

Kidney Transplant Nutrition Facts

Adequate nutrition is important both before and after your transplant surgery.

Prior to transplant surgery:

- People with good nutritional intake heal quicker after surgery
- It is important to continue to eat well balanced meals when you are trying to delay need for dialysis
- If you have questions, become frustrated or unsure of what to eat, the transplant dietitian can help you. She is available to provide nutrition education on Stage 4 and Stage 5 chronic kidney disease (CKD).

After a kidney transplant, your diet still plays a big role in managing your health. Proper nutrition will reduce your risk of infection and rejection.

- If you were on dialysis and had a kidney transplant, you may find this diet easier to follow than the one you were on for dialysis.
- Long term, a well-balanced diet, consisting of lean protein, low-fat dairy products, vegetables, fruit, nuts, and a variety of grains will help maintain good health and kidney function. The DASH (Dietary Approaches to Stop Hypertension) Diet or the Mediterranean Diet are great resources to help you to follow a heart healthy lifestyle.

Food and Drug Interactions

The following foods have been shown to effect absorption of immunosuppression drugs and should be avoided:

- Grapefruit, or anything containing its juice (Fresca, Squirt)
- Pomelo
- Papaya
- Pomegranate
- Starfruit

The following natural health products/herbal supplements (especially in pill form) have been shown to effect absorption of immunosuppression drugs and should be avoided:

- Astragalus
- Evening primrose oil
- Ginseng
- Garlic (supplement only; garlic cloves for cooking are okay)
- Ginger (supplement only; can be used as spice in cooking)
- St. John's Wort
- Herbal tea
- Green tea extract

Diabetes and Blood Sugar Management

Diabetes Prior to Transplant

Declining kidney function will often improve diabetes control, so at times people may feel their diabetes has been cured. Insulin is staying in the body longer because it cannot be excreted in the urine as result of the decreased kidney function. After transplant, insulin will be excreted in the urine. Learning how to manage your diabetes while you are waiting for a kidney transplant can prevent your new kidney from being lost to diabetes. A1C prior to transplant should be maintained less than 8.0. A1C greater than 10 can prevent you from being actively listed for transplant. A1C is not as accurate during CKD. Glucose readings give a better picture of diabetes control. Anemia and toxins can cause A1C to appear falsely low. Your physician, dietitian, or transplant coordinator can help connect you with a diabetic education program. Diabetes education is recommended before kidney transplant.

Renal Friendly Diabetes Plate

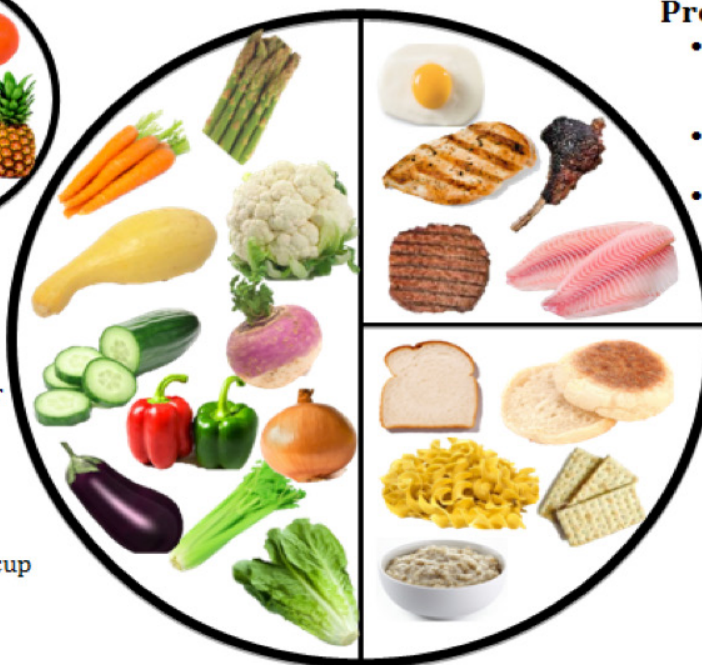


Fruit:

- 1 small or ½ cup serving
- 2-3 servings per day
- 15 grams carb per serving.

Non-Starchy Vegetable:

- ½ cup cooked or 1 cup raw serving
- 2-3 servings daily



Protein:

- 3 oz serving size: approximately the size of a deck of cards
- Choose lean meats, poultry and fish
- Avoid processed meats due to sodium and phosphorous content

Breads and Starches:

- 1 slice bread, ½ cup rice, noodles, or hot cereal, ½ small bagel, english muffin or hamburger bun,
- 4-6 unsalted crackers, ¾ cup unsweetened cereal(no bran cereals)
- 15 gram carb per serving

Eat 3 balanced meals at regular times, 4-5 hours apart. Balanced meal contains at least 3 different food groups.

Need 45-75 grams carbohydrate per meal and 15-30 grams per snack

Elevated Blood Sugars After Kidney Transplant

The steroids and anti-rejection medications can raise blood sugars. Uncontrolled blood sugars can decrease your body's ability to heal after surgery and, if continues, can cause the new kidney to fail. Some people will develop diabetes after transplant, so it is important to monitor your blood sugars if asked to do so. Diabetes is a problem with how your body handles sugar (glucose). Glucose is our body's main source of energy. Diabetes may not change what we eat, but when and how much we eat at a time. Morning blood sugars should be in the range of 80 to 140. A1C (test to monitor blood sugar control) should be maintained at a level less than 7.0. Maintaining a healthy weight and physical activity can help control blood sugars. You will want to work with the doctor, pharmacist, and registered dietitian to keep your diet and blood sugars in good control.

The following tips can help control blood sugars:

- **Eat a variety of foods.** Choose plenty of vegetables, fruits, whole grains, low-fat milk products and lean protein or meat alternatives.
- **Avoid skipping meals.** Eat balanced meals around the same time every day. Try not to go longer than 4 to 6 hours between meals.
- **Watch portions.** Fill half of your plate with vegetables, one quarter as lean protein and one quarter plate of complex carbohydrates (whole grain cereal, bread, rice, potatoes). Each meal should contain 60 grams of carbohydrates.
- **Your body needs carbohydrates.** They fuel our body's need for energy to maintain healthy organ function. Too little carbohydrate is just as dangerous as too much. It is good to limit "simple" carbohydrates in your diet. Simple carbohydrates include sugar, sweets, juice and soda. "Complex" carbohydrates, such as pasta, bread, unsweetened cereal and grains should be included in the daily diet.
- **Don't drink your carbs.** Avoid regular soda pop, juice, sports drinks or any beverages that are high in carbohydrate. Stay hydrated by drinking water and calorie-free beverages.

Nutrition Goals Following Kidney Transplant

Potassium – Potassium often will go up and down after surgery. In the beginning, transplant medications are at slightly higher levels and may cause elevation in potassium. It will be important to limit potassium in your diet until you are sure your new kidney is filtering out the excess potassium and you are on a stable dose of transplant medications. You should limit potassium for 4 to 6 weeks after transplant surgery, before slowly adding high potassium foods back into your meal plan. Typically, there is no potassium restriction after the first 6 weeks.

POTASSIUM-RICH FOODS (>200 MG/SERVING)		
Bananas	Mango	Avocado
Oranges/Orange juice	Papaya	Brussels sprouts
Cantaloupe	Potatoes	Nuts
Honeydew	Tomato sauce	Peanut butter
Prunes	Spinach	Beans
Raisins	Kale	Lentils

LOWER-POTASSIUM FOODS (<100 MG/SERVING)	
Applesauce	Carrots
Green beans	Bagel
Frozen green peas	Waffle
Raspberries, blueberries, strawberries	Cranberry juice, apple juice, grape juice
Watermelon	Hummus
Cucumbers	Bread, whole wheat or white
Oatmeal	Cheese
Rice, white or brown	Spaghetti/macaroni, cooked
English muffin	

Phosphorus – Getting enough phosphorus is an important part of your meal plan. If your kidney is working properly, you will need to stop taking your phosphate binders and follow a diet high in phosphorus. As your new kidney starts to function, your body is able to rebuild bones. While these "hungry bones" are busy gaining strength, your phosphorus could drop very low. The transplant medications can also decrease phosphorous levels. Your transplant nephrologist may prescribe pills to raise phosphorous levels. Many high phosphorous foods are good sources of magnesium and potassium. Goal is 1,500 mg phosphorous, 2,000 mg potassium, and 300 mg magnesium daily.

PHOSPHORUS-RICH FOODS (>100 MG/SERVING)	
Chocolate	Beans*
Granola	Lentils*
Beef or veal	Milk or yogurt (low-fat/fat-free)*
Pork loin	Oatmeal*
Bran*	

MAGNESIUM-RICH FOODS (50-150 MG/SERVING)	
Okra (frozen)	Pumpkin seeds*
Tofu	Bran*
Chocolate	Black beans*
Brown Rice	Trail mix*
Halibut*	Avocado*
Spinach*	Artichokes*
Soybeans*	

** These foods are also high in potassium. If your potassium level is elevated, they should be consumed in moderation or avoided. The dietitian can help you.*

Calcium – Steroids may make it difficult to absorb calcium. Calcium is a mineral that helps your bones and teeth stay strong. Low levels of calcium in your blood may increase your risk of bone fractures. Aim for at least 3 servings of dairy or calcium-fortified foods per day to help keep your bones strong.

Magnesium and Phosphorous – Some medications may cause depletion of these minerals, so it will be necessary to use reference tables to increase consumption of foods rich in these nutrients. Sometimes your doctor will prescribe a pill to improve levels. We can provide a magnesium, phosphorous, and potassium handout.

Protein – For the first 6-8 weeks after transplant, you will need a high protein diet to help heal. Dialysis patients will need as much or more protein following transplant than they did during dialysis. Chronic Kidney Disease (CKD) patients not on dialysis will definitely require more protein after transplant. Protein is important for healing and strength. High doses of prednisone can cause muscle breakdown, making adequate protein intake even more crucial. Six to 8 weeks after the transplant, you should reduce protein intake to 6 to 8 ounces daily.

PROTEIN-RICH FOODS
Lean meat (beef, pork or lamb), turkey, chicken and fish
Eggs, egg whites or egg substitutes
Low-fat milk, cheese and yogurt
Beans and lentils
Soy and tofu products

Vitamins and Supplements – Some of the anti-rejection medications you are taking can cause loss of some vitamins and minerals. A daily multiple vitamin with minerals is sometimes recommended. Do not take any vitamins with herbal additives. Check with the transplant team before taking any protein or nutritional supplements.

Sodium – Monitoring and limiting sodium in your diet is an important step in taking care of your kidney. Transplant medications such as steroids hold on to sodium and water causing swelling, edema and high blood pressure. If you are taking blood pressure medications to lower blood pressure, it is recommended to limit sodium to 2,000 milligrams daily.

TIPS TO LIMITING YOUR SODIUM INTAKE

Avoid cooking with table salt or seasoning salts, such as onion salt or garlic salt.

Avoid the salt shaker. Season foods with fresh or dried herbs and spices to add flavor to foods. Choose “sodium-free” seasonings such as Mrs. Dash. *Avoid salt substitutes as they are usually very high in potassium.*

Read labels and choose foods with 140 mg or less of sodium per serving.

Choose fresh foods, meats, poultry, fish, fruits and vegetables.

Fluids – Once your new kidney starts working, you no longer need to follow a fluid restriction. After the transplant you may develop dehydration, so you need to drink plenty of fluid every day, depending upon your individual needs. When your kidney is working your **GOAL is to drink a minimum of 8 glasses of water (64 ounces) per day**, unless told otherwise by your transplant team. Drinks that contain caffeine and/or alcohol may actually cause you to lose fluids, so do not count them in the 64 ounces of liquid you should be drinking every day.

Well Water – Unless you have your water checked every six months, well water should be boiled prior to drinking. Unboiled well water is safe for cooking and bathing. Some patients have found that it is convenient to boil their water and keep a pitcher in their refrigerator. You may also choose to drink bottled water (distilled or reverse osmosis are the best choices).

Nutrition Concerns after Kidney Transplant

Dining Out and Carryout Food After Transplant

Eating out can be enjoyable, but there are some simple guidelines you should follow to help prevent foodborne illness:

- Always order meat, poultry, and fish well done. Do not eat raw seafood including oysters on the half shell, raw clams, sushi and sashimi.
- Ask if food contains uncooked ingredients such as eggs, sprouts, meat, poultry, or seafood.
- Avoid salad bars and buffets – others may have left germs behind.
- Eat foods immediately while still hot. Leftovers should be refrigerated within 2 hours of purchase or delivery.

Elevated Cholesterol/Triglyceride Levels – Transplant medications and steroids can raise triglycerides and cholesterol. Research has shown that following a heart healthy eating plan combined with regular physical activity can help reduce the risk of heart disease. The following tips can help:

FOODS TO INCREASE
Lean cuts of animal protein (turkey, chicken, beef, pork, buffalo, elk)
Fish and seafood
Low-fat dairy (cheese, milk, yogurt)
Healthy fats (nuts, seeds, flaxseed, soft margarine, oils: olive, canola and peanut)
Fresh fruits and vegetables
Legumes and lentils
Whole grain bread, pasta, crackers

FOODS TO REDUCE OR ELIMINATE
High fat meat (heavily marbled beef, ribs, wings, bacon, sausage)
High fat dairy (whole milk, 4% milk cheese, whole milk yogurt, butter)
Pastries, pies
Fried foods

Weight Gain – Weight gain after transplant is common. People feel better and have a better appetite when they have a working kidney. Steroid medications may stimulate your appetite causing you to increase food intake resulting in unwanted weight gain.

TIPS TO PREVENT WEIGHT GAIN, LOSE WEIGHT, AND MAINTAIN HEALTHY WEIGHT

Increase physical activity after you have been cleared to start exercising from your doctor.

- Your goal is to exercise for at least 150 minutes per week.
- You may break up your exercise sessions into 10-15 minute intervals.
- Move around any way that you can. Every bit of movement counts.
- Plan or schedule exercise into each day.

Eat 3 balanced meals at regular times with 4-5 hours between meals.

Eat at least 5 servings of fruits and vegetables each day.

Eat a half plate of vegetables/fruit, one-quarter grain/starchy foods and one-quarter lean protein (chicken, fish, pork or turkey).

Do not drink your calories. Sweetened soda pop, juices, and other beverages add unnecessary calories.

Limit high calorie snack foods (candy, cakes, cookies, crackers, sun chips).

Choose cooking methods that do not increase the fat content of foods.

- Healthy cooking methods include grilling, baking, boiling, broiling, poaching and steaming.
- Avoid frying and deep frying.

Limit restaurant meals to 3 times per week or less. Read nutrition information posted by restaurants about menu items to help make decisions.

Plan meals ahead of time. Shop with a list. Avoid shopping when hungry. Buy more in-season fresh foods to save money.

Track your meal and exercise calories. Phone apps and websites can help.

Foodborne Illness

After transplant you will take immunosuppression medication to prevent organ rejection. These medications also "weaken" your immune system, which means that your body has a harder time fighting off germs and bacteria from food items. As a transplant recipient, you are more likely to get sick longer, be hospitalized, or even die from a foodborne illness. The following tips will be a reference to help keep you healthy:

- Always wash your hands before preparing or eating food.
- Thoroughly wash fruits and vegetables, use a brush to clean those with rough skins like cantaloupe. Avoid sprouts.
- Water quality/safety: If there is concern about water, boil for 1 minute to help kill impurities. To be considered safe, wells should be tested every 6 months.

- Avoid cross-contamination. This occurs when bacteria are spread from one food to another. This is common when handling raw eggs, meat, seafood, poultry and their juices. Separate raw meat, poultry, and fish from other foods when shopping, handling, and preparing meals. Consider separate cutting boards for foods that require cooking and foods that are eaten raw.
- Cook all animal foods to the proper temperature. Use a meat thermometer to check temperature.
 - Ground meat: 160°F (71.1°C)
 - Steak and roast: 145°F (62.8°C)
 - Chicken: 165°F (73.9°C)
 - Seafood: 145°F (62.8°C)
 - Precooked seafood: 165°F (73.9°C)
 - Leftovers and lunch/deli meat: Re-heat to 165°F (73.9°C)
- Avoid undercooked or raw eggs, including foods made from them like homemade Caesar dressing.
- Avoid unpasteurized milk, cheese made with unpasteurized milk, juice, and apple cider.
- Never consume food past its expiration date.
- Refrigerate and freeze effectively: Cold temperatures slow the growth of most harmful bacteria. Refrigerator temperature should be 40°F or below and a freezer temperature of 0°F or below is one of the most effective ways to reduce risk of foodborne illness. Never thaw food at room temperature. Thaw in refrigerator, cold water, or microwave. Immediately cook foods that have been thawed in water or microwave.

More information can be found at www.cdc.gov/foodsafety and www.foodsafety.gov.

Chronic Kidney Disease and Post-Transplant Nutrition Internet Resources

- www.kidney.org – Website sponsored by the National Kidney Foundation that provides extensive educational material for all stages of CKD, including transplant. Also provides handout for exercises for dialysis patients.
- www.nhlbi.nih.gov – A government website from the National Institutes of Health (NIH) that provides education for the public on healthy eating, weight management and exercise. It includes recipes, health assessment tools such as a BMI (body mass index) calculator, menu planner, heart attack risk calculator, and health risks associated with being overweight.

- **www.niddk.nih.gov/health-information/weight-management** – The Weight-control Information Network, also from NIH, provides resources for exercise and weight control, including the booklets “Active at Any Size” and “Tips to Help You Get Active.”
- **www.heart.org** – Click on “Healthy Living” at the top and then “Healthy Eating.” Information on eating out, guidelines for eating at various types of ethnic restaurants, recipes, grocery shopping lists, a dictionary of nutrition words, and resources on meal planning and physical activity.
- **www.kidneyfund.org** – General information on all aspects of kidney disease, GFR, good explanation of the kidney, diet information, and kidney disease prevention tips.
- **www.choosemyplate.gov** – Provides food/serving information and activity trackers and tools.
- **www.cdc.gov/healthyweight/calories** – Great information to help with weight loss; includes BMI calculator and good explanation of calorie balancing.
- **www.davita.com** – Recipes; overview of treatment options for CKD, including transplant; GFR calculator; kidney disease education videos; and nutrient calculator.
- **www.ultracare-dialysis.com** – Recipes, exercise tips for dialysis patients, shopping lists and meal planning.
- **www.nhlbi.nih.gov/health/health-topics/topics/dash** – Detailed information on DASH (Dietary Approaches to Stop Hypertension); assistance with meal plans for healthy lifestyle post-transplant.
- **www.uofmhealth.org/health-library/aa98646** – Detailed information about the Mediterranean diet; assistance with meal planning for healthy lifestyle post-transplant.

