FOOD FOR THOUGHT

Carbs 101

As you can imagine, we have been asked many questions about carbs over the 12 years we have been publishing GI News. In Food for Thought it’s back to basics as we share our answers to some common FAQs: what are carbs, where do they come from, why are the good ones important, and why the GI matters.

What are carbs? The word “carbohydrate” comes from chemistry and means “watered carbon” (or carbon with water molecules). Sometimes you will see it shortened to CHO which stands for carbon, hydrogen and oxygen. Here’s what the chemical formula of glucose looks like: C₆H₁₂O₆ (which stands for six carbon atoms and six water molecules – H₂O = water).

Carbs are one of four major molecules in our foods, and like two of the others – protein and fat – they provide us with the energy (calories or kilojoules) to power our lives. Water, the fourth major molecule, has no calories. Most foods are a mix of these molecules. Take half a cup (about 95g/3oz) of cooked quinoa. It provides 400 kilojoules (96 calories), 4g protein, 2g fat, 15g carbs (1g sugars, 14g starches), 2g fibre, 4mg sodium, 150mg potassium, and has a low GI (53) and GL (8).

They come in a number of guises. Sugars are carbs, so are starches and the bonus indigestible dietary fibres and resistant starches that nourish the gut, feed the friendly bacteria and keep things moving along nicely on the inside.

Where do they come from? Mostly plants. One way or another, green plants provide us with most of the energy that fuels our lives from the fossil fuels formed millions of years ago to the foods we grow. Carbohydrate energy comes from plant photosynthesis.
The green cells (chlorophyll) in a plant’s leaves use sunlight’s energy to convert the carbon dioxide they absorb from the air and the water they draw up through their roots into the sugars and starches they need to grow and produce the roots, tubers, stems, leaves, flowers, fruits and seeds. They also use it to make their (indigestible to us) cell wall materials such as cellulose, hemicellulose and lignin, along with various gums and pectins. And there’s more, there’s the oxygen they release into the atmosphere so we can all breathe easy.

Why are they important? Good carbs are multi-talented molecules that play key roles in our body. Our brains, nervous system, red blood cells, kidneys and muscles during exercise prefer carbs as their energy source. Carbs also give our cells structure, form part of our genes and play a part in the function of some proteins. On top of this, good carbs serve up a swag of the micronutrients we need for good health including vitamins B, C and E; minerals such as magnesium, potassium and calcium and antioxidants including the carotenoids lutein and zeaxanthin that play a key protective role in eye health.

Why does low GI matter? We recommend putting good carbs on the plate, and where possible, choose those with a low GI or GL. Why? There’s high-level evidence that switching to low GI good carbs that trickle the glucose into the bloodstream can help us cut cravings; feel fuller for longer; stay in shape better by minimising body fat and maximising muscle mass; and decrease our risk of some chronic diseases such as type 2 diabetes and heart disease.

When we eat carb-rich foods (fruit, starchy vegetables, legumes, grains, or dairy products such as milk or yoghurt) our bodies convert their sugars and/or starches into glucose during digestion. However, our bodies do this at very different rates and this is where using the glycemic index (GI) helps us make better choices for long-term health and wellbeing. The GI is particularly useful for people who need to manage their blood glucose levels (BGLs). Think of it as a carbo speedo that gives us an idea how quickly our bodies will digest particular carb foods and how fast and high our BGL is then likely to rise.

High GI: 70 and over • Medium or moderate GI: 56 to 69 • Low GI: 55 and under

Why does it matter how high our BGLs go? As with blood pressure, there’s a healthy range and a risky range. Having BGLs in the normal range over the day is good for our bodies because it also will lower our day-long insulin levels. Having high BGLs from eating too many high GI foods can put pressure on our health, because it means that our pancreas has to work extra hard producing more insulin to move the glucose into the cells, where it provides energy for the body and brain. It’s never a good idea to overwork or overstress body parts. They can wear out or stop functioning properly. It’s not easy to replace a pancreas.

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WHAT’S NEW?
I AM NOT A DIABETIC
National Diabetes Week 2017 kicks off on July 9 in Australia to raise awareness and understanding about this chronic condition. Here at GI News, we thought we would like to do something different on the awareness-raising front with a poem by one of our UK colleagues, Jim Young.

I am not a diabetic.
I have diabetes – you see?
I am not obese,
I do not smoke or drink,
I am a hungry vegetarian,
and I swim in the sea each day.

Then you shouldn’t have diabetes?
But unfortunately, it doesn’t work that way.
My Dad had diabetes and
it was his parting gift to me.
So, I have made friends with my condition,
it calls me Son and I call it Pop,
as I pop another pill.

I treat him with every consideration
and we do love to get it right.
My doctor treats him with reverence
and prescribes only the best wrapped gifts,
to assuage his temper, and hopefully one day
will inject some realism into my insinuation
and oft repeated question,
"Oh why Dad, why? Oh why?“.

Now it ought to be OK? You say.
But these bloody auto-antibodies
go hunting in a pack.
So another pill for cholesterol,
another for BP,
I know these rustling popper packs
will be the life of me.

But I am not a diabetic!
Repeat that after me,
and then maybe you will see,
that whatever my glucose status,
it is me you see – yes me.
So please don't stick a label
for now you know the truth.
You know that I suffer from diabetes,
as you might do,
one day.

Jim Young is Editor-in-chief of Glycosmedia,
an independent online newsletter reporting
latest developments in diabetes research.
You can read more of Jim’s poems here.

KEEPING AN EYE ON EYESIGHT
Protecting our eyesight is one of the most important things we can do to ensure our ongoing quality and enjoyment of life. Ophthalmologist Dr Shanel Sharma explains why for anyone with diabetes it’s vital to be vigilant it’s vital to be vigilant and why the eye is vulnerable to damage from the complications of diabetes.

“Diabetes is the most common cause of blindness for people between 20 and 65 and diabetic eye diseases can affect anyone with diabetes whether type 1 or type 2,” she says. Chronically high blood glucose levels over time damage blood vessels throughout the body. Our small blood vessels are the most vulnerable and are affected first. These include the small blood vessels supplying our eyes, kidneys and our peripheral limbs (toes). People with chronically elevated blood glucose levels have substantially more, and more severe, retinopathy than those with lower blood glucose levels.
What happens in the eye is that the blood vessels become damaged and develop microaneurysms, start to bleed causing haemorrhages and stop carrying blood, resulting in retinal ischaemia. Ischaemic retina causes the release of a protein (VEGF – Vascular endothelial growth factor), resulting in the development of sick and abnormal blood vessels, which can bleed or cause tractional retinal detachment and loss of vision. The other major way people lose sight is from diabetic macular oedema, from leaking of blood product into the macular. The macular is the part of the eye that allows one to read, look at people’s faces, or do any fine detailed work.

As there is usually a 10–15-year delay in chronically high BGLs and appearance of diabetic eye diseases, it is important to control BGLs well from the start. Although the damage to the eye is irreversible, early detection and treatment can reduce the risk of blindness by up to approximately 95%.

If you are diagnosed with diabetic retinopathy, don’t despair. Good blood glucose control can reduce its progression. Aim for an HbA1c of 6.05% (people with HbA1c levels less than 6.05%, generally develop slowest rate of retinopathy). Studies have shown that with every percentage point reduction in your HbA1c, you can reduce progression of diabetic retinopathy by 33%.

Reducing blood pressure helps too. A 2015 Cochrane review concluded that the available evidence supports ‘a beneficial effect of intervention to reduce blood pressure with respect to preventing diabetic retinopathy for up to 4 to 5 years’.

As diabetic eye diseases most commonly have no symptoms, it is essential to ensure that you are being screened regularly by your GP, optometrist or your ophthalmologist. Symptoms that are associated with diabetic eye diseases can include intermittent blurred vision, difficulty with focusing, loss of contrast, double vision or distortion to your vision. Additionally, diabetes is an independent risk factor for developing other eye diseases such as cataracts and glaucoma.”

Studies
- Preventing Diabetic Retinopathy Progression
- Diabetic Retinopathy and Systemic Factors
- Blood pressure control for diabetic retinopathy
- Risks of progression of retinopathy and vision loss related to tight blood pressure control in type 2 diabetes mellitus (UK Prospective Diabetes Study)

Diet and diabetic retinopathy Clinical trials have found that people with diabetes who follow healthy eating principles can reduce their HbA1c levels by 1 to 2 percentage points. If they are also following a low GI diet, they can reduce their HbA1c levels by another 0.5 percentage points. While this may not sound significant, a decrease of just 1 percentage point in HbA1c levels will decrease the common complications of diabetes by 19% to 43%.

Study: Dietary hyperglycemia, glycemic index and metabolic retinal diseases
**Diet and AMD**

A recent review in *Nutrients* critically evaluates the evidence about lutein and zeaxanthin (the predominant carotenoids which accumulate in the retina of the eye) and age-related macular degeneration. “Current evidence suggests that higher dietary intakes of lutein and zeaxanthin are likely to play an important role in protecting against age-related macular degeneration (AMD)” conclude the authors. “A diet high in a variety of foods is important for achieving adequate dietary levels of lutein and zeaxanthin (as well as other nutrients). Moreover, such a diet should include plenty of leafy green vegetables, in keeping with dietary guidelines. There is also value in including a range of other foods to increase variety and improve the bioavailability of lutein and zeaxanthin, such as eggs and selected nuts,” they say.

**Study PDF:** [Lutein and Zeaxanthin—Food Sources, Bioavailability and Dietary Variety in Age-Related Macular Degeneration Protection](#)

**Contact:** vicki.flood@sydney.edu.au or victoria.flood@health.nsw.gov.au

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**FRUCTOSE AND BGLS**

A new systematic review and meta-analysis in the *American Journal of Clinical Nutrition* concludes there’s strong evidence that substituting fructose for glucose or sucrose in food or beverages lowers peak postprandial blood glucose and insulin concentrations without a substantial increase in blood triglyceride concentrations. Not so surprising when you look at the GI values of these sweeteners: Fructose (Fruisana brand) = GI 19; Sucrose (table sugar, average) = GI 65; Glucose = GI 100.

**Study:** [Fructose replacement of glucose or sucrose in food or beverages lowers postprandial glucose and insulin without raising triglycerides: a systematic review and meta-analysis](#)

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**PERSPECTIVES WITH DR ALAN BARCLAY**

**A POTTED HISTORY OF CARBOHYDRATE AND DIABETES**

People have been trying to work out the optimal diet for people with diabetes for hundreds of years. Until recently, most offerings have been restrictive and unpalatable. Fad diets are nothing new. In the early 1900s, they included: the “oat-cure,” the “milk diet,” the “rice-cure,” and “potato therapy,” diets often supplemented with a liberal dose of opium to suppress appetite ...

In 1912, Dr Fred Allen developed his “1000 Calorie Diet” (4200kJ), a very low carbohydrate diet with a kick-start seven-day fast before other foods were gradually reintroduced. Participants were told to boil their low-carbohydrate vegetables three times in water to remove starch. People became very emaciated and weak.

From Allen’s later research on pancreatectomised dogs he concluded glucose was more rapidly absorbed than starch, a principle he expanded to include all “simple sugars” (fructose, galactose, lactose, maltose, sucrose, etc.). It was this “research” that led to low sugar diets being recommended to people with diabetes for most of the 20th century.

Despite H.R. Geyelin demonstrating (1923) that a higher carbohydrate diet did not upset blood glucose levels if adequate insulin was supplied, most doctors recommended low
carbohydrate intakes (15% to 40% of total calories) until the late 1940s. Dr Elliot Joslin for example, plumped for 20% of calories from carbohydrate and 70% from fat.

**Breakthrough 1:** In 1950, the American Diabetic Association and American Dietetic Association developed the first Exchange Lists, which focused on six food groups with similar macronutrient (carbohydrate, fat and protein) levels. This system operated on the assumption that any food within a group was interchangeable because they would have the same impact on blood glucose levels. A good idea, but not entirely successful because the carb exchanges rarely had the same impact.

With an increasing number of deaths of people with diabetes from heart and blood vessel diseases, major diabetes associations reviewed their dietary recommendations in the 1970s dropping fat to less than 35% of calories and increasing carbohydrate to 55% to 60% of calories. It may have made life easier for people with diabetes, but it didn’t solve the problem of blood glucose levels.

**Breakthrough 2:** Building on the work of American dietitian Dr Phyllis Crapo and Australian endocrinologist Dr Mark Wahlqvist, Dr David Jenkins, Dr Tom Wolever and colleagues developed the concept of slow-release carbohydrates and the glycemic index. The concept generated much interest, even more heat and some most useful light as major diabetes associations cautiously revised their restrictions on “simple sugars” due to the growing body of evidence that they don’t adversely affect blood glucose levels in people with diabetes.

**Breakthrough 3:** In 1997, the World Health Organisation/Food and Agriculture Organisation recommend that the terms “simple sugar” and “complex carbohydrate” are no longer used to describe carbohydrate foods. They recommend the use of the GI as the best guide to the effect of carbohydrate foods on blood glucose levels.

The first studies showing that lower GI diets may also improve triglyceride and cholesterol levels were published in 1997.

**Breakthrough 4:** Harvard researchers develop the concept of Glycemic Load (GL = GI x available carbohydrate per serve), and diets with a high glycemic load are linked to the development of type 2 diabetes and heart and blood vessel disease in women and men.

In 2004, a systematic review and meta-analysis supported the recommendation of a higher carbohydrate, lower glycemic index, high fibre diet that is low in saturated fat and moderate in protein for people with diabetes. Dietary recommendations from the major international diabetes associations closely reflected the results.

“A low-GI diet can improve glycaemic control in diabetes without compromising hypoglycaemic events” concludes the first Cochrane Review of the evidence from randomised controlled trials on the GI in the management of diabetes.

**Breakthrough 5:** In 2013, the American Diabetes Associations systematically reviews the scientific evidence and concludes: “there is not an ideal percentage of calories from carbohydrate, protein, and fat for all people with diabetes (B); therefore, macronutrient
distribution should be based on individualized assessment of current eating patterns, preferences, and metabolic goals. (E)

In support of this, an independent group conducted a systematic review of randomised controlled trials of more than 6 months duration and determined that Mediterranean, low GI, higher protein and low carbohydrate diets are all effective in lowering glycated haemoglobin (HbA1c), with Mediterranean diets the most effective at 0.47% points and low carbohydrate diets the least effective at 0.12% points.

In 2014, a systematic review and meta-analysis that looked at people with diabetes who consumed a vegetarian diet for an average of 24 weeks (just under 6 months) found they reduced their HbA1c by 0.39% – that’s close to the Mediterranean diet and vegetarian diets are naturally very high in carbohydrates (an average of 75% of energy). But they also tend to include lots of legumes, which have very low GI values.

We now know that glycemic load is the most powerful predictor of blood glucose and insulin levels. You can lower GL by substituting low GI foods for high GI foods, or by consuming less carbohydrate, or by a bit of both.

The bottom line: There is no single best diet for all people with diabetes to manage their BGLs. It’s over to what works for you and what you can stick with long term. See your diabetes educator or an Accredited/Registered Dietitian to help you put together some healthy eating guidelines. And stick to them. And remember, a diet that’s good for people with diabetes, is good for everybody, so the whole family can enjoy it.

<table>
<thead>
<tr>
<th>FOOD (Grains prepared following manufacturer’s instructions)</th>
<th>GI</th>
<th>SERVING</th>
<th>AVAILABLE CARBS PER SERVING</th>
<th>GL PER SERVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit Passionfruit Pulp in syrup (Woolworths)</td>
<td>46</td>
<td>42g</td>
<td>11g</td>
<td>5</td>
</tr>
<tr>
<td>Breads and snacks Breads and snacks <strong>Raisin Toast (Tip Top)</strong></td>
<td>53</td>
<td>65g (2 slices)</td>
<td>34g</td>
<td>18</td>
</tr>
<tr>
<td><strong>Sweet Potato Crisps: Sea Salt (Red Rock Deli)</strong></td>
<td>41</td>
<td>28g (20 crisps)</td>
<td>12g</td>
<td>5</td>
</tr>
<tr>
<td>Grains <strong>Red Quinoa (Nutritious Foods) prepared following manufacturer’s instructions</strong></td>
<td>54</td>
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<tr>
<td><strong>SuperBlend Fibre (McKenzie’s)</strong></td>
<td>29</td>
<td>50g</td>
<td>25g</td>
<td>7</td>
</tr>
<tr>
<td><strong>SuperBlend Protein (McKenzie’s)</strong></td>
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<td>50g</td>
<td>24g</td>
<td>8</td>
</tr>
<tr>
<td><strong>Teff (Macro)</strong></td>
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<td>33g</td>
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<tr>
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Alan Barclay PhD is a consultant dietitian. He worked for Diabetes Australia (NSW) from 1998–2014 and is a member of the editorial board of Diabetes Management Journal (Diabetes Australia) He is co-author of more than 30 scientific publications, The Low GI Diet: Managing Type 2 Diabetes (Hachette Australia) and The Ultimate Guide to Sugars and Sweeteners (The Experiment, New York).

VIEWPOINTS FROM THE CHARLES PERKINS CENTRE, SYDNEY UNIVERSITY

NEW GI VALUES FROM SUGARS

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Teff is a tiny, gluten-free grain, rich in carbohydrate, fibre and some essential minerals. It can be cooked as a porridge, added to soups and sauces, sprinkled on salads and baked in breads. The Teff cooking method was: Add to saucepan with boiling water. Cook on low heat (lid on) for 15 minutes. Stir occasionally during cooking. Drain and serve.

**Study:** Teff: nutrient composition and health benefits

Mckenzie’s SuperBlend Fibre combines greenwheat freekeh, lentils and beans. A 50g serve provides 8g dietary fibre. To cook: Add to saucepan with boiling water. Cook on medium heat (lid on) for 15 minutes. Stir occasionally during cooking. Drain and serve. Can be used in salads, soups, casseroles or as a grain/legume side dish. SuperBlend Fibre and Protein can be found in the supermarket’s soup aisle.

Mckenzie’s SuperBlend Protein combines lentils, quinoa and beans. A 50g serve provides 7.7g dietary fibre. To cook: Add to saucepan with boiling water. Cook on medium heat (lid on) for 15 minutes. Stir occasionally during cooking. Drain and serve. Can be used in salads, soups, casseroles or as a grain/legume side dish.

**GI testing** The Sydney University GI Research Service (SUGiRS) was established in 1995 to provide a reliable commercial GI testing laboratory. Following the international standard method, the GI value of a food is determined by feeding 10 or more healthy people a portion of the food containing 50 grams of digestible (available) carbohydrate and then measuring the effect on their blood glucose levels over the next two hours.

For each person, the area under their two-hour blood glucose response (glucose AUC) for this food is then measured. On another occasion, the same 10 people consume an equal-carbohydrate portion of the sugar glucose (the reference food) and their two-hour blood glucose response is also measured.

- A GI value for the test food is then calculated for each person by dividing their glucose AUC for the test food by their glucose AUC for the reference food.
- The final GI value for the test food is the average GI value for the 10 people.

**Contact:** For information about GI testing at the University of Sydney, email: Fiona Atkinson, sugirs.manager@sydney.edu.au

**Website** (GI Database and glycemic index FAQs): [www.glycemicindex.com](http://www.glycemicindex.com)

**FOOD UN-PLUGGED**

Raw food diet followers say that cooking foods destroys nutrients and enzymes; raw food marketers claim their products are better for you. Raw desserts are selling like hotcakes (so to speak), as consumers concerned about their health seek to satisfy their basic instincts for sweet pleasure. Are raw desserts nutritionally superior? Let’s take a closer look.

Most raw foodies won’t eat food cooked above 42°C (108°F), the temperature at which the sun dries out food. To concentrate flavours and make foods crispier without heat, raw
foodies use dehydrating machines for fruits, vegetables, nuts, seeds, sprouted beans and seaweed. You can read more about raw foods in GI News here and here.

Reading the marketing guff for raw desserts, you’d be forgiven for thinking their brownies, slices, bliss balls, bars, cakes and mousses were a free pass into healthy dessert heaven while wearing slim-fitting trousers.

Don’t be fooled; these are not everyday foods. They may look gorgeous and contain healthy ingredients such as fruit and nuts, and may be higher in fibre, vitamins and minerals than more orthodox sweets, but because they are usually made with a lot of dried fruit, nuts and seeds (often with a hefty swig of coconut oil) they are very high in calories.

We analysed (Foodworks) two raw desserts (Rawtarian Brownie and Merrymaker Sisters Paleo Salted Caramel Slice) with two traditional recipes on www.taste.com to give you the raw data on raw desserts. The calorie content is very similar. However, if you decide to tuck into Merrymaker’s caramel slice you will down your day’s maximum recommended saturated fat allowance (24 grams in about 3 bites). All gone in one petite portion.

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Rawtarian (53g serve)</th>
<th>Taste.com (54g serve)</th>
<th>Merrymaker Sisters (73g serve)</th>
<th>Taste.com (67g serve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy - kilojoules</td>
<td>974kj</td>
<td>917kj</td>
<td>1554kj</td>
<td>1345kj</td>
</tr>
<tr>
<td>Energy - calories</td>
<td>233 calories</td>
<td>219 calories</td>
<td>371 calories</td>
<td>321 calories</td>
</tr>
<tr>
<td>Protein</td>
<td>2.9g</td>
<td>2.6g</td>
<td>2.5g</td>
<td>3.9g</td>
</tr>
<tr>
<td>Fat - Includes sat fat</td>
<td>13.0g</td>
<td>8.9g</td>
<td>31.1g</td>
<td>19.4g</td>
</tr>
<tr>
<td>Carbohydrates - Includes sugars</td>
<td>23.2g</td>
<td>31.6g</td>
<td>19.6g</td>
<td>32.6g</td>
</tr>
<tr>
<td>Carbohydrates - Includes starches</td>
<td>22.2g</td>
<td>25.1g</td>
<td>18.7g</td>
<td>25.7g</td>
</tr>
<tr>
<td>Sodium</td>
<td>88.4mg</td>
<td>54.2g</td>
<td>203.5mg</td>
<td>110.4mg</td>
</tr>
<tr>
<td>Fibre</td>
<td>5.2g</td>
<td>0.9g</td>
<td>3.6g</td>
<td>0.7g</td>
</tr>
</tbody>
</table>

The raw deal  Dessert is dessert – raw or otherwise. A treat. An extra. Some raw desserts might add extra nutrients, but just like their traditional counterparts, they will also add extra calories, and possibly help you to store them around your middle. Keep raw desserts for occasional indulgence and don’t kid yourself you are bucking the usual nutritional rules because you went “raw”.

The unplugged truth
- You do not need to follow a raw food diet to be healthy or lose weight.
- Some raw desserts may have more fibre and nutrients than their trad counterparts, but they can contain just as many calories and possibly more saturated fat.
- Enjoy raw desserts occasionally and in small amounts.

Thanks to Rachel Ananin AKA TheSeasonalDietitian.com for her assistance with this article.
Nicole Senior pulls the plug on hype and marketing spin to provide reliable, practical advice on food for health and enjoyment. She is an Accredited Nutritionist, author, consultant, cook, food enthusiast and mother who strives to make sense of nutrition science and delights in making healthy food delicious. Contact: You can follow her on Twitter, Facebook, Pinterest, Instagram or check out her website.

**KEEP GOOD CARBS AND CARRY ON**

**EYE HEALTH: THE AYES HAVE IT FOR VEG**

*Guest contributor Diabetes Victoria Dietitian Kim Duggan-Larkin APD explains why.*

It’s common knowledge that eating lots of carrots is great for our eyes. Many people have also got the message that green leafy vegetables are good too. The evidence suggests it’s their antioxidants that protect the macula and other parts of the eye from damage by free radicals and help to keep eyes healthy. The main antioxidants that have been studied are vitamins C and E; and carotenoids such as beta-carotene (which is converted by the body into vitamin A), and lutein and zeaxanthin (which accumulate in the retina).

Because the most common cause of blindness in the developed world is age-related macular degeneration (AMD), much of the research has focused on preventing it, or delaying its progression. As the evidence currently stands, while neither high dietary intakes of carotenoids nor taking antioxidant supplements have been shown to prevent development of AMD, higher dietary carotenoid intakes and antioxidant supplements may be beneficial for people who already have AMD, indicating a protective effect.

As dietitian Bronwyn Eisennhauer *et al* conclude in their recent review, “prudent advice to increase consumption of lutein- and zeaxanthin-containing foods in the diet of those people at high-risk of AMD or who already have AMD should be encouraged.”

To maximise your intake, include plenty of dark green leafy vegetables like spinach, kale, and silver beet, as these are the highest food sources of lutein and zeaxanthin. Orange vegetables such as pumpkin, corn and orange capsicum/peppers are also good sources. Carrots do provide a small amount of lutein and zeaxanthin, however they are higher in beta-carotene. Combining green leafy and orange vegetables with a salad dressing or good quality oil such as olive oil may help the body to absorb these nutrients better.

**TOP TO TOE: CAROTENOID CONTENT (LUTEIN AND ZEAXANTHIN)**

*OF COMMON FOODS PER 100 GRAMS (USDA)*

- Kale, cooked 18,246µ
- Spinach, cooked 11,308µ
- Parsley 5562µ
- Green peas, cooked 2593µ
- Lettuce (romaine or cos) 2313µ
- Squash, cooked 2249µ
- Edamame beans 1619µ
- Brussels sprouts, cooked 1541µ
- Pistachio nuts 1404µ
- Broccoli, cooked 1079µ
- Pumpkin, cooked 1014µ
- Asparagus, cooked 771µ
- Sweetcorn, cooked 684µ
- Green beans, cooked 564µ
- Avocado 270µ
- Carrots 260µ
- Oranges 129µ
- Ripe tomatoes, cooked 94µ

**What about eggs?** Eggs contain smaller amounts of lutein and zeaxanthin than leafy greens, but our body absorbs it very well, likely due to the fat content of the eggs. In addition, eggs
contain vitamin A and some omega-3 fats. You do need to eat the whole egg though, as most of the lutein and zeaxanthin is found in the yolk.

**Study PDF:** [Lutein and Zeaxanthin—Food Sources, Bioavailability and Dietary Variety in Age-Related Macular Degeneration Protection](#)

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**IN THE GI NEWS KITCHEN**

**GO GREEN**

Lifting lutein and zooming in on zeaxanthin with leafy greens is what’s in store this month in the GI News Kitchen because a new review in *Nutrients* concludes: “Current evidence suggests that higher dietary intakes of lutein and zeaxanthin are likely to play an important role in protecting against age-related macular degeneration (AMD)”.

**FOOD AS MEDICINE WITH SUE RADD**

_Sue Radd APD believes that to live well you need to eat well. She is one of Australia’s leading nutritionists and health communicators and recognised by her peers as an expert on plant foods and phytonutrients. Her *Food as Medicine* won Best Health & Nutrition Cookbook in the World for 2016 by Gourmand World Cookbook Awards. She has selected two recipes packed with leafy greens from her new book to share with GI News readers._

**CHICKPEA CURRY WITH PUMPKIN AND BABY SPINACH**

This curry goes well with a steamed brown rice/red rice wholegrain combo. Garnish with extra coriander leaves, if desired. If you find this curry a little hot, try some plain dairy or soy yoghurt on the side. One 400g (14oz) can of chickpeas supplies around 1½ cups when drained. If using this, rinse chickpeas well.

*Prep: 10 mins • Cook: 30 mins • Serves 4*

- 2 tbsp extra virgin olive oil
- 1 medium onion, finely chopped
- 2 cloves garlic, crushed
- 1 tsp chilli powder
- 1 tsp ground coriander
- 2 tsp ground cumin
- 2 cups plain tomato pasta sauce
- 1½ cups cooked chickpeas
- 320g (11oz) peeled pumpkin, diced
- pinch salt, optional
- 120g (4oz) baby spinach leaves
- 2 tsp freshly chopped coriander (cilantro)

Heat oil in a large saucepan and sauté onion for about 5 minutes until soft. Stir in garlic and cook for 30 seconds. • Mix in chilli powder, coriander, cumin, tomato pasta sauce and ½ cup of water. Stir well. • Add chickpeas and diced pumpkin, and bring to boil. Adjust flavour with extra salt, if desired. • Reduce heat and simmer for around 15 minutes or until pumpkin is tender. • Stir through baby spinach leaves until they start to wilt, followed by coriander, and serve immediately.
Per serve
1203kJ/ 287 calories; 9g protein; 13g fat (includes 2g saturated fat; saturated : unsaturated fat ratio 0.18); 29g available carbs (includes 15g sugars and 14g starch); 10g fibre; 639mg sodium; 1055mg potassium; sodium : potassium ratio 0.6.

TANGY LENTIL SOUP WITH SILVERBEET AND ZUCCHINI

Lentils (red, brown and puy) and legumes of all types are a pantry staple for Sue including chickpeas, black beans, borlotti beans, cannellini beans, black-eyed beans, kidney beans, Lima beans, mung beans and more.

Prep: 20 minutes • Cook: 45 minutes • Serves 8

2 tbsp extra virgin olive oil
1 large onion, chopped
500g (17oz) brown lentils, picked over for stones and washed
1 teaspoon salt
2 medium potatoes, peeled and cut into 1cm (½in) cubes
2 medium zucchinis (courgettes), cut into 1cm (½in) cubes
1 bunch silverbeet (chard), trimmed, washed and shredded into 1cm (½in) strips making up 600g (about 1lb 5oz)
2 cloves garlic, crushed
freshly ground black pepper, optional
1 bunch fresh coriander (cilantro), chopped
juice of 2 lemons

Warm oil in a large soup pot and sauté onions until soft. • Add lentils, salt and 8 cups of water, cover with lid and bring to boil. Turn down heat and simmer for 15 minutes. • Add potato cubes and continue cooking for 10 minutes. • Add zucchini, silverbeet, garlic, pepper and 4 cups of extra boiling water, and cook for a further 5 minutes until the greens just start to soften. • Stir in coriander and lemon juice, and ladle hot into soup bowls.

Per serve
1201kJ/ 287 calories; 19g protein; 6g fat (includes 1g saturated fat; saturated : unsaturated fat ratio 0.2); 34g available carbs (includes 5g sugars and 29g starch); 13g fibre; 457mg sodium; 1134mg potassium; sodium : potassium ratio 0.4.

STICKS, SEEDS, PODS & LEAVES

Kate Hemphill is a trained chef. She contributed the recipes to Ian Hemphill’s best-selling Spice and Herb Bible. You will find more of her recipes on the Herbies spices website. Kate’s recipes are made with Herbies spices and blends, but you can use whatever you have in your pantry or that’s available locally.
KATE HEMPHILL’S HOT GINGER PRAWNS

*Sogeri Wild Ginger* (*Zingiber officinale*) is high quality, hot, spicy and aromatic ginger from rhizomes harvested by cooperatives of local highland farmers in the Sogeri region of Papua New Guinea.

Prep: 10 mins • Cook: 5 mins • Serves: 4

2 tsp Sogeri wild ginger powder  
2 tbsp freeze-dried green peppercorns  
4 fresh garlic cloves  
16 green king prawns, peeled, and deveined, tails on  
2 tsp coconut oil

2 cups coriander leaves  
2 cups Thai basil leaves  
½ cup Vietnamese mint leaves

To serve  
1 cup Doongara low-GI brown rice, steamed

Pound ginger powder, peppercorns and garlic cloves in a mortar and pestle to create a paste, then coat prawns and leave to marinate, refrigerated, for at least 1 hour. • Heat a wok to high with coconut oil, then add prawns and all the marinade. Stir-fry for 3–4 minutes until prawns are opaque. Turn off heat, stir through herbs, and serve immediately with the steamed brown rice.

**Per serve**
1360kJ/ 325 calories; 22g protein; 5g fat (includes 3g saturated fat; saturated : unsaturated fat ratio 1.5); 44g available carbs (includes 3g sugars and 41g starch); 6g fibre; 315mg sodium; 718mg potassium; sodium : potassium ratio 0.44.

RECIPIES FROM THE GI FOUNDATION

The Glycemic Index Foundation, a not-for-profit health promotion charity, developed the GI Symbol program to help consumers make healthy low GI choices when grocery shopping easier. *Foods that carry the Symbol have been GI tested at an accredited laboratory and meet strict nutrient criteria consistent with international dietary guidelines for kilojoules, saturated fat and sodium, and where appropriate, fibre and calcium.*

HELGA’S SUPER SALAD AND CHICKEN SANDWICH

Di Crisp from the GI Foundation reports that Helga’s Lower Carb bread range – 5 Seeds (GI 53), Soy & Toasted Sesame (GI 51) and Wholemeal & Seed (GI 53) – now carry the GI Symbol. Visit Helga’s website for ingredients and nutrition information.

Prep: 15 mins • Cook: 10 mins • Makes 2

4 slices Lower Carb Soy & Toasted Sesame bread  
1 (200g/7oz) chicken breast fillet, trimmed  
2 tbsp pistachio dukkah  
½ tsp dried chilli flakes  
¼ cup labne

1 small avocado, mashed  
2 small iceberg lettuce leaves, shredded  
1 small cooked beetroot, coarsely grated  
½ small carrot, peeled, shredded  
½ Lebanese cucumber, thinly sliced  
2 tbsp mint leaves, shredded
Place chicken in a medium saucepan. Cover with cold water. Bring to boil over a high heat. Reduce to simmer. Simmer, uncovered for 8–10 minutes, or until cooked through. Drain and set aside to cool 10 minutes. Shred.

• Combine dukkah, chilli and labne. Spread labne over one side of the two slices of bread. Spread avocado over one side of the remaining bread. • Top the avocado with lettuce, beetroot, chicken, carrot, cucumber and mint. Sandwich together labne-side down. Cut in half. Serve.

**Per serve (1 sandwich)**
2981kJ/ 715 calories; 42g protein; 45g fat (includes 9g saturated fat; saturated : unsaturated fat ratio 0.x); 28g available carbs (includes 9g sugars and 19g starch); 10g fibre; 460mg sodium

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**NUTRITIONAL ANALYSIS**
To analyse Australian foods, beverages, processed products and recipes, we use FoodWorks which contains the AusNut and Nuttab databases. If necessary, this is supplemented with data from www.calorieking.com.au and http://ndb.nal.usda.gov/ndb/search.

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