their microbiome, and different foods may affect people in different ways.

That said, there are still simple steps you can implement when menu planning (many of which you probably already do) in order to help clients optimize gut health:

1. Offer many high fiber foods.

While not all types of fiber “feed” gut bacteria, some do—and all types are important for overall health.

Most adults need around 14 grams of fiber per 1,000 calories consumed. Of course, these guidelines are for healthy adults, and an RD may

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recommend different amounts of fiber for patients with certain medical conditions.

In general, most adults fall short of their fiber needs and this tends to be even more pronounced in the elderly community. Reduced appetite and dentition issues lead to fewer high fiber choices.

Getting enough fiber will feed the beneficial gut bacteria, improve regularity, and promote heart health.

2. Include foods that are known to be prebiotics.

Prebiotics are the foods (like soluble fiber) that feed the good bacteria in our gut. They are partially fermented by the bacteria, helping those colonies to grow and thrive.

Prebiotics include complex carbohydrates like inulin and oligosaccharides, among others. Here are some examples of prebiotic-rich foods that you might include regularly on your menu:

- Almonds
- Apples
- Asparagus
- Bananas
- Garlic
- Greens (especially dandelion greens)
- Oats
- Onions
- Sunchokes
- Sweet potatoes

3. Consider resistant starch.

Resistant starch is a type of carbohydrate that “resists” digestion in the small intestine—and as such, may be beneficial for gut health when it reaches bacteria in the large intestine.

It’s naturally present in certain foods, like greener bananas. However, it can also be formed when foods like pasta, rice, and potatoes are cooked then cooled prior to eating. The cooling process leads to chemical changes in some of the starch that gives it the resistance to digestion.

This sounds a little unappetizing—who would want to eat cold food?!—but there are palatable ways to test this out. For example, a cold potato salad or cold pasta salad is a great way of incorporating resistant starch on a menu.

You can also still reap the benefits of resistant starch if you have extra pasta, potatoes, or rice that you are chilling to reheat the next day. Remember that these need to be cooled and reheated properly according to time and temperature guidelines for food safety.

4. Mix in foods that are natural sources of probiotics.

You know that prebiotics feed the good bacteria—so what are probiotics? Probiotics are actual strains of bacteria that you can consume through foods or supplements.

The theory behind probiotics is that you can increase the levels of certain healthy bacteria in the gut. This may be particularly helpful during certain time frames, like after a round of antibiotics or following an extreme dietary change.

Certain probiotic strains—like *lactobacilli* and *bifidobacteria*—have been shown to improve the diversity and activity of gut health in the elderly. Limited research has also connected these to a reduced incidence of certain gastrointestinal issues, like *C-difficile* associated diarrhea and other gastrointestinal infections.

A doctor or dietitian might recommend specific probiotic supplements as relevant to a patient’s medical condition.

As a CDM, you might offer a food with probiotics on the menu a few times a week to support general gut health. While the research on whole foods is far more limited than that on specific probiotic strains, there is the possibility they could help support gut health.

Some foods are easier to incorporate than others, depending on your clientele. Here are a few examples:

Yogurt

Yogurt is probably the most well-known of all probiotic foods, as evidenced by the “contains live cultures” statement on the label.

All yogurts are made with bacteria, specifically *Lactobacillus bulgaricus* and *Streptococcus thermophilus*. Some manufacturers may heat treat their yogurt after fermenting in order to extend shelf life, and this kills off the live cultures—but this is not common practice. You can double-check the label on the yogurt to ensure that it contains live cultures.

Some yogurts contain additional probiotic strains of bacteria that are particularly beneficial for gut health. For example, in one study, eating yogurt enhanced with additional probiotic strains was associated with reduced upper respiratory infections in older adults.

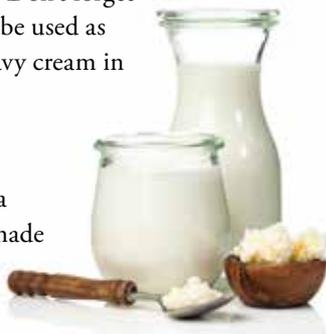


In addition to their benefits on gut health, dairy products like yogurt can be a good source of protein and calcium for older adults.

Yogurt is likely the easiest food on this list to incorporate regularly on your menu. It's relatively inexpensive, and great for snacks or as part of breakfast. Don't forget that plain Greek yogurt can also be used as a substitute for sour cream or heavy cream in savory dips and sauces.

Kefir

Kefir is like yogurt's cousin. It's a fermented dairy beverage that's made with both bacteria (commonly *Lactobacilli*) and yeast.



Certain *Lactobacillus* strains in kefir may help the body by inhibiting the growth or activity of other harmful bacteria. These strains may also benefit the immune system. One study found that kefir helped reduce bloating and improve a subjective measure of "feeling good" among those with Crohn's Disease—though more research is needed to confirm these findings. Kefir can be consumed as a standalone beverage, or can be mixed into smoothies or cooked oatmeal.

Tempeh

This fermented soybean product has a bit of an umami element to it. You'll find it in a firm patty that can be cooked in a variety of dishes. Research suggests that eating fermented soy can increase the levels of good bacteria and reduce pathogenic bacteria in the gut, supporting overall health.



You can use tempeh in a vegetarian sandwich, serve it on top of a salad, or use it in a stir fry. Note that since tempeh is generally cooked, though, you do lose some of the probiotics from heat.

Sauerkraut

You're probably familiar with a sauerkraut-topped hot dog—the fermented cabbage offers a tangy kick to the classic ball-game treat.

Sauerkraut is traditionally fermented with lactic acid bacteria. Though there is little research on the specific



impact of sauerkraut and human health, it's plausible that the bacterial strains may help the gut.

You can go traditional by adding sauerkraut on the menu with a sausage, but think outside the box for other unique ways to use it. Try adding it to a hearty stew (aim to add it after cooking the stew, so as not to kill too many of the probiotic cultures with heat), or try using it in a salad.

Kimchi

Give your food an extra kick with this spicy Korean dish, traditionally made from fermented cabbage and seasonings. Several types of bacteria may be used in the production of kimchi, and research suggests some of these may play a role in immunity and healthy aging.

While this may seem out of the box for current patients, keep in mind that as the United States continues to expand in diversity, and as current generations age into long-term care, there will be more opportunities and demand for incorporating ethnic foods.

In addition to the live bacterial cultures, kimchi also contains many vitamins, minerals, and phytochemicals that can benefit health.

You can try making healthy fried rice dishes that incorporate kimchi, mixing it into an Asian noodle bowl, or adding it to eggs for breakfast.



Olives

Table olives are traditionally fermented, meaning that they pack a probiotic punch in addition to their healthy fats and antioxidants.



Try serving fermented olives in a Greek chicken dish, in a Tuscan spaghetti, or just as a fun snack.

Other Fermented Vegetables

Many shelf-stable pickles are made by pouring hot vinegar over cucumbers and adding spices. While delicious, these are not fermented—and therefore don't offer the probiotic benefits.

Traditional fermented vegetables are made by packing the vegetables in salty water, and letting bacteria work its magic, fermenting some of the carbohydrate in the food. This is where

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IF YOU'RE LOOKING TO PURCHASE

fermented vegetables (whether pickles or other vegetables, like beets or cauliflower), buy them from a reputable manufacturer that uses a traditional brine.

the tangy, acidic flavor comes from—the byproducts of that fermentation. It's also what naturally preserves the food.

If you're looking to purchase fermented vegetables (whether pickles or other vegetables, like beets or cauliflower), aim to buy them from a reputable manufacturer that you know uses a traditional brine.

Pickled vegetables can be mixed into salads or simply eaten as a snack.

Important Considerations for Fermented Vegetables

If you do include fermented vegetables (including sauerkraut, kimchi, olives, and pickled vegetables) on your menu, be aware of these two important considerations:

- If you have a lot of clients on a low sodium diet, keep in mind that fermented vegetables tend to have a high sodium content (thanks to the salt in the brine). Remember that you can easily incorporate other probiotics, like fermented dairy, into the diet. In addition, small amounts of fermented vegetables can likely be used if the remainder of the day includes lower sodium foods.
- Patients on monoamine oxidase inhibitors (MAOIs) may need to avoid certain fermented vegetables due to the high tyramine content.

FINAL TIP

Remember that this is still an area of new research. Studies may emerge in the future that change or refine these recommendations, particularly related to probiotic foods. You don't need to incorporate every tip to promote patient wellness; work on the areas that are most relevant to your clientele. **E**

REFERENCES

- Cuesta-Triana F, Verdejo-Bravo C, Fernández-Pérez C, Martín-Sánchez FJ. Effect of Milk and Other Dairy Products on the Risk of Frailty, Sarcopenia, and Cognitive Performance Decline in the Elderly: A Systematic Review. *Adv Nutr.* 2019 May 1;10(suppl_2):S105-S119. <https://www.ncbi.nlm.nih.gov/pubmed/31089731>
- Huang H, Krishnan HB, Pham Q, Yu LL, Wang TT. Soy and Gut Microbiota: Interaction and Implication for Human Health. *J Agric Food Chem.* 2016 Nov 23;64(46):8695-8709. <https://www.ncbi.nlm.nih.gov/pubmed/27798832>
- Larsbrink J, Rogers TE, Hemsworth GR, et al. A discrete genetic locus confers xyloglucan metabolism in select human gut Bacteroidetes. *Nature.* 2014;506(7489):498-502. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC24463512/>
- Nagpal R, Mainali R, Ahmadi S, et al. Gut microbiome and aging: Physiological and mechanistic insights. *Nutr Healthy Aging.* 2018;4(4):267-285. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6004897/>
- Patra JK, Das G, Paramithiotis S, Shin HS. Kimchi and Other Widely Consumed Traditional Fermented Foods of Korea: A Review. *Front Microbiol.* 2016;7:1493. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5039233/>
- Pu F, Guo Y, Li M, et al. Yogurt supplemented with probiotics can protect the healthy elderly from respiratory infections: A randomized controlled open-label trial. *Clin Interv Aging.* 2017;12:1223-1231. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5557113/>
- Raak C, Ostermann T, Boehm K, Molsberger F. Regular consumption of sauerkraut and its effect on human health: a bibliometric analysis. *Glob Adv Health Med.* 2014;3(6):12-18. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4268643/>
- Shreiner AB, Kao JY, Young VB. The gut microbiome in health and in disease. *Curr Opin Gastroenterol.* 2015;31(1):69-75. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4290017/>
- Slattery C, Cotter PD, O'Toole PW. Analysis of Health Benefits Conferred by Lactobacillus Species from Kefir. *Nutrients.* 2019;11(6):1252. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6627492/>
- Yilmaz İ, Dolar ME, Özpınar H. Effect of administering kefir on the changes in fecal microbiota and symptoms of inflammatory bowel disease: A randomized controlled trial. *Turk J Gastroenterol.* 2019;30(3):242-253. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6428516/>

CE Questions | NUTRITION CONNECTION



This Level III article assumes that the participant has thorough knowledge of the topic. The desired outcome is to integrate analysis and application of knowledge, incorporating continuous quality improvement into best practice.

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- Where are most of the gut bacteria located that are thought to impact human health?
 - Esophagus
 - Stomach
 - Large intestine
- When you eat soluble fiber, gut bacteria partially ferment it into what byproduct (which acts as an energy source for intestinal cells)?
 - Medium chain triglycerides
 - Short chain fatty acids
 - Protein
- Which of the following situations may decrease an elderly patient's gut flora, or alter the activity of the gut bacteria?
 - Multiple prescriptions
 - Reduced fiber intake
 - Both A and B
- For every 1,000 calories consumed, how many grams of fiber do most healthy adults need?
 - 14 grams
 - 7 grams
 - 21 grams
- What is the name for a food that “feeds” the good bacteria in our gut?
 - Prebiotic
 - Probiotic
 - Short chain fatty acid
- What is the name for a food that provides live bacterial cultures in the product?
 - Prebiotic
 - Probiotic
 - Short chain fatty acid
- Which of the following may be a concern with serving fermented vegetables in a clinical setting?
 - Too many calories
 - High in fat
 - High in sodium

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