Low Microbial Diet

What Does the Term “Low Microbial” Mean?

Microbes are tiny living organisms, such as bacteria and fungi, which can be found in foods and liquids. In most processed (canned/cooked) foods, microbes have been eliminated, reducing the risk of food-borne illness. These “low microbial” foods are safer to eat than raw, fresh, or unprocessed foods (untreated fresh fruits/vegetables and raw or undercooked meats). Unprocessed foods – if not handled properly – have a greater potential for causing infection and illness.

Why Do I Need to Follow a Low Microbial Diet?

Cancer treatment with high-dose chemotherapy, radiation therapy, and/or bone marrow or cellular transplant can destroy cells that your body needs to fight infection. As a result, you are more susceptible to food-borne illness, especially while you have a low neutrophil count (part of your White Blood cell count), which is also known as neutropenia (e.g. low neutrophil/White Blood Cell count). Following such treatments, your counts will recover and, although your ability to fight infection is improved, you must continue to handle fresh foods carefully to prevent food borne illness.

How Long Do I Need to Follow a Low Microbial Diet?

For patients having chemotherapy or radiation

Generally speaking, you will need to follow the diet until your treatment is finished and you are no longer “neutropenic”. Your absolute neutrophil count (ANC) indicates your body’s ability to fight infection. Your medical team will monitor your ANC closely. Your risk for infection is greater if your ANC is less than 500 per uL of blood (0.5K/uL on your lab results). When your ANC is greater than 0.5 you are no longer considered to be “neutropenic”. Please note your medical team may want you to continue this diet - even if you are no longer neutropenic - if you are expected to have more chemotherapy/radiation in a short period of time.

For patients having bone marrow or cellular transplants

If you have had an autologous stem cell transplant: You must remain on this diet until day 100 which is about 3 months after your Day Zero (the day of transplant) and you are no longer neutropenic (ANC is over 0.5uL).
For patients who have had an allogeneic stem cell transplant or cord blood transplant
You should continue this diet until you have completed immunosuppressive therapy. Your medical team will also consider if:

- you are at least **6 months past Day Zero** of your allogeneic or cord blood transplant
- you are on a tapering schedule of tacrolimus, your therapeutic levels for tacrolimus are no longer being monitored, **OR** you have been on low-dose steroids* for **the past 30 days**. (* such as methyl prednisone dose of less than 0.1 milligram per kilogram of body weight per day)
- you have not received any other systemic agents to control Graft vs Host Disease (GvHD) such as rituximab, infliximab, ruxolitinib, tocilizumab) **within past 6 months**

If you have had a CAR T cell transplant: You need to follow the diet until day 28, you are no longer neutropenic, and you are no longer need growth factor shots.

Please note: You may need to continue or restart a low microbial diet if you are readmitted to the hospital for illness, have a flare-up of GvHD, or if it is in your best interest according to your doctor’s judgement.

**Day Zero is the Day You Had Your Transplant**

What Foods and Beverages are Safe to Eat on a Low Microbial Diet?

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Recommended Foods</th>
<th>Foods Not Recommended</th>
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</thead>
<tbody>
<tr>
<td>Dairy</td>
<td>Pasteurized milk, yogurt, eggnog, and other milk products</td>
<td>Unpasteurized or raw milk, cheese, yogurt, and other milk products</td>
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<tr>
<td></td>
<td>Commercially packaged cheese and cheese products made with pasteurized milk (mild and medium cheddar, Swiss mozzarella, parmesan, and processed cheese slices and spreads, cream cheese, cottage cheese, and ricotta cheese)</td>
<td>Cheeses with:</td>
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<td></td>
<td>Dry, refrigerated, or frozen pasteurized whipped topping, ice cream, frozen yogurt, sherbet, ice cream bars, homemade milkshakes Commercial medical nutrition supplements (liquid and powdered)</td>
<td>• chili peppers or other uncooked vegetables • molds such as blue, Stilton, Roquefort, and gorgonzola</td>
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<td>Mexican-style soft cheeses, such as queso blanco, queso fresco, and Panela</td>
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<td>Ice cream, milkshakes, or frozen drinks dispensed out of machines</td>
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<tr>
<td>Food Group</td>
<td>Recommended Foods</td>
<td>Foods Not Recommended</td>
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| Protein Foods       | Ground meat, fish, shellfish and poultry cooked to ‘well-done’ - use thermometer to test internal temperatures as listed:  
- Ground beef, pork, veal, or lamb: 160°F  
- Whole cuts beef, pork, veal, or lamb: 145°F with 3 minute rest time  
- Fish: 145°F  
- Poultry (whole cut or ground): 165°F  
- Egg dishes: 160°F  
Fresh-cut deli meats or lunch meats, precooked or smoked ham, sausages, and hot dogs **ONLY if they are steaming hot (165°F)**  
Commercially packaged deli meats, canned meat/fish/ meat spreads/ pates  
Pasteurized or cooked tofu                                                                                      | Raw, rare, or undercooked meat, poultry, game, and tofu  
Raw fish (sushi or sashimi)  
Smoked fish, lox, pickled fish, raw fish, clams, and oysters  
Tempeh products                                                                                                 |
| Protein Foods (cont.) | Refrigerated smoked seafood (such as salmon or trout) if cooked  
Well-cooked eggs and egg substitutes, pasteurized eggs and egg substitutes, powdered egg white (all can be used uncooked)  
Roasted, shelled nuts (e.g., canned or bottled); nuts in baked products; commercially packaged peanut butter and nut butters  
Canned or cooked legumes                                                                                         | Raw or undercooked eggs (including runny, soft-cooked, or poached) and non-pasteurized egg substitutes  
Roasted nuts and seeds in the shell  
Unroasted raw nuts and seeds                                                                                     |
<p>| Entrées and Soups   | All cooked entrées and soups                                                                                                                                                                                      | All miso products, such as miso soup or miso paste                                                          |</p>
<table>
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</thead>
<tbody>
<tr>
<td><strong>Vegetables</strong></td>
<td>Thoroughly washed raw vegetables</td>
<td>Salads from restaurants, delicatessens or salad bars</td>
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<tr>
<td></td>
<td>All cooked frozen, canned, or fresh vegetables</td>
<td>Fresh, non-pasteurized vegetable salsas found in refrigerator case</td>
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<td></td>
<td>Dried herbs and spices</td>
<td>Non-pasteurized items containing raw vegetables found in the refrigerator case</td>
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<tr>
<td></td>
<td>Thoroughly washed fresh herbs</td>
<td>All raw vegetable sprouts, including alfalfa, radish, broccoli, and mung bean sprouts</td>
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<tr>
<td></td>
<td>Shelf-stable bottled salsa</td>
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<td></td>
<td>Cooked vegetable sprouts</td>
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<tr>
<td><strong>Fruits</strong></td>
<td>Thoroughly washed raw fruit; foods containing thoroughly washed raw fruits</td>
<td>Fresh or frozen berries</td>
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<tr>
<td></td>
<td>Canned, cooked or frozen fruit</td>
<td>Pre-cut fresh fruit and salsas, non-pasteurized items containing raw fruits found in the grocery refrigerated case</td>
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<tr>
<td></td>
<td>Dried fruits</td>
<td>Unpasteurized fruit &amp; vegetable juices and cider</td>
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<td></td>
<td>Pasteurized fruit juices and frozen juice concentrates</td>
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<tr>
<td><strong>Grains</strong></td>
<td>All breads, bagels, rolls, muffins, pancakes, sweet rolls, waffles, French toast</td>
<td>Uncooked grain products</td>
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<td></td>
<td>Potato/corn/tortilla chips, pretzels, popcorn</td>
<td>Breads, rolls, or pastries in self-serve bins</td>
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<td></td>
<td>Cooked pasta, rice, grains</td>
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<td></td>
<td>Cooked/ready-to-eat cereals</td>
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<tr>
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<tr>
<td><strong>Fats</strong></td>
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<tr>
<td></td>
<td>Vegetable oils and shortening</td>
<td>Refrigerated fresh salad dressings containing raw eggs or cheeses that are listed as “not recommended” in “Dairy” section</td>
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<tr>
<td></td>
<td>Refrigerated lard, margarine, butter</td>
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<td></td>
<td>Commercial, shelf-stable mayonnaise and salad dressings including blue cheese and other cheese-based salad dressings (refrigerate after opening)</td>
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<tr>
<td></td>
<td>Cooked gravy and sauces</td>
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<tr>
<td><strong>Beverages</strong></td>
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<tr>
<td></td>
<td>Municipally treated tap water, boiled well water</td>
<td>Un-boiled well water</td>
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<tr>
<td></td>
<td>Commercially bottled distilled, spring, and natural waters</td>
<td>Ice from sources other than those on “allowed” list</td>
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<td></td>
<td><strong>In Hospital</strong>: Ice from special filtered machines on inpatient units</td>
<td>Unpasteurized fruit and vegetable juices, or cider</td>
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<td></td>
<td><strong>At Home</strong>: Ice made at home from a safe water source listed above</td>
<td>Fountain beverages</td>
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<tr>
<td></td>
<td>Canned or bottled beverages</td>
<td>Cold-brewed tea made with warm or cold water</td>
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<tr>
<td></td>
<td>Powdered or liquid drink mix reconstituted with water from an allowed source</td>
<td>Maté tea or loose tea</td>
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<tr>
<td></td>
<td>Instant and brewed coffee and tea; cold-brewed tea made with boiling water</td>
<td>Milk or ice-based beverages served from a dispensing machine.</td>
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<tr>
<td></td>
<td>Brewed herbal teas using commercially packaged tea bags</td>
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<tr>
<td></td>
<td>Commercial nutrition supplements, liquid and powdered</td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>Desserts</td>
<td>Refrigerated commercial and homemade cakes, pies, pastries, cream-filled pastries, and puddings</td>
<td>Unrefrigerated, cream-filled pastry products (not shelf-stable)</td>
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<tr>
<td></td>
<td>Homemade &amp; commercially prepared cookies</td>
<td>Unwrapped or self-serve desserts (such as cookies, muffins, pastries or candies)</td>
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<td></td>
<td>Shelf-stable cream-filled cupcakes, cakes or pies</td>
<td>Soft-serve ice cream or frozen treats dispensed from machines</td>
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<td></td>
<td>Canned or refrigerated pudding</td>
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<td></td>
<td>Frozen packaged ice cream, sherbet, Italian ice, and popsicles</td>
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<tr>
<td>Other</td>
<td>Salt, granulated sugar, brown sugar</td>
<td>Bulk food that is not cooked</td>
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<td></td>
<td>Jam, jelly, syrups (refrigerate after opening)</td>
<td>Raw, unpasteurized, or non-heat-treated honey; honey in the comb</td>
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<tr>
<td></td>
<td>Commercially shelf-stable (heat-treated) honey</td>
<td>Brewer’s yeast, if uncooked</td>
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<td></td>
<td>Ketchup, mustard, barbecue sauce, soy sauce, other condiments (refrigerate after opening)</td>
<td>Foods from street vendors or food samples in stores</td>
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<tr>
<td></td>
<td>Pickles, pickle relish, olives (refrigerate after opening)</td>
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<tr>
<td></td>
<td>Candy, gum</td>
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</tr>
</tbody>
</table>

Water, Water Everywhere...But I is it Safe to Drink?

**Tap water** that is rigorously tested on a daily basis for parasites, bacteria and viruses - such as that of the Erie County Water Authority which works in conjunction with the Buffalo Water Authority – is considered safe for you to drink.

**Untreated well water is NOT SAFE!** It may contain a variety of bacteria or viruses that could be life threatening. **Well water must be boiled before you can safely drink it or clean fruits and vegetables with it.** (Well water must come to a rolling boil and continue to boil for a minimum of 1 minute. Then cool, store in the refrigerator, and use within 48 hours.)

**Ice** from the machines on the inpatient transplant unit is safe for you to use, as the water in the machine passes through a special filtration system to remove any bacteria or viruses from the water. You should avoid ice from any other areas of the hospital and from restaurants in general. Ice made at home from an “allowed” water source is acceptable.
Bottled Water can be safe IF you choose a brand that has been treated to reliably remove potentially harmful bacteria and viruses. These processes include distillation, reverse osmosis, or treatment with an “Absolute” one-micrometer filter.

With this standard in mind, the following examples of bottled waters are considered to be safe for you to drink:

- Acadia® (Purified drinking water or pure steam distilled water)
- Aquafina®, Dasani®, Dannon® Natural Spring Water, Deer Park®
- Great Bear®, Ice Mountain®
- Nestlé®, Poland Spring®, Spring Reflections®
- Tops®
- Wegmans®/Mayer Brothers®

Handling Fresh Fruits and Vegetables

- Rinse surface dirt off raw fruits and vegetables.
- Soak raw fruits and vegetables, including those with skins or rinds that will be removed, in water for 2 minutes. Thoroughly rinse fruits and vegetables under running water before eating, peeling, or slicing. Do not use soap, detergents, or bleach.
- Use a small vegetable brush to remove remaining surface dirt. Sanitize the brush between uses.
- Do not eat raw fruit or vegetables with bruised areas or openings in the skin. Bacteria can thrive in these places.
- At the store, buy produce that is not bruised or damaged. If buying fresh pre-cut produce, be sure it is refrigerated or surrounded by ice.
- At home, promptly refrigerate fresh produce. (Fresh whole produce such as bananas, onions and potatoes do not require refrigeration.) Fresh produce should be refrigerated within 2 hours of peeling or cutting. Leftover cut produce should be discarded if left at room temperature for more than 2 hours.
- Don’t cross-contaminate. Use clean cutting boards and utensils when handling fresh produce. If possible, use one clean cutting board for fresh produce and a separate one for raw meat, poultry, and seafood. During food preparation, wash cutting boards, utensils, or dishes that have come into contact with fresh produce, raw meat, poultry, or seafood.
- Do not consume ice that has come into contact with fresh produce or other raw products.
- Use a cooler with ice or ice gel packs if carrying/storing perishable food outdoors including cut fresh fruits/vegetables.
- Do not eat raw fruits, vegetables, or herbs at restaurants.

What Else Can I Do to Prevent Foodborne Illness?

Be a Smart Shopper

- Select unblemished fresh fruits and vegetables with the skin intact.
- Check “sell by” and “use by” dates when you buy meats, dairy products, eggs, etc.
- Have deli selections freshly sliced and use within 1-2 days.
- Always heat freshly sliced deli meats and cheeses to 165° F before you eat them. (You can eat prepackaged deli meats and cheeses without heating.)
• Do not use cracked or unrefrigerated eggs.
• Check foods for off-odors, mold, or contamination.
• Pick up refrigerated and frozen items last when shopping to reduce warming or thawing.
• Keep a cooler in the car to prevent refrigerated and frozen foods from thawing or warming on the way home.
• Reject cans that are dented, swollen, or rusted.
• Do not taste free food samples while you shop. Store groceries promptly.

Store Food Safely
• Keep your refrigerator temperature at 34-40° F.
• Keep your freezer temperature below 5° F.
• Sanitize the shelves and doors of your refrigerator and freezer often.
• Clean spills in the refrigerator IMMEDIATELY.
• Discard freezer-burned foods. They will look dry and discolored and may or may not have visible ice crystals.
• Refrigerate all products marked “Keep Refrigerated.”
• Thaw frozen foods in the refrigerator or microwave: NEVER on a countertop at room temperature.
• Keep all perishables cold until you are ready to use them.
• Discard foods past their “Use By” dates.
• Discard any foods with mold present.
• Refrigerate leftover cooked foods immediately after a meal in an uncovered, swallow container. Cover after cooled. Use leftovers within 3 days (72 hours). Reheat leftovers to at least 165°F.
• Freeze foods to slow bacterial growth.
• Discard any cans that are bulging, leaking or deeply indented.
• Rotate food stock; use older items first.
• Do not store food under the sink.
• Do not store chemicals and cleaning solutions near food.

ALWAYS REMEMBER....

When in doubt, throw it out!

Sanitizing Mix

3 Tablespoons unscented bleach + 1 quart (4 cups) water
Keep a Clean Kitchen

- Sanitize cutting boards, knives and appliance blades after each use with the sanitizing solution mixture.
- Keep appliances and countertops free of food particles.
- If you have a dishwasher, use it to wash your dishes instead of washing dishes by hand. The high water temperatures and the heat from the drying cycle are more effective at sanitizing your dishes.
- If you wash dishes by hand, wear rubber gloves and use hot water to wash and rinse the dishes. Allow dishes to air dry whenever possible to reduce bacteria that may contaminate dishes from dish towels.
- Replace dish cloths and dish towels daily: sanitize them in the sanitizing solution.
- Replace sponges at least weekly. These also can be cleaned with the sanitizing solution if you plan to use them again.

Prepare Food Carefully

- Wash your hands before, during, and after food preparation.
- Wash your hands before you eat.
- Use paper towels – not dish towels – to dry your hands.
- Whenever possible, people on this diet should have someone prepare the fresh/raw foods for them.
- **Wash and scrub all raw fruits and vegetables under cold running water before eating them. (Even if you are not eating the peel.)**
- Packaged fresh vegetables must also be washed – even if they state “triple washed” on the package.
- Use different cutting boards for cooked and raw foods.
- Keep another cutting board for raw meats only.
- Marinate meats in the refrigerator. Discard any leftover marinade or boil it before consuming at the table.
- Do not taste raw or partially cooked meat, poultry, fish, shellfish, or unpasteurized egg mixtures.
- Refer to USDA guidelines for temperature levels for cooking meats and egg dishes, or reheating leftovers. (Available on “Is My Food Safe?” app for your phone or tablet for easy reference.)
Tips for Eating Out

1. The cafeteria and food/beverage kiosks in the hospital must be treated like an outside restaurant in regards to safety and food selection. Please do not assume that the foods and beverages offered are all appropriate choices for patients on low microbial diets.

2. Try to get food from restaurants you are familiar with – places that are clean and that serve the food thoroughly cooked. If you are unfamiliar with the restaurant, here are a few things to look for to help you evaluate the safety:
   ✓ Check the restroom – if it is clean, has soap, and towels or hand driers available, that’s a good start!
   ✓ The restaurant as a whole should be clean and orderly.
   ✓ If you can see the staff in the food prep area, make sure they are wearing gloves.
   ✓ Check out the meals coming out of the kitchen – if you see a lot of fresh or raw vegetable or fruit garnishes, ask that yours be served without these items.
   ✓ Fast foods are not highly recommended from both the perspective of overall nutritional value and food safety. If you choose to have food from a fast-food type restaurant, do not pick up your food via the drive-through. You should go in the restaurant and check it out for cleanliness. Do not let them give you any foods that have been sitting under heating lamps. And remember – no fresh produce on the items you order.

3. No buffet items are allowed. Items can sit out for extended periods of time at room temperature, allowing foods to fall into an unsafe temperature zone. Also, there is no control of other individuals using their hands to remove items from the buffet.

4. Avoid potlucks, salad bars, sidewalk vendors, and food samples offered at grocery stores.

5. No fresh produce is allowed when you are eating out – this includes any garnishes, fresh vegetables added to a sandwich, fresh fruit, etc. Think “cooked foods” when you eat out.

6. You should avoid any self-serve type beverages, including the ice from an ice machine, in any cafeteria or restaurant.

7. Avoid any self-serve foods that could be potentially touched with bare hands.

8. No soft-serve ice cream is allowed. The machines that dispense the ice cream are rarely cleaned thoroughly, making them a breeding ground for bacteria and microbes.

9. When eating out, no cold delicatessen meats or cheeses are allowed unless heated to steaming hot. For example, a cold turkey sandwich is not allowed, but a grilled turkey and cheese sandwich is okay. Deli or luncheon meats that are in packages are acceptable to have unheated at home, but are not under your control in a restaurant.
10. Avoid food that has been sitting under heating lamps – request that your item be freshly made.

11. Pizza is acceptable, since it is cooked. Proceed with caution with chicken wings – must be thoroughly cooked.

12. Uneaten portions of cooked foods should be promptly refrigerated, and may only be eaten/reheated within 3 days (72 hours) of the food being made. Otherwise, it must be frozen, discarded, or given to someone else to eat!

If you have any questions, please call the Roswell Park Dietitian Office

716-845-2398