NUTRITION FOR PEOPLE ON DIALYSIS

Abbott

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Content

What do kidneys do?

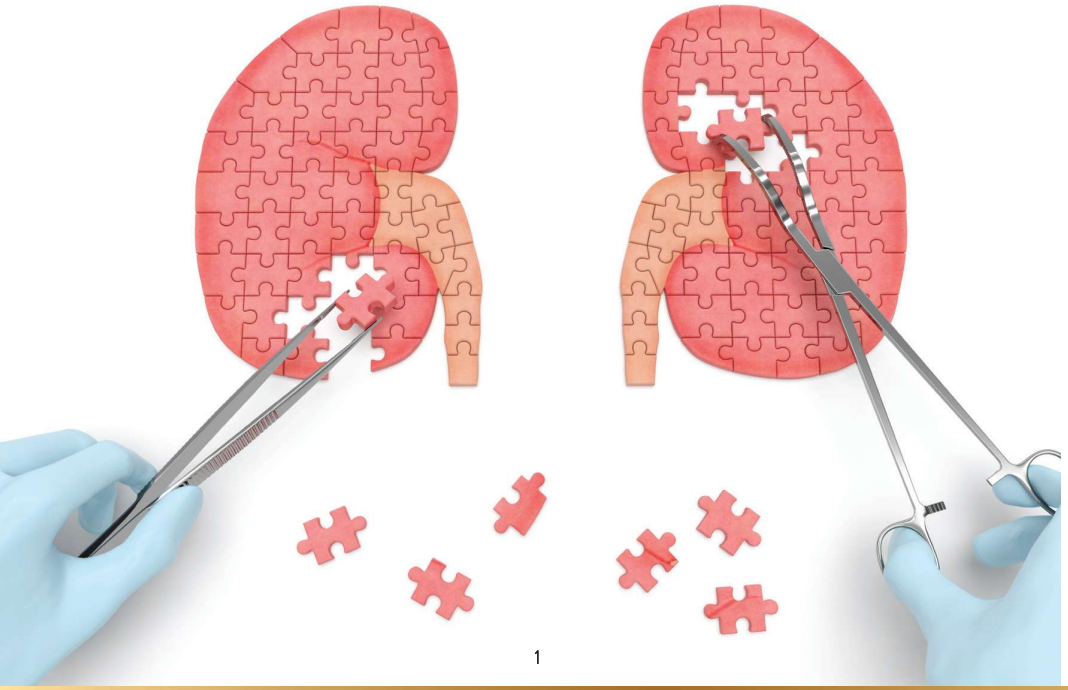
A key function of the kidneys is to remove waste products and excess fluid from the body through urine.

When the protein we eat is digested, a waste product called urea is formed.

Urea and other wastes are combined with water in the kidneys to form urine.

The kidneys also perform other important functions in the body, such as:

- Maintaining the body's balance of water, minerals (e.g. calcium & phosphorus) and electrolytes (e.g. sodium & potassium)
- Releasing hormones which stimulate red blood cell production and help regulate blood pressure
- Producing an active form of Vitamin D that helps to keep bones strong



What is chronic kidney disease (CKD)?

Chronic kidney disease (CKD) refers to a gradual loss of kidney function. Damaged or diseased kidneys do not filter enough waste products from the blood, causing them to build up in the blood and act like poison. People with CKD may also develop complications like high blood pressure, anemia, weak bones, poor nutritional status and nerve damage. CKD also increases the risk of having heart and blood vessel diseases over time.

Common causes of CKD include diabetes, high blood pressure, glomerulonephritis (inflammation and damage to the kidney's filtering units) and hereditary kidney diseases. Individuals can lose more than half their normal kidney function before they start to notice symptoms of kidney disease. Some of these symptoms are:

- **Nausea**
- **Vomiting**
- **Tiredness**
- **Loss of appetite**
- **Itchiness**
- **High blood pressure**
- **Shortness of breath**
- **Swelling in hands, face and feet**

When kidney disease progresses, it may eventually lead to kidney failure. Dialysis or a kidney transplant is then needed to maintain life.

What is dialysis?

Dialysis is an artificial filtering procedure which acts like the normal kidney to remove extra water and waste products that have built up in the body.

There are two kinds of dialysis – hemodialysis and peritoneal dialysis.

Hemodialysis (HD)

HD is the process of removing toxins and excess fluid from the body by continually circulating the blood through a filter called dialyzer. This filter is used with a dialysis machine 3 to 4 times a week.

Peritoneal Dialysis (PD)

In PD, the abdominal cavity is filled with a cleansing solution called dialysate. The walls of the abdominal cavity are lined with a membrane called peritoneum, which allows waste products and extra fluid to pass from the blood into the dialysate. The dialysate typically stays in the peritoneum for 4-5 hours, before it is drained and replaced.

What is albumin and why is it important?

Albumin is a type of protein in the blood. On a regular basis, your albumin level will be measured. Low albumin levels in patients CKD have been associated with poor health outcomes.

Consult your doctor to find out what your target albumin level should be and talk to your dietitian about nutritional options to help you reach that target.

Weighty issues

A person with healthy kidneys may urinate up to seven times a day. Most people on dialysis, however, make little to no urine, because their kidneys can no longer remove wastes and extra fluid from the body effectively. Without urination, fluid builds up in the body and can cause swelling, shortness of breath and weight gain. Dialysis filters the blood to remove excess fluid but it cannot do the job as effectively as healthy kidneys which work around the clock.

Your weight without the excess fluid that builds up between dialysis is called dry weight. It is the lowest weight you can safely reach after dialysis without developing symptoms of low blood pressure such as cramping, which can occur when too much fluid is removed. In general, you should not gain more than 5% of estimated dry weight between dialysis sessions.

Nutrition and dialysis: A basic guide

The dietary needs of people on dialysis may vary depending on factors such as body size, activity level and blood test results. If the individual is following a diet plan for diabetes or other health conditions, he or she has to continue on it as well.

It can be challenging for dialysis patients to manage their diet, hence they are strongly encouraged to consult a dietitian for personalized guidance on food intake to meet dietary goals.

Getting the right nutrition through your prescribed diet and appropriate nutrition supplements can help improve your condition and make you feel stronger. Importantly, it can also help improve the effectiveness of your dialysis treatments as well as reduce risk of health complications.

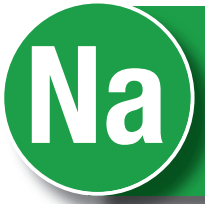
Dietary goals at a glance

Calories
You have to eat enough calories to supply your body with the energy to function properly and carry out daily activities.

Protein
You need more protein than before to replace the protein you lose during dialysis. Eating the right amount of protein will help in building muscle.

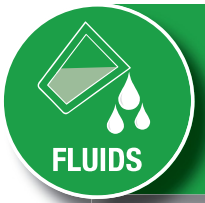
Potassium
High potassium levels in the blood can cause irregular heartbeat or a heart attack. Foods which are high in potassium, such as certain type of fruit and vegetables may need to be limited or avoided. Soaking and cooking these food items with extra water and draining it off, may help lower potassium content as well.

Phosphorus
The build-up of phosphorus in the blood can draw calcium out of your bones, making them weak. Foods high in phosphorus such as dairy products, organ meats, fish with edible bones, whole-grains and beans may need to be reduced.



Sodium
Consuming too much sodium can lead to fluid retention, causing swelling of the legs and feet and increasing blood pressure. Restriction of sodium intake can help to maintain normal fluid balance.

Vitamins
Some vitamins need to be supplemented, while the intake of others should be controlled.



Fluids
Excess fluid intake can result in shortness of breath, swelling and increased blood pressure. Getting the right amount of fluid will help you feel your best. Consult your doctor, dietitian or nurse about your daily fluid allowance.

Calories

You need to have sufficient calories in the diet to supply your body with energy to function properly and carry out daily activities. If too few calories are consumed, the body may break down muscles for energy and also utilize dietary protein as an energy source. This is not desirable as protein then cannot perform the valuable function of building body tissues.

To help make up your daily calorie needs, you need to eat your prescribed diet which includes approved food items from each of the food groups. Adding more fat and sugar (such as margarine, oils, honey and jam) to the diet can help you increase energy intake. Discuss with your dietitian on how you can ensure adequate calorie intake while making appropriate food choices. This is especially important if you have diabetes and need to maintain good sugar control (see section on “Dialysis and diabetes”).

Protein

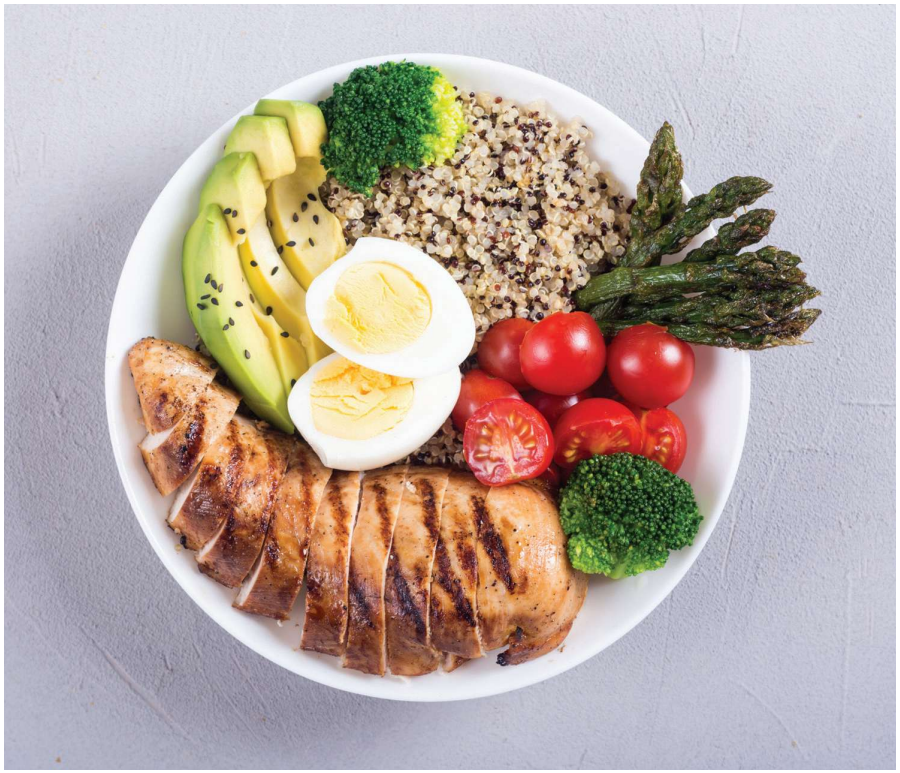
You may have been on a low protein diet before dialysis, but now your body needs more protein to replace the protein you lose during dialysis treatment. The key is to eat the right amount of protein – neither too little nor too much.

With the right amount of protein, your body can build muscles and you can improve the body’s immune system. This helps to reduce the risk of health complications like infections and malnutrition.

Protein is found in both animal and plant foods:

1. Animal protein- meat, poultry, fish and other seafood, eggs, milk and milk products
2. Plant protein- beans and bean products (e.g. tofu), nuts, lentils, bread, rice

Protein from animal sources is the best in quality, which means they are efficiently used by the body and so should make up most of the protein in the diet.



Protein Exchanges

Each food in the protein exchange list below contains 7g of protein. Protein exchange helps provide variety in choosing suitable protein sources in your diet.

Please consult your dietitian to learn more and find out the number of protein exchanges you require in a day.

ANIMAL PROTEIN:	
Egg	1 (medium)
(Cooked) Fish Chicken Mutton Beef Pork	30g or 1 matchbox size
Prawn	4 (medium)

MILK & MILK PRODUCTS*+:	
Fresh Milk or UHT	1 cup (200ml)
Milk Powder	4 tablespoons (150g)
Yoghurt	1 small tub (150g)
Cheese*	1½ slice (30g)

LEGUMES*+:	
Beans/Lentils (cooked)	½ cup (120g)
Taukua	½ square firm (60g)
Tofu	½ large block soft (150g)

NUTS/SEEDS*+:	
Nuts and Seeds	½ cup (30g)
Peanut Butter	2 dessert spoons (30g)

* High in sodium
\+ High in phosphate

USEFUL TIP
Spread out the intake of protein evenly throughout the day for better utilization by the body.

Potassium

Potassium is a mineral that helps your nerves, muscles and heart work properly. For people with CKD, the kidneys can no longer remove excess potassium.

Choose foods which are low or moderate in potassium more frequently and consume in moderation. Foods which are high in potassium should be limited or avoided.

Fruits – limit to 2 servings per day

Low < 150mg potassium per serving		Medium 150 – 250mg potassium per serving		High > 250mg potassium per serving	
Apple	1 small	Cherry	10 medium	Apricots	4 small
Blueberries	½ cup	Chiku	1½ medium	Avocado	1 medium
Cranberries	100g	Duku	10 medium	Banana	1 small
Durian	2 seed	Langsat	10 medium	Custard apple	1 medium
Dragon fruit	½ fruit	Lychee	6 medium	Dates	2 pieces
Grapes	10 small	Orange	1 small	Figs	2 small
Grapefruit	½ fruit	Papaya	1 slice	Honeydew	1 slice
Guava	½ fruit	Passion fruit	3½ medium	Jackfruit	2 seed
Lemon	1 small	Peach	1 medium	Kiwi	1 medium
Lime	1 whole	Persimmon	1 medium	Mango	½ medium
Longan	10 medium	Plum	2 small	Nectarine	1 medium
Mangosteen	4 medium	Pomelo	3 segment	Pomegranate	½ medium
Pear	1 small	Raspberries	1 cup	Prunes	4 pieces
Pineapple	1 wedge	Strawberries	1 cup	Rockmelon	1 slice
Rambutan	4 medium	Tangerines	1 medium	Soursop	1 slice
Water apple	4 medium	Dried fruit e.g. Raisins	20g		
Watermelon	1 wedge				
Canned fruit (juices drained)	½ cup				

Source: National Kidney Foundation

Vegetables – limit to 2 servings per day
1 serving = 100g (¾ cup) cooked; 100g raw non-leafy; 150g raw leafy

Low < 200mg potassium per serving	Medium 200 – 350mg potassium per serving	High > 350mg potassium per serving
Bean sprouts	Asparagus	Bamboo shoot
Brinjal	Chinese cabbage	Broccoli
Cabbage	Cauliflower	Mustard green/Chye Sim
Capsicum	Carrot	Chick peas
Carrot (frozen/boiled)	Celery	Fern shoot (pucuk paku)
Cucumber	Chives	Fresh mushroom
French bean	Chili (green/red)	Kale (Kai Lan)
Gourd – all types	Ladies finger	Lotus root
Kangkung	Leeks	Petai
Lettuce	Lentils (boiled/dhal)	Potatoes
Long bean	Lima bean	Seaweed
Mushroom	Peas (raw/dried)	Spinach
– Canned, drained	Snow peas	Sweet potato
– Dried, soaked and drained	Pumpkin	Sweet potato leaves
Onion	Sweetcorn (frozen/boiled)	Tomato (paste/puree)
Peas (frozen/boiled)	Tomato (raw, canned)	Water chestnut
Spring onion		
Turnip		
Winter melon		

Source: National Kidney Foundation

Beverages

Low	Medium	High
Syrup-based drinks	Barley	Strong coffee or tea
	Chinese tea	All fresh/canned fruit & vegetable juice
	Non-cola beverage	Herbal medicine drinks
	Sugar cane juice	Cocoa & malted beverage
		Milk
		Wine

USEFUL TIP

1. To remove some of the potassium from vegetables:
   - Cut vegetables into smaller pieces
   - Soak vegetables in water for 1-2 hours
   - Drain water before cooking
2. Drain juice or syrup from canned fruits and vegetables
3. Use whole rather than ground spices

Source: National Kidney Foundation

Phosphorus

When the kidneys are not working properly, phosphorus can build up in your blood. A high phosphate level tends to attract calcium from the bones, making them weak and brittle. It also results in the deposition of hard calcium phosphate salts in the soft tissues, leading to conditions like skin itchiness, joint pains and eye irritation.

Phosphorus is mainly found in animal foods and dairy products. Some plant food such as whole-grain and nuts contains high phosphorus as well. Limit the intake of foods high in phosphorus.

FOODS HIGH IN PHOSPHORUS

- Milk
- Yoghurt
- Cheese
- Legumes (e.g. tofu, soybean milk)
- Nuts and products (e.g. peanut butter)
- Seeds and products (e.g. sesame oil)
- Coconut and products (e.g. coconut milk)
- Cola drinks/dark colored soda
- Malted and cocoa-based drinks
- Cheese, nut and chocolate-based biscuits
- Chocolate
- Keropok (fish and prawn cracker)
- Bones (chicken wing or feet soup stocks)
- Fish with edible bones (sardines)
- Organ meat (e.g. liver, kidney)
- Egg yolk
- Extracts (Marmite/Bovril)
- Anchovies (ikan bilis)
- Dried prawn
- Dried fish
- Dried mushroom
- Seaweed
- Oats
- Muesli/Weet-Bix
- Brown rice
- Wholemeal
- Wholegrain bread/biscuits

Source: National Kidney Foundation

USEFUL TIP

Don't forget to take phosphate binders (e.g. calcium carbonate) with meals! If prescribed, these pills bind phosphate from food and prevent their absorption into the blood. Taking them without a meal makes them ineffective.

Sodium

Sodium is a major part of table salt and can be commonly found in sauces, condiments, preservatives, preserved foods and canned foods. Too much sodium increases thirst and causes fluid build-up in the body, which increases blood pressure and can hurt your heart.

Here are some steps to help reduce your sodium intake.

1. Most sodium comes from processed food and is present in many different forms. Read the ingredient labels. The product is likely to be high in sodium if the first three ingredients contain any of these:
   - Sodium chloride/table salt
   - Monosodium glutamate (MSG)
   - Rock/sea/iodized salt
   - Baking powder
   - Sodium nitrite
   - Sodium benzoate
2. Avoid the use of lower sodium salts as they usually contain potassium.

USEFUL TIPS

- Limit sodium-rich processed food such as luncheon meat or hot dogs and choose fresh vegetables, poultry and meat.
- When cooking at home, use whole spices, lemon juice or natural seasonings such as shallots, onions, garlic and parsley to spice up your cooking instead of adding table salt.
- Only add salt or sauces sparingly after cooking. Taste the food before salt is added.
- Avoid having pickles, sambal belachan, papadum or chutneys with your meal.
- Minimize the number of times you eat out as most food sold outside is highly salted.
- When dining out, ask for less gravy, avoid drinking the soup and limit preserved foods such as 'ikan bilis'. Remember to request for freshly cooked items without salt, MSG or soy sauce.
- When purchasing foods, choose foods that have the 'Healthier Choice' symbol or those labelled in 'Low In Sodium' or 'No Added Salt'.
- Read food labels to compare similar foods per 100g and choose the lower sodium version.

Vitamins

People on dialysis often need to take a renal multivitamin supplement with the right balance of vitamins. This is because some vitamins are lost during dialysis (e.g. vitamin B6 & B12), and following a dialysis diet could also mean that you are not getting enough of certain vitamins. On the other hand, some vitamins should not be supplemented because levels will build up in the body as the kidneys stop working (e.g. Vitamin A).

If a vitamin supplement is not prescribed, you should ask your doctor or dietitian for a recommendation before taking one.

Fluids

When you drink or consume too much fluid, you may get:

- Cramps during your dialysis session
- High blood pressure
- Shortness of breath
- Increase in blood pressure
- Heart problems, e.g. fast pulse, weakened heart muscles and an enlarged heart
- Muscle cramping and drop in blood pressure after dialysis treatment, which can leave you feeling nauseated, dizzy and weak

Sources of fluid include liquids like water, tea, coffee, cordial drinks, milk and soup. Other food items can contribute fluid too, such as porridge, jelly, ice cube, ice cream and ice kacang.

Daily allowance for fluid intake may vary from 500 to 1000 ml per day, depending on your urine output and activity levels. To know if you're in the correct fluid balance, you can weigh yourself daily to monitor sudden/rapid rise in weight, or check your legs for swelling.

Here are some ways to help control your fluid intake:

- Measure the fluid allowed for the day in a jug. Each time you consume any fluid, pour out the same amount from the container. When it runs out of water, you know you have reached your daily allowance
- Suck on an ice cube to moisten dry mouth (the fluid content should be accounted for)
- Rinse mouth with water but do not swallow it
- Limit salty food so you will feel less thirsty

Fluid Content Of Common Measures

Item	Volume (ml)
1 tablespoon	15
1 Chinese soup spoon	30
1 ice cube	20
1 Chinese bowl of porridge	100
1 tea cup	150
1 cup	250

Dialysis and diabetes

If you have diabetes, your doctor may adjust your medication to help optimize blood sugar control while on dialysis. Diet management also becomes even more important.

Carbohydrate foods affect blood sugar the most, so your carbohydrate intake would need to be adjusted to help manage your blood sugar levels. Carbohydrates include both starchy foods like rice, bread, noodles and fruits, as well as sugary foods like candies and sweet desserts.

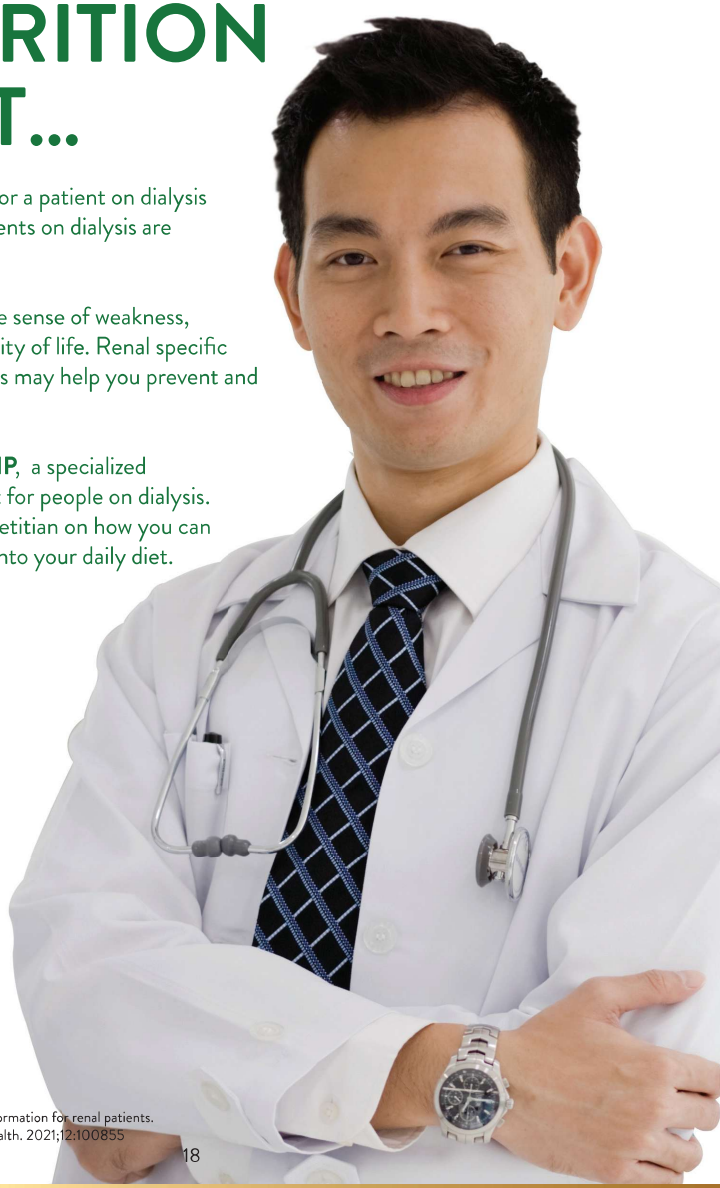
Consult your dietitian to find out the amount of carbohydrates that are sufficient to meet your needs and the type of carbohydrate foods to eat. If you are on peritoneal dialysis, the dietitian will also take into account the quantity of dialysate solutions you're using as the dialysate is usually a sugar-based solution.

WHEN YOU NEED A NUTRITION BOOST...

Following a diet suitable for a patient on dialysis is hard. Almost 1 in 2 patients on dialysis are malnourished[1].

Malnutrition increases the sense of weakness, impairs recovery and quality of life. Renal specific oral nutrition supplements may help you prevent and overcome malnutrition.

Consider using **Nepro® HP**, a specialized medical nutrition product for people on dialysis. Consult your doctor or dietitian on how you can incorporate **Nepro® HP** into your daily diet.



This section contains product-specific information for renal patients.

[1] Rashid I, et al. Clin Epidemiol Global Health. 2021;12:100855

Nepro® HP supports your nutritional needs and helps to replace the protein and other nutrients you may have lost during dialysis

PROTEIN

HIGH IN PROTEIN
(17.82g/bottle) to help replace protein lost during dialysis

B6 28 B3

COMPLETE & BALANCED
With 28 vitamins and minerals including vitamins B3 & B6 to help produce energy and reduce tiredness

P K Na

LOW IN PHOSPHORUS, POTASSIUM, AND SODIUM
to help comply with current expert recommendations*

* European Best Practice Guidelines (EBPG), European Society for Clinical Nutrition and Metabolism (ESPEN), National Kidney Foundation KDOQI/KDIGO guidelines – when used as sole source of nutrition

OTHER FEATURES OF NEPRO® HP

401 Kcal

Rich in calories
To meet energy needs (401kcal/bottle)

REDUCED WATER 161ml

Reduced water content
(161ml/220ml bottle)

Suitable for people with Diabetes
Advanced, slow-digesting, low Glycemic Index (GI) carbohydrate complex

Ω

Contains Omega-3
& monounsaturated fatty acids (MUFA)

Nepro® HP has low Glycemic Index of 35, which makes it also suitable for people with diabetes on dialysis.

How to incorporate Nepro® HP into your diet?*

***Note:**

Suggestion only, consult your dietitian to ensure Nepro® HP is used appropriately and aligned with your specific nutritional needs and treatment plan.

Add variety to your diet with Nepro® HP recipes.

Hearty Rice Porridge

Servings: 2

Ingredients:

- 0.5 bottle vanilla Nepro® HP (220ml)
- 0.5 cup cooked white rice
- 1 cups water
- 1 whole apples (peeled, cored, sliced)
- 0.5 tbsp sunflower seeds

Directions:

1. Mix together rice, water and sugar in a saucepan. Cook until soft.
2. Add sliced apples and cook until tender. Remove from fire and add vanilla Nepro® HP.
3. Stir well and serve hot. Garnish with sunflower seeds.

Nutrition Facts

Amount per serving	
Kcal	200
Protein	6 g
Carbohydrate	29 g
Fat	7 g
Sodium	44 mg
Potassium	162 mg
Calcium	68 mg
Phosphorus	82 mg

Mushroom Soup

Servings: 4

Ingredients:

- 0.5 bottle vanilla Nepro® HP (110ml)
- 0.75 cups homemade chicken stock
- 150g fresh mushrooms
- 0.5 tbsp butter
- Salt and black pepper to taste

Directions:

1. Bring stock to boil in a pot. Add mushrooms and butter. Cook for about 10 minutes then remove a few mushrooms for garnish.
2. Use a hand-held blender and blend all ingredients in the pot until smooth. Add vanilla Nepro® HP and stir well.
3. Portion into bowls, garnish with mushrooms and serve immediately.

Nutrition Facts

Amount per serving	
Kcal	139
Protein	6 g
Carbohydrate	10 g
Fat	9 g
Sodium	147 mg
Potassium	140 mg
Calcium	62 mg
Phosphorus	67 mg

Strawberry Smoothie

Servings: 2

Ingredients:

- 1 bottle vanilla Nepro® HP (220ml) (chilled)
- ½ cup frozen strawberries
- 4 tbsps water

Directions:

1. Combine the ingredients in the jar of a blender.
2. Blend on 'high' until smooth.
3. Serve immediately.

Nutrition Facts

Amount per serving

Kcal	213
Protein	9 g
Carbohydrate	19 g
Fat	11 g
Sodium	87 mg
Potassium	193 mg
Calcium	123 mg
Phosphorus	88 mg

Cranberry Crunch Muffins

Serves: 2

Serving Size: 1 muffin

Ingredients:

- 1/3 cup all-purpose flour
- 1/3 tsp baking powder
- 1/24 cup wheat germ
- 1/24 cup sliced almonds
- 1/12 tbsp unsalted butter
- 1/6 bottle vanilla Nepro® HP (36.67ml)
- 1/6 large egg
- 1/18 cup vegetable oil
- 1/12 tsp pure vanilla extract
- 1/6 tbsp fresh orange zest
- 1/12 cup chopped dried cranberries

Directions:

1. Preheat the oven to 400°F. Line a 12-cup muffin tin with paper liners. Set aside.
2. In a large mixing bowl, combine the flour, baking powder, artificial sweetener and wheat germ. Remove ¼ cup of the flour mixture and place in a separate smaller bowl.
3. To the ¼ cup flour mixture, add the sliced almonds and butter. Using a fork, combine this mixture until it is crumbly. Set aside almond crunch mixture.
4. Whisk together the vanilla Nepro® HP, egg, vegetable oil, vanilla extract, and orange zest. Pour the mixture into the remaining flour mixture and fold together (just to combine). Add the dried cranberries and gently fold into batter. Do not over-blend the batter.
5. Spoon the batter into the prepared muffins pan. Sprinkle almond crunch mixture (see step #3) evenly over each cup. Bake for 14 to 16 minutes. Remove the muffins from the pan immediately and transfer them to a wire rack to cool. Serve warm. Muffins can be cooled, wrapped individually in airtight bags, and frozen up to 1 month.

Nutrition Facts

Amount per serving

Kcal	148
Protein	5 g
Carbohydrate	24 g
Fat	8 g
Sodium	79 mg
Potassium	67 mg
Calcium	143 mg
Phosphorus	197 mg

Your Meal Plan

Consult your dietician for a personalized CKD-friendly meal plan tailored to meet your nutritional needs.

Meal	Time	Food Item/portion	Remark
Breakfast			
Snack			
Lunch			
Snack			
Dinner			

Talk to your dietitian on what your daily nutrition targets should be.

Calories

Target calories per day _____

Protein

Target grams per day _____

Phosphorus

Target milligrams per day _____

Potassium

Target milligrams per day _____

Fluids

Target milliliters per day _____

Dry Weight

Target kilograms per day _____

Ask your dietitian how you can include Nepro® HP in your daily meal plan.

Your Health Chart

Name: ____________________ Date of Birth: ____________

Height: ________ cm Gender: Male/Female

			Date of Examination		
Key measurements	Units	Range	/ /	/ /	/ /
Weight	kg				
BMI		18.5 - 23			
Blood Pressure (BP)	mmHg	120/80			
Renal Profile					
Potassium	mmol/L	3.5–5.5			
Sodium	mmol/L	135-150			
Chloride	mmol/L	96 - 108			
Bicarbonate	mmol/L	>20 <24			
Pre Creatinine	Variable on body mass and gender				
Post Creatinine	µmol/L	442			
Pre Urea	mmol/L	>20 <40			
Post Urea	mmol/L	< 6.67			
Bone Profile					
Calcium	mmol/L	2.2–2.60			
Phosphate	mmol/L	< 1.18			
Lipid Profile					
Total Cholesterol	mmol/L	< 6.1			
Triglycerides	mmol/L	< 2.3			
HDL-cholesterol	mmol/L	1.0–2.0			
LDL-cholesterol	mmol/L	< 3.334			
Albumin	g/L	> 35g			
Endocrine Function					
HbA1c	%	4.6–6.4			
Glucose Random	mmol/L	4.0–9.0			

Date of Examination					
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洗肾者营养信息

Abbott

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目录

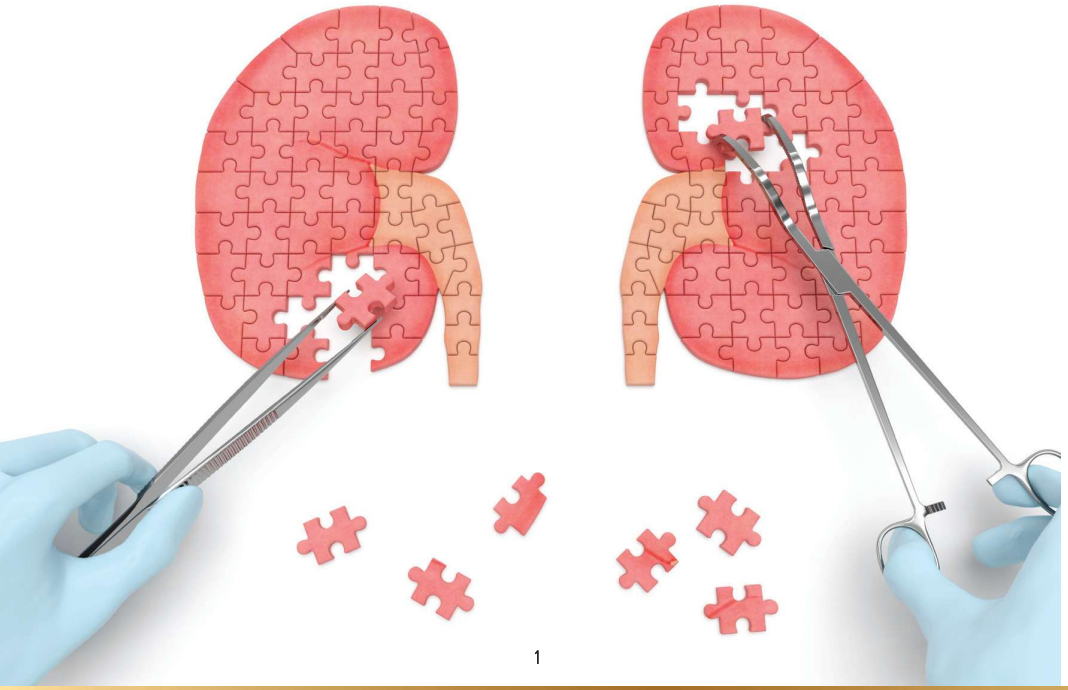
肾脏有什么功能?

肾脏的一个重要功能是通过尿液清除体内的废物和多余的体液。

当蛋白质被消化时,一种叫做尿素的废物产品会形成。尿素和体内的其他废物会在肾脏中与水结合,形成尿液。

肾脏在体内也有其他重要的功能,如:

- 保持身体的水、矿物质(如钙、磷)和电解质(如钠和钾)的平衡
- 释放刺激红细胞生成和有助于调节血压的激素
- 制造有助强化骨骼的活性维生素D



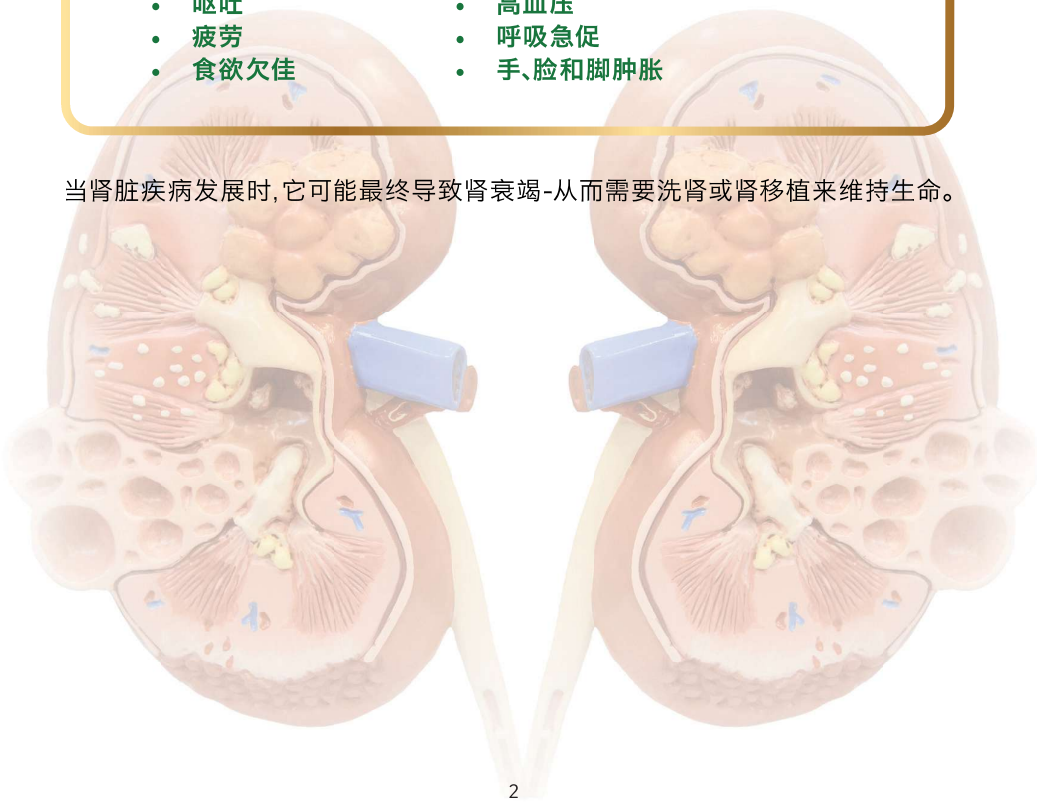
什么是慢性肾病(CKD)?

慢性肾病 (CKD) 是指肾功能逐渐衰退。受损或患病的肾脏不能从血液中过滤足够的废物,导致它们在血液中累积,并像毒药一样产生毒副作用。CKD 患者可能出现并发症,如高血压、贫血、骨质疏松、营养状况差和神经损伤。长久之下,CKD 也增加患心脏病和血管疾病的风险。

慢性肾脏病 (CKD) 的常见病因包括糖尿病、高血压、肾炎(肾脏的过滤单元发炎和损伤)和遗传性肾脏疾病。在您开始注意到肾脏病的病症前,您的肾脏可能已经失去了一半以上的正常功能。慢性肾脏病的病症包括:

- **恶心**
- **呕吐**
- **疲劳**
- **食欲欠佳**
- **发痒**
- **高血压**
- **呼吸急促**
- **手、脸和脚肿胀**

当肾脏疾病发展时,它可能最终导致肾衰竭-从而需要洗肾或肾移植来维持生命。



什么是洗肾?

洗肾是一种仿效正常肾脏运作的人工过滤程序,从体内去除多余的水和已经在身体里累积的废物。

有2种洗肾方式-血液洗肾与腹膜洗肾。

血液洗肾(HD)

HD 是通过不断循环血液,将其通过一个被称为洗肾器的过滤器,来去除体内的毒素和多余液体的过程。该过滤器与洗肾机一起使用,每周使用3至4次。

腹膜洗肾(PD)

进行腹膜洗肾(PD)时,腹腔会被注入透析溶液。腹腔内的腹膜作为过滤网,清除液中的废物和多余液体,将其排到腹腔里的透析溶液。透析溶液通常停留在腹膜4-5小时,然后再将其排出和更换。

白蛋白是什么,为什么它如此重要?

白蛋白是血液中的一种蛋白质,是一个衡量您整体营养健康的指标。您的白蛋白水平将被定期测试。在CKD患者中,过低的白蛋白水平与不良病诊结果,是被信为有着密切关连的。

向您的医生咨询您的白蛋白标准水平,并和营养师讨论如何正确饮食以帮助您达到目标。

体重问题

拥有健康肾脏的人一天会排尿高达七次。但对于洗肾者,他们通常会面对尿少或无尿问题,因为他们的肾脏不能有效地清除体内的废物和多余体液。没有排尿,体液会累积在体内,引起肿胀、呼吸急促和/或体重增加。

洗肾有助过滤血液,以去除多余的液体,但它的功效不如健康的肾脏,因为健康的肾脏是全天都在运作的。

干重量是洗肾者在没有累积多余体液的情况下,的理想体重。干重量也是洗肾者,避免出现低血压症状前,可达到的最低体重。当过多体液被排除,低血压症状如抽筋可出现。您不可在洗肾期间增加超过估计干重量的5%。

营养与洗肾：基本指南

洗肾患者的饮食需求取决于各种因素，比如体积、活跃水平和血液检测结果等因素。如果该患者在使用一个针对糖尿病或其它健康状况的饮食计划，他或她也必须继续坚持该计划。

对于洗肾患者，饮食管理是具有挑战性的，因此强烈建议他们咨询营养师以获得对食物摄入和营养的个人化指导。

通过您的规定饮食计划和相关营养品摄取足够的营养。这能有助提升您的身体状况，并让您保持强壮。这同时也能提升洗肾的效益和减少与肾病和洗肾有关的并发症。

饮食目标概述

卡路里

您必须摄取足够的热量来提供能量，让身体能正常运作和进行日常活动。

蛋白质

您需要比以前更多的蛋白质来补充您在洗肾过程中损失的大量蛋白质。食用适量的蛋白质将有助于建立肌肉。

钾

在血液中过高的钾水平会导致心跳不规则或心脏病发作。含钾量高的食物（如某些类型的水果和蔬菜）可能需要限制或避免食用。用额外的水浸泡和烹饪这些食物并将其沥干，也可能有助于降低钾含量。

磷

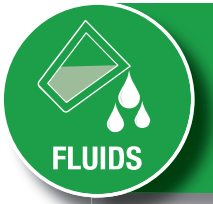
如磷在血液中累积，可能会导致钙质从骨骼中流失，使骨骼变弱。含磷量高的食物（如乳制品、内脏、含食用骨头的鱼类、全谷物和豆类），可能需要减少或避免摄取。

钠

摄取过多的钠会导致体液潴留，引起腿和脚水肿和血压升高。限制钠的摄取可有助维持正常的体液平衡。

维生素

一些维生素需补充，一些维生素需控制摄取量。



液体

摄取过量的液体会导致呼吸急促、肿胀和血压升高。饮用适量的液体将让您感觉最佳。向您的医生、营养师或护士咨询有关您每日应饮用的液体允许量。

卡路里

您需要摄取足够的热量来提供能量，让身体能正常运作和进行日常活动。如果摄取过少热量，身体会分解肌肉获取能量，也会利用食物中的蛋白质作为能量来源。这是不可取的，因为这样蛋白质就不能实现有价值的功能-建立人体组织。

为了达到您的每日热量需求，您需按照规定的饮食计划，从各种食物组别中摄取获准食品。在饮食中添加更多的脂肪和糖（如人造牛油，蜂蜜和果酱）也可帮助增加您摄取的热量。与您的营养师讨论如何确保您摄取足够的热量，同时做出适当的食物选择。如果您患有糖尿病，您需保持良好的血糖控制，这是尤其重要的（见下节“洗肾与糖尿病”）。

蛋白质

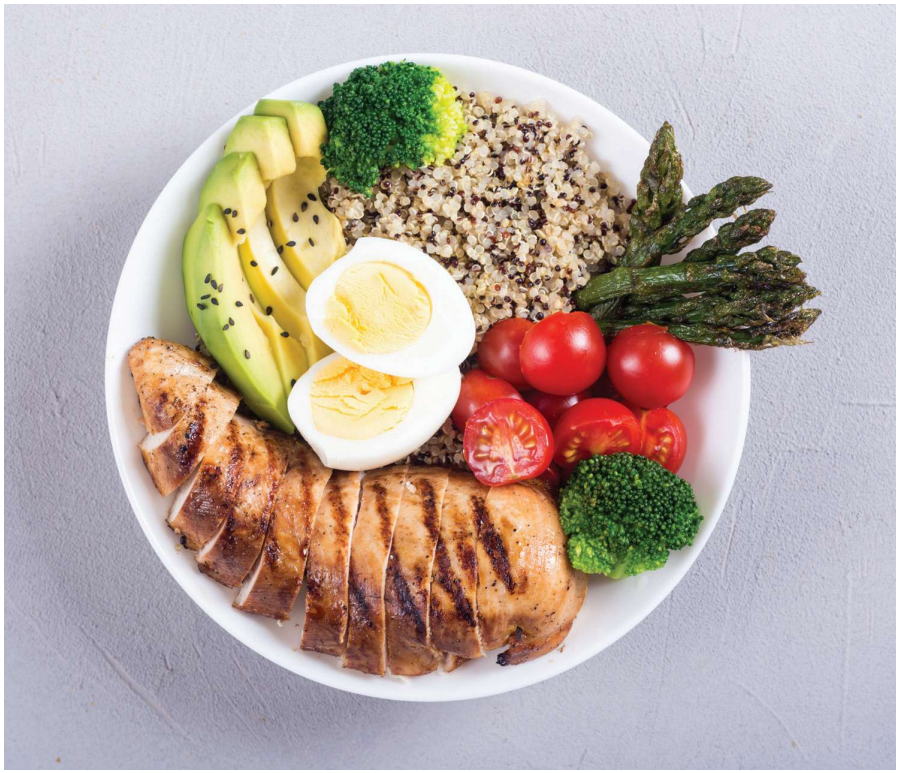
在洗肾前，您可能一直在维持低蛋白质的饮食习惯，但开始洗肾后您的身体现在需要更多的蛋白质来补充洗肾治疗过程中流失的蛋白质。关键是要吃适量的蛋白质-不要太少，也不能太多。

有了适量的蛋白质，您的身体可以建立肌肉，从而可提高身体的免疫系统。这有助于减少并发症（如感染和营养不良）的风险。

在动物和植物性食物中都可找到蛋白质：

1. 动物蛋白质-肉类、家禽、鱼类及其他海产品、蛋、奶和奶制品
2. 植物蛋白质-豆类及豆制品（如豆腐）、坚果、扁豆、面包、米饭

动物来源的蛋白质质量最好，其意味着它能有效的被身体运用，应占据您摄取蛋白质来源的绝大部分。



蛋白质替换表

以下蛋白质替换列表中的每种食物含有 7g 蛋白质。蛋白质替换有助您在进行饮食选择时能更有效选择合适的蛋白质来源。

请咨询您的营养师，以计划出您一天需要的蛋白质替换量。

动物蛋白质：	
鸡蛋	1 粒 (中等大小)
(熟) 鱼 鸡 羊肉 牛肉 猪肉	1 个火柴盒大小
虾	4 只 (中等大小)

牛奶及乳制品⁺：	
牛奶 (新鲜或超高温灭菌)	1 杯 (200ml)
奶粉	4 汤匙 (150g)
酸奶	1 杯 (150g)
奶酪(切达干酪)*	1½ 片 (30g)

豆类⁺：	
豆类/扁豆(熟)	½ 杯 (120g)
豆干	½ 块 (60g)
豆腐	½ 块 (150g)

坚果/种子⁺：	
坚果与籽类	½ 杯 (30g)
花生酱	2 甜品勺 (30g)

*高盐分
⁺高磷酸盐

提示

均匀的分散一天当中所摄取的蛋白质，以便身体更有效的运用。

钾

钾是一种矿物质，能帮助神经、肌肉和心脏正常运作。因为肾功能下降，CKD 患者的肾脏不能清除多余的钾。

过量的钾因此在血液中累积，导致心跳不规则和体弱。经常选择钾含量低或中等的食物，并适量食用。限制或避免高钾的食物。

水果 - 每天限制为2份

低 每份含<150mg 钾		中等 每份含150 - 250mg 钾		高 每份含>250mg 钾	
苹果	1 小粒	樱桃	10 粒（中等大小）	杏子	4 小粒
蓝莓	½ 杯	慈菇 (Chiku)	1½ 粒（中等大小）	鳄梨	1 粒（中等大小）
蔓越莓	100 g	杜古 (Duku)	10 粒（中等大小）	香蕉	1 小支
榴莲	2 瓣	冷刹 (Langsat)	10 粒（中等大小）	释迦	1 粒（中等大小）
火龙果	½ 粒	荔枝	6 粒 （中等大小）	枣	2 片
葡萄	10 小粒	橙	1 小粒	无花果	2 小粒
葡萄柚	½ 粒	木瓜	1 片	蜜瓜	1 片
番石榴	½ 粒	百香果	3½ 粒（中等大小）	菠萝蜜	2 瓣
柠檬	1 小颗	桃子	1 粒（中等大小）	奇异果	1 粒（中等大小）
青柠	1 整粒	柿子	1 粒（中等大小）	芒果	½ 粒（中等大小）
龙眼	10 粒（中等大小）	李子	2 小粒	油桃	1 粒（中等大小）
山竹	4 粒(中等大小)	柚子	3 瓣	石榴	½ 粒(中等大小)
梨	1 小个	覆盆子	1 杯	西梅干	4 片
黄梨	1 块（楔形）	草莓	1 杯	哈密瓜	1 片
红毛丹	4 粒（中等大小）	柑橘	1 粒（中等大小）	红毛榴莲	1 片
水苹果/连雾	4 个（中等大小）	水果干如葡萄干	20 g		
西瓜	1 块（楔形）				
罐头水果（沥干汁水）	½ 杯				

参考资料：国家肾脏基金会

蔬菜 - 限制为每天2份
1份=100g (¾杯) 熟；100g(无叶)生；150g生(有叶)

低 每份含 <200 mg 钾	中等 每份含200 - 350mg 钾	高 每份含>350mg 钾
豆芽	芦笋	竹笋
茄子	大白菜	西兰花
包菜	花椰菜	芥末绿/菜心
灯笼椒	胡萝卜	鹰嘴豆
胡萝卜（冷冻/煮熟）	芹菜	蕨菜芽（巴古菜）
黄瓜	韭菜	新鲜蘑菇
四季豆	红辣椒（绿/红）	芥兰
葫芦－各种类型	羊角豆	莲藕
空心菜	韭葱	臭豆
莴苣	扁豆（煮熟/扁豆汤）	马铃薯
豆角	利马豆	海藻
蘑菇	豌豆（生/晒干）	菠菜
－罐装，挤干	荷兰豆	番薯
－干燥、浸泡、挤干	南瓜	番薯叶
洋葱	甜玉米（冷冻/煮熟）	番茄（酱/泥）
豌豆（冷冻/煮熟）	番茄（生、罐装）	马蹄
葱		
芜菁		
冬瓜		

参考资料：国家肾脏基金会

饮料

低	中等	高
糖浆饮料	薏米	浓咖啡或茶
	中国茶	所有新鲜/罐装水果和蔬菜汁
	非可乐饮料	草药饮料
	甘蔗汁	可可和麦芽饮料
		牛奶
		酒

提示

1. 要从蔬菜中去除一些钾，您可：
   - 将蔬菜切成更小片
   - 将蔬菜泡在水中1至2个小时
   - 在烹煮前滤沥干水分
2. 沥干罐头水果和蔬菜的果汁或糖浆
3. 使用香料而不是香料粉

参考资料：国家肾脏基金会

磷

当肾脏不能正常工作时，磷可能会在您的血液里累积。高磷水平会抽出骨骼中的钙，使其变弱变脆。这也会导致坚硬的磷酸钙盐在软组织中沉积，导致各种疾病，如皮肤发痒、关节疼痛和眼睛发炎。

磷主要存在于动物性食品和乳制品中。一些植物食品（如全谷物和坚果）中亦含有高磷。限制高磷食物的摄取量。

高磷食物

- 牛奶
- 酸奶
- 奶酪
- 豆类（如豆腐、豆浆）
- 坚果和其加工品（如花生酱）
- 种子和其加工品（如芝麻油）
- 椰子和其加工品（如椰奶）
- 可乐饮料/深色汽水
- 麦芽和可可饮料
- 奶酪、坚果和巧克力饼干
- 巧克力
- 炸鱼饼和虾饼
- 骨头类（鸡翅膀或鸡脚高汤）
- 可食骨鱼（沙丁鱼）
- 内脏（比如，肝、肾）
- 蛋黄
- 提取物（妈蜜酱/肉汁）
- 凤尾鱼（江鱼仔）
- 虾米
- 鱼干
- 蘑菇干
- 海藻
- 燕麦
- 什锦燕麦片/维多麦
- 糙米
- 全麦
- 全麦面包/饼干

参考资料：国家肾脏基金会

提示

不要忘了随餐服用磷酸盐结合剂（如碳酸钙）！磷酸盐结合剂可结合食物中的磷酸盐，预防磷酸盐被吸收到血液中。如没有随餐服用，磷酸盐结合剂将无效。

钠

钠是食盐的主要部分，可以在酱料、调味品、防腐剂、腌制食品和罐头食品中找到。过多的钠会使我们容易口渴和导致体液累积，而这会导致血压升高和伤害您的心脏。

以下步骤可帮助您减少钠摄取量：

1. 钠大多来自加工食品，存于许多不同的形式。所以您需阅读成分标签。如果前三种成分中含有以下任何成分，该食品可能是高钠食品：
   - 氯化钠/精盐（Sodium chloride/table salt）
   - 味精（MSG）
   - 岩盐/海盐/加碘盐（Rock/sea/iodized salt）
   - 烘焙粉（Baking powder）
   - 亚硝酸钠（Sodium nitrite）
   - 苯甲酸钠（Sodium benzoate）
2. 避免使用代盐品，因为它们通常含有钾

提示

- 限制钠量高的食物，如加工食品（如午餐肉或热狗），选择新鲜蔬菜、家禽和肉类
- 在家里做饭时用香料、青柠汁或天然调味料（如葱、洋葱、大蒜和欧芹）来提味，而不是添加精盐
- 只在烹调后加少量盐或调味汁。在加入盐前品尝食物
- 少吃腌制食品、多用途马来叁巴酱、印度薄饼或酸辣酱等食物
- 尽量减少您在外用餐的次数，因在外用餐大部分的食物都是高盐的
- 外出用餐时，要求更少的肉汁，避免饮用汤，限制腌制食品，如“江鱼仔”。尽量点不加盐、味精或酱油的新鲜烹煮的食物
- 在购买食品时，选择有“较健康选择”标志的食物，或标有“低钠”或“不添加盐”的食物
- 阅读食品标签，对比类似食品（每100g），并选择钠含量低的食品

维生素

洗肾患者通常需要服用含有均衡维他命的多种维生素补充剂。这是因为某些维生素(如维生素 B6 和 B12)在洗肾过程中流失,而洗肾时遵守的饮食习惯也可能造成您摄取不足够的维生素。另一方面,一些维生素不应补充,因为当肾脏停止工作时,这些维生素(如维生素 A)会在体内累积。

如果医生没有给您处方维生素补充剂,您应该在服用之前,要求您的医生或营养师推荐您应摄取的正确维生素补充剂。

液体

当您饮用或者喝太多液体时,您可能会患有以下问题:

- 在洗肾时抽筋
- 高血压
- 呼吸急促
- 血压升高
- 心脏问题,如脉搏快、心肌衰弱、心脏扩张
- 洗肾治疗后肌肉抽筋和血压下降会让您感觉恶心、头晕和无力

体液的来源包括水、茶、咖啡、甜果汁饮料、牛奶和汤的液体。其他食品(如粥、果冻、冰块、雪糕、红豆冰)也会给身体添加体液。

每日允许的液体摄取量可从500到1000ml不等,这取决于您的尿量和活动水平。要知道您是否处于正确的体液平衡,您可以每天自己秤体重,来监测体重是否突然/快速上升,或检查您的腿部是否肿胀。

以下是一些帮助控制液体摄取量的方法:

- 用一个水壶测量当日允许的液体量。每次您饮用任何液体时,都要从容器中倒出相同的量。当水壶的水被倒空后,您就知道您已达到每日允许的饮水量
- 吮吸冰块湿润干燥的嘴巴(液体量应被计算在内)
- 用清水漱口,但不要吞咽
- 限制咸的食品,这样您就不会感到那么口渴

有用提示
液体测量的常见方法

物品	量 (ml)
1 汤匙	15
1 中国汤匙	30
1 块冰块	20
1 中国碗盛的粥	100
1 茶杯	150
1 杯	250

洗肾与糖尿病

如果您患有糖尿病,您的医生可能会调整您的药物,以提高洗肾时的血糖控制。饮食管理也变得更加重要。

含碳水化合物的食物最会影响血糖，所以您的碳水化合物的摄取量需要调整，以帮助管理您的血糖水平。碳水化合物包括淀粉类食物(如米饭、面包、面条)和水果,以及含糖的食物(像糖果和甜食)。

请向您的营养师咨询,以了解您碳水化合物的需求,以及可食用的碳水化合物食物种类。如果您在进行腹膜洗肾,营养师也会考虑您使用的洗肾液量,这是因为洗肾液通常是一种糖基溶液。

当您需要增强营养时...

遵循适合透析患者的饮食是很困难的。近二分之一的透析患者营养不良[1]。

营养不良会增加虚弱感，损害康复和生活质量。肾脏专用口服营养补充剂可以帮助您预防和克服营养不良。

考虑使用**Nepro® HP**,一个为洗肾者特制的营养品。向您的医生或营养师咨询,了解如何把**Nepro® HP**纳入您的饮食计划中。

本节包含提供给肾病患者的产品具体信息

[1] Rashid I, et al. Clin Epidemiol Global Health. 2021;12:100855。

Nepro® HP 补助您的营养需求，并帮助您补充洗肾过程中流失的蛋白质和其他营养物质

* European Best Practice Guidelines (EBPG), European Society for Clinical Nutrition and Metabolism (ESPEN),National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI™), Kidney Disease: Improving Global Outcomes (KDIGO®) guidelines - when used as sole source of nutrition

其他 NEPRO® HP 产品特点

401 Kcal
高热量以符合热量需求
(401千卡/瓶)

REDUCED WATER 161ml
较低水分
(161毫升/220毫升瓶装)

适合同时患有糖尿病的洗肾者使用
先进、慢消化、低升糖指数(GI)的碳水化合物

含有 OMEGA-3
脂肪酸和单不饱和脂肪酸 (MUFA)

*Nepro® HP*的血糖生成指数低至 35，也适合同时患有糖尿病的洗肾者使用

如何把 Nepro® HP 纳入您的饮食计划？*

***注意：**

请咨询您的营养师，以确保正确使用 Nepro® HP 并符合您的特定营养需求和治疗计划。

使用 Nepro® HP 食谱让您的饮食更多样化

丰盛的米粥

份量：2

配料：

- 0.5 瓶香草 Nepro® HP (220ml)
- 0.5 杯白饭 (熟)
- 1 杯水
- 1 粒苹果 (去皮、去核、切片)
- 0.5 汤匙葵花籽

做法：

1. 将白饭、水和糖放入平底锅混合在一起。烹煮直到软化。
2. 加入切片的苹果，煮至其变软。熄火。在米粥内添加香草 Nepro® HP。
3. 搅拌均匀，趁热端上桌。用葵花籽装饰。

营养价值

每一人份含量

千卡路里	200
蛋白质	6 g
碳水化合物	29 g
脂肪	7 g
钠	44 mg
钾	162 mg
钙	68 mg
磷	82 mg

蘑菇汤

份量：2

配料：

- 0.5 瓶香草 Nepro® HP (110ml)
- 0.75 杯自制鸡汤
- 150g 新鲜蘑菇
- 0.5 汤匙牛油
- 加入盐和黑胡椒调味

做法：

1. 将鸡汤放入煲里煮至沸腾。添加蘑菇和牛油。烹煮大约10分钟后，取出一些蘑菇以作装饰用途。
2. 使用手持式搅拌器，将煲中的所有配料搅拌直顺滑。之后添加香草 Nepro® HP，将其搅拌均匀。
3. 将汤分成几份盛入碗中，用蘑菇装饰，可立即食用。

营养价值

每一人份含量

千卡路里	139
蛋白质	6 g
碳水化合物	10 g
脂肪	9 g
钠	147 mg
钾	140 mg
钙	62 mg
磷	67 mg

草莓冰沙

份量: 2

配料:

- 1 瓶香草 Nepro® HP (220ml) (冷藏)
- ½ 杯冷冻草莓
- 4 汤匙水

做法:

1. 将配料放入搅拌器中混合起来。
2. 将搅拌机速度调高，并将混合物搅拌至顺滑。
3. 可立刻饮用。

营养价值

每一人份含量

千卡路里	213
蛋白质	9 g
碳水化合物	19 g
脂肪	11 g
钠	87 mg
钾	193 mg
钙	123 mg
磷	88 mg

蔓越莓松糕

份量: 12个

配料:

- 1/3 杯多用途面粉
- 1/3 茶匙烘焙粉
- 1/24 杯小麦胚芽
- 1/24 杯切片杏仁
- 1/12 汤匙无盐牛油
- 1/6 瓶香草 NeproR HP (220ml)
- 1/6 粒大鸡蛋
- 1/18 杯植物油
- 1/12 茶匙纯香草提取物
- 1/6 汤匙新鲜橘皮
- 1/12 杯切碎的蔓越莓干

做法:

1. 烤箱预热至 400° F。用纸衬垫衬上松糕烤盘 (12杯)。放置一边。
2. 将面粉、烘焙粉、人造甜味剂和小麦胚芽倒入一个大碗中。从面粉混合物中取¼杯，将其放入一个小碗中。
3. 将切片的杏仁和牛油加入¼杯的面粉混合物中。用叉子搅拌该混合物，直到松碎。将杏仁片混合物放置一边。
4. 混合香草 Nepro® HP、鸡蛋、植物油、香草精和橘子皮。把混合物倒入剩下的面粉混合物中，将其拌在一起(仅将其结合起来)。加入蔓越莓干，轻拌成面糊。不要过度拌面糊。
5. 将面糊盛入准备好的松糕烤盘。在每个杯上均匀撒上杏仁片混合物 (见步骤3)。烘烤14至16分钟。将松糕立刻从烤盘中取出，将其移至铁架冷却。趁热食用。松糕可以冷却，单独包装在密封袋中，冷冻保存长达1个月。

营养价值

每一人份含量

千卡路里	148
蛋白质	5 g
碳水化合物	24 g
脂肪	8 g
钠	79 mg
钾	67 mg
钙	143 mg
磷	197 mg

您的饮餐计划

请咨询您的营养师，制定满足您营养需求的个性化膳食计划。

餐点	时间	食物/ 分量	备注
早餐			
点心			
午餐			
点心			
晚餐			

向您的营养师咨询您的日常营养目标数值。

卡路里

每日目标卡路里数值 _____

蛋白质

每日目标克数值 _____

磷

每日目标毫克数值 _____

钾

每日目标毫克数值 _____

液体

每日目标毫升数值 _____

干重量

每日目标公斤数值 _____

咨询您的营养师如何可以将 Nepro® HP 纳入您的日常饮食计划中。

您的健康图表

姓名: ______________________ 出生日期: ____________

身高：__________ cm 性别：男性/女性

			体检日期		
关键指标	**单位**	**范围**	/ /	/ /	/ /
体重	kg				
身体质量指数(BMI)		18.5 - 23			
血压	mmHg	120/80			
肾功能分析					
钾	mmol/L	3.5–5.5			
钠	mmol/L	135-150			
氯化物	mmol/L	96 - 108			
碳酸氢钠	mmol/L	>20 <24			
肌酐(前)	范围取决于体重和性别				
肌酐(后)	µmol/L	442			
尿素(前)	mmol/L	>20 <40			
尿素(后)	mmol/L	< 6.67			
骨骼分析					
钙	mmol/L	2.2–2.60			
磷酸盐	mmol/L	< 1.18			
脂肪分析					
总胆固醇	mmol/L	< 6.1			
甘油三酯	mmol/L	< 2.3			
高密度脂蛋白胆固醇	mmol/L	1.0–2.0			
低密度脂蛋白胆固醇	mmol/L	< 3.334			
白蛋白	g/L	> 35g			
内分泌功能分析					
糖化血红蛋白(HbA1c)	%	4.6–6.4			
随机血糖	mmol/L	4.0–9.0			

体检日期					
/ /	/ /	/ /	/ /	/ /	/ /

NOTES 笔记

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