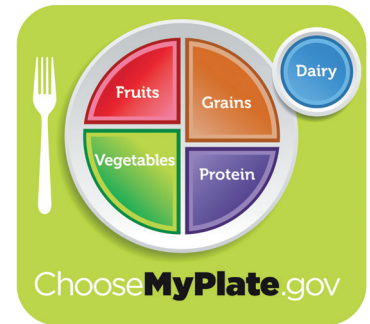


Nutrition Goals Before Transplant

General Nutrition

It is important to stay as healthy as possible prior to transplant. Symptoms of your liver disease may make it difficult to consume enough nutrients and alter your body's normal way of utilizing nutrients. Here are some healthy lifestyle tips:

- Liver disease often increases calorie and protein needs. Aim to eat at least three meals and two snacks per day.
- Try to follow the MyPlate guide (see graphic) for every meal to ensure a well-balanced meal of protein, starches, fruits and vegetables.
- Follow a Mediterranean-style diet including lean proteins, low-fat dairy, whole grains, fruits, vegetables and healthy fats. Avoid packaged/processed foods as much as possible.
- If you feel full quickly when eating, four to six smaller meals may help you meet your nutrition needs more comfortably.
- Include a protein source with every meal and snack. This helps maintain muscle mass and prevent malnutrition/frailty. Protein foods include meat, fish, eggs, dairy products, beans, nuts and seeds.
- Consume a bedtime snack containing protein as this has been shown to help prevent muscle loss.
- If you can't eat enough food, nutritional drinks may be helpful.
- High-calorie foods such as olive oil, butter, whole fat dairy, avocados and nuts can help reach calorie needs.
- Avoid foods that may cause foodborne illness such as unpasteurized dairy products, raw or uncooked meat, poultry, seafood and eggs, raw vegetable sprouts, as well as clams, oysters, mussels and scallops.
- Prevent vitamin and mineral deficiencies. It may be recommended to take a multi-vitamin.
- Stay as active as possible. A daily program of regular exercise, as well as normal activities, can help maintain general strength and energy levels. Reduced activity can lead to decreased endurance, flexibility of the muscles and ability of the lungs and the heart to function.



Weight Loss

Obesity may be a contraindication for liver transplant. If you have been instructed to lose weight, the following are recommended for you:

- Follow the MyPlate guide for every meal as mentioned on the previous page.
- Follow a Mediterranean-style diet.
- Use a smaller plate at meals to help with portion control. Limit unnecessary snacking.
- Limit added sugar in the diet such as pop, juice and sweets.
- Include physical activity.


Fluid Retention




You will likely be instructed to follow a low-sodium diet. Sodium in the diet encourages the body to retain water. This is known as ascites or edema. The fluid may gather in the feet, legs, abdomen or other body tissues. Medications called diuretics help the body get rid of extra sodium and water. If you eat too much sodium, these medications can't work as well. A low-sodium diet can lower fluid buildup and help you feel better. Here are some tips and facts:


- Almost all foods naturally contain some sodium. The amount found in unsalted food is adequate to meet your body's needs.
- Limit sodium to no more than 2,000 mg (2 grams) per day.
- One teaspoon of salt contains 2,300 mg of sodium.
- Break it up evenly throughout your day. For example, 600 mg per meal and 100 mg per snack if eating three meals and two snacks per day.
- Read nutrition facts labels on all foods and drinks to look for sodium content. It will be labeled in milligrams (mg).
- Avoid any form of added salt such as regular table salt, sea salt, pink Himalayan salt, salt seasonings, garlic salt, onion salt, etc.
- Avoid salt substitutes such as No-Salt and Nu-Salt. These still contain sodium and are very high in potassium which can affect your diuretics.
- Limit eating out as much as possible.
- Some sources of sodium are not obvious in the food we eat. Softened water, bottled water and some medications (such as antacids, laxatives and antibiotics) can be sources of hidden sodium.

Healthy Food Choices

Eating a low-sodium diet helps you to feel better and lower fluid buildup in the abdomen. The following tool is designed to assist you in making healthy low-sodium choices in your diet. When in doubt, use the nutrition label to determine if a food is a good choice.

GOOD CHOICES	LIMIT OR AVOID
<p>Meats and Meat Alternatives:</p> <ul style="list-style-type: none"> • Fresh beef, pork, veal, lamb, poultry, fish • Eggs • Dried beans, peas, lentils (choose dry or canned with no salt added) • Unsalted nuts, unsalted peanut butter 	<ul style="list-style-type: none"> • Processed meats, such as bacon, sausage, pepperoni, hot dogs, ham, luncheon/deli meats, chipped beef, corned beef, anchovies, sardines, caviar • Dried meat, smoked fish • Salted nuts, salted peanut butter • Microwave/frozen meals
<p>Milk, Yogurt, Cheeses:</p> <ul style="list-style-type: none"> • Milk or yogurt • Frozen yogurt, ice cream, ice milk • Natural swiss cheese • Low-sodium cheeses • Low-sodium cottage cheeses 	<ul style="list-style-type: none"> • Buttermilk, malted milk • Processed cocoa • Processed cheese • Bleu, feta, and other high-sodium cheeses • Cottage cheese
<p>Breads, Cereal, Rice and Pasta:</p> <ul style="list-style-type: none"> • Bread, rolls, breadsticks • Taco shells, tortillas • Pasta, barley, rice cooked without added salt • Unsalted cooked cereal • Low-sodium crackers • Homemade soup with low-sodium ingredients 	<ul style="list-style-type: none"> • Breads, rolls, breadsticks made with garlic salt, onion salt, or cheese • Stuffing mixes • Pasta or rice mixes with seasoning packets • Salted crackers • Regular canned or dry soups, broths, bouillons • Baking mixes such as cakes, pancakes, waffles or muffins

GOOD CHOICES	LIMIT OR AVOID
<p>Vegetables:</p> <ul style="list-style-type: none"> • Fresh or frozen vegetables without salt added • Homemade and low sodium tomato sauces • Low sodium or no added salt canned vegetables 	<ul style="list-style-type: none"> • Regular canned vegetables • Vegetable juices • Pre-made spaghetti/tomato sauce • Instant mashed potatoes (boxed) • Potato mixes • Sauerkraut, pickles, olives or other pickled vegetables
<p>Fruits:</p> <ul style="list-style-type: none"> • Any kind of fruit or fruit juice (fresh, frozen or canned) 	<ul style="list-style-type: none"> • Adding salt to fruits (such as watermelon) • Glazed or crystallized fruit
<p>Snacks:</p> <ul style="list-style-type: none"> • Fresh fruits and vegetables • Unsalted popcorn • Unsalted pretzels • Unsalted nuts • Unsalted crackers 	<ul style="list-style-type: none"> • Regular potato chips, taco chips, corn chips, microwave popcorn • Regular pretzels • Regular nuts • Regular crackers • Other salty snack foods
<p>Beverages:</p> <ul style="list-style-type: none"> • Water • Milk • Coffee, decaf coffee • Teas • Cocoa made with milk • Soda with no- or low-sodium (limit 24 ounces or less per day) • Fruit juices 	<ul style="list-style-type: none"> • Gatorade® • Powerade® • Vegetable juices • Instant cocoa mixes • Instant cappuccino mixes
<p>Desserts:</p> <ul style="list-style-type: none"> • Fruit ice • Homemade tapioca, rice and cornstarch pudding • Custard made with milk • Hard candy • Cake, cookies, pie, sherbert, ice cream and candy (check nutrition label as amount of sodium varies) 	<ul style="list-style-type: none"> • Instant pudding or other pre-packaged dessert mix • Frozen pies • Minced meat pies 

GOOD CHOICES	LIMIT OR AVOID
<p>Fats, Oils (use sparingly):</p> <ul style="list-style-type: none"> • Vegetable oil and mayonnaise • Unsalted butter or margarine • Unsalted or low-sodium salad dressing • Low-sodium cream, non-dairy creamers • Unsalted nuts • Avocado • Cooking fat or oil 	<ul style="list-style-type: none"> • Regular salad dressing • Bacon and bacon fat • Gravy made with mixes or bouillon • Snack dips made with processed cheese or instant soup mixes 
<p>Seasonings and Condiments:</p> <ul style="list-style-type: none"> • Herbs and spices without salt • Hot sauce • Lemon • Garlic • Onion • Fresh horseradish • Low-sodium ketchup • Low-sodium chili sauce • Low-sodium steak sauce 	<ul style="list-style-type: none"> • Salt, garlic salt or other flavored salts • Nu-salt or lo-salt, lite salt, Butter Buds • Soy sauce, tartar sauce, teriyaki sauce, jarred salsa, worchestershire sauce, bouillon, sweet & sour sauce, steak and barbeque sauce • Monosodium glutamate (MSG) • Prepared horseradish, prepared mustard • Ketchup, seasoning/coating mix, meat tenderizers • Cooking wine

Nutrition Goals After Transplant

General Nutrition

After surgery, your body will need enough calories and protein to help with healing. Some patients eat well soon after surgery while others take some time. You will have a nasogastric tube in place until the function of your intestines resumes. Once the tube is removed, you will begin a clear liquid diet as tolerated and then advance to a regular diet. Some patients require a feeding tube (Dobhoff) if not eating well. This is uncommon, but could occur.

Here are some tips to ensure proper nutrition once advancing to a regular diet:

- Eat regularly throughout the day. Either three meals and two snacks or four to six smaller meals, whichever your body can handle. Avoid skipping meals.
- Include a protein source at each meal and snack.
- Include high-calorie foods if appetite is poor and you need to increase calories.
- Consider nutritional supplements if having difficulty meeting protein/energy needs.

- Once you have fully healed from surgery, establish healthy eating and exercise habits to maintain a healthful weight. A Mediterranean-style diet is recommended.
- If you are struggling with fluid accumulation, continue a low-sodium diet of 2,000 mg per day.

Liver transplant patients should follow the guidelines for the general population and have their cholesterol/lipid profile done once a year. As many as 40 percent of liver transplant recipients will develop high cholesterol. Patients are encouraged to keep their cholesterol and lipids under control by:

- Controlling weight with healthy eating and exercise
- Use of anti-cholesterol and anti-lipid medications as prescribed by your doctor
- Smoking cessation

Hyperglycemia

Steroids may elevate blood sugar and can lead to steroid-induced diabetes. Whether your blood sugar is elevated for this reason, or you previously had diabetes, here are some tips:

- Carbohydrates are found in grains, starches, fruit, starchy vegetables, beans, dairy and sweets.
- Limit high-carbohydrate foods. They are an important source of nutrition, but eating too many at once can cause high blood sugars.
- Consume well-balanced meals that include a protein, starch, and fruit or vegetable.
- Try to eat the same amount of carbohydrates at each meal.
- Avoid skipping meals.
- Don't drink your carbohydrates. Sugary beverages can increase your blood sugar without providing much nourishment. Limit any sweetened beverage to no more than four ounces per day.

Nutrient Imbalances

Some post-transplant medications may cause mineral imbalances specifically in potassium, magnesium, phosphorus and calcium.

If your potassium is elevated, avoid/limit these foods:

- Fruits: apricots, bananas, dates, dried figs, honeydew, melon, kiwi, mango, nectarine, orange, orange juice, papaya, prunes, prune juice and raisins.

- Vegetables: artichokes, avocado, bamboo shoots, chard, brussels sprouts, fresh or raw beets, green beans, collard or mustard, kohlrabi, okra, parsnips, potatoes, pumpkin, spinach, sweet potatoes, tomatoes, tomato sauce, tomato juice, winter squash and yams.
- Miscellaneous: bran, dried beans or peas, salt substitute, soy milk and yogurt.
- Use in limited amounts: coffee, milk, peanut butter, nuts and seeds.

Previous liver disease, and the use of medications such as prednisone, make liver transplant patients very susceptible to thinning bones. Include high-calcium foods into your diet such as:

- Milk, cheese, yogurt and other dairy products
- Non-dairy milks that are calcium fortified
- Calcium-fortified orange juice
- Sardines
- Dark, leafy greens
- Sesame and chia seeds

Some medications may cause depletion of magnesium and phosphorus. Include foods high in magnesium and phosphorus into your diet. However, be cautious if also needing a low-potassium diet as foods high in magnesium and phosphorus may be high in potassium as well.

Foods high in magnesium:

- Spinach, avocados, black beans and brown rice
- Pumpkin seeds, cashews, almonds and peanuts
- Dark chocolate

Foods high in phosphorus:

- Chicken, turkey, beef and pork
- Beans, lentils and whole grains
- Milk and yogurt
- Nuts and seeds

Food Safety

It will be very important to follow good food safety practices to prevent foodborne illness. Post-transplant patients are more susceptible to this type of illness due to taking immunosuppressant medications. Your risk is highest one to six months after transplantation. The following is recommended:

- Avoid cross contamination. Keep raw and ready-to-eat foods separate.
- Keep raw meat, poultry and seafood near the bottom of the refrigerator or place them in to plastic bags to prevent raw juice dripping on ready to eat foods.
- Always wash your hands for at least 20 seconds before and after you touch food.
- Wash counters where food is prepared before and after use.
- Be sure food is being stored at safe temperatures – keep hot food hot and cold food cold.
- The refrigerator should be kept at 40°F or below, and the freezer at 0°F or below.
- Check for “use by” dates – **DO NOT USE IF BEYOND THE EXPIRATION DATE.**
- Avoid purchasing dented or bulging cans, cracked jars or items with unsealed lids.
- Check eggs – open carton and do not buy if any are broken or cracked.
- Avoid unpasteurized foods and sprouts.
- Do not eat any raw or undercooked meats, poultry, seafood or eggs.
- Avoid salad bars and buffets.
- Water – well water should be tested periodically for contamination. Check with your local water treatment center on the proper protocol to collect water samples. Well water should be avoided unless it is tested frequently.
- Wash raw fruits and vegetables well. Use a brush if needed.
- Store ground meat, poultry and fish up to one to two days; other red meats such as steak or roasts three to five days.
- Use refrigerated leftovers within two days.
- Meat, poultry and seafood need to stay cold while they thaw. Thaw them:
 - In the refrigerator – one to two days before you will cook.
 - In the microwave – use the defrost setting, then cook right away.
 - Cook food to the proper temperature (see chart on the following page).

FOOD	TYPE	TEMPERATURE (°F)
Ground Meat & Meat Mixtures	Beef, veal, lamb and pork	160
	Turkey, chicken	165
Fresh Beef, Veal, Lamb	Steaks, roasts, chops Rest time: 3 minutes	145
Poultry	All poultry (breasts, whole bird, legs, thighs, wings, ground poultry, giblets, and stuffing)	165
Pork and Ham	Fresh pork, including fresh ham Rest time: 3 minutes	145
	Precooked ham (to reheat) <i>Note: Reheat cooked hams packaged in USDA-inspected plants to 140°F</i>	165
Eggs and Egg Dishes	Eggs	Cook until yolk and white are firm
	Egg dishes (such as frittata, quiche)	160
Leftovers, etc.	Leftovers, casseroles, sauces, gravies	165
Seafood	Fish with fins	145 or cook until flesh is opaque and separates easily with a fork
	Shrimp, lobster, crab, scallops	Cook until flesh is pearly or white, and opaque
	Clams, oysters, mussels	Cook until shells open during cooking

Drug-Nutrient Interactions

The following should be avoided due to interference with certain post-transplant medications:

- Grapefruit
- Papaya
- Pomegranate
- Pomelo
- Starfruit
- St. John's Wort

Please let the transplant team know of any supplements you are taking.

While following a diet specific for liver disease, keep in mind any other diet restrictions you may have as advised by your doctor or dietitian. The transplant dietitian can help create a diet plan specific to your needs after transplant. Do not hesitate to contact the transplant dietitian with any questions at **(734) 936-8273**.