

cover feature

CARBOHYDRATES

What's the deal?

Nutritionist **Rose Carr** looks at the most confusing (still!) food group and gets to the bottom of what we all need to know about carbohydrates.

IN A RECENT poll of 206 readers on www.healthyfood.co.nz, 48% of you said "I try and limit my carbohydrate intake", while 42% said "I love carbs – bring on the pasta!". This seems to demonstrate our current attitudes towards carbohydrate foods; some of us love them and some of us are still suspicious of carbohydrates and think we should limit our intake. So, what's the real deal? Are carbs good, bad, or something in between? Carbohydrates have had such a lot of bad press in the past few years that you could probably be forgiven for thinking that all carbohydrate foods are bad for you. How many people do you know who have tried a 'low-carb' diet; or tell you that the best way to lose weight is to not eat carbs after 5pm?



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WHAT ARE CARBOHYDRATES?

When we think about carbohydrate foods, the ones that spring to mind are usually bread, potatoes, pasta, rice, cake, etc. These are all foods which are high in carbohydrate, although in reality most foods are made up of different components, of which carbohydrate is one.

Chemically speaking, carbohydrates are made up of chains of sugar molecules. Glucose has just one sugar molecule, as do fructose (found in fruit) and galactose (found in dairy products). These are called monosaccharides ('one sugar'). Sucrose, or table sugar, has two sugar molecules, as does lactose (in milk), so they're called disaccharides ('two sugars'). Oligosaccharides ('few sugars') are sugars that have between three and nine sugar molecules joined together and polysaccharides ('many sugars'), like starch, are made up of more than nine sugar molecules. As a general rule, the less sugar molecules in the carbohydrate, the more quickly it can be broken down during digestion.

WHERE DO WE GET CARBOHYDRATES IN OUR DIET?

Most of the carbohydrates in our diet come from the plant-based foods: breads and cereals, vegetables, fruits and legumes (i.e. beans and peas). You also get some

carbohydrates from milk and other dairy products.

HOW MUCH CARBOHYDRATE SHOULD WE HAVE?

The Ministry of Health recommends carbohydrates should supply at least 55% of the energy on our diet. To achieve this they recommend we eat six servings of breads or cereals every day.

The last National Nutrition Survey of adult New Zealanders in 1997 found that on average only 46% of energy came from carbohydrates – with both our protein and in particular our fat intake being higher than recommended. So (assuming we're eating the right amount of food overall) the Ministry actually would like us to eat MORE carbohydrate, and to balance that by eating less fat and less protein.

SO CARBOHYDRATES ARE GOOD FOR US?


To answer this question it's useful to have an understanding of how carbohydrates are digested by the body.

During digestion all carbohydrates, except fibre, are broken down into monosaccharides

(glucose) that can be absorbed into the bloodstream.

Glucose is the main energy source for all of the cellular activity in our bodies, and the only source of energy for the brain, unless we are starving.

So while it is true that carbohydrates are converted into sugars, far from being bad for us, they are essential to us. Glucose that isn't needed immediately will be stored as glycogen in the muscles and liver. Any excess after that will get stored as fat.

After a meal containing carbohydrate foods the level of glucose in your bloodstream ('blood glucose' or 'blood sugar') will increase. This stimulates the release of the hormone insulin, which in turn stimulates the uptake of glucose from the bloodstream into tissue cells; so over time the blood glucose level falls back to a base level. The glucose is then either used by the cell, or if there is an excess to immediate requirement, it is stored in a different form – called glycogen – in the liver and skeletal muscle cells. If required, the liver glycogen stores can be converted back into glucose to keep your blood glucose level within a 

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normal range between meals. The glycogen in the muscles provides a quickly-accessed source of energy when it's required.

If you don't consume enough carbohydrates to keep up the required level of blood glucose, your body must convert fat or protein to glucose through a less efficient backup process. This process is designed to see you through an unexpected fast and it is not ideal for your body, since without carbohydrates you will lose body water, sodium and potassium, and you won't have energy reserves in skeletal muscles for an emergency.

Dietary fibre is used in a different way to other carbohydrates – it passes through the digestive system unchanged, but is essential for good health. (See our Gut Health feature in the June issue of HFG).

The plant-based carbohydrate foods are, in terms of volume, the basis of a healthy diet. They are low in fat, high in fibre and contain vitamins and minerals as well as other phytochemicals that promote good health.

BUT WON'T CARBOHYDRATES MAKE ME FAT?

Taking in more energy than we use makes us gain body fat – no matter what the composition of the diet. In other words, if you consume more energy (kilojoules) than your body needs – whether it be from carbohydrate, protein, fat or alcohol – the excess energy will be converted to fat.

GOOD CARBS, BAD CARBS: HOW TO DECIDE

When choosing the carbohydrate component of your meal, consider the following:

- Is it a whole grain?
- Is it low GI? (check labels)
- Does it contain lots of nutrients, like fibre, vitamins, minerals and antioxidants? (read the labels and nutritional claims on packaging)

If the answer is "yes" to any of these questions, chances are it's a carbohydrate that will be good for you. On the other hand if the answer is "no" to all of these questions, it's probably worth replacing it with a carb that fits these criteria.

In fact, carbohydrates are your friend, especially if you're dieting, because they're less "energy dense" – per gram they contain less than half the kilojoules of fat.

ARE ALL CARBOHYDRATES EQUAL?

No. And I think this is where the confusion arises. Some people manage to use a low-carb diet as an excuse to not eat potatoes (especially after 5pm) but still


manage to justify, to themselves at least, a piece of cake at morning tea.

While chocolate cake is predominantly carbohydrate, sadly it's not what the Ministry of Health means when it says we should eat six servings a day!

While it's true that we need to eat lots of carbohydrate for good health, we also need to limit the amount of free sugars that we eat.

Not all carbohydrates are equal – and we shouldn't treat them as though they are.

Some processed foods can often have added fat and sugar making them much higher in kilojoules. We talk about this as being "energy dense" – that is for the same amount of food, you get more energy.

"Satiety" describes how full we feel after eating. Foods like cake, white bread and fruit juice are less satisfying or filling than foods like fruit and whole grain bread. If a food is less satisfying, we tend to eat more of it, which is where the weight problems can start. It's about getting the balance right: making healthier choices more often and not overdoing the foods that don't satisfy. 

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CHOOSING BETWEEN CARBOHYDRATES



**BROWN RICE
VS
WHITE RICE**



Brown rice is a fabulous food that has had bad press because its GI is higher than white rice. Brown rice is a whole grain, which means that there are many health benefits of including it in your diet (see "whole grains" page 26). And just because white rice isn't a whole grain, doesn't mean it has no place; after all it is low GI. Why not use both and add variety to your diet?



**DRIED FRUIT
MIX
VS
FRUIT CAKE**



Fruit contains sugar (and dried fruit is higher in sugar content by weight than fresh fruit) but the cake has added sugar and fat. Go for the fruit.



**BAKED
POTATO
VS
POTATO
CHIPS**



The poor potato has been hard hit in the past few years, not only from the Atkins advocates but also when we learned it was high GI as well. But the potato is an important carbohydrate source in many of our diets; it's fat free and delivers some fibre and a range of vitamins and minerals. Potato chips, on the other hand, contain fibre, vitamins and minerals, but they also have added fat, so that 100g of potato chips gives you around 2000kJ versus 370kJ for 100g of baked potato. Choose the potato.

BAGELS,

THE THINKING MAN'S CRUMPET...

Bagels Make
The Perfect Summer Lunch
– simple and delicious

CHICKEN AND 'WASAVO' BAGEL

Serves 1

- 1 Sesame Seed ABE'S® Real Bagel
- 'Wasavo' Mayonnaise – 1 mashed avocado, juice of one lime or lemon, 1 tsp Wasabi paste, ¼ C mayonnaise, combined with salt and pepper



- ¼ red capsicum, sliced in thin rings
- ½ a smoked chicken breast, sliced
- Baby spinach leaves – small handful

1. Split and lightly toast bagel
2. On each half layer baby spinach, red capsicum, smoked chicken, top with a dollop of Wasavo Mayo

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GET SOME FREE! Email to comp@bagels.co.nz with your delicious brunch serving suggestion using ABE'S® Real Bagels. The best 100 recipes will each receive 2 bags of our delectable ABE'S® Real Bagels ABSOLUTELY FREE! Better hurry...

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SO DO LOW-CARB DIETS WORK?

It has been claimed by some that "carbohydrates are bad because they increase blood glucose levels, causing insulin to be released which will then store the glucose as fat." For some reason insulin is painted as the baddie.

The fact is that fat storage only occurs when excess energy (kilojoules) has been consumed.

CARBS AFTER 5PM

If you find that cutting out carbohydrates after 5pm helps with weight loss, guess what: it's probably because by doing this you're consuming fewer kilojoules. There's no 'magic' about cutting out the carbs, nor the 5pm cut-off.

Very low-carb, high protein

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diets are just another form of a low kilojoule diet. The 'trick' with this one is that if you restrict yourself to a very low carbohydrate diet you'll initially notice quite rapid weight loss; unfortunately that's because you'll lose body water, which is not good. As soon as you resume a normal diet the water and the weight will return. Pretty discouraging.

If a diet works longer-term

it means that by following the 'rules' of that diet you have cut the number of kilojoules you're consuming each day. Unfortunately with many diets this also means that you might be cutting out essential nutrients from your diet.

Low-carb diets are not recommended for any length of time as they will also be low fibre diets, which is certainly not good for gut health.

If weight loss is your goal, a better idea is to cut down on, or eliminate, foods that you know are not healthy choices – like fatty and sugary processed foods – and reduce serving sizes. Sensible advice never seems as sexy does it?

THE RESEARCH


The low-carb diet craze appears to have been and gone. Manufacturers in the US who were turning out 'low-carb this' and 'carb-reduced that' are now looking for alternatives to keep their sales going, and in fact Atkins, the company that started it all has filed for bankruptcy.

One thing the craze did do was to question the traditional

low fat, high carbohydrate advice for weight reduction. As a result there has been a lot of research into different diets, with varying levels of carbohydrate, protein and fat. Much of the research is not conclusive, but investigations are continuing. We'll keep you posted on the research as it happens.

Some of the findings so far have been interesting: some studies have shown that for periods of up to six months people can lose more weight on a low-carb diet than a low fat diet; although for sustained weight loss for one year or more there is no evidence of greater loss on low-carb diets. There is some evidence that low-carb diets may result in better blood triglyceride levels and maybe less insulin resistance. This is of interest to researchers, who now want to find out if lowering the glycaemic load of the diet overall would have the same effect.

IN SUMMARY

The evidence so far suggests that restricting intake of sugars and using lower GI carbohydrates, as well as increasing fibre, will give the best results for heart health while reducing weight. One thing the researchers do agree on: drop out rates are very high for extreme diets. 

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HOW TO CHOOSE YOUR CARBOHYDRATES

So if we all need carbohydrate foods, how do we decide which are the best ones for our health?

We've probably all heard about the GI (Glycaemic Index) and it can help us to understand carbohydrates (see the April issue of HFG, or visit www.healthyfood.co.nz), but it doesn't tell the whole story. Another important aspect is how rich in nutrients (like fibre and vitamins etc.) the food is. This is where choosing whole grains makes a difference. But let's look at the GI first.

HOW TO GET YOUR WHOLE GRAINS

- Swap your bread for a grainy type
- Try whole grain muffins or fruit loaf
- Use oats, muesli or whole grain cereals
- Snack on pop corn
- Use brown rice
- Cook corn on the cob
- Try tabouleh instead of couscous or white rice

GLYCAEMIC INDEX

The GI measures the rate of digestion and therefore the glycaemic (blood glucose) response of our bodies to different foods. Foods are ranked with a GI number between 1 (low) and 100 (high). Low GI foods are digested more slowly so the blood glucose response is less and lasts longer. Our bodies like this and we feel full for longer.

The GI of a food is affected by the chemistry of the different components of the food, including the types of fibre and starch, the size of particles, the amount of free sugars, acidity and fat content. With all of these factors affecting GI you can see why it's not easy to 'intuitively

Whole grains are a special group of carbohydrates which we all should be eating every day. (In the US, the new dietary recommendation is to "make half your grains whole grain").

know' how different foods might rank. Plus when you're eating a meal, it's the overall GI that counts, not the GI of the individual components.

The GI should not be used in isolation to make judgements about carbohydrates. You may have heard that Basmati rice has a lower GI (58) than brown rice (80). Does that mean that brown rice is not

foods; but for many of us it's simply confusing – we don't know what whole grains are.

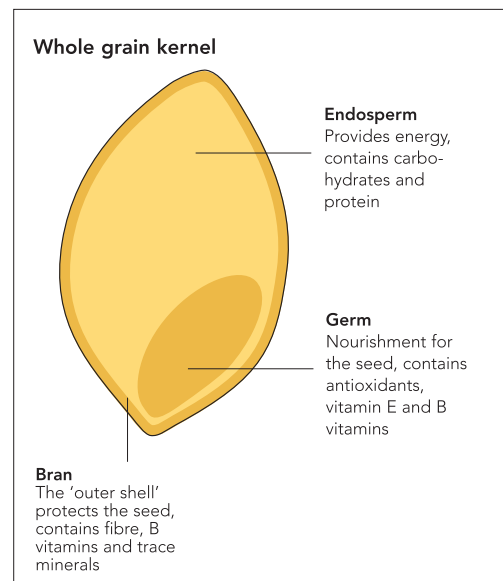
So first let's clarify what we mean when we talk about grains. The Roman goddess of grain is called Ceres; hence 'cereal', the other name for grain. Grains or cereals are the edible seeds of grasses, but we also have so-called 'pseudocereals' which are non-grasses that are also grown for their seeds and used in similar ways. Examples of true cereals are wheat, rice and oats. Some pseudocereals, which are less familiar, are quinoa, buckwheat and amaranth.

good for us? No! Brown rice is a whole grain, and we all need to be eating more of those.

WHOLE GRAINS













Whole grains are a special group of carbohydrates which we all should be eating every day. (In the US, the new dietary recommendation is to "make half your grains whole grain").

Mention the word 'whole grain' and some people will turn off immediately: for a few it conjures images of dry, unappetising



FINDING WHOLEGRAINS

There are a wide range of whole grains, which can be used as they are, or are found as ingredients in other food. Many grains are available in a number of different forms. Remember whole grains have the seeds intact. You don't have to change all of your grains to wholegrains – just try to include some more in your diet.

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|--|--|---|--|
|  <p>Oats: Oats don't usually have their bran or germ removed in processing, except in the production of oat flakes. Rolled oats are the most widely used of whole grains.</p> |  <p>Amaranth: This tiny seed has around 16% protein. It's best used added to other grains as on its own it's quite strong.</p> |  <p>Buckwheat: A seed that's often used like rice. You can also buy buckwheat noodles.</p> |  <p>Bulgur: Made from whole wheat kernels that are boiled, dried and crushed. Available in coarse to fine forms, it's used in Middle Eastern cooking to make tabouleh.</p> |
|  <p>Corn: Sweetcorn on the cob, canned corn and popcorn are whole grains. Use these as part of a meal or as a snack.</p> |  <p>Millet: Find millet ground, for use in baking or as a cereal like porridge; or as flakes or puffed, which is eaten as cereal.</p> |  <p>Rye: Along with wheat, rye is the most commonly used grain in bread and bakery products. As rye comes in many forms, look for whole grain products.</p> |  <p>Rice: Brown rice is the whole grain of rice which has only had the inedible outer husk removed. White rices have had their bran and germ layers removed.</p> |
|  <p>Quinoa: Quinoa (Keen-wah): Like amaranth, this is an ancient seed crop from South America which is a complete protein. The seeds can be cooked like rice but must be rinsed first.</p> |  <p>Spelt: Known as "Farro" in Italy, spelt is one of the oldest cultivated grains. Spelt can be used in flour and baking either as a wholegrain or with the bran removed, so again, look for the whole grain products. Use in baking.</p> |  <p>Barley: This tends to be hulled as the hull is particularly tough, so some of the bran may be removed in this process. Barley flakes are made by rolling hulled barley, but pearly, or polished, barley is hulled barley with parts of the kernel removed.</p> |  <p>Wheat: This is the most widely used of all the grains. Durum wheat, a different variety to that used in breads, is used to make pasta. Wheat comes in many forms and whole wheat products are available, you just need to check the label.</p> |

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Other grains:

Couscous: The couscous available in your supermarket is generally not a whole grain although you can find whole couscous elsewhere – you'll notice it is a slightly more tan colour.

Pasta: Most pasta is made using durum wheat semolina that has been processed to remove the bran and germ although wholemeal varieties are available.

Polenta: The endosperm of corn is ground to form polenta, a thick porridge which is solid when cold.

Semolina: This is made by coarsely grinding milled durum wheat. Not usually found in whole grain forms.

There are three parts of a grain – endosperm, germ, and bran. A whole grain is one where no part of the grain has been removed. The bulk of the grain, the endosperm, is predominantly carbohydrate (in the form of starch) with some protein and relatively few other nutrients compared to the germ and bran portions. The germ and bran contain antioxidants - of which some are unique to grains - vitamin E, B vitamins, trace minerals and unsaturated fats; also the bran is rich in dietary fibre.

During the milling process to make white flours the germ and bran are removed, thus

removing a large proportion of the nutrients. On the other hand wholemeal is, as the name suggests, made by milling whole grains to a fine texture, so that none of the goodness of the grain is lost. Brown rice is a whole grain, whereas white rice has the germ and bran removed during the polishing process.

WHY CHOOSE WHOLE GRAINS?

Whole grains provide carbohydrates, fibre, protein, vitamins, minerals and phytochemicals (natural chemicals found in plants that benefit our health) and are low in fat. As more research is done, the list of health benefits of eating more whole grains just gets longer.

• **Heart health:** Eating whole grains is associated with lower cholesterol and reduced risk of

heart disease. Compared to people who rarely eat whole grains, people who eat them regularly have a 20-40% lower risk of heart disease.

• **Diabetes:** You'll decrease your risk of developing Type 2 diabetes by eating three serves of whole grains a day.

• **Cancers:** People who regularly eat whole grain and high fibre foods are less likely to get bowel cancer.

It also appears that eating whole grains on a regular basis may protect against stomach cancer and possibly others, but the evidence is less clear at the moment.

• **Weight control:** Studies have shown that people who eat more whole grains weigh less, and gain less weight during middle-age, than people who eat less whole grains.



LABEL READING: HOW TO FIND WHOLE GRAINS

It's not always easy to find whole grains; it requires a bit of detective work reading the labels on food.

Terms to look for on labels:

In ingredient lists: wholegrain, whole wheat, whole (grain), stone ground (grain), popcorn, brown rice, barley, oats, rye, millet. These contain all parts of the grain, so you'll get all the nutrients of the whole grain. Look at the order of the ingredients though; if a whole grain is not listed as the first or second ingredient, the product is unlikely to be a good source of whole grain.

Terms that don't mean whole grain:

Bran, multigrain, unbleached flour, organic flour, semolina. These have (most likely) had some parts of the grain removed, so you will be missing the benefits of whole grains.

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HOW MUCH WHOLE GRAIN SHOULD WE EAT, AND HOW DO WE GET IT?

It's pretty unlikely that we are going to turn our backs completely on white bread (my current favourite is ciabatta) or the ease of cooking couscous for dinner in a hurry; nor, heaven forbid, are we going to start serving our Thai green curry on brown rice. And sushi without white rice? I don't think so. Refined grains are here to stay, so we come back to one of the nutritionist's favourite words: variety.

It's not about dumping all your favourites. It's about mixing it around a bit and including whole grains in your day. Given that we are advised to have six servings or more of breads and cereals every day, it's not such a big leap to try to make half of them whole grain.

Examples of one serving of cereal include:

- 1 medium slice of bread
- 1 small bread roll
- 1 muffin
- 1 cup cooked rice
- 1 cup cooked pasta
- 1 cup cornflakes
- ½ cup cooked porridge
- ½ cup muesli
- 2 plain sweet biscuits

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INCLUDING WHOLE GRAINS IN YOUR DAY

BREAKFAST

Bowl of **muesli**, fruit and low-fat milk **(1 serve)**
Slice of **grain toast** **(1 serve)**
Tea/coffee/juice/milk

LUNCH

Sandwich or roll filled with tuna/chicken/lamb and salad **(2 serves)**

DINNER

Stir-fry of lamb with Asian greens and rice
Stewed apple with ice cream or yoghurt

SNACKS

- **Grainy bread** **(1 serve)**
 - Fresh fruit
 - Yoghurt
- Handful of nuts

Courtesy of Catherine Saxelby, dietitian.
www.foodwatch.com.au

With breads and breakfast cereals it's not too difficult to use whole grains at least some of the time. And while you're unlikely to fancy brown rice with your Indian, it does add a nice nutty texture to a stir-fry (especially if you don't cook the rice as long as the packet tells you to).

Popcorn is often recommended as a low kilojoule snack, so now you have another good reason to eat it (hold the butter and salt); or you can include sweetcorn in your meals.

CARBS: THE BOTTOM LINE

Carbohydrate foods are the basis of our diet and eating them on a regular basis is essential to energy levels, mental function and general good health. The low-carb diet craze is in its death throes, but hopefully it can leave a positive legacy: a better understanding of carbohydrates.

What we know now is that there is a difference between types of carbohydrates, and we should be eating more of some and less of others. A bit of common sense always helps; we all know that foods with lots of added sugar and fat are not the same as wholegrain breads and cereals. So rather than limiting your carbohydrate intake, try to include more whole grains and fewer refined and processed carbs; this has the potential to improve overall health and wellbeing. And if it's your weight you're concerned about, you don't need to skip carbs at an evening meal. Just watch your portion sizes, as you do for everything else you're eating, and enjoy those healthy carbs.

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For sources of information for this article see page 79 or www.healthyfood.co.nz