EAGLE CLINICAL®

BOOSTING PROTEIN INTAKE

PATIENT HANDOUT

Your practitioner may have advised you to increase your protein intake for a variety of reasons. Adequate protein is important to:

- Help regulate your appetite.
- Boost your metabolism.
- Support weight loss goals.
- Improve muscle mass and strength.
- Support bone density.
- Support recovery after injury.
- Support fertility.
- Support your digestion.
- Support your immune function.
- Support brain health, mood, cognition, and stress.
- Support healthy blood sugar balance.

WHAT IS PROTEIN?

Protein is an essential macronutrient just like carbohydrates and fats. While all three of these serve as primary fuel sources for the body, providing energy and nourishment, protein provides the structural building blocks for the body's tissues.

Proteins are made up of groups of amino acids. Different combinations of amino acids form different proteins. There are twenty amino acids that form the basic building blocks of all proteins. Nine of these amino acids are essential, meaning that the human body cannot make them and must be obtained from the diet. The remaining eleven amino acids are non-essential, meaning that the body can make them itself, though it is important to gain adequate amounts by consuming dietary sources as well, especially in conditions of increased demand for protein (i.e. substantial amounts of physical activity, pregnancy, breastfeeding, and older age). Table 1 below lists the essential and non-essential amino acids.[1]

TABLE 1. ESSENTIAL AND NON-ESSENTIAL AMINO ACIDS[1]

Essential amino acids		Non-essential amino acids	
Histidine	Phenylalanine	Alanine	Glutamine
Isoleucine	Threonine	Arginine	Glycine
Leucine	Tryptophan	Asparagine	Proline
Lysine	Valine	Aspartic acid	Serine
Methionine		Cysteine	Tyrosine
		Glutamic acid	

SPECIALISED NUTRITIONAL MEDICINE

HOW PROTEIN BENEFITS THE BODY

APPETITE REGULATION AND PROTEIN METABOLISM IN WEIGHT LOSS

Adequate protein intake is an important dietary consideration to promote regular appetite, as it increases feelings of fullness and satiety. One study in overweight men showed that increasing protein intake reduced cravings, relative carbohydrate intake, late night snacking, and overeating.[3] As such, adequate protein is an essential part of a sustainable weight loss program. Diets high in protein have been shown to boost metabolism and increase the number of calories burned per day due to the 'thermic' effect of protein.[4] This is because muscle is more metabolically active than fat, meaning it burns more calories when you are at rest.[5] Protein also supports weight loss by helping to conserve lean muscle mass.[6]

MAINTAINING MUSCLE MASS AND RECOVERY

Protein is key for building and repairing muscle tissue. Physically active adults and athletes require a higher amount of dietary protein compared to people living a sedentary lifestyle. The three branch-chain amino acids (BCAAs): leucine, isoleucine, and valine are particularly important for decreasing muscle fatigue and soreness.[7] It should be noted, however, that a balanced intake of a variety of amino acids, together with sufficient carbohydrate intake and suitable exercise, is required for muscle growth and recovery.[8, 9]

BENEFITS IN BONE HEALTH AND AGEING

Dietary protein is vital for maintaining bone health across the lifespan. Protein makes up roughly 50% of bone volume, and about one-third of its mass.[10] It also plays a role in the prevention of osteoporosis; protein may reduce hip fracture risk, and is beneficial in maintaining bone mineral density, which declines gradually with age.[11, 12]

TISSUE RECOVERY POST-INJURY

Protein is essential for the maintenance and repair of body tissue. Due to its function in collagen production, low protein levels cause a decrease in collagen development, slowing the wound healing process.[13, 14] Collagen protein is required for restructuring and rebuilding bones and tendons, not just muscle and skin tissue. To optimise the recovery process after injury (e.g. bone fractures and tendon tears), adequate or, in some cases higher protein intake is required, and forms an important part of rehabilitation nutrition. Modified protein intake should also account for changes in patterns of physical activity.[15, 16, 17]

DIGESTIVE SYSTEM FUNCTION

Dietary amino acids, in particular glutamine, serve as the main fuel source for cells in the gut. Glutamine is also crucial for maintaining the integrity of the gut lining itself, and in protecting cells by reducing inflammation, especially in inflammatory bowel disease (IBD).[18]

IMMUNE SYSTEM FUNCTION

Optimal nutritional status of protein promotes a strong immune system, as sufficient protein intake is crucial for antibody production.[19] A deficiency of dietary protein or amino acids, especially glutamine, has long been known to impair immune function and increase susceptibility to infections.[20]

BRAIN HEALTH, MOOD AND STRESS

The brain requires a range of amino acids, like glutamine, to synthesise chemicals that regulate emotional responses, cognition, behaviour, and stress.[21, 22, 23] The essential amino acid tryptophan is a precursor to the chemical messenger serotonin, which is important for mood regulation, and has been researched to reduce anxiety and depression.[24, 25] Whilst effects of protein on cognition have not been extensively studied, the amino acid tyrosine may play a role in preventing and managing cognitive decline/dementia.[26, 27] Adequate protein intake is also important during periods of prolonged stress. The chemical changes that occur in chronic stress induce the breakdown of protein and lean body tissue to meet increased energy demands.[28, 29, 30, 31]

BLOOD SUGAR BALANCE

A balanced intake of protein, fats, and lower glycaemic index (GI) carbohydrates is foundational for regulating blood sugar levels after eating, especially in diabetes.[32, 33] As discussed, protein also has metabolic benefits in weight loss, which is a beneficial strategy for the management of insulin resistance in type 2 diabetes.[34]

MALE & FEMALE FERTILITY

Protein is vital for both male and female fertility. Studies have shown an association between low protein diets and reduced testosterone levels,[35] reduced sperm count, and reduced testicular function.[36] Protein also helps improve ovulation, egg quality, and embryo development in females.[37, 38] Some studies have suggested that replacing animal sources of protein, in particular chicken and red meats, with vegetable sources of protein may reduce the risk of infertility associated with failure to ovulate.[39]

HOW MUCH PROTEIN SHOULD YOU GET?

Protein requirements differ based on age, gender, and activity levels. The demand for protein increases over periods of growth and development, particularly during childhood, adolescence and in pregnancy.

Table 2 below lists the Australian estimated average requirements for protein by age and gender. Table 3 lists the Australian estimated average requirements for protein in each trimester of pregnancy and lactation.

TABLE 2. AUSTRALIAN ESTIMATED AVERAGE REQUIREMENTS FOR PROTEIN IN MALES AND FEMALES THROUGHOUT LIFE[46]

	Age	Male protein requirements	Female protein requirements
Childhood	1 to 3 years old	12 g/day (0.92 g/kg)	
	4 to 8 years old	16 g/day (0.73 g/kg)	
	9 to 13 years old	31 g/day (0.76 g/kg)	24 g/day (0.61 g/kg)
Adolescence	14 to 18 years old	49 g/day (0.78 g/kg)	35 g/day (0.62 g/kg)
Adults	19 to 70 years old	52 g/day (0.68 g/kg)	37 g/day (0.60 g/kg)
Older adults	>70 years old	65 g/day (0.86 g/kg)	46 g/day (0.75 g/kg)

TABLE 3. AUSTRALIAN ESTIMATED AVERAGE REQUIREMENTS FOR PROTEIN DURING PREGNANCY AND LACTATION[46]

Protein requirements	
1st trimester	No additional requirements
2nd trimester	49 g/day (0.80 g/kg)
3rd trimester	49 g/day (0.80 g/kg)
Lactation/breastfeeding	54 g/day (0.88 g/kg)

PROTEIN: ATHLETES

Protein targets for athletes typically range between 1.2-1.6 g/kg of body mass per day, varying with sport, training, and events. This is approximately double the amount recommended for sedentary adults[47]

PROTEIN: OLDER ADULTS

Muscle mass is important to conserve as we age to preserve strength, maintain mobility, and prevent physical debility.[48, 49] Older adults have a greater rate of protein breakdown and a reduced ability to utilise protein in the body, therefore protein requirements are higher in this group (see Table 2).[50]

THE IMPACT OF A PROTEIN DEFICIENCY ON OTHER NUTRIENTS

A deficiency in protein can affect the status of many other nutrients, namely phosphorus, potassium, sodium, chlorine, water, nitrogen, sulphur, zinc, magnesium, and vitamin A within the body. A lack of any of these nutrients may result in poor growth, a breakdown of muscle tissue,[40] poor immune function,[41] low mood,[42] impaired brain function (e.g. learning and memory),[43] blood sugar balance,[33] and infertility.[44, 45]

WHY IS PROTEIN IMPORTANT?

1. The production of collagen, the most abundant protein found in the body. Collagen is an important part of connective tissue, providing strength and structure to bones, tendons, and ligaments. Together with keratin and elastin proteins, collagen also provides protection and flexibility to the skin and hair.
2. Building and repairing muscle and bone tissue.
3. Nourishing the cells that line the gut to support digestion and absorption.
4. Transporting oxygen and carbon dioxide via haemoglobin, the iron-containing protein component of red blood cells.
5. Maintaining fluid balance and blood pressure via the kidneys.
6. Producing antibodies, immune cells that protect against invading bacteria, viruses, fungi, and allergens.
7. Creating chemical messengers (hormones and neurotransmitters) for mood regulation, learning and cognition, and blood sugar control.
8. Transporting and storing various nutrients.
9. Forming enzymes that trigger various chemical reactions within the body.

ANIMAL-BASED VERSUS PLANT-BASED PR

THE COMPLETE AND INCOMPLETE STORY

Protein sources are often classified as either complete or incomp
poultry, eggs, fish, and seafood) are considered complete source
of quinoa and soy. When adhering to a vegetarian or vegan diet
are getting all of the essential amino acids.[51]

In the past, it was thought that for a vegetarian or vegan to get all of the esse
However, this has since been debunked and it is now understood combining a

Table 4 below lists the amount of protein per serve in various animal-based

ANIMAL AND PLANT-BASED P

ANIMAL-BASED PROTEIN SOURCES

Beef (100 g raw/65 g cooked = 17 g)

Dairy: yoghurt (3/4 cup/200 g = 20 g), **cheese** (2 slices/40 g = 10 g), **milk** (1 cup/250 mL = 8 g) and **butter** (1 tablespoon/14 g = 0.1 g)

Eggs (2 large/120 g = 16 g)

Fish: salmon (100 g cooked = 22 g), **sardines** (100 g cooked = 19.8 g) and **cod** (100 g cooked = 19 g)

Kangaroo (100 g raw/65 g cooked = 20.2 g)

Lamb (100 g raw/65 g cooked = 16 g)

Pork (100 g raw/65 g cooked = 18 g)

Poultry: turkey (100 g raw/80 g cooked = 23 g), **chicken** (100 g raw/80 g cooked = 22 g) and **duck** (100 g raw/80 g cooked = 15.2 g)

Seafood: lobster (100 g cooked = 27 g), **mussels** (85 g cooked, without shell = 20 g), **crab** (100 g cooked = 17.9 g), **oysters** (85 g cooked, without shell = 16 g), **prawns** (85 g cooked = 12.75 g) and **caviar** (30g = 7.5 g)

ROTEIN:

plete depending on whether all nine essential amino acids are present. Protein derived from animals (meat, dairy, es of protein. Protein from plants (vegetables, legumes, nuts, and seeds) are mostly incomplete, with the exception it is important to consume a variety of different plant-based protein sources throughout the day to ensure you

ntial amino acids, each meal had to be built from complementary incomplete protein sources, a process known as 'protein combining'. variety of incomplete proteins over the day or week will ensure an adequate intake of essential amino acids.[52]

and plant-based foods for reference.

PROTEIN SOURCES PROTEIN PER SERVE[53, 54]

PLANT-BASED PROTEIN SOURCES

Amaranth (1/2 cup cooked/123 g = 4.5 g)

Brewer's yeast (1 tablespoon/15 g = 8.3 g)

Cacao (2 tablespoons/15 g raw powder = 4 g)

Carob (2 tablespoons/15 g raw powder = 0.9 g)

Corn (1/2 cup cooked/75 g = 2.6 g)

Flours: gluten-containing grains: kamut (50 g = 7 g), **barley** (50 g = 5 g), **spelt** (50 g = 5 g), **rye** (50 g = 5 g), **whole wheat** (50g = 5 g) and **semolina** (50 g = 5 g), **other flours: lupin** (50 g = 18.1 g), **almond** (50 g = 11.5 g), **besan/chickpea/gram** (50 g = 11 g), **coconut** (50 g = 10.9 g), **buckwheat** (50 g = 7 g), **hemp** (50 g = 7 g), **teff** (50 g = 5.7 g), **millet** (50 g = 5.6 g), **sorghum** (50 g = 4.3 g), **corn/maize** (50 g = 4.2 g), **brown rice** (50 g = 3.8 g), **tiger nut** (50 g = 2.5 g), **amaranth** (50 g = 2 g), **green banana** (50 g = 1.8 g)

Jackfruit (1 cup/65 g = 2.4 g)

Legumes: lupin (1/2 cup cooked/83 g = 13.5 g), **lentils** (1/2 cup cooked/99 g = 9 g), **adzuki beans** (1/2 cup cooked/115 g) =8.6 g), **split peas** (1/2 cup cooked/98 g = 8.2 g), **pinto beans** (1/2 cup cooked/86 g = 7.7 g), **black beans** (1/2 cup cooked/86 g = 7.6 g), **kidney beans** (1/2 cup cooked/85 g = 7.5 g), **lima beans** (1/2 cup cooked/94 g = 7.4 g), **chickpeas** (1/2 cup cooked/82 g = 7.3 g), **mung beans** (1/2 cup cooked/101 g = 7.1 g), and **road beans/fava beans** (1/2 cup cooked/85 g = 6.5 g)

Millet (1/2 cup cooked/87 g = 3.1 g)

Mushrooms (1 cup raw/70 g = 2.2 g)

Nuts: peanuts (30 g = 7.7 g), **almonds** (30 g = 6.6 g), **pistachios** (30 g = 6.2 g), **cashews** (30 g = 5.5 g), **walnuts** (30 g = 4.6 g), **hazelnuts** (30 g = 4.5 g), **pine nuts** (30 g = 4.1 g), **Brazil nuts** (30 g = 4 g), **pecans** (30 g = 2.8 g) and **macadamias** (30 g = 2.4 g)

Oats (1/2 cup/50 g = 6.6 g)

Polenta (3/4 cup/125 g = 2 g)

Quinoa (1/2 cup cooked/93 g = 4.1 g)

Rice (1/2 cup cooked/100 g = 2.7 g)

Seeds: hemp (30 g = 9.5 g), **sacha inchi** (30 g = 9 g), **pumpkin/pepitas:** (30 g = 8.9 g), **nigella/black seeds** (30 g = 6.3 g), **sesame** (30 g = 6.1 g), **sunflower** (30 g = 5.8 g), **flaxseeds/linseeds** (30 g = 5.5 g), **poppy** (30 g = 5.4 g) and **chia** (30 g = 5 g)

Soy beans (1/2 cup/86 g cooked = 14.3 g) and **soy products: tempeh** (85 g = 16 g), **tofu** (170 g = 14g), **edamame** (1/2 cup/75 g shelled = 9.2 g), **soy milk** (1 cup/250mL = 8 g), and **miso** (1 tablespoon/18 g = 2 g)

Spelt (1/2 cup cooked/97 g = 5.4 g)

Spirulina (1 tablespoon/7 g = 4 g)

Tahini (30 g hulled = 7.1 g)

Teff (1/2 cup cooked/126 g = 4.9 g)

Tiger nuts (1/4 cup/30 g = 1.3 g)

Wheat products: seitan (28 g = 21 g), **freekeh** (1/4 cup/50 g raw = 6.3 g), **farro** (1/4 cup/50 g raw = 6 g), **couscous** (1/2 cup cooked/79 g = 3 g) and **bulgur** (1/2 cup cooked/91 g = 2.8 g)

TIPS TO GET MORE PROTEIN IN YOUR DIET

TIPS FOR OMNIVORES

Aim to consume 20 g to 25 g of protein at each main meal.

- Add eggs, cottage cheese, or nut/seed butter to wholemeal instead of white toast, for more wholegrain protein.
- Swap sugary cereals for oats with high protein yoghurt, or porridge topped with chopped nuts/seeds.
- Make breakfast omelettes with cheese (see below).
- Snack on high protein yoghurt topped with chopped nuts/seeds and a handful of fresh berries.
- Add feta cheese or nuts/seeds to salads (see below).
- Add canned sardines or salmon on rice crackers as a snack.
- Swap chocolate, crackers, and potato chips for a handful of spiced nuts as a mid-afternoon snack.
- Add cooked chicken to wraps or sandwiches for lunch.
- Include lean cuts of meat, poultry, eggs, fish or seafood to dinner dishes (e.g. baked casseroles, skillets, paellas, etc.), together with fresh fruits, vegetables, nuts, seeds, grains, and legumes for a healthy, well balanced diet.
- When indulging in dessert, swap sugary ice creams for protein pudding made from high protein yoghurt, coconut or almond milk, cacao powder, chocolate protein powder, and topped with chia seeds.
- Boost your intake with protein powders. Whey, collagen and egg are common animal-based protein powders (see vegetarian list for other kinds) to consider adding to smoothies.

TIPS FOR VEGETARIANS/VEGANS

Aim to consume 20 g to 25 g of protein at each main meal.

- Enjoy breakfast fritters with chickpeas and mushrooms.
- Mix your own homemade granola/trail mix/muesli with more nuts and seeds, and less dried fruits.
- Spread nut/seed butters or hummus onto rice crackers as a snack.
- Sprinkle a serve of nuts/seeds (e.g. dukkah) over salads, vegetables, or curries for crunch and texture.
- Make protein balls, cookies, bars or slices with nut/seeds, nut/seed butter, cacao, and protein powder (see below).
- Add tahini to salad dressings/vinaigrettes.
- Blitz or stir pearled barley and legumes into vegetable soups.
- Add cubed tempeh/tofu to stir-fry dishes.
- Make vegan bolognese with red lentils.
- Create Buddha/harvest bowls with quinoa/buckwheat, legumes, and/or tempeh/tofu.
- Make veggie burger patties with quinoa, black beans, and/or falafel.
- Make smoothies with coconut or nut milks (e.g. almond, cashew, and macadamia). Add in 1 tablespoon of nut/seed butter and cacao.
- Boost your intake with protein powders. Sprouted and fermented golden pea, brown rice, hemp, and pumpkin seed are common plant-based protein powders to consider adding to smoothies.

MEAL IDEAS

BREAKFAST OPTIONS

Besan (chickpea) flour and egg omelette with sliced portobello mushroom, spinach, and crumbled feta.

LUNCH OPTIONS

Naked burrito bowl with pulled pork, black beans, brown rice, chopped tomato, corn, lettuce, Spanish onion, avocado, coriander, lemon juice, and topped with a small a dollop of sour cream.

SNACK OPTIONS

No-bake protein balls with rolled oats, peanut butter, hemp seeds, maple syrup, and coated in cacao.

DINNER OPTIONS

Quinoa salad with roast vegetables (sweet potato, beetroot, carrot), eggplant, and capsicum topped with chopped almonds.

References available from clinical support or on our website via: https://bit.ly/BProteinDH or scan QR code