The Centre for Strong Medicine

STRONG FOOD FACTS

The Importance of Nutrition for Health and Wellbeing

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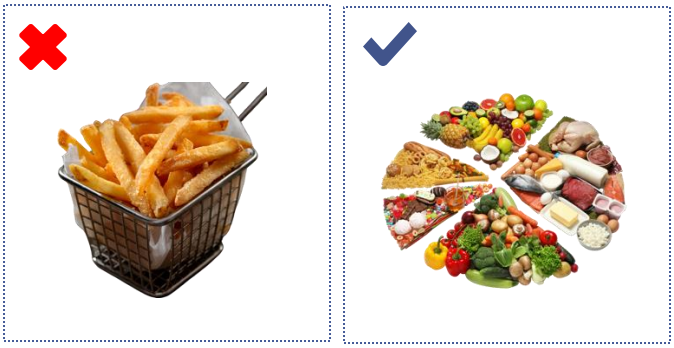
Important Concepts in Nutrition

Dietary Diversity

A single food contains select nutrients only, so a monotonous diet could result in malnutrition. Therefore, a combination of a variety of foods should be consumed in every day to provide us with all the essential nutrients. The more types and colors of fruits and vegetables we eat, the more diversity the diet will have



Nutrient Density[1]

The amount of nutrients in different types of food varies. Given the same size, one food may have higher nutrient content while having a lower energy content. This is referred as having higher nutrient density. The older you are, the higher the nutrient density needs to be. This is because energy needs and appetite often go down with age as muscle mass declines. This means that the smaller volume of food needs to be of higher quality; that is, have a greater diversity, and a higher nutrient density.

High in nutrient contents, like vitamins, minerals and dietary fibre + **Moderate in calorie/ kJ** (Energy content) = **High nutrient density**

Low in nutrient contents, like vitamins, minerals and dietary fibre + **High in calorie/ kJ** (Energy content) = **Low nutrient density**

High in nutrient contents, like vitamins, minerals and dietary fibre + **High in calorie/ kJ** (Energy content) = **High nutrient density**

Nuts

EVOO

Glycemic Index (GI)[2]

This is a scale that ranks carbohydrate-containing foods based on how quickly they raise blood sugar and insulin levels after eating. Both high glucose and high insulin levels after meals are damaging to blood vessels and nerve cells. Therefore, keeping glycaemic level post-meal (post-prandial) in check is very important for preventing and treating cardiometabolic diseases and cognitive decline.

When you eat carbohydrate-containing foods (e.g. white bread or white rice):

Your digestive system absorbs the food.

Carbohydrates are broken down into **glucose**, which is released in your bloodstream.

The rate at which carbohydrates are broken down influences **satiety, blood glucose and insulin levels**.

High GI vs. Low GI Food

High GI Food

Carbohydrates break down **quickly** after you eat.

They release their glucose into the blood **quickly**.

Blood glucose level **rises rapidly**. Because **insulin** is released to lower the blood glucose, and there is only a **short** period of feeling full (satiety).

Low GI Food

Carbohydrates break down **slowly** after you eat.

They release their glucose into the blood **gradually**.

Blood glucose and insulin **level rises more slowly and less dramatically**. There is a **longer** period of feeling full (satiety).

Sources of High GI (Less Desirable) Foods

White bread

Crackers

Instant Noodles

Doughnuts

Croissants

Most Packaged Breakfast Cereals

Sources of Low GI (Desirable) Foods

Brown Rice

Legumes

Rolled or Steel-cut Oats

Sweet Potatoes

Spinach

Whole-grain Bread

Glycemic Index on a Scale

Low: 0–55

Medium: 56-69

High: 70-100

Swaps for Lowering Glycemic Index[3]

Instead of...	GI	Eat...	GI
White rice	89	Brown rice / converted rice	62
Instant oatmeal	69	Rolled / Steel-cut oats	55
Cornflakes	77	Wheat flakes	45
Baked potato	95	Whole-grain pasta, bulgur	48
White bread	70	Whole-grain bread	41

Meal Planning for Reference

Breakfast

Traditional Rolled Oats with High Protein Milk

Average GI: ~ 48

Lunch

Lentil, Olive & Semi-dried Tomato Sauce with Whole Grain Pasta

Average GI: ~ 41.5

Dinner

Oven Baked Chickpea Casserole with Crispy Eggplant Topping

Average GI: ~ 15

What is Protein?

Protein is a substance found in food that plays multiple roles in the body to maintain health.

How can Protein Impact Health Status?

- Major component of muscles & connective tissues
- Antibodies are proteins
- Assists cell signalling
- Most hormones are proteins (exceptions are sex hormones and adrenal cortex hormones)
- Forms structure of cells.

How is Protein Related to Exercise?

During exercise, especially in resistance training, muscles experience micro-tears, while are part of the process of muscle hypertrophy.

To repair these tears, the amino acid building blocks of proteins need to be available to be taken up by skeletal muscle.

A higher-protein diet, combined with resistance (anabolic) exercise, may improve the body's adaptation to the exercise. This especially true for people who have lost muscle for any reason, have inadequate food intake or poor appetite, or are frail.

! **But extremely high-protein diets do NOT provide additional benefits and could impair kidney function if you have underlying kidney disease, while contributing to the risk of dehydration.**

What Health Risks are Caused by Inadequate Protein Intake?

Sarcopenia

Progressive loss of muscle mass and muscle strength that is associated with ageing, related to **inadequate intake** of **energy and protein**, as well as **low levels of physical activity**.

Signs and Symptoms:

- Falling
- Feeling weak
- Slow walking speed
- Difficulty rising from a chair
- Weight loss/muscle wasting.

Frailty

A cumulative decline in multiple body systems or functions. Its pathogenesis involves physical and social dimensions, related to inadequate **intake of energy and protein**, as well as the **accumulation of chronic diseases**.

Signs and Symptoms:

- A clinical syndrome predisposing to loss of independence in functional activities
- Increased vulnerability to physical or psychological stress.
- May be reversible or attenuated by medical, psychosocial, nutritional or physical interventions.

Drug Interactions with Proteins

Propranolol - High Protein Food

High-protein foods can **increase the bioavailability** of propranolol, a medication commonly used to treat **high blood pressure, irregular heartbeats, and other heart-related conditions.**

Consequence:

Higher proportion of a drug that enters the circulation when introduced into the body and may have an exaggerated effect, such as slow heart rate (bradycardia) or low blood pressure (hypotension).

Levodopa - Protein

Protein foods can **decrease the efficacy** of levodopa, a medication primarily used to treat **Parkinson's disease**.

Consequence:

With less levodopa crossing into the brain, its effectiveness in managing Parkinson's symptoms decreases. This may result in slowness of movement (bradykinesia), freezing of gait, fall risk, or other Parkinsonism symptoms.

Recommendation:

Allow at least one hour between protein containing meal and levodopa. Taking levodopa with an empty stomach one hour before meals is the easiest way to do this.

REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Sources of Proteins

Red Meat

Fish

Yogurt

Poultry

Milk, Cheese

Eggs

Sources of Vegetarian Protein

Tofu

Lentils

Peanut butter

Nuts

Peas

Beans

Protein Intake Table[4]

For most adults, it is suggested to have **1.0 - 1.2g/kg** of protein per day to **prevent osteoporosis and sarcopenia**. Many nutritionists now recommended 1.2g /kg for older adults due to its decreased muscle protein synthesis ability. So for example, if you weigh 65 kg, you need 78 g protein per day.

Food	Serve Sizes	Protein Content
Meat, Poultry, Eggs		
Chicken, skinless	3 ounces (85 g)	28 g
Steak	3 ounces (85 g)	26 g
Turkey, roasted	3 ounces (85 g)	25 g
Lamb	3 ounces (85 g)	23 g
Pork	3 ounces (85 g)	22 g
Egg, large	1 egg (50 g)	6 g
Legumes		
Pinto Beans	½ cup	11 g
Lentils	½ cup	9 g
Black Beans	½ cup	8 g
Tofu	100 g	8 g
Chickpeas	½ cup	7 g
Peas, Green	½ cup	4 g
Supplements		
Protein powder	per scoop	10 - 30 g
Protein bar	100 g	25 g

Protein Intake Table[4]

Food	Serve Sizes	Protein Content
Seafood		
Salmon	3 ounces (85 g)	22 g
Tuna	3 ounces (85 g)	22 g
Shrimp	3 ounces (85 g)	20 g
Dairy Products		
Greek Yogurt	6 oz	18 g
Cottage Cheese (1% fat)	4 oz	14 g
Regular Yogurt (nonfat)	1 cup	11 g
Milk, Skim	1 cup	8 g
Mozzarella (part skim)	1 oz	7 g
String Cheese (nonfat)	1 piece (0.75 oz)	6 g
Non-dairy Milks		
Soy Milk	1 cup (243 ml)	8 g
Oat Milk	1 cup (240 ml)	3 g
Almond Milk	1 cup (~ 240 ml)	1 g
Nuts and Seeds		
Mixed	About 1 handful (30g)	7 g

You should divide protein into different meals and snacks. As you can only absorb about 30g at a time, the rest in that meal will then be eliminated by the intestines. Make sure to have some proteins at breakfast, as well as lunch and dinner. High protein snacks (nuts, roasted chickpeas, yoghurt, etc) can also boost overall protein intake if needed.

Tips to Manage Proteins in Diet

Legumes

- **Anti-inflammatory properties -** reduce the risks of infections and maintain health of your immune system
- **Great source of protein -** best protein food for your brain
- **Low GI carbohydrates -** help with blood sugar control and satiety.

Shopping Tips:

- ✓ Limit products with added sugars
- ✓ Look for products labelled with 'no added salt'
- ✓ For roasted legumes, choose 'reduced salt' varieties.

Best and Less Desirable Brain Protein Foods to Eat

Best:

- ✓ Legumes and nuts/seeds - enjoy everyday
- ✓ Fish and seafood - include at least 3 times per week
- ✓ Chicken & other poultry - limit to 3 times per week
- ✓ Eggs - up to 4 eggs per week.

Less desirable:

- ✗ Fresh red meats - avoid altogether or limit to 1-3 times per month
- ✗ All processed red and white meats - avoid altogether e.g., salami, bacon, pepperoni.

Meal Prepping

- ✓ Swap 3 of your main meals based on red meat to fish, seafood or beans meals each week
- ✓ Use moist cooking methods such as stewing, casseroling, steaming, poaching and boiling to prevent toxic chemicals forming during cooking that could injure your brain.

What is Fat?

Fat is a macronutrient, a substance that exists in different forms in food and plays numerous roles in maintaining our health.

Main Types of Fat

Saturated

- **Negative influence** on cholesterol levels and cardiovascular health
- Mostly from animal sources. Exceptions are coconut oil, palm oil, palm kernel oil. These are often found in processed or pre-processed foods. **Check the labels**.

NUTRITION INFORMATION		
SERVINGS PER PACKAGE: 25 SERVING SIZE: 15mL		
AVG QTY	PER 15mL	PER 100mL
ENERGY	517 kJ	3446 kJ
PROTEIN	0g	0g
FAT, TOTAL	13.7g	91.5g
SATURATED	2.1g	13.9g
MONOUNSATURATED	10.2g	68.1g
POLYUNSATURATED	1.4g	9.5g
TRANS FAT	0g	0g
CARBOHYDRATES	0g	0g
SUGAR	0g	0g
SODIUM	0mg	0mg
CHOLESTEROL	0mg	0mg
ANTIOXIDANTS		
VITAMIN E (33% RDI)	3mg	21mg
TOTAL POLYPHENOLS	8mg	56mg
SQUALENE	56mg	375mg
PHYTOSTEROLS	24mg	159mg

Unsaturated

- Monounsaturated fat VS. Polyunsaturated fat
- Monounsaturated fat - commonly found in **Mediterranean-style diet** e.g., **Extra Virgin Olive Oil (EVOO)**
- Polyunsaturated fat - essential fatty acid: **Omega-3 and Omega-6**.
- Currently, there is no guidance on the exact ratio. But, it is suggested to have **a ratio of 4:1 omega-6:omega-3**. Eating oily fish once or twice a week, regular consumption of nuts and avoiding excessive
- Help **maintaining good cholesterol levels, cardiovascular and cognitive health.**

Trans

- Small amounts exist naturally in foods and are fine
- **Industrial produced** trans fat is very **harmful**, mainly found in processed food such as baked goods, fried food and refrigerated dough products. They are added to increase the shelf-life of foods
- **Negative influence** on cholesterol levels, cardiovascular health, increase risk of Type 2 diabetes and obesity.

What Health Risks are Fats Related to?

Obesity

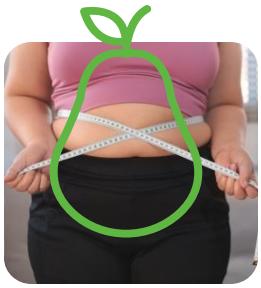
Condition when **abnormal or excessive fat accumulation** presents a risk to health.

Complications:

- Osteoarthritis
- Type 2 Diabetes
- Cardiovascular disease
- Stroke
- Peripheral vascular disease
- Hypertension
- Dementia
- Depression
- Mobility impairment
- Restrictive lung disease
- Fatty liver.

The most metabolically risky type of obesity is visceral (abdominal obesity), when adipose tissue accumulates in and around your organs, particularly your liver. This is sometimes referred to as an “apple” body type, opposed to a “pear” body type, in which the fat is mostly around the hips.

Apple (Android)



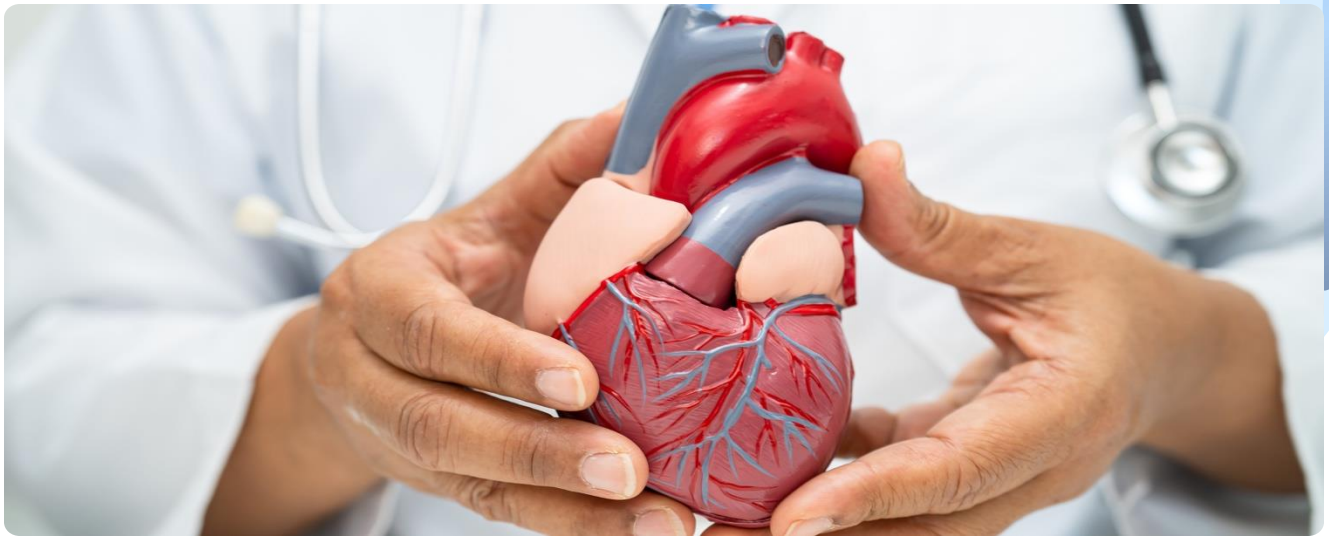
Pear (Gynoid)

Men and post-menopausal women are more likely to have android-type fat distribution.

What Health Risks are Fats Related to?

Cardiovascular Diseases

Atherosclerotic disease involving blood vessel throughout the body.



Complications:

- Heart attack (myocardial infarction)
- Heart failure
- Chest pain (angina)
- Aneurysm
- Stroke
- Cognitive impairment or dementia.

Sources of Healthy Fats

Walnut

Fatty Fish

Extra Virgin Olive Oil

Almonds

Sunflower Seeds

Avocado

Sources of Unhealthy Fats

EAT LESS!

Margarine

French Fries

Fried Food

Baked Goods

Butter

Processed Foods

Tips to Manage Fats in Diet

Extra Virgin Olive Oil (EVOO) and Health

- **Anti-inflammatory properties -** reduces the risks of infections and maintain health of your immune system
- **Antioxidants -** protect the body from damage and ageing.
- **Healthy fat -** supports cardiovascular health; helps to achieve healthy weight loss; improves glycemic control and protects the body from ageing.

Shopping Tips:

- ✓ Look for products clearly labelled as 'Extra Virgin'.
- ✓ Avoid 'lite' olive oil and 'olive oil ' margarines
- ✓ Check the ingredient list to ensure it's 100% Extra Virgin Olive Oil
- ✓ Always store your EVOO in a dark cool cupboard. For optimal benefits, use within 4-6 weeks of opening.

Mediterranean Eating Pattern

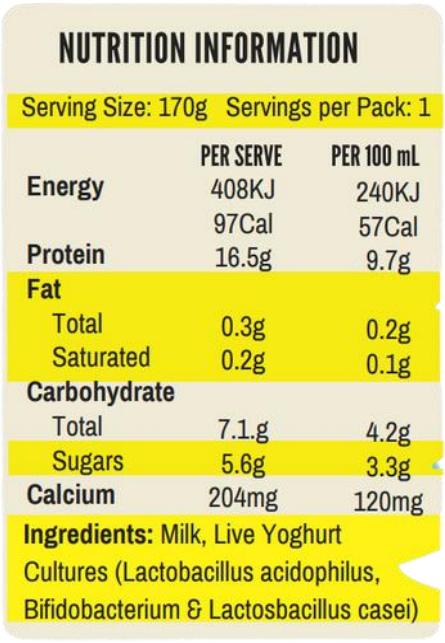
- Effective in lowering cardiovascular risk factors, heart disease and dementia risk, as well as depression, inflammatory bowel disease, arthritis and other chronic diseases
- Boosts anti-inflammatory foods and healthy fats from EVOO, nuts/ seeds and oily fish
- Increases your intake of omega-3 fats from oily fish, green leafy vegetables, walnuts, and flax seeds.

Tips to Manage Fats in Diet

Dairy Shopping Tips - Checking the Label!

Per 100g column and serving size:

- Always look at the 'per 100g' column to compare products
- Serving size is the average serving size of the product as determined by the manufacturer. However, this may not be the same as the serving size you have.



NUTRITION INFORMATION

Serving Size: 170g Servings per Pack: 1

	PER SERVE	PER 100 mL
Energy	408KJ 97Cal	240KJ 57Cal
Protein	16.5g	9.7g
Fat		
Total	0.3g	0.2g
Saturated	0.2g	0.1g
Carbohydrate		
Total	7.1.g	4.2g
Sugars	5.6g	3.3g
Calcium	204mg	120mg

Ingredients: Milk, Live Yoghurt Cultures (Lactobacillus acidophilus, Bifidobacterium & Lactosbacillus casei)

Total fat:

- Milk and yoghurt: look for less than 2g per 100g
- Cheese: look for less than 15g per 100g.

If you have high blood pressure or are taking blood pressure medication, choose low-fat versions

Saturated Fat: look for less than 15g per 100g

Sugar:

- For yoghurt, choose unsweetened (no added sugar) natural or plain Greek yoghurt
- Added sugars are sugars and syrups put in foods during preparation or processing.

Ingredient list:

- Foods are listed in order from the largest to the smallest components of the product
- For yoghurts, choose unsweetened (no added sugar) versions. If a source of 'added sugar' is listed near the start of the list, it may not be the best choice.
- Naturally occurring sugars are found in foods such as fruit (fructose), dried fruit and milk (lactose).

What is Fibre?

Fibre is a type of carbohydrate found in plant-based foods that cannot be digested. However, it helps in maintaining our health in a variety of ways, including the promotion of healthful types of bacteria in the colon (the gut microbiome).

2 Types of Fibre[5]

Insoluble - Poorly Fermentable Fibre

- Adds bulk to the bowels and promotes movements
- **CANNOT** dissolve in water.

Soluble - Rapidly Fermentable Fibre

- Forms 'thick-gel' when it attracts water, which slows digestion and results in lower blood glucose and cholesterol levels
- **CAN** dissolve in water.

How can Fibre Impact Health Status?

- ✓ Normalises bowels movements
- ✓ Possesses anti-inflammatory properties
- ✓ Controls blood glucose and cholesterol levels
- ✓ Reduces risks of heart disease, colon cancer, diverticulosis and other diseases.

What Health Risks is Fibre Related to?

Gastrointestinal health

Fibre is vital for **maintaining a healthy digestive system**, promoting regular bowel movements, supporting beneficial gut bacteria, and reducing the risk of various gastrointestinal disorders.

Signs and Symptoms of Inadequate Intake:

- ❄ Constipation
- ❄ Digestive disorders
- ❄ Fatigue.

Maintenance of Glucose and Cholesterol Levels

High fibre food takes a longer time to digest and releases glucose to the bloodstream gradually, resulting in greater satiety/feeling full.

Complications of Inadequate Intake:

- ✗ Higher risk of coronary heart disease
- ✗ Higher risk of diabetes
- ✗ Higher risk of colon cancer
- ✗ Weight gain.

Drug Interactions with Fibre

High Fibre Diet

Simvastatin, Ezetimibe, Pravastatin and Fluvastatin

A high-fibre diet is recommended to lower cholesterol but may change the effectiveness of certain cholesterol-lowering drugs like simvastatin, ezetimibe, pravastatin, and fluvastatin.

Suggestion:

- If you are taking drugs to lower cholesterol, their absorption and efficacy may be variably affected by fibre or other components of meals. Therefore, best to take them at a standard time in relation to meals for consistent absorption and benefits.

! **REMINDER**

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Sources of Insoluble Fibre

Good for gut health!

Brown Rice

Broccoli

Whole Grains

Nuts

Legumes

Quinoa

Sources of Soluble Fibre

Lowers cholesterol level!

Sweet Potatoes

Oats

Pear

Apple

Avocado

Red Kidney Beans

Both types of fibre can be found in some foods, such as carrots, apples and beans.

Fibre Intake Table[6]

For both adult males and females should be above 25–30 g daily.

Food	Serve Sizes	Fibre Content
Fruits		
Dried dates	1 cup	14 g
Dried peaches	1 cup	13 g
Dried prunes	1 cup	12 g
Raspberries	1 cup	8 g
Avocado	1 avocado	6.7 g
Raisins	1 cup	6 g
Pear	1 medium	5.5 g
Strawberry	1 cup	3 g
Apple	1 medium	2.2 g
Vegetables		
Artichoke	1 artichoke	10.3 g
Carrots (skin on)	1 cup	6.9 g
Broccoli	1 cup	2.4 g
Legumes		
Pinto Beans	< ½ cup (100 g)	6.5 g
Lentils	< ½ cup (100 g)	3.7 g

Fibre Intake Table[6]

Food	Serve Sizes	Fibre Content
Grains		
Rolled oats	Half cup	4.5 g
Brown rice	1 cup	2.7 g
Whole grain bread	1 slice	2.4 g
Popcorn (popped)	1 cup	1.2 g

You should divide the portion into different meals.

Make sure you have enough fluid intake in the day (e.g., 1.5L / day in food and drink), or the increased fibre could worsen constipation and gastrointestinal (GI) symptoms.

Tips to Manage Fibre in Diet

Easy Ways to Eat More Fruit Every Day

- Add chunks of fresh or dried fruits to raw salads and breakfast cereals
- Make a smoothie with fresh or frozen fruit and yoghurt with dried fruit (sultanas, cranberries, apricots, dates and prunes)
- Add fruit to baked fish
- Use fruit for dessert after your main meal and for snacks.

Extra Tips:

- ✓ Eat fruit with its skin on where possible for extra fibre
- ✓ Buy fruit in season as it is usually cheaper, tastier and more nutritious. Check out local farmers markets
- ✓ Frozen fruits are convenient alternatives to fresh fruits and are equally nutritious.

Easy Ways to Include a Variety of Veggies Every Day

- Enjoy dark leafy greens in salads or sandwiches
- Enjoy cut up raw vegies as a snack such as carrot and celery sticks, capsicum strips, broccoli florets, cucumber slices or green string beans
- Replace dips made with sour cream or cream cheese with mashed or pureed veggies such as avocado, roasted capsicum, chickpeas, black beans or eggplant.

Easy Ways to Get Some Wholegrains Every Day

- Grainy, stoneground, rye, wholemeal or sourdough breads are ideal to accompany soups, in sandwiches or for toast
- Avoid refined (low fibre) grain-based foods such as white bread, sugary breakfast cereals, white rice, white flour and products made with this e.g., pizza base, crackers, muffins, croissants, cakes, cookies, biscuits.

What is Calcium?

- Micronutrient in food
- Essential for the health of bones and teeth.

How can Calcium Impact Health Status?[7]

- Strengthening bones and teeth
- Regulating muscle functioning, such as contraction and relaxation
- Regulating heart functioning
- Blood clotting
- Transmission of nervous system messages
- Enzyme function.

Sources of Calcium

Dairy Products

Nuts

Green Leafy Vegetables

Tofu

Fortified Foods

Figs

What Health Risks is Calcium Related to?

Aged-related Loss of Bone

After middle age, your bones commonly lose density and strength, which can lead to osteoporosis and fractures. This condition is part of a broader decline in various body systems and functions, although the amount of decline is greatly influenced by dietary intake and physical activity patterns throughout life.

Signs and Symptoms:

- Increased susceptibility to fractures of spine, hips, wrist, ribs, ankles, pelvis
- Back pain
- Forward flexed posture
- Reduced mobility
- Increased risk of falls
- Decreased lung capacity
- Digestive disorders.
- Fatigue.

Hypertension

A condition where the blood vessels have persistently raised pressure. Most people with hypertension do not have symptoms, but some may rarely experience headaches or other symptoms. Chronically elevated calcium levels are usually from hormonal fluid losses, abnormalities, or drugs rather than dietary intake. Very high intakes of vitamin D preparations can cause hypercalcemia, but this is uncommon. Vitamin D from sun exposure does not have this potential risk.

Signs and Symptoms:

- Headaches
- Nosebleeds
- Risk for stroke or heart attack
- Risk for dementia.

What Health Risks is Calcium Related to?

Arrhythmias

Circulating calcium levels are very tight controlled. Any increase or decrease (usually related to hormonal abnormalities, dehydration, or kidney disease) could cause arrhythmias.

Signs and Symptoms:

- Fatigue
- Dizziness or lightheadedness
- Rapid heartbeat or pounding in the chest
- Sweating
- Chest pain or pressure.

Kidney Stones[8]

Most kidney stones are composed of calcium and oxalate. It occurs when absorbing too much calcium from the intestines or too much calcium from the bones, some may due to irregular amount of calcium released into urine.

Signs and Symptoms:

- Severe pain in your back or side
- Fever
- Abnormal urine colour
- Blood in the urine.

Drug Interactions with Calcium Containing Foods

Antibiotics - Dairy Products

Calcium in foods reduces the absorption of antibiotics such as astetracycline, doxycycline, and ciprofloxacin.

Consequence:

This binding prevents the antibiotics from being absorbed effectively into the bloodstream, resulting in reduced absorption and potentially inadequate treatment of infection. The solution is to these antibiotics at a similar time each day in relation to meals, such as one-half hour before meals, particularly those including calcium.

Monoamine Oxidase Inhibitors (MAOIs)

They can interact with certain dairy products, but milk and non-fermented cheeses generally are ok.

Instead of...	Alternatives
Soy milk	Almond milk
Aged cheese e.g., Cheddar, Gouda, and Parmesan	Fresh cheese e.g., Mozzarella, cottage cheese, cream cheese
Fermented milk products e.g., kefirv, buttermilk	Fresh milk

Consequence:

Hypertensive crisis with fermented cheeses or other high - tyramine foods (cured meat and fish, soy products of any type, tomato pasta, pickled or fermented vegetables, draft beers, overripe fruit).

Drug Interactions with Calcium Cooking Foods

Proton-pump Inhibitors (PPIs)

These include omeprazole, pantoprazole and esomeprazole, all of which prevent the secretion of acid in your stomach. Acid is needed for the adequate absorption of many vitamins and minerals, including calcium.

Consequence:

Higher calcium intake from the diet is needed to maintain adequate calcium nutrition and bone health.

! **REMINDER**

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Calcium Intake Table[9]

Men and Women 19 years+: 1000 mg per day

Men over 70 years: 1300 mg per day

Women over 50 years: 1300 mg per day.

Food	Serve Sizes	Calcium Content
Milk & Milk Drinks		
Sheep Milk	200 ml	380 mg
Milk, skimmed	200 ml	244 mg
Milk, semi-skimmed	200 ml	240 mg
Soy Drink (calcium-enriched)	200 ml	240 mg
Milk, whole	200 ml	236 mg
Almond Milk	200 ml	90 mg
Oat Milk	200 ml	16 mg
Yoghurt		
Yoghurt, low fat	6 oz (~170 g)	310 mg
Yoghurt, natural	150 g	207 mg
Yoghurt, flavoured	150 g	197 mg
Yoghurt, with fruit pieces	150 g	169 mg
Vegetables		
Broccoli	120 g (raw)	112 mg
Silverbeet	100 g	87 mg
Beans & Lentils		
White Beans	80 g (raw), 200 g (cooked)	132 mg
Chickpeas	80 g (raw), 200 g (cooked)	99 mg

You should divide high calcium-containing foods into different meals if possible to maximise absorption.

Tips to Manage Calcium in Diet

The Mediterranean Diet

- Naturally low in salt and high in potassium from fruit, vegetables, whole grains and dairy products, and thus is an ideal dietary pattern to optimise your calcium nutrition
- Reduces the rate of bone loss in individuals with osteoporosis
- EVOO is one of most beneficial components of the Mediterranean diet for bone health and represents the main edible fat.

Avoid:

- Consumption of **caffeine, soft drinks and alcohol**, which interfere with calcium homeostasis (increasing excretion in the urine, increasing calcium extraction from bone, or decreasing calcium absorption), should be used in moderation. In particular, alcohol in excess has **many negative effects** on calcium metabolism and bone health, including **decreased** calcium absorption in the intestines, decreased activation of vitamin D in the liver (needed for calcium absorption), **suppression** of bone-forming cells (osteoblasts) which build bone, decrease in testosterone and estrogen and increase in parathyroid hormone, all of which **negatively** impact bone formation and strength, thus **increasing the risk of fractures**.

Dairy Shopping Tips

- Enjoy high energy, high protein, dairy-based snacks e.g., natural or plain Greek yoghurt topped with fresh fruit and nuts/seeds
- Choose higher protein options among similar foods
- If you are choosing milk alternatives, check that the product is fortified with calcium → Aim for 300g of calcium per serving.

Tips to Manage Calcium in Diet

Important Note

Note that **not all milk alternatives contain adequate amounts of calcium**. Unfortified almond and rice milk are very low in calcium naturally. **Check the labels** to be sure they are an adequate replacement for dairy products if you are lactose intolerant and need to avoid dairy.

REMINDER

Remember that you can take **lactaid-containing dairy milk or lactaid tablets** if you don't have enough of this enzyme naturally in your intestines. There are many advantages to the nutritional content of dairy milk, it contains all of the nutrients needed by humans making it **one of the most nutritious foods available**. This completeness is not present in milk alternatives. In addition to calcium, milk supplies casein and whey proteins, vitamin B12, vitamin B6 (riboflavin), phosphorus, potassium, magnesium, zinc, among others. The **whey protein in milk** is high in branched chain amino acids, which are **very important for muscle growth** and can augment the gains achieved with **resistance (strength) training**. Soy protein is not as effective in this regard, another reason to **choose milk over soy-based milk** alternatives if you are trying to **prevent or treat muscle loss from ageing or disease**.

What is Magnesium?

- Micronutrient (mineral) in food
- Releases energy from food, assist bone and muscle health.

How can Magnesium Impact Health Status?[10]

- Required for muscles and nerves to work properly
- Helps keep blood sugar and blood pressure optimal, prevents cardiac arrhythmias
- Aids synthesis of proteins, bone and DNA (genetic materials)
- Prevents or treats constipation and gastrointestinal reflux (GORD)
- Reduces anxiety
- Relieves insomnia
- Prevents muscle cramps at night.

Sources of Magnesium

Dark Chocolate

Nuts

Green Leafy Vegetables

Tofu

Yogurt

Dried Fruit

Seeds

Fatty Fish

Whole Grains

What Health Risks is Magnesium Related to?

People with Type 2 Diabetes

Magnesium deficits and higher urinary magnesium excretion in people with insulin resistance or type 2 diabetes are due to elevated glucose levels in the kidneys, which increase urine output.

Consequence:

Magnesium deficiency.

Older Adults

Older adults tend to **consume less magnesium**, absorb it **less efficiently**, and **excrete it more.** This results in a **risk** of **magnesium depletion**, especially in individuals with chronic diseases or taking multiple medications (particularly **diuretics or proton-pump inhibitors for reflux/ulcers**).

Consequence:

Magnesium deficiency.

Signs and Symptoms of Magnesium Deficiency:

- Loss of appetite
- Nausea
- Vomiting
- Stroke
- Fatigue
- Muscle weakness
- Anxiety
- Cardiac arrhythmias
- Constipation
- Muscle cramps.

Drug Interactions with Magnesium

Bisphosphonates[11]

Magnesium-rich supplements or medications can decrease the absorption of oral bisphosphonates, such as alendronate (Fosamax), used to treat osteoporosis.

Suggestion:

Use of magnesium-rich supplements or medications and oral bisphosphonates should be separated by at least 2 hours. Magnesium and many other nutrients in food and beverages decrease the absorption of these drugs, so they should always be taken on an empty stomach.

Antibiotics[11]

Magnesium can form insoluble complexes with tetracyclines, such as demeclocycline (Declomycin) and doxycycline (Vibramycin) as well as quinolone antibiotics, such as ciprofloxacin (Cipro) and levofloxacin (Levaquin).

Suggestion:

These antibiotics should be taken at least 2 hours before or 4–6 hours after a magnesium-containing supplement or meal.

Drug Interactions with Magnesium

Levodopa

Levodopa is used for Parkinson's disease. Magnesium interacts with it, which lower its effectiveness.

Suggestion:

Patients who take these medications **should consult with professionals** about their **dietary plan**. Generally, it is only **magnesium supplements** that are a **concern, not** magnesium in diet, which is needed for adequate muscle and nerve function, as well as many other cellular processes.

Diuretics[11]

Chronic treatment with loop diuretics, such as furosemide (Lasix) and bumetanide (Bumex), and thiazide diuretics, such as hydrochlorothiazide (Aquazide H) and ethacrynic acid (Edecrin) can lead to loss of magnesium. On the other hand, potassium-sparing diuretics, such as amiloride (Midamor) and spironolactone (Aldactone), reduce magnesium excretion.

Suggestion:

Patients who take these medications should **consult** with professionals about their **dietary intakes and supplements.**

REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Magnesium Intake Table[11]

Adult Males: 400 - 420 mg daily Adult Females: 310 - 320 mg daily

Older Males: 420 mg daily Older Females: 320 mg daily.

Food	Serve Sizes	Magnesium Content
Nuts and Seeds		
Pumpkin seeds, roasted	1 ounce	156 mg
Chia seeds	1 ounce	111 mg
Almonds, dry roasted	1 ounce	80 mg
Vegetables		
Spinach, boiled	½ cup	78 mg
Potato, without skin	1 small	25 mg
Broccoli, chopped and cooked	½ cup	12 mg
Legumes and Beans		
Black beans, cooked	½ cup	60 mg
Edamame, shelled, cooked	½ cup	50 mg
Kidney beans, canned	½ cup	35 mg
Grains and Cereals		
Rice, brown, cooked	½ cup	42 mg
Breakfast cereals, fortified	1 serving	42 mg
Oatmeal, instant	1 packet	36 mg
Bread, whole wheat	1 slice	23 mg

You should divide the magnesium-rich foods into different meals.

Tips to Manage Magnesium in Diet

Nuts and Seeds

- Add a handful of nuts and seeds into yoghurt
- Sprinkle on your porridge or toss in your smoothies
- Have 1½ tablespoons of any nut butter/seed paste.

Extra Tips:

- ✓ **If you have problems with dentition or chewing, grind your nuts or soak them in water for 8-12 hours before eating**
- ✓ **Shell your own nuts (e.g., walnuts) and freeze to keep fresher.**

Vegetables

- Enjoy spinach in salads or sandwiches
- Enjoy boiled, steamed or lightly roasted potatoes. Avoid hot chips, deep fried wedges and mashed potato! Use potato in rotation with other more intensely coloured veggies
- Enjoy cut up raw veggies as a snack like broccoli florets.

Legumes and Beans

- Add legumes to your salads as the protein source instead of beef or chicken
- For a super quick meal, coarsely mash cooked/canned beans and sauté in olive oil with garlic or chilli adding a squeeze of lemon juice. Serve on top of grainy bread along with some diced raw onion and tomato.

What is Potassium?

- Micronutrient (mineral) in food
- Important for cardiovascular health, nerve signals, and fluid balance.

How can Potassium Impact Health Status?[12]

- Prevents cardiac arrhythmias
- Helps control blood pressure
- Protects against strokes and cardiovascular disease
- Protects against osteoporosis
- Protects against kidney stones.

Sources of Potassium

Banana

Nuts

Broccoli

Seeds

Fish

Brussel Sprouts

What Health Risks is Potassium Related to?

Hypokalemia[13]

Blood levels of potassium are very low, usually due to diuretic use.

Signs and Symptoms of potassium deficiency:

- Constipation
- Tiredness
- Muscle weakness
- Increased urination
- Cardiac arrhythmias.

Kidney Stones[13]

Inadequate consumption of potassium could lead to development of kidney stones.

Risk factors in causing inadequate consumption levels of potassium due to excessive losses:

- Prolonged diarrhea or vomiting
- Heavy sweating
- Laxative abuse
- Diuretic use.

Drug Interactions with Potassium

Angiotensin Converting Enzyme (ACE) Inhibitors[13]

ACE inhibitors, such as benazepril (Lotensin), enalapril and angiotensin receptor blockers, such as losartan (Cozaar), candesartan, eprosartan and telmisartan are used to treat high blood pressure, heart failure, and kidney disease.

Consequence:

They decrease the amount of potassium lost in the urine and can make potassium levels too high, especially in people who have kidney problems.

Potassium-sparing Diuretics[13]

Potassium-sparing diuretics, such as amiloride (Midamor) and spironolactone (Aldactone), are used to treat high blood pressure and congestive heart failure.

Consequence:

These medications decrease the amount of potassium lost in the urine and can make potassium levels too high, especially in people who have kidney problems.

Proton-pump Inhibitors (PPIs)

Including omeprazole, pantoprazole, and esomeprazole decrease magnesium absorption and can lead to deficiency level.

Consequence:

Low magnesium affects potassium regulation, potentially causing fluid imbalances in the body as well as cardiac arrhythmias.

! REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Potassium Intake Table[14]

Adult Males: 3400 mg daily

Adult Women: 2600 mg daily.

Food	Serve Sizes	Potassium Content
Vegetables		
Beet greens, cooked	1 cup	1309 mg
Lima beans, cooked	1 cup	969 mg
Spinach, cooked	1 cup	839 mg
Sweet potato, cooked	1 cup	572 mg
Mushrooms, portabella, cooked	1 cup	529 mg
White beans, cooked	1/2 cup	502 mg
Pinto beans, cooked	1/2 cup	373 mg
Kidney beans, cooked	1/2 cup	359 mg
Black beans, cooked	1/2 cup	306 mg
Fruit		
Kiwifruit	1 cup	562 mg
Banana	1 medium	451 mg
Grapefruit	1 fruit	415 mg
Melon, honeydew	1 cup	388 mg
Mandarin orange	1 cup	324 mg
Cherries	1 cup	306 mg
Peach	1 cup	293 mg

Potassium Intake Table[14]

Dairy		
Yogurt, plain, nonfat	8 ounces	625 mg
Yogurt, plain, low fat	8 ounces	573 mg
Milk, fat free (skim)	1 cup	382 mg
Buttermilk, low fat	1 cup	370 mg
Milk, low fat (1 %)	1 cup	366 mg
Yogurt, Greek, plain, nonfat	8 ounces	320 mg
Yogurt, Greek, plain, low fat	8 ounces	320 mg
Protein Foods		
Clams	3 ounces	534 mg
Pork	3 ounces	303 mg
Beef	3 ounces	288 mg
Lamb	3 ounces	285 mg

You should divide the higher potassium foods into different meals if possible.

Tips to Increase Potassium in Diet

Vegetables

- Enjoy the vegetables in salads or sandwiches
- Puree cooked/canned lima beans with herbs and EVOO to make delicious dips/spreads
- EVOO is one of most beneficial components of the Mediterranean diet for bone health, and represents the main edible fat.

Extra Tips:

- ✓ **For convenience, buy pre-washed bags of dark leafy greens**
- ✓ **Frozen green veggies such as frozen kale and spinach are an economical and excellent alternative for vegetables that are out of season.**

Fruits

- Blend fresh or frozen fruit with low fat milk or plain yogurt and ice for a smoothie
- Top grainy toast with sliced bananas and peanut butter
- Thread cut up fruit onto skewers for a fruit kebab.

What is Sodium (Salt)?

- Micronutrient (mineral) in food
- Vital in maintaining proper blood volume and tissue fluid balance in the body.

How can Sodium (Salt) Impact Health Status?

- Its level impacts kidney function by affecting electrolyte balance in body
- Its level impacts hormone production by affecting levels of both aldosterone and glucocorticoids
- High levels can increase blood pressure and cause peripheral oedema (swelling of ankles)
- Low levels can lead to low blood volume, dehydration, and hypotension
- Both high and low sodium values can impair cognitive and cardiac functions.

Desirable Sources of Sodium

Legumes

Nuts

Seafood

Undesirable Sources of Sodium

Fast Food

Processed Foods

Canned Food

What Health Risks is Sodium Related to?

Kidney Disease

Populations with a high average salt intake have a high risk of development of chronic kidney disease.

Cardiovascular Disease

High sodium intake increases blood pressure, which can strain the cardiovascular system and lead to cardiovascular disease, including stroke, myocardial infarction and dementia.

Drug Interactions with Sodium

Antihypertensive

High sodium intake increases blood pressure, but antihypertensive medications lower it.

Consequence:

This makes it harder for the medication to work, resulting in the need for higher dosages and often multiple medications.

REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.[47]

Tips to Manage Sodium (Salt) in Diet

The Mediterranean Diet

- Naturally low in salt and high in potassium from fruit, vegetables, whole grains and dairy products
- Reduces blood pressure in individuals with hypertension
- EVOO is one of most beneficial components of the Mediterranean diet for cardiometabolic health, and represents the main edible fat.

Processed Snacks and Desserts

- Compare similar products and pick the one with less than 120 mg of sodium per 100g
- Choose, where possible, products with 'salt reduced' or 'no added salt'
- Avoid completely or limit to 3 times per month
- Choose healthy savoury snacks based around veggies, whole grains, legumes and dairy, e.g., raw carrots; celery with unsalted peanut butter; unsalted mixed nuts/seeds; unsalted roasted chickpeas/legumes.

Takeaway Food

- Limit your intake to 3 times per month, buy small serves and swap for healthier alternatives
- It's ok to purchase healthy items such as salads, fruit salads, roasted vegetables or couscous
- Pick one day to make healthy meals and snacks for a few days or for the whole week.

What is Zinc?

- Micronutrient (mineral) in food
- Important for body's normal functions and systems.

How can Zinc Impact Health Status?[15]

- Supports the immune system
- Assists in wound healing
- Plays a role in thyroid function
- Involved in blood clotting
- Influences senses of taste and smell, which are related to appetite
- Increases testosterone levels, maintains muscle function and sexual function in men.

Sources of Zinc

Oyster

Crab

Lean Meats

Beans

Yogurt

Chickpeas

What Health Risks is Zinc Related to?

Vegetarians (especially vegans)

The bioavailability of zinc from vegetarian diets is lower than from non-vegetarian diets, because vegetarians typically eat large amounts of legumes and whole grains, which contain phytates that bind zinc and inhibit its absorption.

Consequence:

Risk of zinc deficiency.

People with Gastrointestinal Disorders/Who Have Had Bariatric Surgery

People with gastrointestinal disorders, like inflammatory bowel disease (IBD) or those who've had bariatric surgery, often face zinc deficiency. This happens because they might eat less zinc-rich food, absorb less zinc, or lose more zinc through urine due to inflammation.

Consequence:

Risk of zinc deficiency.

Consequences of zinc deficiency:

- Interfere with the senses of taste and smell
- Delays in wound healing
- Changes in cognitive and psychological function
- Delays in wound healing
- Signs of testosterone deficiency in men (lower muscle mass and function, fatigue, lower libido and reduced sexual function).

What Health Risks is Zinc Related to?

Type 2 Diabetes

People with type 2 diabetes have a decreased zinc absorption and increased excretion in urine.

Consequence:

Results in hyperzincuria (excess zinc excretion in urine).

Excess Zinc Absorption

It is possible to have too much zinc if you take a large amount as a supplement over a long period of time. The excess zinc can bind to copper and cause a copper-deficiency anemia which cannot be corrected until the excess zinc supplementation is ceased. This is not a problem seen with the naturally-occurring quantities of zinc available in foods. The upper limit of zinc which should be consumed daily is 40 mg (a level which is generally only possible with supplements, not food sources).

Consequences of Excessive Consumption of Zinc:

- Lowered immunity
- Lowers good cholesterol (HDL)
- Nausea
- Dizziness
- Headaches
- Vomiting
- Anorexia.

Drug Interactions with Zinc

Antibiotics[16]

Both quinolone antibiotics (such as Cipro) and tetracycline antibiotics (such as Achromycin and Sumycin) might interact with zinc in the gastrointestinal tract, which could inhibit the absorption of both zinc and the antibiotic if they are taken at the same time.

Suggestion:

Taking the antibiotic at least 2 hours before or 4–6 hours after the zinc supplement minimizes this interaction.

Penicillamine[16]

Zinc can reduce the absorption and action of penicillamine, a drug used to treat rheumatoid arthritis and Wilson disease.

Suggestion:

People should take zinc supplements and penicillamine at least 1 hour apart.

! **REMINDER**

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Drug Interactions with Zinc

Diuretics[16]

Thiazide diuretics, such as chlorthalidone (Hygroton and Thalitone) and hydrochlorothiazide (e.g., Esidrix and HydroDIURIL), increase zinc excretion in the urine.

Suggestion:

This increased excretion, in turn, decreases serum zinc concentrations.

Proton-pump Inhibitors (PPIs)

Proton-pump inhibitor like omeprazole, pantoprazole and esomeprazole) inhibit the absorption of acid-dependent nutrients like zinc.

Consequence:

This results in lower level of zinc absorption and potential deficiency.

! **REMINDER**

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Zinc Intake Table[16]

Adult Males: 14 mg daily

Adult Women: 8 mg daily.

Food	Serve Sizes	Zinc Content
Seafood		
Oysters	90 g	~30 mg
Crab	90 g	3.2 mg
Salmon (cooked)	90 g	0.5 mg
Meat and Poultry		
Beef (steak)	90 g	3.8 mg
Nuts and Seeds		
Pumpkin seeds (pepitas)	30 g	2.2 mg
Peanuts	30 g	0.8 mg
Grains and Cereals		
Oats (rolled, cooked in water)	1 cup	2.3 mg
Rice (white, long-grain)	½ cup cooked rice	0.3 mg
Bread (white)	1 slice	0.2 mg
Dairy Products		
Cheese (cheddar)	45 g	1.5 mg
Milk (1% fat)	1 cup	1 mg

Zinc is rich in many foods, but your body cannot absorb the zinc from all foods in the same way. Therefore, it is important to have a balanced diet.

Tips to Manage Zinc in Diet

Seafood

- At least 3 serves of fish or seafood per week
- Best way to cook your fish is to steam, poach, bake or lightly grill it
- Add a tahini sauce or a tomato salsa to baked fish
- Flavour with lemon/citrus flavours, fresh or dried herbs and spices such as oregano, garlic, chili, ginger, dill, coriander and parsley.

Easy way to have fish or seafood in your diet:

- ✓ **Add canned tuna or salmon to omelettes, pasta salads or noodle casseroles**
- ✓ **Enjoy canned sardines with some grainy or sourdough bread and tomato for an instant lunch.**

Grains and Cereals

- Enjoy porridge made with any rolled grains or steel cut oats for breakfast. Use traditional rolled oats instead of quick oats!
- Use long grain brown rice, pearled barley, bulgur wheat, freekeh (young green wheat), millet, polenta and other wholegrains as a side to your main meals
- Choose wholegrain pasta and eat moderate portions. Ensure pasta is still slightly firm (al dente), not overcooked
- Avoid refined (low fibre) grain-based foods such as sugary breakfast cereals, white flour and products made with this e.g., pizza base, crackers, muffins and croissants.

What is Folate (Vitamin B9)?

- Micronutrient (vitamin) in food
- Important for red blood cell production, neurological health, mood.

How can Folate (Vitamin B9) Impact Health Status?

- Reduces the incidence of neural tube defects in the developing baby
- Improves cardiovascular health
- Prevents peripheral neuropathy, gait disorders, cognitive dysfunction and depression
- Prevents anemia, low platelets and low white blood cells.

Sources of Folate (Vitamin B9)

Fortified Foods

Avocados

Green Leafy Vegetables

Beans

Peas

Brussels Sprouts

What Health Risks is Folate (Vitamin B9) Related to?

People with Alcohol Use Disorder[17]

People with alcohol use disorder frequently have poor-quality diets that contain insufficient amounts of folate. Moreover, alcohol interferes with folate absorption and hepatic uptake, accelerates folate breakdown, and increases its renal excretion.

Consequence:

Folate (Vitamin B9) deficiency.

Pregnant Women[17]

During pregnancy, demands for folate increase because of its role in nucleic acid synthesis.

Consequence:

Folate (Vitamin B9) deficiency.

Signs and Symptoms of Folate (Vitamin B9):

- Megaloblastic anemia, low platelets and white blood cell counts
- Increased risk of infections
- Soreness in and shallow ulcerations on the tongue and oral mucosa
- Elevated blood concentrations of homocysteine
- Changes in skin, hair, or fingernail pigmentation
- Cognitive dysfunction
- Peripheral neuropathy (numbness or paresthesias in feet)
- Gait disorders, falls
- Depression.

Drug Interactions with Folate (Vitamin B9)

Methotrexate[17]

Methotrexate (Rheumatrex, Trexall), used to treat cancer and autoimmune diseases, is a folate antagonist.

Suggestion:

Patients taking methotrexate for cancer or rheumatological diseases should consult their specialist before taking folate supplements because the supplements could interfere with methotrexate's anticancer or immunosuppressive effects. Generally, folate supplementation is needed when taking these medications chronically, and is taken on the day after the drug has been administered.

Antiepileptic Medications[17]

Antiepileptic medications, such as phenytoin (Dilantin), carbamazepine (Carbatrol, Tegretol, Equetro, Epitol), and valproate (Depacon), are used to treat epilepsy, psychiatric diseases, and other medical conditions.

Suggestion:

Because folate supplements might reduce serum levels of these medications and lead to seizures it is advised to consult with professionals. Generally, folate supplementation is needed when taking these medications chronically.

Drug Interactions with Folate (Vitamin B9)

Proton-pump Inhibitors (PPIs)

Including omeprazole, pantoprazole and esomeprazole decrease folate absorption and body levels.

Suggestion:

Generally, folate supplementation is needed when taking these medications chronically.

! REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Folate (Vitamin B9) Intake Table[17]

For both adult males and females should be 400 µg daily, while that for pregnant women is higher.

Food	Serve Sizes	Folate Content
Protein Food		
Beef liver, braised	3 ounces	215 µg
Crab, Dungeness	3 ounces	36 µg
Fish, halibut	3 ounces	12 µg
Ground beef, 85% lean, cooked	3 ounces	7 µg
Chicken breast, roasted	3 ounces	3 µg
Dairy		
Milk, 1% fat	1 cup	12 µg
Vegetables		
Spinach, boiled	½ cup	131 µg
Asparagus, boiled	4 spears	89 µg
Brussels sprouts, frozen, boiled	½ cup	78 µg
Lettuce, romaine, shredded	1 cup	64 µg
Avocado, raw, sliced	½ cup	59 µg
Fruits		
Orange	1 small	29 µg
Papaya, raw, cubed	½ cup	27 µg
Banana	1 medium	24 µg

You should divide the portion into different meals.

Tips to Manage Folate (Vitamin B9) in Diet

Vegetables

Meal Planning Tips:

- ✓ Include at least one raw salad each day and drizzle it with EVOO and lemon juice or vinegar
- ✓ Replace dips made with sour cream or cream cheese with mashed or pureed veggie like avocado
- ✓ On weekends wash and spin dry dark green leaves, then chop into ribbons, and refrigerate or freeze, ready for use in stews, smoothies and more!

Cooking Tips:

- ✓ **Avoid overcooking**
  Overcooking can destroy folate. Steam or lightly cook vegetables
- ✓ **Use fresh ingredients**
  Fresh produce typically has higher folate content.

Fruits

- ❄ 3 serves of fresh or frozen fruits everyday.
- ❄ Buy fruit in season as it is usually cheaper, tastier and more nutritious. Check out local farmers markets
- ❄ Frozen fruits are convenient alternatives to fresh fruits and are equally nutritious.

What is Vitamin B12?

- Micronutrient (vitamin) in food
- Vitamin B12 is important for red blood cell production and also works together with folate (Vitamin B9) to release energy from food.

How can Vitamin B12 Impact Health Status?

- Maintains the health of nerve cells in brain and peripheral nervous system
- Plays a role in the production of myelin, a protective sheath around nerve cells
- Lowers risk of cardiovascular diseases
- Needed for bone marrow production of all cell lines.

Sources of Vitamin B12

Dairy

Fortified Breakfast Cereals

Clams

Meat

Oily Fish

Eggs

What Health Risks is Vitamin B12 Related to?

Older Adults[18]

With ageing and decreased stomach acid (achlorhydria), vitamin B12 cannot be cleaved from its protein-bound food sources, and therefore cannot bind to Intrinsic Factor and enter the blood stream at the sites in the small intestine (terminal ileum).

Consequence:

Vitamin B12 deficiency.

Vegetarians[18]

Vegans and vegetarians have a higher risk of developing vitamin B12 deficiency because natural food sources of vitamin B12 are limited to animal foods.

Consequence:

Vitamin B12 deficiency.

Pernicious Anemia

Adults with pernicious anemia, a genetic condition, where there are antibodies to Intrinsic Factor formed, prevent absorption of B12 from the diet, and intramuscular injections are needed monthly for life.

What Health Risks is Vitamin B12 Related to?

Gastric Achlorhydria of Ageing

Gastric acid production is reduced with age. In some individuals it is reduced to an extent that B12 cannot be cleaved from protein-bound food sources. In these individuals, IM B12 is not needed. A B2 oral supplement daily can be absorbed without the need for gastric acid.

Intestinal Surgery or Inflammatory Bowel Disease

Adults who have gastric bypass surgery, other intestinal surgery removing the stomach or small intestine, or loss/dysfunction of the terminal ileum due to cancer/Crohn's Disease, they do not have B12 available from gastric mucosa and/or cannot absorb B12 in small intestine. They will also need intramuscular B12.

Signs and Symptoms of Vitamin B12 Deficiency:

- Weight loss
- Pale skin
- Fatigue
- Cognitive impairment
- Peripheral neuropathy
- Poorer vision.
- Gait disorder
- Weakness
- Loss of appetite
- Swollen red tongue bleeding gums
- Jaundice

Drug Interactions with Vitamin B12

Gastric Acid Inhibitors[18]

Gastric acid inhibitors include proton pump inhibitors, such as antoprazole (Somac), esomeprazole (Nexium and Nexium 24HR), omeprazole (Losec), rabeprazole (Pariet) and lansoprazole (Zoton FasTabs).These drugs are used to treat gastroesophageal reflux disease and peptic ulcer disease. They can interfere with vitamin B12 absorption from food by slowing/preventing the release of gastric acid into the stomach and thereby lead to vitamin B12 deficiency.

Suggestion:

Patients who take these medications should consult with professionals about the diet plan. Generally, they should not be taken every day unless there is an ongoing risk of gastric bleeding or Barrett's esophagus (pre-cancerous change in esophageal mucosa due to chronic acid reflux). If they are needed chronically, oral B12 supplementation may be needed.

Metformin[16]

An antihyperglycemic agent used as first-line treatment for prediabetes and diabetes, reduces the absorption of vitamin B12 and significantly reduces serum vitamin B12 concentrations.

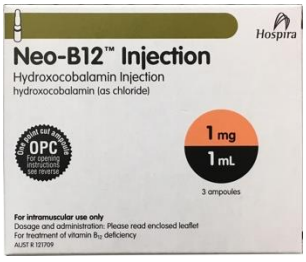
Suggestion:

Individuals who take these medications should consult with professionals about the diet plan, and may need oral B12 supplementation.

Drug Interactions with Vitamin B12

! Note:

B12 (intramuscular) injections are only needed for people who have no Intrinsic Factor (genetic condition called Pernicious Anemia) or no/non-functioning terminal ileum. If the problem is achlorhydria (no stomach acid) due to simple ageing or PPI's oral B12 (100 mg/d) is sufficient. This is because acid is needed to release B12 from protein. B12 pills DO NOT need to be released from protein.



! REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Vitamin B12 Intake Table[18]

For both adult males and females should be 2.4 µg daily.

Food	Serve Sizes	Vitamin B12 Content
Protein Foods		
Beef liver, cooked, pan fried	3 ounces	70.7 µg
Clams (without shells), cooked	3 ounces	17 µg
Oysters, eastern, wild, cooked	3 ounces	14.9 µg
Salmon, Atlantic, cooked	3 ounces	2.6 µg
Turkey, breast meat, roasted	3 ounces	0.3 µg
Dairy		
Milk, 2% milkfat	1 cup	1.3 µg
Yogurt, plain, fat free	6-ounce container	1.0 µg
Cheddar cheese	1½ ounces	0.5 µg
Egg, whole, cooked	1 large	0.5 µg

Most of the vitamin B12 comes from animal-based sources. Therefore, it is important to be aware of the possible need for B12 in vegans (not vegetarians who eat eggs and dairy products).

! Note:

Your liver stores 3-5 years of B12, so you will not develop deficiency from achlorhydria, pernicious anemia, or drugs for several years. Levels can be checked periodically for those on long-term metformin or proton-pump inhibitors (PPIs) and vegans.

Tips to Manage Vitamin B12 in Diet

Meal Planning

- Ensure each meal contains a source of Vitamin B12, especially if you follow a vegetarian or vegan diet, in which case you will need fortified foods to get it, as it only exists naturally in animal products, such as eggs, milk, meat and fish
- Add fortified plant-based milk or yogurt to your smoothies
- Include fortified cereals, eggs, or dairy products in your morning routine
- Add marmite, vegemite on toast.

Dairy - For Vegetarians Who Are Not Eating Meat and Fish (which contain much more B12)

- Up to 2 serves of dairy foods per day
- ! **Note:** If you have high blood pressure or are taking blood pressure medication, aim for 2-3 serves per day, preferably low-fat versions
- Enjoy a traditional Greek salad with crumbled fetta, dried oregano and plenty of extra virgin olive oil (EVOO)
- Dip raw vegetables in a yoghurt based dip such as a tzatziki, a Greek-style yoghurt dip with cucumber.

What is Vitamin D?

- Micronutrient (vitamin) in food, but main source is produced in your skin, from cholesterol precursors after exposure to UV light. After age 70, skin product in diminishes and dietary or supplement sources become predominant source of vitamin D
- Important for our muscle, bone and teeth health.

How can Vitamin D Impact Health Status?

- Maintains proper blood levels of calcium to achieve critical for bone formation, growth, and repairing bones and teeth
- Plays a role in the immune system
- Helps muscle functioning
- Influences fat storage
- Needed for hormone production
- May have a role in depression, dementia and cancer preventions.

Sources of Vitamin D

Sunlight (Naturally exists!)

Eggs

Fortified Foods

Mushrooms

Oily Fish

Shrimp

What Health Risks is Vitamin D Related to?

People with Limited Sun Exposure[19]

People with limited sun exposure are among the groups who are unlikely to obtain adequate amounts of vitamin D from sunlight, as well as those over the age of 70 whose skin is unable to make it efficiently any longer.

Consequence:

Vitamin D deficiency.

People with Obesity/who have Undergone Gastric Bypass Surgery/Inflammatory Bowel Disease (IBD)/Pancreatitis/Coeliac disease/Cystic Fibrosis

Individuals with obesity have lower vitamin D levels because subcutaneous fat traps the vitamin. Those who undergo gastric bypass surgery are at even higher risk of deficiency due to reduced absorption as are those with inflammation of the gut mucosa, such as in IBD.

Consequence:

Vitamin D deficiency.

Signs and Symptoms of Vitamin D Deficiency:

- Rickets
- Bone pain
- Osteoporosis
- Muscle weakness
- Low calcium absorption leading to secondary hyperparathyroidism and bone disease.

Drug Interactions with Vitamin D

Statins[19]

Statin medications reduce cholesterol synthesis. Because endogenous vitamin D is derived from cholesterol, statins may also reduce vitamin D synthesis in the skin in adults under age 70.

Consequence:

Reduced vitamin D synthesis rate.

Steroids[19]

Corticosteroid medications, such as prednisone (Deltasone, Rayos, and Sterapred), are often prescribed to reduce inflammation. These medications reduce calcium absorption and impair vitamin D metabolism, increasing vitamin D requirements.

Consequence:

Reduced vitamin D activity = increased requirements.

Dilantin, Rifampin and Phenobarbital

All increase vitamin D catabolism.

Consequence:

Reduced vitamin D synthesis rate and a higher requirements of vitamin D intake.

! REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Vitamin D Intake Table[19]

Adult: 5.0 µg daily

Older Adults: 10 - 15 µg daily.

Food	Serve Sizes	Vitamin D Content
Oils / Supplements		
Cod liver oil	1 tablespoon	34 µg (1,360 IU)
Fish		
Trout (rainbow), farmed, cooked	3 ounces	16.2 µg (645 IU)
Salmon (sockeye), cooked	3 ounces	14.2 µg (570 IU)
Dairy		
Milk, 2% milkfat, vitamin D fortified	1 cup	2.92 µg (120 IU)
Soy, almond, and oat milks, vitamin D fortified	1 cup	2.5 - 3.6 µg (100–144 IU)
Cheddar cheese	1.5 ounces	0.4 µg (17 IU)
Protein Foods		
Egg, scrambled	1 large	1.1 µg (44 IU)
Liver, beef, braised	3 ounces	1.0 µg (42 IU)
Chicken breast, roasted	3 ounces	0.1 µg (4 IU)
Vegetables		
Mushrooms, white, raw, sliced, exposed to UV light	½ cup	9.2 µg (366 IU)
Mushrooms, portabella, raw, diced	½ cup	0.1 µg (4 IU)

You should divide the vitamin D-rich foods into different meals.

Tips to Manage Vitamin D in Diet

Eggs

- Up to 4 eggs per week, preferably free range
- Enjoy eggs boiled or poached
- If you prefer fried eggs, cook them in EVOO
- In the Mediterranean, eggs were also whisked with lemon juice and stirred into soup or used to make a lemony sauce.

Easy way to include eggs into your diet:

- ✓ **Top grainy sourdough bread with poached eggs and wilted spinach for breakfast**
- ✓ **Hard boil eggs and use in sandwiches instead of processed meats for lunch**

Hard boiled eggs can be kept in the fridge for up to one week

- ✓ **Combine leftover veggies with eggs for a quick omelette for dinner.**

Fish

- At least 3 serves of fish or seafood per week
- Avoid large predatory fish, like swordfish and flake (shark) as these contain higher levels of mercury that accumulate in the brain
- If using a BBQ, wrap fish in parcels so it does not blacken
- Bake fish in the oven drizzled with EVOO, dried oregano and lemon and wrapped in parchment paper. Lemon juice increases the availability and absorption of the vitamins and trace elements in herbs and vegetables if used together.

Tips to Get Enough Sunlight Exposure

How Does Sunlight Exposure Work?

- A naturally occurring chemical substance in your skin: 7-dehydrocholesterol (precursor of vitamin D) converts to cholecalciferol (vitamin D_3) under exposure of sunlight (UV light)
- Cholecalciferol (vitamin D_3) undergoes conversion in liver to 25-hydroxycholecalciferol and finally in the kidneys, where becomes 1,25-dihydroxycholecalciferol (active form of vitamin D)
- Chronic liver disease and kidney disease in later stages can blunt or prevent the adequate activation of vitamin D, thus requiring supplementation of the active form (called Calcitriol). The usual dietary or supplemented forms of vitamin D will not work, as they are not activated.

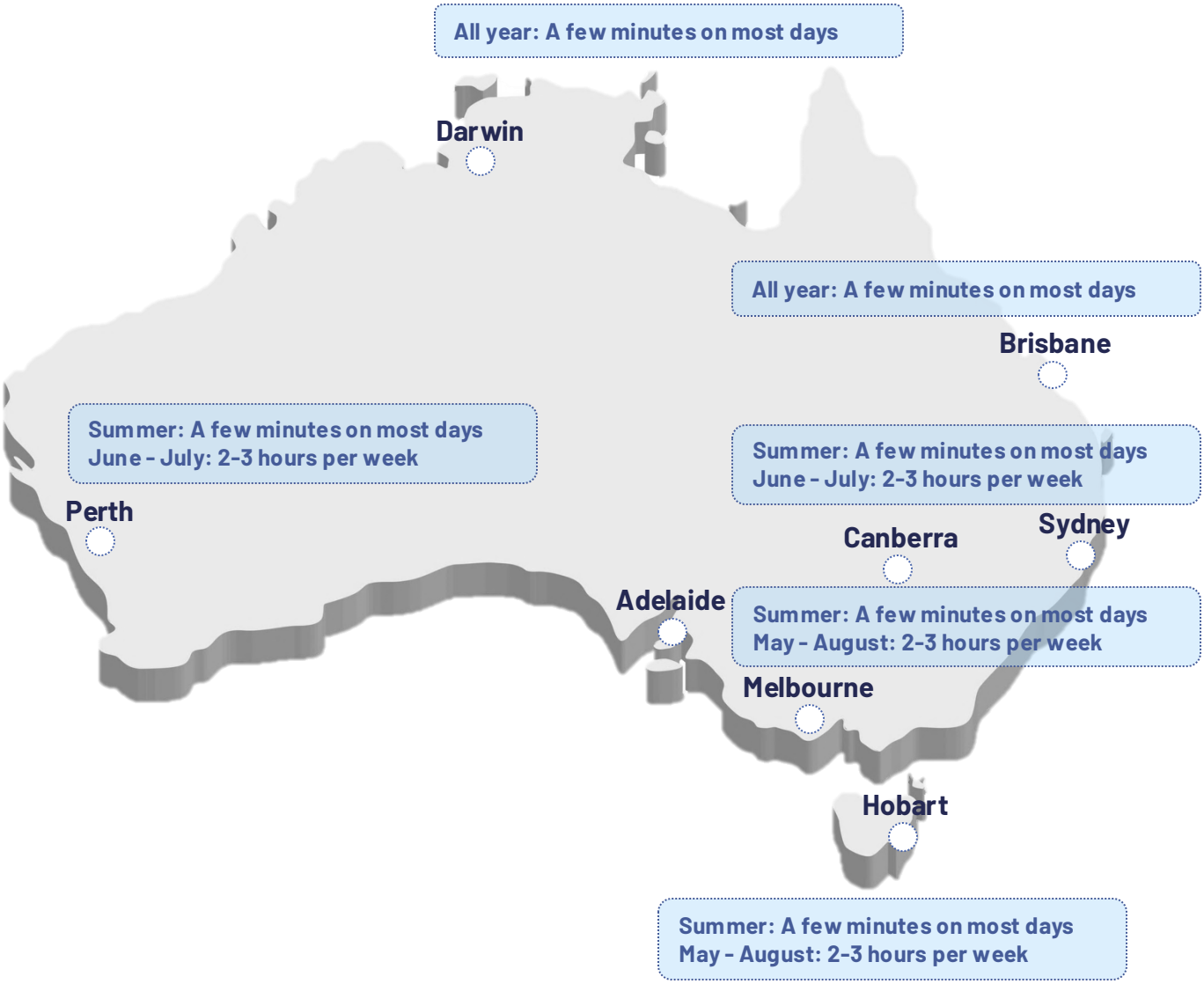
Important Notes

Your body cannot absorb vitamin D from all foods in the same way. Therefore, it is important to have a balanced diet. For younger adults, 15 minutes of UV light exposure to face/forearms at mid-day may be through a window is usually sufficient for daily needs. Longer duration of exposure leads to breakdown of vitamin D so is not more beneficial. Sunblock prevents UV light from synthesising vitamin D.

Most commercial and automobile glass blocks the UV rays responsible for vitamin D production, therefore you cannot get adequate vitamin D from sitting in the sun inside a car or building. Fluorescent lighting in offices and commercial spaces does not make vitamin D in your skin either.

Tips to Get Enough Sunlight Exposure

How Much Sunlight to Get Daily?[20]



Exposure of the face, arms, hands and legs without applying sunscreen can will usually lead to adequate vitamin D synthesis in those up to age 70 or so.

Women who wear full or partial head coverings are at risk of deficiency.

What is Vitamin K?

- Micronutrient (vitamin) in food
- Vitamin K is important for blood coagulation and wound healing.

How can Vitamin K Impact Health Status?

- Possesses antioxidant properties
- Possesses anti-inflammatory properties
- Helps in wound healing
- Needed for blood coagulation.

Sources of Vitamin K

Broccoli

Brussel Sprouts

Kale

Canola Oils

Spinach

Lettuce

What Health Risks is Vitamin K Related to?

People with Malabsorption Disorders[21]

Individuals with malabsorption syndromes and gastrointestinal disorders, such as cystic fibrosis, celiac disease, ulcerative colitis, and short bowel syndrome, may struggle to absorb vitamin K effectively. In some case, vitamin K supplementation is needed for them.

Consequence:

Vitamin K deficiency.

Signs and Symptoms of Vitamin K Deficiency[22]:

- Bleeding tendency
- Risk of osteoporosis/osteopenia
- Hemorrhaging
- Longer time for wound healing.

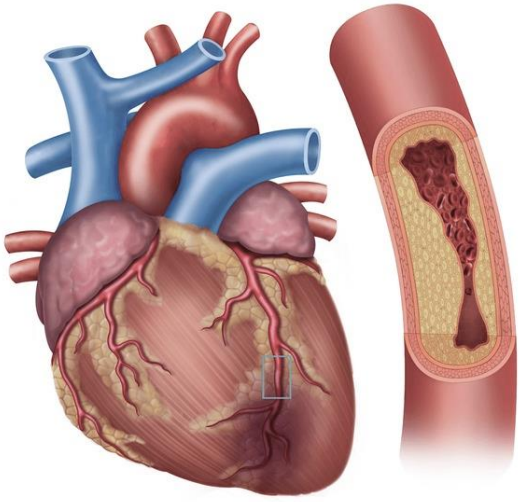
Osteoporosis[21]

Vitamin K helps activate many proteins, including osteocalcin, which is important for bone health. Some research suggests that high levels of inactive osteocalcin are linked to weaker bones. Some studies show that higher vitamin K intake might lead to stronger bones and fewer hip fractures, but not all studies agree.

What Health Risks is Vitamin K Related to?

Coronary Heart Disease[21]

It is found that vascular calcification, a buildup of calcium in blood vessels, is a risk factor for coronary heart disease because it reduces the elasticity of arteries. Matrix Gla-protein (MGP), which needs vitamin K, may help prevent this. Without enough vitamin K, MGP cannot work properly, leading to more calcification and a higher risk of heart disease. This is especially important for patients with chronic kidney disease, who are more prone to vascular calcification.



Drug Interactions with Vitamin K

Warfarin (Coumadin) and Similar Anticoagulants[21]

Vitamin K can interact with anticoagulants like warfarin (Coumadin), dalteparin (Fragmin), enoxaparin (Clexane), and rivaroxaban (Xarelto). These drugs reduce the activity of vitamin K, lowering the levels of vitamin K-dependent clotting factors.

Suggestion:

Patients who take these medications should consult with professionals about the diet plan. Generally, they should maintain a consistent intake of vitamin K from food and supplements because sudden changes in vitamin K intakes can increase or decrease the anticoagulant effect.

Antibiotics[21]

Antibiotics can kill the bacteria in the gut that produce vitamin K, which might lower vitamin K levels. This effect can be stronger with cephalosporin antibiotics, like cefoperazone (Cefobid), as they might also block vitamin K's action in the body.

Suggestion:

Individuals who take these medications should consult with professionals about the diet plan.

! REMINDER

Always consult with a healthcare provider for personalised advice and before making any changes to diet or medication.

Vitamin K Intake Table[23]

Men: 120 µg daily

Women: 90 µg daily.

Food	Serve Sizes	Vitamin K Content
Vegetables		
Turnip greens, frozen, cooked, boiled, drained, without salt	1 cup	851 µg
Cress, garden, raw	1 cup	270.9 µg
Kale, frozen, unprepared	1 cup	223.5 µg
Broccoli, frozen, chopped, cooked, boiled, drained, without salt	1 cup	162.1 µg
Asparagus, frozen, cooked, boiled, drained, without salt	1 cup	144 µg
Spinach, raw	1 cup	144.9 µg
Broccoli raab, raw	1 cup chopped	89.6 µg
Fruits		
Kiwifruit, green, raw	1 cups, sliced	72.5 µg
Blueberries, frozen, sweetened	1 cup, thawed	40.7 µg
Blackberries, frozen, unsweetened	1 cup, unthawed	29.9 µg
Oils		
Oil, canola	1 tbsp	10 µg
Oil, olive, salad or cooking	1 tablespoon	8.1 µg
Salad dressing, mayonnaise, soybean and safflower oil	1 tablespoon	3.4 µg

You should divide the vitamin K-rich foods into different meals.

Tips to Manage Vitamin K in Diet

Meal Planning

- Common green leafy vegetables that are high in vitamin K are spinach, silver beet, brussels sprouts, broccoli, Chinese cabbage, parsley and certain dark-coloured lettuces
- Add green leafy vegetables in your sandwiches or salad
- Add kale to morning smoothies
- Make a smoothie with fresh or frozen fruit and yoghurt.

Easy Ways to Use Extra Virgin Olive Oil (EVOO)

- ✓ Use EVOO on all your salads, together with lemon or vinegar and mop up any leftover dressing with some grainy or sourdough bread!
- ✓ Drizzle EVOO on bread instead of spreading butter or margarine; or place in a small jar in the fridge to slightly solidify so it is spreadable
- ✓ Use 1 tbsp of EVOO per 1 cup of vegies or salad.

Time Saver Tips

- On weekends wash and spin dry dark green leaves, then chop into ribbons, and refrigerate or freeze, ready for use in stews, smoothies and more!
- Buy frozen spinach, mixed frozen vegies and pre-washed bagged dark leafy greens to use during the week
- Use 'passata' (bottled pureed cooked tomatoes), tomato puree or tomato paste liberally in your cooking. Just remember to add onion/garlic and plenty of EVOO.

Please contact **Professor Maria Fiatarone Singh AM, MD, FGSA, FRACP** and our friendly staff if you would like more information on nutrition and your health or any other medical questions you may have.

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