Protein power

If fat, protein, fibre and carbohydrate were the X-Men of food, then protein would definitely be Wolverine. Think protein and you think bulk, lean muscle, fighting through pain and generally being so much butch-er than the rest (mmm, must remember to go to the butcher). Protein has been presented as the superhero food that will save us from skinniness, fend off flab and be the rescue remedy for mutant-like recovery after wicked workouts. The questions are, though, are all proteins created equally and is protein's power unlimited?

Your body on protein

Our bodies rely on proteins we eat (or drink) for eight amino acids that the body cannot make itself. These are called 'essential' amino acids and they form the building blocks for muscle repair, building and maintenance, but unfortunately, the formula is not as simple as 'Eat protein, make/maintain muscle'. Eating protein beyond the recommended limit for your weight and activity can mean that protein just becomes another energy source – that is, it won't make you any closer to looking like Ronnie Coleman, all that beef and protein powder just becomes an expensive energy fuel or building block for fat. And it gets trickier.

"Recent research suggests that taking any more than 20-30g of protein at one time provides no further stimulation of muscle building," says Gary Slater, who splits his time between the School of Health and Sport Sciences at the University of the Sunshine Coast and his role as National Performance Nutrition Coordinator for the Wallabies. "Typical intake patterns show that Australians may get upwards of half their daily protein intake in their evening meal, with little at other times of the day." This means that we are robbing ourselves of the potential benefits we can have from protein because we get the same benefit from a 120g serve of beef as we do from a 300-350g piece of steak. "That's why I try to include a small amount of high quality protein in each snack and meal for all my athletes," says Slater.

Protein needs vary depending on your activity level and bodyweight. An average, not particularly active man requires 0.8g of protein per kilogram of bodyweight, while a male power/strength athlete looking to bulk up may require as much as 2g per kilogram. The Dietitians Association of Australia (DAA) recommends an absolute limit of 200g of protein per day, regardless of bodyweight and activity.

Too much protein can not only be a waste, it can be downright dangerous. The process of breaking down protein into a form that can be used by the body is taxing on the body – much more so than dealing with carbohydrates and fats. Too much protein can overload the liver's capacity to convert the excess nitrogen (a byproduct of assimilating protein) into urea. "This can cause damage to the kidneys," says Melanie McGrice, dietitian and spokesperson for the Dietitians Association of Australia. McGrice emphasises that although some proteins, such as whey protein isolate, may be more biologically available than others (that is, our bodies break it down and make use of it more quickly), "protein is still protein – you will still have that stress on the liver and kidneys". Another consideration is the other substances that might be putting in our bodies when we eat protein – things like saturated fat, cancer-causing compounds and cholesterol, for example.

Who needs what?

Nearly all the chatter on protein is about strength/power athletes and guys trying to bulk up, but protein has a vital role to play for endurance athletes, too.

Simone Allen, owner of Nutrition Works and a dietitian working with elite endurance athletes in Perth, says male endurance athletes need 1.2–1.4g of protein per kg each day, which is 50 per cent or more than a non-athlete. Just like a bodybuilder or strength athlete, an endurance athlete needs 20g of protein soon after training or an event to help with recovery. Allen works on a formula of 0.8 grams per kilo bodyweight per hour for carbs, in conjunction with 20g of protein. So for a 70kg athlete training for 90 minutes, she would aim for them to eat or drink a total of 84g of carbs with 20g of protein, split between a post-workout snack within 15-30 minutes of training, then the remainder about half an hour later. "The research is saying is that by breaking up that total amount into smaller parts and having it every 15 or 30 minutes, rather than one bulk amount, you are actually able to utilise that nutrients better."

As a guide, Allen tends to class food as simply high nutrients versus low nutrients".

“With cereals, for instance, cornflakes or Nutri Grain is kind of flavoured air, but when you have a higher fibre cereal like Sports Plus, or a muesli, then naturally it will have the protein in there as well. It doesn’t have to be a lot, because the milk or yogurt that goes with it will have about 10g of protein in it.

“The general consensus is that protein is not beneficial before or during an endurance event or training – we focus on other key nutrients, like carbohydrates, fluids, sodium. Certainly, when I see athletes doing ultra-endurance events of 13 hours or more, then we do incorporate some meals or snacks that contain protein because you need to account for a day’s protein intake. That’s when we go for the more easily digestible, liquid forms, such as Sustagen Sports or an Up and Go style of drink that shouldn’t cause any inner gut issues,” Allen says.

At the other end of the scale, Gary Slater says the Australian rugby union players easily exceed the 1.6-1.7g of protein per kilogram bodyweight recommended for strength/power athletes. “Athletes I work with achieve 2-2.5gof protein per kilogram body mass.” His main concern, however, is for the athletes to optimise their protein by taking it in via 20-25g serves 6 times a day. “But you need to take into consideration someone’s overall nutrition needs, not just their protein needs,” says Slater, who advocates getting protein across a range of sources – red meat, white meat, seafood and three serves of dairy per day.

Despite the hype, Slater says the push for protein pre-exercise is a little bogus. “The alleged evidence comes from two studies, but the results could never be replicated. Now the consensus is that the best time for getting protein is immediately after exercise, whereas there’s good evidence to support that ingesting carbs before and/or during working sessions can increase work capacity, enhancing resistance training adaptations.”

Lisa Middleton, an advanced sports dietitian who has worked with AFL clubs such as Essendon and St Kilda, works on a formula of 2g+ per kilogram of bodyweight for the younger athletes trying to bulk up in the power/endurance sport of Aussie Rules. Other players may only need 1.6g/kg, but “inevitably, the way athletes eat when they are doing a lot of training, they go above the 2g/kg anyway,” she says.

“The bigger issue with the younger athletes is simply eating often enough to get in the total calories they need to put on weight. We really emphasise the importance of protein around training – within 15-20 minutes is ideal, but anything up to an hour is still beneficial. But if they are burning more energy than they are taking in, they will have trouble holding onto their muscle weight.”

For overall health, eating a range of whole grain cereals, fresh vegetables and fruits becomes even more important if you’re packing in the protein. These healthy extras will fuel the micronutrients and potassium alkali salts needed to reduce the potential renal acid load and urinary calcium loss that can occur due to the acidic nature of protein-rich diets.

But weight, there’s more

If your aim is to lose some flab, then protein is also the star player, according to the DAA. “We don’t call it a high protein diet – it’s a higher protein diet,” McGrice says. “The protein intake is not so high that you’re restricting carbohydrates or other essential nutrients.” For this reason, dietitians such as McGrice prefer to work out protein needs as a percentage of total energy intake – 20 to 25 per cent. “It’s safe to maintain a rate of up to 20 per cent over an extended period of time,” McGrice says.

Protein helps in three ways. First, protein has a greater thermic effect than fat or carbohydrate – in other words, the body must raise the rate of energy use to digest protein. When this extra protein come at the expense of extra carbohydrate – especially simple carbs and sugars – it can prevent any frequent and intense insulin responses than can cause energy to be stored as fat. Protein – specifically the amino acid leucine – helps preserve muscle as you lose weight. More muscle assists in maintaining a high metabolism, which is your defence against the fat jumping right back on. On top of this, many studies show that subjects report feeling “fuller for longer” when they’re on a higher protein diet. The powerful appetite suppressing effects come from the fact that protein stimulates the release of the hormone cholecytokinin from the stomach cells, which then travels through the bloodstream to the hypothalamus, where it tells the brain that the stomach is full.

Protein propaganda – the facts and the fiction

Red meat gives you cancer, eggs are bad for your heart, nuts make you fat and soy turns you into a lady-boy. Myths aside, what are the perils of protein?

Red meat

The evils of red meat are heavily debated, but the DAA's interpretation of current research is that there is a "relatively modest" link between high intakes of red meat, particularly processed meats, and the risk of colorectal cancer.

The National Health and Medical Research Centre's 2012 national dietary guidelines err on the safe side, suggesting a limit of 455g of red meat per week, but McGrice says, "the biggest issue is the cooking – we know that meat cooked at high heat contains more carcinogens."

The cancer-causing compounds are heterocyclic amines (HCAs), but they are not exclusive to red meat. The Cancer Project, run by Physicians for Responsible Medicine in the USA, found that a chicken breast chucked on the barbie can produce more than 10 times the HCAs of a beef steak. Adding garlic, rosemary or sage may help because the antioxidants in these herbs have been found to block the formation of HCAs.

Saturated fat is another big concern, with the CSIRO estimating that red meat typically supplies a third of the fat Australians eat each day. The flipside is that the CSIRO also states that lean red meat is effective in lowering cholesterol – so red meat quality becomes a variable for red meat quantity.

The worst villain is processed meat (sausages, ham, salami, etc.), which tend to contain high fat and nitrates, which increase the risk of colorectal cancer, while a meta-analysis published in 2011 found that just 50 grams of processed meat – one hot dog or 2 slices of bacon daily – was associated with a 51 per cent increased risk off type 2 diabetes.

One thing you probably don't need to worry about is the hype over hormone growth promotants (HGPs). In 2011, Coles supermarkets caused a panic when they talked up the fact that they only stocked beef free from HGPs, the suggestion being that HGPs are bad for your health. The DAA issued a statement pointing out that in Australia, the use of HGPs is regulated by the Australian Pesticides and Veterinary Medicines Authority, and according to the Department of Health and Aging, not a cracker of data links the consumption of residues of HGPs currently used in Australia with adverse effects to human health.

Eggs

Egg yolks have long been suspect because they contain cholesterol – the stuff that builds up in our blood vessels, increasing our risk of heart attacks and strokes. But eating cholesterol isn't the main thing that makes our blood cholesterol go up – saturated fats are. A large egg has about 6g of protein, vitamins, antioxidants plus they're a rare food source of vitamin D. They contain 5g of fat, but more than half of that is the good, unsaturated type that actually helps counterbalance cholesterol's artery clogging effects. "The current standard for eggs is to have up to 6 (whole) eggs a week," says McGrice.

Soy products

The concern with soy products has been that they contain phytoestrogens, which may mimic the female hormone oestrogen in some circumstances, but a 2010 meta-analysis of 15 placebo-controlled studies concluded that "neither soy foods nor isoflavone supplements alter measures of bioavailable testosterone concentrations in men". Still, the DAA says its good to be cautious.

"Avoid having soy supplements or large amounts of soy products – 1 or 2 servings a day is fine and that amount can actually be quite beneficial to defend against prostate cancer," McGrice says.

Both soy milk and cows' milk are good sources of protein and a range of other essential vitamins and minerals, but while soy has the advantage of being free from saturated fat, cows' milk is naturally a better source of calcium.

Nuts

Nuts are touted for their 'good' fats'. Some contain useful amounts of Omega-3 and high amounts of monosaturated fats, which can help regulate blood lipids and protect against cardiovascular deterioration, but Amanda Benham, nutritionist at Human Herbivore in Brisbane, warns not to get carried away.

"Nuts are high in fat and not a particularly good protein source. They can be helpful for people who have trouble getting enough calories in, but for most athletes a I recommend no more than a handful or two a day of nuts or seeds. If weight loss is your goal, they are best avoided."

BOX 1
All mixed up: protein drinks

“Do you bench press? Have a penis? Then you need our newest whiz-bang protein powder, now with a free shovel.” That’s the message we seem to get from protein supplement suppliers, so let’s cut the crap from the credible.
“Protein powders can have a place in an athletes meal plan, but what they don’t provide is a whole range of nutrients that a 120g piece of steak would,” Gary Slater says. “So with a steak you are getting the high biological value protein that’s very rich in leucine (the amino acid primarily responsible for stimulating muscle building), but it’s also giving the iron, the zinc, etc. to go with it.”
All our panel of dietitians agreed that a protein powder with high biological availability (such as a whey protein isolate) can be valuable for its convenience immediately post-exercise, especially if you don’t have much of an appetite at that time. They also agreed that it’s the protein itself that’s important – the added carbs and amino acids could simply be emptying your wallet.
“Endurance athletes might typically need 20g of protein and 60g of carbohydrates after training,” says Simone Allen. “Some protein powders might supply that ration of carbs, but you can get them more cheaply if you have a couple dinner rolls with jam along with a 90% protein powder drink.”
Gary Slater points out that for people on a tighter budget, some current research shows that 600ml of low-fat flavoured milk works well as a recovery drink. “It contains fluid & electrolytes to promote rehydration, carbs for refuelling and 20-25g of high biological protein to support muscle repair/ building.”
Slater adds that even when it comes to ingredients that are proven performance boosters (e.g. creatine monohydrate), it would be best to have these separately rather having them included in a ‘one stop shop’ protein powder.
“If you are having a high-quality protein supplement and eating a variety of proteins, such as dairy, eggs, meat, fish, then you won’t need extra amino acids on top of that,” adds Middleton. “For example, leucine is one of the essential amino acids that is considered to be important for muscle protein stimulus, but you get enough leucine from having 15 to 25g of a higher quality protein already, you don’t need extra.”
A study out of the US has also caused Slater to take caution with protein powders. “The study took 15 popular protein supplements and gave subjects the equivalent of three serves a day and checked for heavy metal contamination. Five of the 15 exceeded the safety levels for those heavy metals. “I personally think that the quality control procedures in Australia with our major supplement brands are probably much better, but I still usually restrict people to one or two serves a day,” Slater says.
For any protein supplement, read the label and adjust your serving size so that it provides 20-25g of protein – some ‘suggested servings’ provide much more than this, just to get you to empty the tin faster. Here are our pick of cost-effective protein powders and their appropriate serving sizes. For added carbs, mix up your drink in a blender with banana or oats, or mix your powder with fruit juice.

Musashi P High Protein
30g = 20g protein, 6g carbs, 477kJ
An economic protein formula that’s appropriate for both post-workout or as a between meals protein-booster.
RRP $54.90/850g, $32.95 Vitamin King

Vital Strength Launch
25g = 22.9g protein, 0.56g carbs, 386kJ
Almost nothing but fast-acting pure whey protein isolate, with very high doses of leucine and other essential amino acids.
RRP $89.80/1kg, $55.15 Vitamin King

BSc WPI
30g = 26.8g protein, 0.79g carbs, 463kJ
A no-fuss fast-acting whey protein isolate with almost zero fat and carbs.
RRP $87.95 /900g, $59.95 Nutrition Warehouse

GNC Whey & Oats
60g = 22.5g protein, 26.25g carbs, 1036kJ

A good choice for hard gainers. This formula combines fast acting Whey Protein Isolate (WPI) and slower digesting Whey Protein Concentrate (WPC), which makes it good between meals. The carbs comes from oats rather than sugars, so you get a 7g hit of heart healthy soluble fibre.
$109.95/2kg GNC shops

NitroFusion Multi Source Protein
35g = 25g protein, 5g carbs, 569kJ
The choice of protein powder for Aussie vegan strength athletes, NitroFusion combines the highly digestable and high biological value proteins of brown rice, peas and artichokes. Despite the lack of animal products, it provides a whopping 2.3g of the vital muscle-building amino acid leucine, which is on par with any WPI product.
$46/908g online from the Uproar Vegan store, www.uproar.org.au

BOX 2
The meat-free guide to protein

Vegans have often been perceived as scrawny, anaemic sports-dodgers, but a growing range of athletes are proving that you can have might without the meat.
“For the majority of vegan athletes, getting enough protein does not prevent a challenge, provided that energy (calorie) needs are met,” says Amanda Benham, nutritionist at Human Herbivore in Brisbane. “Vegan diets consisting of a variety of foods from the plant food groups will normally supply more than enough protein.”
Taking in adequate protein as a vegan is not as hard as was once thought.
“It was believed that certain plant proteins had to be combined at the same meal in order to provide the optimum amounts of amino acids. It turns out that this is unnecessary, as there is constant turnover of amino acids in the body,” says Benham.
The plant foods richest in protein are legumes (lentils, beans, chickpeas), soy products, nuts and seeds, but Benham says the kicker is that once you cut back on ‘empty calories’ – such as high fat and sugary junk – you’ll automatically increase the percentage of protein in a diet when these are replaced by unrefined complex carbs, such as those protein-packing whole grain and legumes foods.”
For heavy training, vegans need to focus on B vitamins, iron and calcium. These are typically found in whole grain breads, beans and dairy substitutes such as fortified soy yogurts. Products such as breads, juices, breakfast cereals and soy-based products are often fortified with B vitamins, calcium and/or iron. “Look at the labels – good iron sources are above 10 per cent of the recommended daily intake, very good sources are above 25 per cent,” Benham says.
For snacks, Benham recommends soy milk and banana smoothies, baked beans and wholegrain bread or a Mexican bean dip with low-fat crackers.
“For a post-exercise meal, I recommend equal portions of a low-fat protein source (e.g. legumes or textured vegetable protein), some complex carbohydrate (rice, pasta, potato) and vegetables – including greens and red/orange vegetables.
“Protein supplements can provide an easy way to add more protein to the diet. These can be based on soy, rice, pea, hemp or other sources of protein, but they should be consumed along with a varied healthy vegan diet – not in place of one.”