Information about

High-Protein, High-Energy Diet

For advanced liver disease

Rationale

If your doctor has told you that you have advanced liver disease, or if you are not sure if you have advanced liver disease, please consult your doctor.

It is common for people with advanced liver disease to develop 'protein and energy malnutrition'. There are some changes that you can make to your diet to support your liver and overall health.

In advanced liver disease, the liver stops working efficiently, which reduces its ability to store and release glycogen, a chemical that is used to provide energy when the body needs it. When this happens, the body uses up its fat stores and breaks down its own muscle for energy. This leads to muscle wasting and reduced strength. However, you may not notice any weight loss, or your weight may even increase due to fluid build-up.

To counteract this, people with advanced liver disease need to eat more protein and more calories than healthy people of the same age, gender and weight. If left untreated, malnutrition can result in serious health complications.

Health benefits

A high-protein, high-energy diet is important for people with chronic liver disease, as the protein and fat are used to maintain muscle and body tissue (including the liver) and to keep the body working normally.

Research shows that a high-protein, high-energy eating plan may improve health outcomes and reduce the number of times people develop complications of chronic liver disease, such as infection, encephalopathy (confusion caused by liver disease) or fluid build-up, which may require hospitalisation.

To help prevent muscle and fat loss, eat foods high in protein and energy.

What is a high-protein, high-energy diet?

A high-protein, high-energy diet provides 1.2–1.5 grams of protein/kilogram of body weight/day and adequate energy to maintain fat stores (35–40 kcal/kg body weight/day).

It is important to have a well-balanced diet to ensure you are getting enough carbohydrate, protein, fat, vitamins and minerals.

To increase protein and energy intake, make sure you include at least one food from each of the following columns at each meal or snack. Also see the sample eating plan at the end.

Protein Foods	Energy Foods
• Meat, fish, chicken • Eggs • Milk and milk powder • High-protein yoghurt • Custard • Cheese • Legumes (baked beans, lentils, chickpeas) • Tofu • Unsalted nuts and seeds (including pastes)	• Bread and bread products • Breakfast cereals • Pasta, rice, noodles • Cakes, biscuits, pastry • Butter/margarine, oil, cream • Jam, honey, golden syrup • Potato, sweet potato, corn

Some of these foods may be high in salt. If you have been advised to follow a low-salt diet, refer to the no-added-salt information below.

Replace tea, coffee or water with fluids that provide protein and/or energy (such as milk), especially if you have been advised to restrict your fluid intake.

Milk and fortified soy milks are a great base for nourishing drinks, as they are high in both protein and energy. Full-cream milk is preferable because it contains more kilojoules than low-fat milk.

To make your milk higher in protein and calories, other ingredients may be added, such as ice-cream, milk powder, yoghurt and a variety of flavourings.

Additional considerations

Overweight

Your doctor may recommend a high-protein diet with reduced fat and carbohydrate. Try to limit fatty and sweet foods. Ask your doctor to refer you to a dietitian for help with an appropriate eating plan.

Diabetes and glucose intolerance

Follow a high-protein, high-energy diet and include a moderate amount of carbohydrate sources to help with controlling blood sugar levels.

If the restricted diet is leading to muscle wasting and/or weight loss, consult a dietitian for additional advice on meeting your individual protein and energy needs in light of your advanced liver disease.

Vegetarian or lactose intolerance

Adequate protein can be obtained from legumes, nuts and seeds and foods made from these. Soy milk and soy products are a suitable high-protein substitute for cow's milk and milk products if dairy product tolerance is a concern. Most high-protein supplement drinks prescribed by dietitians have a low lactose content and can be used by people who have lactose intolerance.

It is important to be aware that almond milk and rice milk are very low in protein, and a glass of oat bran milk or coconut milk has less than half the protein content of a glass of cow's milk.

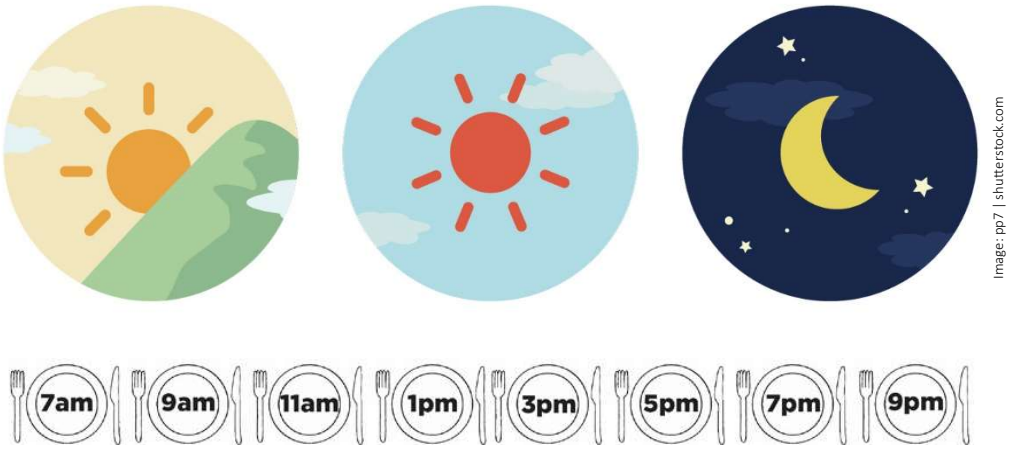
Changes in sense of taste

Many people with advanced liver disease describe an altered sense of taste and a heightened sense of smell that can reduce their ability to eat. Mineral deficiencies can lead to a changed sense of taste. This can be easily identified by a blood test and corrected with oral supplements. Discuss this with your doctor and dietitian.

Eat frequently and avoid fasting

People with advanced liver disease should try to eat six to eight smaller meals and snacks throughout the day (every two to three hours) instead of having three main meals. Small, frequent meals can boost your nutrition intake and can be useful if you feel full quickly or if your appetite has decreased.

The liver plays an essential role in supplying energy when fasting. In advanced liver disease, this role is impaired. You should aim to eat a protein-rich snack before bed. Many people with advanced liver disease have difficulty sleeping. If you are awake in the middle of the night, have a high-protein snack or supplement drink to reduce the time spent fasting overnight.



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Eat small meals often and have a snack of energy- and protein-rich food before bed.

If you are awake during the night, have a high-protein snack or supplement drink.

Vitamins and minerals

The changes that occur in chronic liver disease can lead to vitamin and/or mineral deficiencies. Problems such as excessive bleeding, osteoporosis, anaemia and night blindness can result if vitamin and/or mineral levels are too low.

Common vitamin deficiencies include the fat-soluble vitamins – A and D. Identification and correction of these deficiencies is essential for patients with chronic liver disease.

Eating a variety of foods can help to avoid the problem of vitamin deficiencies.

Supplements

There are several special nutrition supplements that may help increase your calorie, protein, energy, vitamin and mineral intake. Avoid taking any supplements or following diets that are not recommended by your doctor or accredited practising dietitian.

Fluid reduction

As liver disease progresses, a build-up of fluid in the stomach area (known as ascites) and swelling of the feet and legs (oedema) may occur, which can cause weight gain and mask muscle loss.

You may be asked to limit the amount of fluids you drink through the day. This includes all beverages and watery foods, such as soup. Half of your fluid intake should be high in protein (e.g. milk).

No added salt

If you have fluid retention, your doctor and dietitian will recommend you follow a no-added-salt, high-protein diet.

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Salt acts like a sponge with fluid in your body. By reducing the amount of salt you eat and increasing your protein intake, you can limit the amount of fluid that stays in your body.

Salt is not the only way to add flavour. Instead add:

- Freshly ground black pepper
- Lemon, lime and other citrus fruits
- Vinegar, particularly balsamic vinegar
- Oil or butter
- Fresh herbs
- Chillies
- Ginger, garlic, shallots and spring onions
- Spices such as mustard powder, nutmeg, cinnamon, cardamom, ginger and cumin
- Toasted and ground sesame seeds

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Hints to reduce salt intake:

- Eat fresh whole foods
- Avoid salty canned or processed foods
- Use low-salt or no-added-salt versions – frozen vegetables have less salt than canned vegetables
- Do not add salt to your meal at the table
- Make your own stock and do not add salt – stock cubes, bouillon cubes and gravy granules can be high in salt
- Eat cold, cooked fresh meat, poultry or eggs instead of deli meats or cured foods
- Choose unsalted butter or salt-reduced margarines
- Certain bottled waters are high in sodium – check the labels carefully

High-protein, high-energy diet: sample eating plan

Breakfast

- Cereal and full-cream milk, or porridge
- Eggs (cooked to your liking) with toast and unsalted butter (or salt-reduced spread)
- 1 cup of high-protein yoghurt with fruit
- Hot chocolate or coffee made with milk, or a glass of milk

Morning snacks

- Cheese on toast
- Cheese and crackers
- Milkshake made with full-cream milk

Lunch

- Sandwich with roast meat, chicken, fish, egg or cheese
- Baked beans (low-salt variety), eggs or grilled cheese on buttered toast
- Meat, fish or poultry with buttered vegetables or salad
- Dessert if desired
- Glass of full-cream milk

Afternoon snacks

- Custard or high-protein yoghurt with fruit
- Hard-boiled egg
- Handful of unsalted nuts, or dried fruit and nut mix (low-salt version)
- Custard tart
- High-protein yoghurt
- Glass of milk with chocolate malt powder
- Omelette
- Teacake, muesli bars or fruit bread and a glass of milk

Dinner

- Meat, fish or poultry with buttered vegetables or salad
- Pasta with meat sauce and salad
- Toasted cheese sandwich
- Dessert

Bedtime snacks

- Milkshake or hot milk with honey or other flavourings
- 1 cup of high-protein yoghurt or custard with fruit
- Hot chocolate made with milk
- Cheese and crackers
- Glass of milk with chocolate malt powder and slice of bread or toast
- 1 cup of whole grain cereal or muesli with ¾ cup of milk
- Muesli bar with fruit smoothie, glass of milk or creamed rice
- High-protein supplement drink

Take-home points

- To help prevent muscle and fat loss, eat foods high in protein and energy
- Eat small meals often
- Have a protein-rich snack before bed and in the middle of the night if you are awake
- Work with a dietitian to develop a personal eating plan

Acknowledgements

This resource was reviewed and updated by the following health professionals in 2021:

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