

Steps to Good Nutrition after LUNG TRANSPLANT

Healthy Eating

Nutrition plays an important role in recovering after a lung transplant. Eating enough protein, calories, vitamins and minerals will help your body heal. Protein helps build tissue, protect muscles and fight infections. Carbohydrates and fats fuel your body with the energy needed for recovery.

Protein

You will need a high protein diet for 6–8 weeks after your transplant. You will need high protein foods to help you heal from surgery, make new cells, and prevent infection. If you have lost muscle prior to transplant, you may require a high protein diet for 3 months or longer to rebuild your strength.

Your total requirement is _____ grams of protein per day (*1.5 g/kg actual or ideal weight*).

Long-term it is less at _____ grams of protein per day (*1.2 g/kg actual or ideal weight*).

Helpful Hints:

- Divide protein evenly between your meals and snacks
- 3 ounces (90 grams) of cooked meat is about the size of a deck of cards
- Protein powder may be used to help you meet your protein needs. Check the nutrition label for specific protein amount of each scoop. Also check the ingredient list to ensure the product is appropriate after your transplant as some powders may contain unwanted additives such as probiotics that may increase risk for bacterial translocation.

Meat Sources	Amount	Grams of Protein
Chicken, beef, lamb, pork or veal, cooked	3 ounces (90 grams)	25
Fish and shellfish, cooked	3 ounces (90 grams)	18
Canned tuna or salmon (drained)	½ can (60 grams)	14

Vegetarian Sources	Amount	Grams of Protein
Cooked split peas, beans, lentils or chickpeas	1 cup (250 mL)	15
Tofu (firm)	½ cup (125 grams)	10
Peanut butter/Almond butter	2 Tbsp. (30 mL)	7-8
Seeds (pumpkin, sesame and sunflower)	1 ounce (¼ cup)	7
Nuts (peanuts, almonds, walnuts, cashews)	1 ounce (¼ cup)	6
Eggs (large)	1	6

Dairy & Alternative Products	Amount	Grams of Protein
Greek yogurt	¾ cup (175 grams)	15-18
Cottage cheese, ricotta cheese, paneer	½ cup (115 grams)	14
Milk (skim, 1%, 2%, whole or chocolate)	1 cup (250 mL)	9
Soy milk	1 cup (250 mL)	7
Cheese (hard)	1 ounce (28 grams)	7
Yogurt	¾ cup (175 grams)	6
Skim milk powder	2 Tbsp. (30 mL)	5
Pudding (made with milk)	½ cup (125 mL)	4

***Fortified plant based beverages (almond, cashew, rice, oat, coconut) are not a significant source of protein.**

Grain Products	Amount	Grams of Protein
Quinoa, cooked	1 cup (250 mL)	8
Bagel, 3½ inch diameter	1	7
Pasta, cooked	1 cup (250 mL)	7
Pita, 6½ inch diameter	1	6
Rice, cooked	1 cup (250 mL)	6
Cream of wheat	1 cup (250 mL)	4
Oatmeal	¾ cup (188 mL)	4
Bread	1 slice	2-4

Nutritional Supplements	Amount	Grams of Protein
Protein powder – whey protein isolate (Boost® Just Protein)	21g	18
Vegan protein powder – soy/pea/hemp/brown rice protein	21g	13
Protein bars (Clif® Builder's Bar, PowerBar®, Protein Plus®)	1 bar	20
Vegan protein bars (Vega Sport®, Vega® 20g Protein Bar)	1 bar	20
Energy bars (Clif® Bar, Luna® Bar, PowerBar®)	1 bar	8-11
Boost® High Protein or Ensure® High Protein or Ensure® Protein Max	1 bottle	12-20
Diabetic Boost® or Glucerna®	1 bottle	11-16
Boost Plus® or Ensure Plus®	1 bottle	14
Boost® or Ensure®	1 bottle	9-10

Fluid

Drink fluids throughout the day

Your fluid requirement is _____ mL per day.

At least half of your fluid should be water. Fluid is important for good kidney function.



Potassium

Your potassium may be high after transplant. It needs to be managed based on lab work. Transplant medication may push up your potassium level, and if so, you'll need to avoid high potassium foods such as: bananas, oranges, potatoes, dark green vegetables, lentils. Follow the guidelines of your dietitian/team.

Magnesium

Your magnesium may be low after transplant. Brazil nuts, pumpkin seeds, and hemp hearts are some of the highest food sources of magnesium. Also eat other nuts and seeds, whole grains, bran cereals, cooked dried beans, peas and lentils, peanut butter, brown rice, and dairy.

Salt

Be moderate in your use of salt and salty foods. Limit processed and convenience food and cook at home more often. Some people may need more or less salt than this. Follow the instructions of your transplant team.

Bone Health

You need calcium and vitamin D to keep your bones healthy

- Vitamin D needs: 600-1000 IU per day
- Calcium needs: 1000-1200 mg per day (3-4 servings of high calcium foods per day)

One serving of a high calcium food is:

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|-------------------------------|---|
| • Milk | 1 cup (250 mL) |
| • Yogurt | $\frac{3}{4}$ cup (175 grams) |
| • Cheese | 1½ ounces (50 grams) (approximately 2 thumbs worth) |
| • Calcium-fortified soy milk | 1 cup (250 mL) |
| • Firm tofu made with calcium | 5 ounces (150 grams) |
| • Canned salmon with bones | 2.5 ounces (75 grams) |
| • Canned sardines | 2.5 ounces (75 grams) |

Talk to your dietitian if you cannot eat 3-4 servings of high calcium foods per day – a calcium supplement may be needed.

Weight Gain

Excess weight gain after transplant can cause impairment of new lung graft function, high cholesterol, and high blood pressure leading to impairment of kidney function. Follow the Healthy Plate diet pattern as directed by your health care provider and limit simple sugars such as juice, candies, cookies, cakes and soda. Extra weight can also make it difficult to control blood glucose.

It is easier to prevent weight gain than to lose the weight. Please incorporate exercise and healthy eating habits into your daily routine.

Speak to your dietitian if you are overweight or gaining too much weight.

Medication Side Effects

Some common post-transplant medications may cause changes to your bowel function, appetite, weight, or blood glucose control.

Your dietitian can help you address these side effects, and dietary intervention can help prevent or manage high blood pressure, high cholesterol, diabetes, and potential loss of kidney function.

Speak to your dietitian if you have concerns about any of these issues.

Food Safety for Immunocompromised Individuals

Choose Foods Wisely

- Check the SELL BY, USE BY, BEST BEFORE or EXPIRY dates and discard if past due
- Place all raw meat/poultry/fish in plastic bags to prevent their juices from contacting other foods in grocery cart and refrigerator
- Avoid self-select bulk foods

Handle Foods Safely

- Wash hands and surfaces thoroughly - sanitize countertops, cutting boards and utensils before and after preparing food. Use a kitchen sanitizer (as directed) or a bleach solution (add 5 mL of bleach to 750 mL of water). Rinse all items carefully with water.
- Cook food to safe internal temperature - use a thermometer (see page 6 for temperatures)
- Refrigerate cooked foods promptly - eat leftovers within 2–4 days
- Avoid cross-contamination - keep raw meat, poultry, fish and their juices away from other foods

Thaw Food Safely

- Use refrigerator for slow and safe thawing of meat, fish and poultry
- Cold water can be used for faster thawing. Place food in leak-proof plastic bag and submerge in cold tap water
- Microwave: cook meat and poultry immediately after microwave thawing

Raw, Undercooked, Unpasteurized Foods

- Avoid raw or undercooked ground meats, pork, poultry, game meat, non-canned pate and meat spreads, fish, seafood (sashimi, oysters, smoked salmon, ceviche), or eggs
- Avoid non-dried deli meats, including uncooked hot dogs and their juices
- Avoid unpasteurized milk and dairy products, juices and ciders
- Avoid soft and semi-soft cheeses (ex. Havarti, Brie, blue-veined cheeses)
- Avoid raw sprouts

This will minimize your chances of contracting listeriosis and other foodborne illnesses such as E.coli and salmonella. Symptoms of a foodborne illness include: nausea, vomiting, diarrhea, abdominal cramping, fever, skin rash and low blood pressure. Notify your doctor if you experience any of these symptoms.

Food Recall Alerts

You can view Canadian food recall warnings online at inspection.gc.ca/ and you can sign up to receive the most recent recall warnings by email at: inspection.gc.ca/english/util/listserv/listsube.shtml?foodrecalls_rappelsaliments

Type of Food	Food to Avoid	Safer Alternatives
Hot dogs	Hot dogs straight from the package, without further heating.	Hot dogs that are well cooked to a safe internal temperature. The middle of the hot dog should be steaming hot or 74°C (165°F).
Deli meats	Non-dried deli meats, such as bologna, roast beef and turkey breast.	Dried and salted deli meats, such as salami and pepperoni. Non-dried deli meats that are heated until steaming hot.
Eggs and egg products	Raw or lightly cooked eggs, or egg products that contain raw eggs, including some salad dressings, cookie dough, cake batter, sauces, and drinks (like homemade eggnog).	Egg dishes that are well cooked to a safe internal temperature of 74°C (165 °F). Cook eggs until the yolk is firm. Homemade eggnog heated to 71°C (160°F).
Meat and poultry	Raw or undercooked meat or poultry, such as steak tartar.	Meat and poultry that are cooked to their safe internal temperature (see page 6).
Seafood	Raw seafood, such as sushi. Raw oysters, clams and mussels. Refrigerated, smoked seafood.	Seafood cooked to a safe internal temperature of 74°C (165°F). Oysters, clams and mussels that are cooked until the shell has opened. Smoked seafood in cans, or seafood that does not need to be refrigerated until it is opened.
Dairy products	Raw or unpasteurized dairy products. Unpasteurized and pasteurized soft cheeses, such as Brie and Camembert. Unpasteurized and pasteurized semi-soft cheeses, such as Havarti and Monterey Jack. All unpasteurized and pasteurized blue-veined cheeses.	Pasteurized dairy products. Pasteurized cheeses such as cheese curds, cheddar, and cottage cheese. Pasteurized processed/spreadable cheeses, such as cream cheese. Pasteurized and unpasteurized hard cheeses, such as Romano and Parmesan.
Sprouts	Raw sprouts such as alfalfa, clover, radish and mung beans.	Thoroughly cooked sprouts.
Pâtés and meat spreads	Refrigerated pâtés and meat spreads.	Pâtés and meat spreads sold in cans, or that do not have to be refrigerated until they are opened.
Fruit juice and cider	Unpasteurized fruit juice and cider.	Unpasteurized fruit juice and cider that are brought to a rolling boil and cooled. Pasteurized fruit juice and cider.

The above information is taken from Health Canada's "Safe Food Handling for Immunocompromised Individuals." It is available at nada.ca/wp-content/uploads/2017/03/immune-immunitaire-eng.pdf.

Safe Internal Cooking Temperatures Chart

MEAT, POULTRY, EGGS AND FISH		TEMPERATURE
Beef, veal and lamb (pieces and whole cuts)		
Medium-rare		63 °C (145 °F)
Medium		71 °C (160 °F)
Well-done		77 °C (170 °F)
Mechanically tenderized beef (solid cut)		
Beef and veal		63 °C (145 °F)
Steak (turn over at least twice during cooking)		63 °C (145 °F)
Pork (ham, pork loin and ribs)		
Pork (pieces and whole cuts)		71 °C (160 °F)
Ground meat and meat mixtures (burgers, sausages, meatballs, meatloaf and casseroles)		
Beef, veal, lamb and pork		71 °C (160 °F)
Poultry (chicken and turkey)		74 °C (165 °F)
Poultry (chicken, turkey and duck)		
Pieces		74 °C (165 °F)
Whole		82 °C (180 °F)
Eggs		
Egg dishes		74 °C (165 °F)
Seafood		
Fish		70 °C (158 °F)
Shellfish* (shrimp, lobster, crab, scallops, clams, mussels and oysters)		74 °C (165 °F)
Other foods		
Other foods (hot dogs, stuffing and leftovers)		74 °C (165 °F)

Foods and Supplements Can Affect Your Medications or Lungs

Vitamins or minerals, such as calcium pills or multivitamins, **should not** be taken within 2 hours of your transplant medications.

Avoid Grapefruit, Pomelo, Seville Oranges and Starfruit

Seville orange, also known as bitter orange, is most often found as an ingredient in marmalade.

Avoid these fruits and their juices as they can make the blood levels of your transplant medications too high.

Use caution with teas

Regular black tea is considered safe.

Green tea and Earl grey tea can be safely consumed in small and consistent quantities (e.g. 1-2 cups per day).

Other herbal teas, tinctures, or tisanes **should not** be consumed until discussed with your transplant dietitian and transplant pharmacist.

Herbal Products, Nutrition Supplements, and Probiotics

Check with the transplant team before taking herbal or nutrition products and supplement pills. These products may:

- Interact with transplant medications
- Make your immune system too strong

Probiotics naturally occurring in yogurts and foods are considered safe, but avoid probiotic supplements as these contain much higher levels and have been reported to cause problems in some post-transplant patients. Check the ingredient list of protein powders as some companies add probiotics to their products.

Alcohol

Check with the transplant team before drinking alcoholic beverages.

If you have any questions, please contact:

Your Dietitian: _____ Telephone: 604-875-4111 x 67947

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