

The higher protein–low GI diet for people with diabetes

Professor Brand-Miller from the Charles Perkins Centre at the University of Sydney is the President and a Director of the Glycemic Index Foundation, and author of popular books about the GI of foods. She is co-author of the two books mentioned within this article. The CSIRO and GI Foundation have partnered to make the CSIRO Total Wellbeing Diet available online, as part of a broader collaboration agreement. The CSIRO has licensed the Total Wellbeing Diet to SP Health for the development and management of the Total Wellbeing Diet online program, in collaboration with the GI Foundation. Professor Brand-Miller also manages a GI testing service at the University of Sydney. Associate Professor Markovic has declared that she has no conflict of interest.

A good case can be made for all of us to adopt a high protein, low glycaemic index (GI) diet. While most studies so far involve overweight, obese and insulin-resistant individuals, there are no contraindications for people with either type 1 or type 2 diabetes (T2D) and indeed, they may benefit more. In this context, ‘high protein’ means around 25% of energy intake or 100 g per day. This is equivalent to approximately 400g meat or fish, which is higher than the Australian Dietary Guidelines (10–20% of energy intake), and higher than the average intake of Australians (18%). However, it is not as high as Atkins-style diets (40%) or paleo diets (30–35%). The carbohydrate content is proportionately reduced to about 45% of energy intake, which is close to that of the average Australian (44%), but at the lower limit of the level recommended in the Australian Dietary Guidelines (45–65%).

WHY SHOULD WE INCREASE PROTEIN INTAKE?

High protein foods induce greater satiety and have higher thermogenic

effects than carbohydrate and fats. These two effects have benefits for weight control. Meta-analyses show that high protein diets induce faster and greater weight loss than conventional high carbohydrate, low fat diets. The modestly higher protein intake reduces carbohydrate intake, which lowers postprandial glycaemia and glycosylated haemoglobin (HbA1c) in people with diabetes. This dietary pattern can also improve fasting blood glucose and triglyceride levels. Protein foods such as lean red meat, fish, poultry, eggs, dairy products and legumes are also rich in the micronutrients that are often deficient in Australian diets (including iron, zinc, iodine, vitamin A, and omega-3 fats).

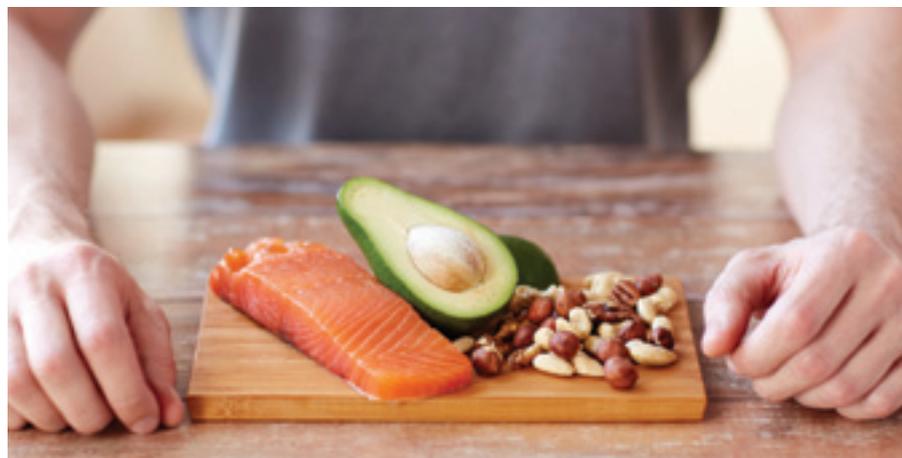
VERY HIGH PROTEIN DIETS ARE CONTRAINDICATED

It is critical to ensure that the diet is moderately higher in protein, rather than very high. Very high protein (>35% of energy intake), very low carbohydrate diets (<20% of energy intake) have been linked with greater mortality and poorer cognition. In meta-analyses,

low carbohydrate diets may improve triglycerides and HDL-cholesterol levels but this is accompanied by unfavourable changes in LDL-cholesterol levels. A Swedish study of approximately 42,000 women, followed for around 12 years, demonstrated that consumers with the highest protein:carbohydrate ratio had a 15% greater risk of all-cause mortality. In a Greek study of 23,000 men and women followed for 10 years, all-cause mortality was 22% higher in those consuming the highest amount of protein and lowest amount of carbohydrate. In an 18-year follow-up study of around 6,000 Americans, 50 years and older, found those with the highest protein intake had a 5-fold higher mortality from diabetes, and 4-fold higher risk of cancer death in those under 65 years. A smaller Swedish study among 924 men who were 70 years old at baseline and followed up for 20 years, concluded those who followed a strict low carbohydrate diet had the lowest survival rate. Very low carbohydrate intake is also associated with lower mood, greater aggression, and higher rates of depression, perhaps because the brain is being deprived of its favoured fuel – glucose. Interestingly, cognitive performance is also influenced by macronutrient ratios. Both very high protein and very high carbohydrate meals slowed reaction times, with the best performance seen after a moderate protein, moderate carbohydrate meal.

WHY SHOULD WE CHOOSE LOW GI CARBOHYDRATE?

Meta-analyses of randomised controlled trials (RCTs) show that low GI carbohydrate diets reduce HbA1c



and postprandial glycaemia in people with diabetes. In the largest study, the low GI diets progressively reduced HbA_{1c} by 0.5% points over 6 months, and the low GI diet group had greater reductions in medication than the conventional healthy diet group. In addition, HDL-cholesterol levels increased, which suggests a reduction in cardiovascular risk. And just like high protein foods, low GI carbohydrate foods are associated with higher satiety and higher rates of thermogenesis after consumption. In meta-analyses of RCTs of weight loss studies, low GI diets improved weight control and body fat, particularly in the weight loss maintenance phase. In systematic reviews and meta-analyses of observational studies, diets with a lower GI or lower glycaemic load (GL = carbohydrate intake × GI/100) were associated with 20-40% lower risk of T2D, even after adjustment for fibre. Indeed, anti-inflammatory benefits are seen more consistently for low-GI/GL diets than higher-fibre or wholegrain diets. Unlike very high protein diets, there are no safety concerns related to low GI diets.

THE DIOGENES STUDY

The recent DioGenes (Diet, Obesity and Genes) Study identified two dietary factors that were associated with short-term prevention of weight regain after prior weight loss: higher protein intake and consumption of lower GI foods. The findings indicated that overweight and obese participants assigned to the combination of modestly higher protein and lower GI ad libitum had significantly better completion rates and weight maintenance after 6 months when compared with the official dietary guidelines, or standard protein and high GI diets. Indeed, those consuming the high protein-low GI combination diet continued to lose body fat during the weight maintenance phase. They were also twice as likely to have maintained a 5% weight loss compared to the other dietary groups at the 6-month timepoint. Furthermore, the children of the adults randomised to the high protein-low GI diet in the DioGenes study showed a spontaneous fall in risk of being obese.

THE PREVIEW STUDY

On the basis of the findings in DioGenes, we hypothesised that the same high protein-low GI diet may be superior to conventional diets (i.e. those currently recommended by public authorities) for both diabetes prevention and the reduction of its complications. The primary goal is to identify the most efficient lifestyle pattern for the prevention of T2D in a population of pre-diabetic, overweight or obese individuals. The project includes a multicentre, randomised lifestyle intervention trial of 3 years duration with a recruitment target of 2,500 pre-diabetic participants, including children, adolescents, adults and elderly individuals, including around 200 adults in Sydney. An online tool with questions from the AUSDIAB risk factor scoring system was used to screen potential volunteers who were then invited for diagnostic tests at the new Charles Perkins Centre at the University of Sydney. For the first 8 weeks of the intervention, all participants aimed for a weight loss of 8% by following a prescribed

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low energy diet (approximately 800 kcal per day), with products supplied free of charge by the Cambridge Weight Plan Ltd. Those who achieve the target weight loss enter the 136-week weight maintenance phase of the intervention. They are randomised to one of two diets (higher protein-low GI or conventional healthy diet) and two exercise strategies (moderate intensity for 150 minutes a week, or higher intensity for 75 minutes a week). The primary outcome will be the incidence of T2D at the 3-year timepoint. Preliminary findings will be available in 2018.

PUTTING A HIGHER PROTEIN-LOW GI DIET INTO PRACTICE

In the meantime, there are many good reasons (and no contraindications) to

Table 1: Sample meal plan for a higher protein-lower GI diet = 7500kJ; 30% protein; 27% fat; 40% carbohydrate.

Breakfast:
45g steel cut oats
250ml skim/reduced fat milk
1tsp honey + ground cinnamon
1 banana
Snack:
100g grapes
1 slice reduced fat cheddar cheese
Lunch:
125g raw weight chicken breast
1 boiled egg
2 cups salad
1 tsp olive oil dressing
1 slice low GI bread
Snack:
25g dried fruit & nuts
Dinner:
150g raw weight salmon
1.5 cups (raw) vegetables, oven roasted
1 tsp pesto
1 cup cooked low GI rice
Dessert:
200g reduced fat Greek yoghurt
50g frozen mixed berries
1 tsp honey

Figure 1: The Low GI Recipe mark.



recommending a modestly higher protein-low GI diet for people with diabetes. A sample meal plan is shown in *Table 1*. In practice, most Australians find it easy to eat bigger serves of the protein foods at lunch and dinner, but breakfast is a challenge. If you have time to cook them, new research shows that eggs for breakfast are safe and healthy for people with diabetes. Those with higher amounts of the long chain polyunsaturated fats are the best choice.

Putting a higher protein-low GI diet into practice with the aim of losing weight is easy with the new CSIRO Total Wellbeing online diet (<http://www.totalwellbeingdiet.com>). The cost of participation (\$149) is fully refundable as long as certain conditions are met, such as weighing in regularly, whether there is weight loss or not. For weight loss maintenance and prevention of weight regain, books such as *World's Best Diet* and *The Low GI Shoppers Guide 2015* are helpful. In Australia, we are fortunate to know the GI of almost all the common carbohydrate foods on the market. In order to make 'healthy choices easy choices', the Glycemic Index Foundation has developed the GI symbol. Foods that carry the GI symbol have had their GI tested at an accredited laboratory and also meet strict nutrient criteria. The GI Foundation has also recently developed a 'Low GI Recipe' certification mark, which identifies healthy recipes that also meet strict criteria for GI and GL requirements (*Figure 1*).

PRACTICE POINTS:

- The combination of a higher protein-low GI diet helps prevent weight regain.
- Very high protein and very low carbohydrate diets are contraindicated.
- The new CSIRO Total Wellbeing Diet online is based on higher protein-low GI principles.

In summary, there is a large body of scientific evidence that suggests that a higher protein-lower GI diet will improve weight control, postprandial glycaemia, beta-cell function, and inflammatory markers in overweight and obese individuals. There is no contraindication to applying this diet to people with diabetes. Indeed, we think there is a good case to recommend it for everyone in preference to the conventional healthy diet. At the present time, very high protein/very low carbohydrate diets may be helpful for short-term weight loss (3-6 months) but should not be prescribed for the longer term.

FURTHER READING

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2. Larsen TM, Dalskov SM, van Baak M, Jebb SA, Papadaki A, Pfeiffer AF, et al. Diets with High or Low Protein Content and Glycemic Index for Weight-Loss Maintenance. *N Engl J Med*. 2010 Nov 25;363(22):2102-13.



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