

Nutrition and Pain

Good general nutrition:

The [Australian Dietary Guidelines](#) (2013) summarise current evidence:

1. Aim for a [healthy weight](#): eating the right food types and portions is 80% of the battle while activity is 20%.
2. Eat a wide variety of nutritious foods
 - a. Eat at least 5 serves of vegetables (including [beans/legumes](#)) every day. "Eat a rainbow".
 - b. Eat 2 pieces of fruit daily.
 - c. Be selective with grain (cereal) based foods. Focus on [whole grains](#) and [high fibre cereals](#). Limit [refined grain](#) products (white rice, white bread, pasta and noodles).
 - d. Choose good quality protein sources: lean meats, fish, plant protein (including [beans/legumes](#)) and low fat dairy.
 - e. Drink [water](#) instead of sugar containing drinks.
3. Minimise energy dense foods including processed, packaged and 'fast' foods. These are typically high in refined carbohydrate, fat and salt content and are linked to obesity, inflammation and chronic disease.

Eating to reduce pain:

The aim is to calm nervous, immune and endocrine (hormonal) systems.

1. **'Slow' not 'fast' carbs** to minimise blood sugar spikes and inflammation: limit, high glycaemic index carbohydrates (sugars, fruit, bread, cereals, pasta, and rice; most packaged foods). Fill up on 'slow' carbs (in vegetables, beans/ legumes) and protein (including fish, meat, cheese and plants) instead.
2. **High fibre** to support healthy gut bacteria: eat plant foods including plenty of vegetables, beans/legumes and some whole grains, nuts and fruit.
3. **Phytonutrients** to mop up free radicals: more vegetables! Eating whole plant foods is preferred. Vitamin supplements can help in selected cases.
4. **High quality fats**: Eat sufficient omega 3 essential fatty acids via whole foods (eg. fish or eggs) or supplements (fish, krill or flaxseed oil).

Helpful websites and resources

[Australian Dietary Guidelines](#)

[Australia's healthy weight week](#)

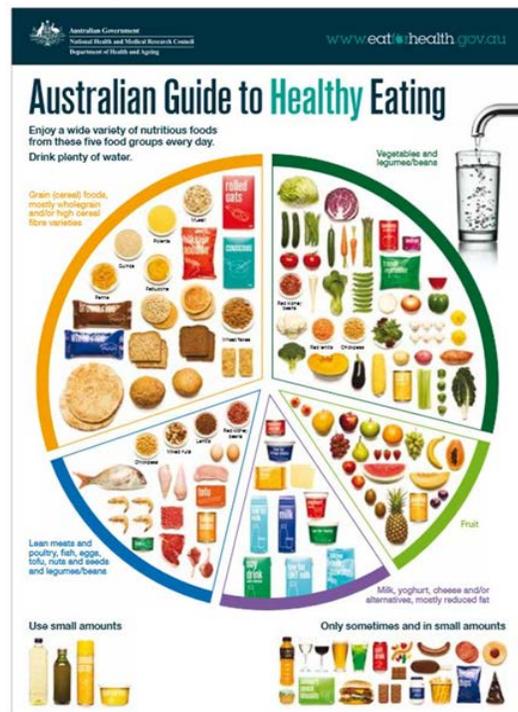
[Smart eating for you](#)

Consult an accredited dietitian for further advice

Good general nutrition

The Australian Dietary Guidelines provide a detailed review of current scientific evidence. This evidence is incorporated into the plate shown below which replaces earlier versions of the plate and food pyramids.

[Australian guide to healthy eating](#)



[Experts respond to the Australian Dietary Guidelines](#)

The above link offers interesting perspectives as a number of experts comment on the Australian Dietary Guidelines. Key points include:

1. There is recognition that the increased supply of cheap, tasty, energy-dense food has been the main driver of population weight gain over the last three decades. There is agreement with the strong emphasis in the Australian Dietary Guidelines on reducing energy dense processed food intake and returning to eating more of the basic food groups.
2. There is a particular mention of the strengthening evidence that consumption of sugar-sweetened drinks is associated with weight gain.
3. There is discussion of the type and amount of grain (cereal) food recommended in the guideline. The comment is made that the evidence of health benefit is purely related to whole grain and fibre and not cereals in general. "There is no benefit – but possibly harm – from eating a large amount of refined grain foods and the recommendation does not truly reflect the evidence". There is also comment that the recommendation of six serves of grain foods as a minimum for men is too high. "With two-thirds of the population overweight or obese, such a recommendation will ensure continuing obesity. Fibre and micronutrient intakes can be achieved with a much lower amount of wholegrain foods than this recommendation".
4. Comment was made about the need to improve regulation of the food industry and particularly the need to improve food labeling.

The link between Western diet and chronic disease

The human race grew up on a “hunter and gatherer” diet of vegetables, fruit, nuts and lean meat. Around 10,000 years ago the agricultural revolution brought an increased intake of cereal foods and dairy. More recently the industrial revolution and then the rise of supermarkets saw us become consumers of highly refined and processed foods. What is now known as a Western diet is therefore very different from the food patterns of our ancestors¹.

A World Health Organisation (WHO) report published in 2003 summarised changing dietary trends and their role in chronic disease causation². Problems identified included the high energy density of food, an increase in refined foods such as sugars and other high glycaemic index carbohydrates, an increase in saturated fats and reduced intake of fibre, fruit and vegetables. WHO promotes better nutrition as a major strategy in the fight against chronic disease.

In Australia, over 50% of the population are overweight (BMI \geq 25)³ and chronic diseases now account for two-thirds of our healthcare expenditure⁴. The call for improved nutrition is supported by all health sectors.

Inflammation as a possible underlying mechanism

Scientific evidence has shown that the typical Western diet causes low grade systemic inflammation known as “metaflammation”. This inflammation appears to underlie many chronic diseases including obesity, high blood pressure, high cholesterol, heart disease, diabetes, dementia, depression and cancer^{5,6}.

In addition, diet induced inflammation has the potential to sensitise the nervous system and contribute to chronic pain⁷. Poor nutrition has been linked to many pain conditions including osteoarthritis^{8,9}, inflammatory arthritis¹⁰, inflammatory bowel disorders¹¹ and fibromyalgia¹². Although more research is needed there is evidence to suggest that improved nutrition can play an important role in treating chronic pain.

Eating to reduce pain

There are multiple nutritional strategies that have the potential to reduce pain via actions on the nervous, immune and/or endocrine (hormonal) systems. 5 key areas showing promise in the emerging scientific literature are discussed below:

1. Minimal refined carbohydrates
2. High dietary fibre
3. Phytonutrients
4. Omega 3 fats
5. Dietary supplements

1. Minimal refined carbohydrates

Refined carbohydrates have a high glycaemic index. This means that they cause a rapid rise in blood sugar. Unless such foods are taken at a time of heavy exercise they produce a spike in insulin level and this in turn contributes to inflammation. Weight gain and chronic disease are longer term results.

There is evidence that even a single highly processed, packaged meal containing high glycaemic index carbohydrates increases levels of inflammatory markers¹³.

However, on the positive side, a recent study showed that after only 10 days on a healthy eating plan focussing on unprocessed foods, there were marked improvements in blood pressure, glucose tolerance and cholesterol levels¹⁴.

Minimising refined, high glycaemic index, carbohydrates ('fast' carbs) is recommended to reduce inflammation and potentially also pain. However given that the body needs carbohydrate, 'slow' carbs are preferred, in the form of vegetables, beans/legumes and whole grains. Eating up to 2 pieces of fruit daily also provides a good source of carbohydrate but there is a need for caution. The fructose contained in fruit has a high rate of conversion to fat and eating more than 2 pieces daily can lead to weight gain.

Eating protein leads to a rise in glucagon rather than insulin (a different hormonal response). With a well-balanced diet, eating protein in combination with 'slow' carbs produces a balanced rise in both insulin and glucagon with is non-inflammatory. Protein is also helpful in that it causes a sensation of fullness and therefore a reduced desire to eat refined carbohydrates.

2. High fibre diet

Fibre is the component of plant food which is resistant to digestion, passing through the gut to ferment in the large bowel or colon. High levels of dietary fibre help to maintain colonisation of the large bowel with healthy, rather than harmful, gut bacteria.

A high fibre diet has many well known health benefits including maintenance of good bowel function and reduced cholesterol and blood glucose levels. Research has shown benefit from a high fibre diet in cardiovascular disease, kidney disease and type 2 diabetes^{15,16,17,18}.

Recently an Australian research team has proposed a possible link between dietary fibre intake, inflammation in the gut wall and the risk of auto-immune disorders¹⁹. This mechanism has potential relevance to pain. Short chain fatty acids are a by-product produced from fermentation of dietary fibre by gut bacteria. These short chain fatty acids then play a role in damping down immune responsiveness in the gut wall and beyond. Thus a low fibre diet brings increased immune responsiveness and more autoimmune diseases. Changing to a high fibre diet brings more short chain fatty acids and less immune system hyper-responsiveness.

The solution is to eat plant foods including plenty of vegetables, beans/legumes and some whole grains, nuts and fruit.

[ABC Catalyst](#) screened a program in 2010 which explored the value of a high fibre diet in reducing immune system responsiveness. Follow the link to watch the program or read more about it.

The Australian Dietary Guidelines recommend a daily intake of 30-35 grams of fibre.

3. Phytonutrients

Phytonutrients are part of the body's defence system which "mops up" potentially damaging free radicals. Some free radicals are formed as part of normal metabolic processes, but production is increased by pain, smoking, stress and excessive dietary fat intake. If the system gets out of balance with too many free radicals and not enough mopping up, illness can develop. Problems include premature ageing, heart disease and

cancer. It is also proposed that increased free radicals contribute to nervous system sensitisation and pain.

Classic phytonutrients include vitamin C, vitamin E, beta-carotene and the trace mineral selenium. Fresh vegetables and fruit are good sources along with green tea, red grapes (resveratrol) and red wine.

Phytonutrient treatment shows promise in acute pain²⁰. Benefit has also been shown in fibromyalgia²¹, dysmenorrhoea (period pain)²², painful diabetic neuropathy²³, and recurrent pancreatitis²⁴. Two studies showed that Vitamin C supplementation in people with wrist fractures significantly reduced development of complex regional pain syndrome^{25,26}.

4. Omega 3 fats

Omega-3 and omega-6 fatty acids have different functions in the body. More dietary omega-6 leads to an inflammatory state (increased pro-inflammatory cytokines) while more omega-3 reduces inflammation and immune responsiveness.

In a traditional hunter gatherer diet it is estimated that the ratio of omega-6 to omega-3 was approximately 1:1. A typically Western diet is usually deficient in omega 3 and has a ratio of 10-30:1. This excess of omega 6 fatty acids pushes cellular metabolism in an inflammatory direction and contributes to chronic disease²⁷.

The omega 3 fatty acids are the healthy fats present in oily fish and some vegetable and nut oils. They include **alpha linolenic acid** present in flaxseed, walnut and fish oils and **eicosapentaenoic acid** (EPA) and **docosahexaenoic acid** (DHA) which are contained only in fish oil. Omega 6 fatty acids are contained in corn, canola and sunflower oils.

Studies of increased omega 3 intake in rheumatoid arthritis have shown significant improvement in joint pain along with reduced use of non-steroidal anti-inflammatory drugs^{10,28,29,30}. Studies of human osteoarthritic cartilage have shown that omega 3 treatment lowers levels of aggrecanases and inflammatory chemical mediators^{8,9}. Aggrecanases are enzymes that break down joint cartilage and contribute to osteoarthritis. Fibromyalgia studies have shown that omega 3 improves muscle pain, mood and fatigue³¹.

Research also points to benefit from increased omega-3 intake in other chronic conditions especially where inflammation is involved. These include Crohn's disease, asthma, psoriasis and heart disease.

5. The role of nutritional supplements

The emphasis of the Australian Dietary Guidelines is on whole foods rather than supplements. There is no clear evidence to support the use of supplements rather than the appropriate whole food that contains the necessary ingredient. Nevertheless at a practical level there may be a convenience factor, for example, in using fish oil capsules instead of eating regular fish.

In terms of scientific evidence omega-3 supplementation has the most evidence to support its use. In selected cases there may be a role for vitamin supplements.

Glucosamine and chondroitin have been studied in osteoarthritis^{32,33,34}. There are limited, high quality studies and their effectiveness remains unclear, particularly for severe arthritis. Both glucosamine and chondroitin have been found to be as safe as placebo (fake pills), with fewer side effects than some other medications.

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