

# What's to Gain from Grains?

An update of the scientific evidence



**Grains &  
Legumes  
Nutrition  
Council**

*Cultivating Good Health*

## Foreword

I have been associated with the Grains & Legumes Nutrition Council (formerly Go Grains Health & Nutrition) for many years and it is with pleasure that I introduce their latest initiative. Grain foods have been one of the staples recommended to Australians in Government dietary guidelines, with increasing emphasis on wholegrain at each revision of those guidelines.

It is therefore concerning to note the number of Australians limiting core grain foods in their diet as a result of lack of knowledge of their benefits and misconceptions such as their consumption is linked to weight gain. This report provides an important update on the research evidence of the health benefits of grain foods. It also examines some ways in which health professionals can assist consumers in making good quality grain food choices.

**Dr David Roberts, Grains & Legumes Nutrition Council Scientific Review Board**

**ISBN: 978-0-9873026-0-1**

This brochure has been developed by the Grains & Legumes Nutrition Council (formerly Go Grains Health & Nutrition) to provide health professionals with information on grains and health. The information has been independently reviewed by the Dietitians Association of Australia (DAA). For individualised nutrition and dietary advice see an Accredited Practising Dietitian (APD). Visit the DAA website to find a dietitian near you. [www.daa.asn.au](http://www.daa.asn.au)

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## Are Australians eating enough grain foods?

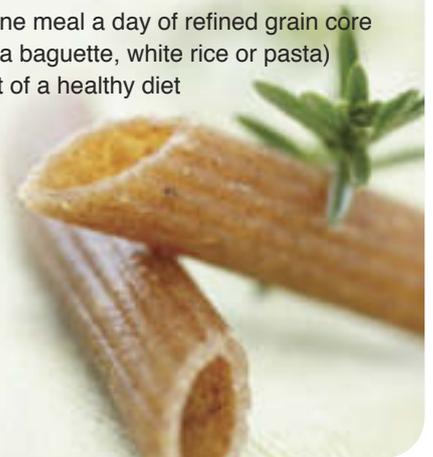
Recent research suggests that Australians are unsure of the benefits of grain foods in the diet and are choosing options high in saturated fat, added salt and added sugars more often. A survey commissioned by the Grains & Legumes Nutrition Council to track grain food consumption in Australia (2011 Consumption Survey)<sup>1</sup> indicates people are eating an average 3.2 serves of core grain foods a day, almost one serve less than the minimum of 4 serves per day recommended in the Australian Guide to Healthy Eating 1998. People are also choosing wholegrain less often with an average intake of just over 1 serve of a day, a decline from 1.4 serves per day in 2009.<sup>1</sup>

Reasons for the decline in grain food intake appear to be a result of misconceptions and a lack of understanding of their benefits. One in 5 male respondents in the survey indicated that they do not understand the benefit of grain foods in the diet, and more than 1 in every 3 women reported limiting grain foods to assist in weight loss. The survey also found that not only are people eating less core grain foods, they are choosing 'extra' grain foods more often. On average, 1/3 of the total grain foods eaten by Australians each day are non-core foods ("extras") like cakes, biscuits, pastries and takeaway foods (such as hamburgers, hot dogs and pizza). This is an increase from 2 years ago when the same survey found 22% of grain foods eaten were non-core foods.

To help health care professionals address this lack of understanding, this research update provides an overview of latest evidence on the benefits of grain foods in the Australian diet. It will assist in reminding people of the health benefits of core grain foods and encouraging them to make smart grain food choices: eat the recommended serves of core grain foods, mostly wholegrain, and limit intake of higher fat, salt and sugar non-core (extra) grain foods.

### **5** reasons to encourage Australians to enjoy grain foods every day

1. Consumption of 2 – 3 serves of wholegrain food is associated with a 20 – 30% reduced risk of chronic disease<sup>25</sup>
2. Cereal fibre from grain foods is linked to reduced risk of bowel cancer
3. People consuming 3 – 5 serves of wholegrain foods tend to gain less weight
4. Cereal fibre is linked to protection against heart disease
5. Including one meal a day of refined grain core foods (like a baguette, white rice or pasta) can be part of a healthy diet



**Core grain foods** - including breads, breakfast cereals, crispbreads, rice, pasta and noodles are primary contributors of fibre, thiamin, magnesium and iron in the Australian diet.<sup>2,3</sup>

**Non-core grain foods** – grain foods high in salt, fat or added sugar, including cakes, pastries, biscuits, chips, pies and sausage rolls.

# Cereal Fibre & Digestive Health

We are all familiar with the advice to eat dietary fibre because ‘it helps keep you regular’. However, increasingly evidence is indicating that there is much more to the story: different types of fibre each have distinct roles and confer unique health benefits. So a combination of different fibres is key to optimal gut health.

The fibre in grain foods passes through the small intestine undigested and, on reaching the large bowel, is fermented by bacteria. Carbohydrates act as prebiotics as they are the primary substrates for gut bacteria and the fermentation selectively promotes the growth of beneficial bacteria.

The bacterial population of the bowel is critical for health. Numerous studies have established that changes in diet, particularly increases in amount and quality of carbohydrate, can affect the bacterial populations in the large bowel and so have consequences for gut health.<sup>4</sup>

In the colon, the resident beneficial bacteria facilitate the conversion of dietary fibre and other undigested material into short chain fatty acids (SCFA). The main SCFA are acetate, propionate and butyrate. Of these, it is believed that butyrate is of particular benefit for lowering bowel cancer risk as it promotes the death of colorectal cancer cells.<sup>5</sup> It has been shown that a low carbohydrate diet reduces the production of the beneficial SCFA such as butyrate, highlighting the importance of including grain foods in the diet.<sup>6</sup>

According to Dr David Topping from the CSIRO, “The paradox in Australia is that while we have one of the highest intakes of fibre in industrialised countries we still have one of the highest rates of bowel cancer. The answer lies not in advice to increase fibre intake generally, but more importantly to eat different types of fibre including foods that contain resistant starch which promotes the production of butyrate”.



Fibre type			
	Soluble fibre	Insoluble fibre	Resistant starch
Function	Viscous fibres slow the time it takes for food to pass through the stomach and small intestine resulting in slower absorption of nutrients and lower plasma cholesterol levels.	Exerts greatest influence on the large bowel - helps to normalize bowel function (shortens transit time, helps produce larger and softer stools and increases defecation frequency).	Starches that resist small intestinal breakdown are fermented by bacteria in the large bowel, producing short chain fatty acids (SCFA), which are important for colonic health.
Sources	Oats, barley, vegetables, lentils, beans (dried or canned) and fruit.	High fibre wheat-based breakfast cereals, brown rice and pasta, wholemeal and rye breads.	Wholegrain foods, legumes, cold cooked potatoes, rice, pasta and firm bananas.



### **Grain foods: a key to the puzzle of rising bowel cancer rates**

Colorectal cancer is one of the most common forms of cancer in Australia, affecting 1 in 12 people under the age of 85 and leading to the death of almost 80 people every week. A recent systematic review and dose-response meta-analysis of 25 prospective cohort studies reported that fibre from grain foods and particularly wholegrains is associated with reduced risk of colorectal cancer, but fibre from fruit and vegetables does not have a significant association.<sup>7</sup>

From an analysis of the eight cohort studies that reported on cereal fibre intake, the review found that for every 10g of cereal fibre, the risk of developing bowel cancer was reduced by 10%. In addition, people who ate 3 serves of wholegrain foods per day were 17% less likely to develop bowel cancer than those people who didn't eat wholegrain foods.

Nutrient Reference Values for dietary fibre <sup>8</sup>	Men	Women
Adequate Intake	30g/day	25g/day
Suggested Dietary Target for reduction of chronic disease	38g/day	28g/day



**Practice Tip:** Promote a diet rich in a range of fibres by encouraging people to eat a variety of high-fibre foods, including wholegrain foods.

# Grain Foods & Weight Management

In Australia, an estimated 35% of women and 15% of men are currently limiting grain foods such as bread and pasta in their diet to help lose weight.<sup>1</sup> However, the evidence from both cohort studies and clinical trials indicates that wholegrain foods can be included in an effective weight loss diet and can aid long-term weight management.

## Weight Loss

The popularity of high protein low carbohydrate diets has led some people to cut out all grain foods to lose weight. However, wholegrain foods are important for good health and the popular higher protein diet, the CSIRO Total Wellbeing Diet, recommends at least 3 serves of wholegrain foods such as high fibre breakfast cereal and wholegrain bread each day.

Janet Franklin, APD at Metabolism and Obesity Services at Royal Prince Alfred Hospital, explains that core grain foods are an important part of a weight loss diet: “Many people come to our clinic reporting that they are avoiding high carbohydrate foods mostly bread, rice, and pasta but aren’t necessarily avoiding biscuits and cakes. Core grain foods such as wholegrain bread, cereals and rice provide many health benefits that people tend to forget. Rather than focussing on limiting grain foods, it is more important to encourage people to make good carbohydrate choices as part of a calorie-controlled diet by choosing core wholegrain foods first and eating the low fibre, highly processed, higher salt and fat grain foods only occasionally.”

Evidence from intervention trials indicates that between 3 and 7 serves of wholegrain foods can be included in an effective calorie-controlled diet for weight loss (1 serve equivalent to one slice of bread).<sup>9-12</sup> Compared to a high carbohydrate low fat diet, a low carbohydrate diet may be more effective in the short-term for weight loss if carbohydrate is replaced with protein. However, long term studies suggest that both methods provide similar results. A recent study that compared the effect of weight-loss diets varying only in the proportions of fat, protein and carbohydrate showed each diet to be equally successful in facilitating and maintaining loss of fat mass, lean mass, visceral adipose tissue, and hepatic fat over 6 months and a two-year follow-up period.<sup>13</sup>

Janet Franklin explains, “We find that including grain foods in the diet is more sustainable in the long-term because it allows people to choose from a wide variety of foods and enjoy eating in social situations.”

“Consumption of 3-5 serves per day of cereal foods (mainly wholegrain) is associated with a reduced risk of weight gain.”

*Evidence Statement, Draft Australian Dietary Guidelines 2011<sup>14</sup>*



“Wholegrain foods are an important part of a healthy higher protein diet for weight management which is why the CSIRO Total WellBeing diet recommends at least 3 serves of wholegrain foods per day.”

*Professor Manny Noakes, Research Program Leader CSIRO Food, Nutrition and Health Science*



“ An estimated 26% of Australians are currently limiting grain foods in their diet to help lose weight. ”<sup>1</sup>



### Long-term Weight Management

Long-term observational studies demonstrate that people who include wholegrain foods in the diet are less likely to gain weight over time.

Two reviews of the evidence on grains and weight have been published in the last 5 years and conclude that higher intakes of grain foods, particularly wholegrain foods, are associated with lower BMI, smaller waist circumference and less weight gain.<sup>15,16</sup>

**Practice Tip:** Rather than restrict core grain foods for weight management, focus on reducing the 'extra' foods

A key study of three large cohorts recently published in the New England Journal of Medicine reported that consumption of wholegrain foods is associated with reduced weight gain over 4 years.<sup>17</sup>

In each 4-year period, participants gained an average of 1.51 kg, equivalent to 7.5 kg over 20 years. Every additional serve of wholegrain food in the diet was associated with significantly less weight gain over 4 years in both women and men (-0.8 kg). A higher intake of wholegrain foods was associated with less weight gain than higher intakes of vegetables or low fat dairy.

### Swap It

Non-core grain food*		Core grain food alternative*	
Banana bread (128g slice)	1700 kJ	Wholegrain English muffin toasted with margarine	650 kJ
Cafe muffin	1400 kJ	Raisin toast with margarine (2 slices)	800 kJ
Packet of corn chips (large)	1000 kJ	2 cups popped corn (Lite butter flavour)	350 kJ
Cafe Anzac biscuit	1100 kJ	Two wholegrain crispbreads with a tablespoon of cream cheese	340 kJ

\*Nuttab 2010 / Foodworks 2009

# Grain Foods & Irritable Bowel Syndrome



**INTERVIEW: Dr Jane Muir discusses the treatment of Irritable Bowel Syndrome with dietary manipulation of carbohydrates**

**Dr Jane Muir.** Dietitian and Head of Research, Eastern Health

Clinical School, Monash University.

Jane has over 20 years experience in nutrition research, with a focus on the role of carbohydrates in the health of the gastrointestinal tract. Her current research is in the role of poorly absorbed short chain carbohydrates (called FODMAPs) on the genesis of symptoms in patients with functional gut disorders such as IBS

## **1. What proportion of the Australian population do you estimate suffers from IBS?**

Irritable bowel syndrome affects one in seven adults in Australia and is characterised by GI symptoms including lower abdominal pain, bloating, wind and altered bowel habit (ranging from constipation to diarrhoea). We still do not fully understand the causes of IBS but it appears that it involves disruption of the gut microflora, disturbed motility and hypersensitivity of the gut to gas produced when small unabsorbed carbohydrates are rapidly fermented by the gut bacteria.

## **2. Do you recommend people with IBS avoid all grain foods?**

Dietary manipulation of certain dietary carbohydrates (we have called FODMAPs) is one accepted first line of therapy for these patients. FODMAPs stands for Fermentable, Oligosaccharides, Disaccharides, Monosaccharides and Polyols which are widely distributed in food. Many grains and cereals contain fermentable oligosaccharides including fructans and galacto-oligosaccharides (GOS). For treatment of IBS we recommended that low FODMAP grains and cereals are substituted for the usual cereal products. For example, products made from rice-, maize-, potato- or corn-flour tend to be low in FODMAPs and are better tolerated than rye and wheat products.

## **3. Is a low FODMAP diet a long-term solution to IBS?**

The low FODMAP diet is not a diet for the long-term; it is designed to alleviate symptoms associated with IBS. We recommend that it is followed for 6-8 weeks and then reviewed with a specialist dietitian at which point food containing FODMAPs can be slowly re-introduced. It is not advisable to stay on a low FODMAP diet for the longer term because the potential 'prebiotic' effect of certain FODMAPs means they are probably essential for maintaining a healthy population of gut bacteria as well as maintaining normal bowel function through important laxative effects.

“The low FODMAP diet is not a diet for the long-term; it is designed to alleviate symptoms associated with IBS. We recommend that it is followed for 6-8 weeks... at which point food containing FODMAPs can be slowly re-introduced.”



## *Wheat Avoidance*

Results from the 2011 Consumption Survey indicate that 16% of Australians may be avoiding wheat-based foods. This choice appears to be more common in women than men, with more than one in every 5 women reporting limiting wheat (22% women and 12% men).

# Grain Foods & Heart Health



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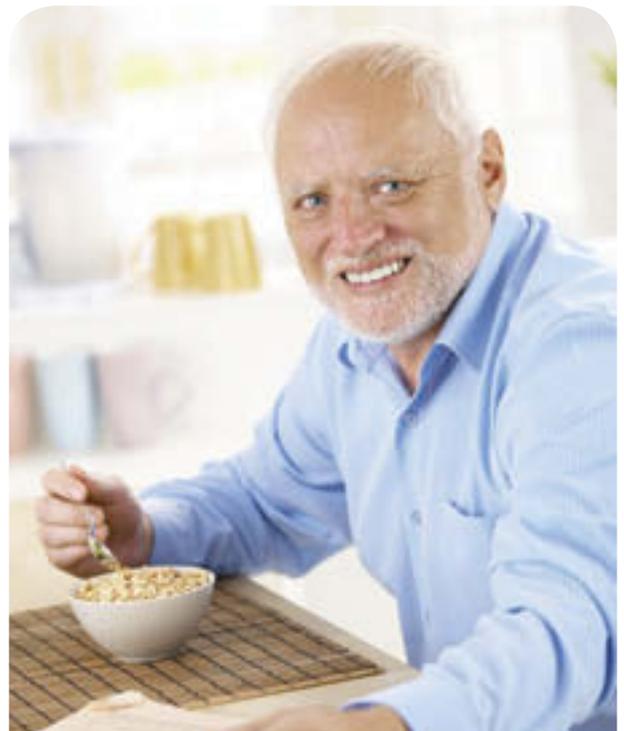
While the protective role of oats and barley in heart health is well established, the role of Australia's staple grain, wheat, is less well known.

A review commissioned by the Grains & Legumes Nutrition Council concluded that there is moderate, consistent evidence from cohort studies that higher intakes of wholegrain foods including wheat-based foods as well as bran foods, are linked to reduced risk of cardiovascular disease (CVD).<sup>18</sup> The protective effect of grain foods was also highlighted in the scientific evidence review conducted to inform the revision to the Australian Dietary Guidelines which concluded that the 'Consumption of cereal foods (especially wholegrains and those with fibre from oats and barley) is associated with a reduced risk of cardiovascular risk in adults'.<sup>19</sup> This statement is based on consistent evidence from observational and intervention studies of a 30% reduction in CVD risk with higher intakes of grain foods.

Evidence is beginning to suggest that different grain foods may have different benefits to heart health. Evidence from intervention trials continues to grow on the positive effect of the soluble fibre in oats and barley on reducing total and LDL-cholesterol. However, intervention studies from the last 10 years indicate the protective effect of wholegrains may also work through impacts on blood pressure, inflammatory status, endothelial function and prebiotic affects. In particular, some emerging evidence suggests wholegrain wheat might play a role by helping to control blood pressure.

**Practice Tip:** Grain foods are an important part of a diet for maintaining heart health. It is important to help people understand the benefits of eating a variety of grain foods including wholegrain wheat and rye as well as oats and barley.

*Did you know?* Men who eat breakfast cereal everyday are less likely to develop hypertension than those who never eat cereal.<sup>20</sup>



*“...there is moderate, consistent evidence that higher intakes of wholegrain foods including wheat-based foods as well as bran foods, are linked to reduced risk of cardiovascular disease.”*

## Handy tips for adding variety to the grains in your day:

1. Swap oats for a wholegrain wheat or bran cereal on some days
2. Add barley to soups and stews
3. Swap sandwiches for cold pasta salad a couple of times per week
4. Snack on wholegrain crackers with hummus or crispbread with avocado
5. Have your stir-fry with brown rice

# Refined Grains in a Healthy Diet

The current Australian Dietary Guidelines recommend “Eat plenty of cereals (including breads, rice, pasta, and noodles), preferably wholegrain”.<sup>21</sup> However, for many Australians refined grain foods are more familiar and the preferred choice. A systematic review of the evidence from the last 10 years helps answer the question: What proportion of refined grains can be consumed in a healthy diet?

The review of 135 studies found limited association between refined grain intake and adverse health outcomes, and no association with cardiovascular disease.<sup>22</sup> Similarly, a meta-analysis of prospective cohort studies in 2008 also reported that refined grain intake is not associated with increased risk of CVD.<sup>23</sup>

A total of 32 prospective cohort studies were identified, 27 of which found either a protective effect or no association between higher refined grain intake and CVD, type 2 diabetes, metabolic syndrome or weight gain. Of the nine intervention studies, which largely studied the effect of wholegrain or low GI on cardiovascular or metabolic risk, six reported no significant difference in health outcomes between refined grain and wholegrain intakes. In summary, the evidence from the review indicates that consuming up to 50% of all grain foods as refined grain core foods is not linked with any increased disease risk.

Eating more wholegrain foods and lower glycemic index grain foods remain important health recommendations, so consumers should be encouraged to increase their intake of these foods and ideally aim for one-half to two-thirds of their grain foods as wholegrain.

However, this study indicates people can choose up to one half of grain foods from refined grains and enjoy these foods as part of a balanced healthy diet. Some refined grain foods have a naturally low GI and these should be preferred, eg sourdough white bread, basmati rice and pasta.

Refined grain core foods were defined in the study as those without high levels of added fat, sugar or salt. It is important to advise that grain-based foods high in added fat, sugar or salt such as cakes, muffins, pastries or pizzas should only be enjoyed as occasional indulgence foods.

**Practice Tip: ‘One Meal a Day is OK’** As part of a healthy diet that includes choosing wholegrain and high fibre most of the time, one meal each day could contain a refined grain food. For example, a wholegrain cereal for breakfast, a white bread sandwich at lunch and brown rice with stir-fry for dinner.

“...consuming up to 50% of all grain foods as refined grain core foods is not linked to any increased disease risk.”



# Wholegrain Daily Target Intake



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In 2008, the Grains & Legumes Nutrition Council in collaboration with the International Life Sciences Institute (ILSI) convened an expert panel to determine an Australian Daily Target Intake (DTI) for wholegrain intake. This is an achievable, evidence-based target intake of wholegrains per day.<sup>24</sup>

Adults and children 9+ years	48g wholegrain each day
Children 4-8 years	32-40g wholegrain each day
Children 2-3 years	24g wholegrain each day

## Wholegrain content of core grain foods<sup>25</sup>

Wholegrain Food	Serve Size	Wholegrain Content (approx.)
Wholegrain bread	2 slices	30 - 40g
Multi-grain bread	2 slices	5 - 30g
Wholegrain breakfast biscuit	2 biscuits	30g
Wholegrain breakfast cereal	30 - 45g	15 - 30g
Natural Muesli	1/2 cup	30 - 40g
Porridge	1/2 cup raw oats	30g
Brown Rice	1 cup cooked	125g
Popcorn (plain)	20g	15g
Muesli bar	1 bar	10 - 15g

Enjoy a variety of wholegrain foods to reach the 48 gram Daily Target Intake.





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## More Information and Resources Available

For more information on the benefits of grain foods as well as a range of downloadable resources for clients call our Information Line on 1300 472 467 or visit the Grains & Legumes Nutrition Council website: [www.glnc.org.au](http://www.glnc.org.au). While you are there subscribe to GLNC e-news to keep up-to-date with bi-monthly updates of the latest scientific research findings on grains and legumes.



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