

PART TWO Food & Diet

9. Chocolate causes acne

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Outbreaks of pimples, blackheads and cysts are a cause of enormous anxiety and embarrassment among teens and young adults. If you're part of the 20% of Australians who have experienced severe acne, you've probably tried a raft of treatments and preventive measures. But does giving up chocolate help?

It's unclear where or how this myth arose, but researchers tested the link three times from 1965 to 1971, suggesting it must have been a commonly held belief at least 40 years ago. All three studies came up with the answer: chocolate doesn't exacerbate acne.

But by today's standards, the investigations were all of a poor scientific standard. The original study, conducted in 1965, contained just eight participants.

The next study, published in the *Journal of the American Medical Association* in 1969, had 65 participants, but the results were confounded by the use of two different groups of subjects: 60 adolescents (14 girls) and 35 young adult male prisoners of an unspecified age. The researchers didn't account for the effects of gender, age, puberty, menstrual cycles, stress, smoking, lifestyle, background dietary intake or medical conditions affecting the skin.

The 1971 study, published in the journal *American Family Physician*, evaluated the effects of chocolate, milk, roasted peanuts and cola on acne in 27 students, but it failed to report their age and only followed them for one week. Also, it didn't address all potential confounders and failed to report significant acne outbreaks during or immediately after the study period.

Several detailed critiques of these studies' shortcomings have since been published. But the chocolate and acne myth has remained controversial and unchallenged since.

A recent study of YouTube videos found more than 85% of clips with keywords 'acne', 'acne diet' and 'acne food' supported the belief that diet has a moderate association with acne.

So why does the myth that chocolate causes acne continue to circulate?

Perhaps the fault lies with us researchers as the protagonists of evidence-based practice. We have failed to subject this chocolate myth to the rigours of a randomised control trial (RCT), despite the fact that almost all people aged 15 to 17 years experience some degree of acne. We need a decent RCT so we can know once and for all whether to unleash our teenagers, and ourselves, in the confectionery aisle at the supermarket.

Food and acne

Recent evidence suggests it may be time to expand our investigation of chocolate and acne and focus on milk consumption and the glycemic index (GI).

Milk and its products, including pasteurised milk, yoghurt, ice cream and cottage cheese, contain an array of naturally occurring ingredients that promote growth. The whey protein of dairy products, with the exception of cheese, leads to an increased release of insulin. And the casein protein in dairy products leads to an increase in levels of insulin-like growth factor (IGF).

Surprisingly, drinking milk raises blood insulin levels to a greater degree than predicted, based solely on its lactose content (the carbohydrate found in milk). Although the biochemical pathways are complex, in simple terms, this can lead to a worsening of acne.

This same reaction does not occur after eating cheese.

Glycemic index and glycemic load

Diets with a high glycemic index (GI) or glycemic load (GL) trigger a higher insulin response. This is because high-GI foods contain carbohydrate in a form that is quickly digested and absorbed into the blood stream, sending a message to the pancreas to secrete insulin.

This high level of insulin, in turn, increases IGF, potentially exacerbating acne. The insulin then sets out to clear the glucose from the blood.

So can a high GL, with more high-GI foods, help manage acne?

This was tested in a 2007 randomised control trial. The researchers asked 43 males aged 18 years to follow either a low-GL or a high-GL diet for 12 weeks. Meanwhile, the severity of their acne was assessed by dermatologists who were blinded to the dietary intervention aspects of the study.

The low-GL groups were instructed to swap some high-GI foods for others higher in protein, such as lean meat, chicken, or fish, and to favour lower-GI foods such as whole-grain bread, pasta, and fruits. The low-GL diet aimed for 25% energy from protein, 45% from low-GI carbohydrates, and 30% energy from fats. The high-GL group was encouraged to follow a high-carbohydrate diet.

Interestingly, those following the low-GL diet saw their acne improve, along with their insulin sensitivity. They also lost weight. It's important to note, however, that this work has not been repeated by other researchers at this stage.

What to do if you suffer from acne

Acne commonly persists into adulthood, with almost two-thirds of adults in their 20s and 43% in their 30s experiencing the condition. No matter what your age, you can get help from your GP who may need to refer you to a dermatologist.

When it comes to food, more good quality research studies are needed to assess the impact of dietary manipulations. But along with medical treatment, there are some dietary strategies worth trying:

1. Reduce your intake of high GI carbohydrate foods, such as potatoes, doughnuts, pancakes, sweetened breakfast cereal, and white bread. Swap high GI for lower GI choices such as apples, bananas, carrots, corn, muesli, mixed grain bread, pasta, porridge, tomato soup, sweet potato.
2. Be more active to improve insulin sensitivity; go for a short walk after eating to help reduce blood sugars to moderate insulin levels.
3. Reduce your milk (but not cheese) intake. To achieve peak bone mass you will need to take a daily calcium supplement.
4. If you're overweight, try and reduce your weight, even by a few kilograms.

10. Coffee is a health drink

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Many Australians begin their day with a cup of coffee. It's widely viewed as a tonic with revitalising properties — each

cup making us feel better. But this isn't the same as being good for our health.

Coffee is the most widely used stimulant in the world, with Australians consuming more than 3 kg of coffee per person every year. Most of this is instant coffee, drunk at home (about 80% of total consumption), but café coffee is on the rise.

Coffee is a deliciously complex mixture of different compounds that come from the bean, as well as those generated or excluded in the processes of fermentation, roasting and brewing.

Some of coffee's phytonutrients (organic components) may theoretically be beneficial for human health, including antioxidants, lignans and minerals. Others, such as acrylamide, are toxic chemicals.

But the most well-known component is, by far, caffeine, and each cup of instant coffee contains around 100 mg of the stimulant.

Caffeine acts by blocking the (adenosine) receptors in our brain that are responsible for dulling brain activity. So by preventing this dulling, it increases stimulation. This is why coffee is so invigorating on those dreary mornings when we would rather be in bed. It's also one of the reasons it keeps us awake at night.

Caffeine also makes us urinate more. But despite popular belief, it's not because we're dehydrated. Caffeine increases the urine output of habitual non-drinkers (especially in large doses), but doesn't seem to have much diuretic effect in people who regularly take a cup or two.

Caffeine has other short-term impacts on the human body. It stimulates metabolism and modestly increases systolic blood pressure levels (by two to 12 mmHg). But again, this effect is most pronounced in non-coffee drinkers and immediately after having a cup.

By contrast, drinking coffee for more than two weeks doesn't appear to increase your blood pressure. A moderate daily intake of coffee (two to three cups a day) isn't associated with an increased risk of hypertension, although a higher intake (five to eight cups) may increase your risk.

The downside of a regular coffee intake is addiction. The more coffee you drink, the more likely you are to crave another cup. Cutting out coffee can leave you with withdrawal symptoms such as headaches, fatigue, inattention and low mood, even if you only drank a cup a day.

Some of the feeling we get from our morning 'fix' of coffee is simply relief of this withdrawal. But withdrawal may have its own upside too. When we expose our body to modest stresses, we build stress tolerance to make us better prepared when any real danger comes along.

This is the science of hormesis, which is based on the idiom 'what doesn't kill you makes you stronger' and is widely used to explain the pleiotropic benefits of physical exercise (no pain, no gain).

Excessive coffee intake (more than eight cups a day) appears to be associated with an increased risk of premenopausal breast cancer, osteoporosis, arthritis, seizures, stroke and cardiac arrhythmias.

Whether this is caused by the chemicals in the coffee, the sleep deprivation or the coffee lifestyle associated with this level of intake remains unclear.

However, a regular, moderate intake of coffee (up to two to three cups a day) does not appear to be harmful to your health. Evidence suggests that a moderate daily intake of coffee may modestly reduce your risk of Alzheimer's disease, Parkinson's disease, depression, type 2 diabetes, and some cancers.

But none of these associations are strong enough to recommend drinking coffee.

There are many better ways to get antioxidants and other phytonutrients in our diet and decrease our risk of disease.

Regular exercise and a varied diet with plenty of fresh fruit and vegetables are perhaps the most important.

There's certainly not enough evidence to support the notion that coffee is a health drink. But as we drag ourselves from bed each morning, it sure feels like one.

11. Chewing gum stops onion tears

Ian Gibbins

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The cultivated onion, *Allium cepa*, is a savoury staple of cuisines around the world. Yet slicing up onions all too often leads to tears; you peel off the papery outer skin, start chopping and before long, your eyes are stinging and watering so much you can hardly see, your nose runs like crazy and you wonder why someone hasn't found a decent way to prevent this torment.

Suggested solutions abound: chew gum, peel onions under water, use a sharp knife, make sure the onions are cold, light a candle nearby, turn on an exhaust fan, wear goggles, or use the good chef's technique to get the job done as quickly as possible. Best of all, get someone else to do it.

Before deciding which methods work best, let's examine two fundamental questions: why do onions make you cry? And why do we cry anyway?

We generate tears almost continuously. Tears are made by the lachrymal glands located on the upper, outer surface of each eyeball. Although mostly water, tears contain a complex mixture of salts and organic compounds, which together keep the surface of the cornea clean and lubricated.

Every time we blink, the eyelids sweep a film of tears across the cornea. A series of tiny glands (tarsal or meibomian glands) in the eyelids secrete a lubricant to prevent the eyelids

sticking to the cornea. This process is known as basal tear secretion and is controlled by parasympathetic nervous pathways.

We don't usually notice basal tear secretion, as it quickly drains away through a pair of lacrimal ducts in the inner (nasal) corner of each eye into the nasal cavity. If tear production increases much over basal rate, this drainage mechanism cannot cope, and teardrops overflow the eyelids. Your nose also runs, as the ducts drain as much fluid as possible from the eye.

Crying occurs in response to two main types of stimuli: chemical or emotional. In each case, the increased tear secretion is due to greater activity of the relevant parasympathetic nerves, triggered by subconscious neural pathways in the brainstem.

Emotional crying is usually associated with a subset of extreme emotional states: sadness, elation, anger. Unless you are an actor, tear generation usually is outside conscious control, as are the characteristic facial expressions and vocalisations (sobs, wails, and so on).

Tears also help protect the eye from injury or irritation. Foreign material is detected by fine sensory endings of the trigeminal nerve in the cornea, which activate reflex tear generation, often accompanied by involuntary blinking. Thus, the offending material is washed from the corneal surface or out from under the eyelids.

When we slice onions, damaged cells release enzymes that break down to form a derivative of sulfenic acid. This is rapidly converted into a volatile gas (onion lachrymatory factor) by a further enzyme, lachrymatory factor synthase. The lachrymatory factor reacts with water on the corneal surface to produce a range of noxious compounds, including sulphuric acid and hydrogen sulphide.

Onions and garlic have another sulphur-containing compound: allicin. Along with the onion gas, allicin activates the TRPV1 receptors (also stimulated by noxious heat and hot chillies) and TRPA1 receptors (also stimulated by wasabi). Together, these compounds guarantee your eyes will sting and

feel like they are burning. So we cry until the noxious agents are diluted and washed from our eyes.

So which methods work best to reduce tearing up? Sharp knives minimise tissue damage, but volatile irritants are still released. Keeping onions cold reduces vapour formation, whereas cutting onions under water or in a strong airflow from an extractor fan prevent vapours reaching your eyes. (Goggles work even better, as long as you don't mind how you look!)

But breathing through your mouth or chewing gum has no effect: the tear stimulus is in your eyes, not your nose or mouth.

In principle, onions could be bred or genetically engineered not to express one of the enzymes that cause you to cry. But where would the challenge be then?

12. Fruit juice is healthier than soft drink

Tim Crowe

Deakin University

We often hear, from health experts and well-meaning parents, that soft drink is terribly unhealthy and we should opt for fruit juice instead. But apart from a few additional vitamins and minerals, not much differentiates fruit juice from soft drink: both beverages will give you the same sugar and calorie hit.

Before you start venting, let me make an important disclaimer: fruit juice does have a few redeeming health benefits that make it a little better than soft drink. Prune juice can alleviate constipation and many juices contain micronutrients such as vitamin C and potassium.

But these nutrients are found in many other foods. And vitamin C and potassium deficiency are hardly public health issues in Australia.

One of the biggest assumptions about fruit juice is it must be healthy because it's full of 'natural sugars'. Fruit juice does contain natural sugar, which is a mix of fructose, sucrose and glucose, but the quantity (and kilojoules) is on par with soft drinks.

Kids who drink fruit juice are more likely to be overweight than kids who don't.

The term 'natural' is also misleading, as the sugar (sucrose) in Australian soft drink is just as natural as that found in Australian fruit juice because it comes from sugar cane. Whether juice is extracted from fruit, or sugar is obtained from sugar cane, both are forms of food processing.

And when it comes to your waistline, that sugar has to be used up or it will eventually result in weight gain. Think of that the next time you're lining up for a super-sized freshly squeezed concoction from your favourite juice bar. That one drink may contain six to ten pieces of fruit and probably has enough kilojoules to meet more than 10% of your daily energy needs.

While science is still unclear in this area, there is evidence to suggest that feelings of fullness (satiety) after a meal are lower when those kilojoules are consumed in liquid form (especially from more clear type fluids), rather than as solid food.

This could be due to the rapid transit of the liquid through the stomach and intestines, giving less time to stimulate signalling of satiety. This increases the chance of over-consuming energy with the end result of greater weight gain, or a sabotaging of weight loss.

One study conducted by Deakin University researchers found the more fruit juice Australian schoolchildren drank, the more likely they were to be overweight compared with kids who didn't drink fruit juice. A similar link between increased

fruit juice consumption and weight gain has been seen in children from low-income families.

Soft drink will give you the same sugar and calorie hit as fruit juice.

When you're drinking fruit instead of eating it, you're missing out on the pulp that's left behind — and that's where all the fibre is. Fibre is an important nutrient for controlling body weight and keeping the digestive tract healthy. But most Australians aren't getting anywhere near the 30 grams for men and 25 grams for women of fibre recommended by the National Health and Medical Research Council.

Fibre also helps protect against colorectal cancer, the second biggest cancer killer of Australians each year, after lung cancer. In a recent update to the most comprehensive report ever published on the role of food, nutrition and physical activity on cancer, the World Cancer Research Fund upgraded the level of evidence linking foods containing fibre with protection against colorectal cancer from 'probable' to 'convincing'.

For someone struggling to keep their weight in check, drinking too much fruit juice or soft drink will make it hard to lose weight or maintain a healthy weight. If you feel the need for a drink, water is your best choice. And when it comes to fruit, eat it, don't drink it.

13. Cutting carbs is the best way to lose weight

Gary Sacks

Deakin University

There seems to be an endless number of fad diets and 'golden rules' for weight loss. One of the most popular of these rules is that cutting carbohydrates (carbs) is the best way to lose weight.

The most famous low-carb diet is the Atkins diet, first developed in the 1970s. The Atkins diet recommends limiting foods high in carbs, such as bread, pasta and rice. Carbs are replaced with foods containing a higher percentage of proteins and fats (meat, poultry, fish, eggs and cheese) and other low-carb foods (most vegetables).

But what does the evidence show us about whether low-carb diets really are best for weight loss?

Theoretically, a ‘calorie is a calorie’ and it doesn’t matter what types of food the calories come from. Accordingly, all reduced-energy (calorie) diets should lead to equivalent weight loss.

However, some studies have reported that low-carb diets lead to greater weight loss than other types of diets, at least in the short-term. So, what are the possible explanations for these results, and can we rely on them?

Changes in body composition

Energy is stored in the body as protein, fat, and glycogen, which is a form of carbohydrate. If there is an imbalance between how many of these nutrients are ingested (through the food that is eaten) and how many are used by the body for everyday functions, body composition will change.

In turn, this will affect body weight because of the different impact that the relative amounts of stored protein, fat and carbohydrates have on body weight.

However, the vast majority of studies which have measured calorie intake very accurately (that is, they locked people in a room and measured exactly what they ate for several days), show absolutely no difference in weight loss based on the composition of the diet. High-protein diets and high-carb diets resulted in the same weight loss.

This indicates that, in the short-term at least, the human body is a superb regulator of the type of energy it uses, and

whether the diet is low-carb or high-carb will probably not make much of a difference to the amount of weight lost.

Changes in metabolic rate

The body's metabolic rate (the amount of energy expended by the body in a given time) is dependent on the composition of the diet. Consumption of protein, for example, is known to result in a larger increase in energy expenditure for several hours after a meal compared with the consumption of fat or carbs.

But the overall effect of diet composition on total energy expenditure is relatively small. As a result, the assumption that a 'calorie is a calorie' is probably a reasonable estimation as far as energy expenditure is concerned.

Changes in hunger levels and satiety

Some diets can lead to reduced hunger, improved satiety (feeling full), and can be easier to stick to than others. There is an enormous amount of research on this.

The problem is that it's extremely difficult to accurately measure what people are eating over extended time periods. People rarely stick to their diets for more than just a few weeks, making it almost impossible to adequately compare the effects of different diets.

And so, is cutting carbs the best way to lose weight?

Maybe, but there's not really good evidence supporting it. All diets with similar calorie content have a similar effect on weight loss in the short-term. This is because the body adapts rapidly to changes in relative protein, fat and carbohydrate intake levels.

The truth is that losing weight and keeping it off in the long term is difficult. It requires permanent changes to the number of calories you eat each day.

Perhaps the best dietary advice comes from Michael Pollan when he says: 'Eat food. Not too much. Mostly plants.'

14. Eating at night causes weight gain

Tim Crowe

Deakin University

If only a cure to world hunger was as easy as dishing out late-night sandwiches to the starving masses, and seeing them gain weight by eating at night.

The reality is that it's not when you eat, but how much you eat, that explains weight gain.

Not eating at night is common advice given to people to help avoid weight gain. You would be hard pressed though, to find proof to support this recommendation.

While studies have found that overweight people do eat more food at night time, this also goes hand-in-hand with this group typically eating a greater number of kilojoules per meal and more meals over the course of a day, than people who are not overweight.

Yet further studies have found no link between eating at night and weight gain — no single eating occasion contributes any more or less to excess weight gain than any other period.

Another nail in the coffin of this myth comes from a recent scientific review of the evidence for eating regular meals and controlling weight.

Eating regularly is a feature of most weight management guidelines, but this advice is based more on conventional wisdom than scientific evidence.

The clear conclusion of the scientific review — which analysed a wide range of eating patterns, from just one very large meal a day right up to 17 small snacks a day — was that body weight is not greatly influenced by how often someone eats.

The review also concluded that eating smaller meals, but more often, does not lead to an often-claimed increase in

metabolic rate. And changing the frequency of eating only has a mild influence on feelings of hunger.

The amount of food a person eats at night and how regularly they eat really is a matter of personal choice.

So if a current eating pattern works to help shed weight or stop weight gain, there is little reason to change eating frequency purely based on well-meaning advice from health professionals or the latest fad diet.

Of course, going to bed on a full stomach straight after a meal may make for a poor night's sleep, so this should be avoided if possible.

And as for the popular, but ill-informed advice to not eat carbs after 6 pm (or insert any other time of your choosing) — carbohydrates cannot tell the time.

It is excess kilojoules, not maligned carbohydrates, that are to blame for weight gain.

If the spare tyre is still inflating, it may be better to look at your whole diet and lifestyle, rather than blaming a late-night turkey sandwich.

15. Detox diets cleanse your body

Tim Crowe

Deakin University

Detox diets make amazing promises of dramatic weight loss and more energy — all achieved by flushing toxins from the body. Toxins have very little to do with it; detox diets 'work' because of the very severe dietary and energy restrictions they require someone to follow.

Detox or liver-cleansing diets have been around for many years. With amazing claims of rapid and easy weight loss and improved health, together with a heavy dose of Hollywood

celebrity endorsement, it is no wonder these diets are in the public spotlight.

Toxin build-up from our environment and poor diet and lifestyle habits are claimed to be the main culprits for weight gain, constipation, bloating, flatulence, poor digestion, heartburn, diarrhoea, lack of energy and fatigue. 'Detoxing' is a way for the body to eliminate these toxins and, as a result, a person will feel healthier and lose weight.

Detox diets can vary from a simple plan of raw vegetables and unprocessed foods and the elimination of caffeine, alcohol and refined sugars to a much stricter diet bordering on starvation with only juices consumed.

Some detox programs may also recommend vitamins, minerals, and herbal supplements. Detox diet programs can last anywhere from a day or two to several months.

Do detox diets work?

There is no shortage of glowing testimonials from people who have gone on a detox diet, claiming to feel cleansed, energised and healthier. Promoters of detox diets have never put forward any evidence to show that such diets help remove toxins from the body any faster than our body normally eliminates them.

The idea that we need to follow a special diet to help our body eliminate toxins is not supported by medical science. Healthy adults have a wonderful system for removal of waste products and toxins from the body. Our lungs, kidneys, liver, gastrointestinal tract and immune system are all primed to remove or neutralise toxic substances within hours of eating them.

As for the dramatic weight loss typically seen, this is easily explained by the very restrictive nature of detox diets, which can cut kilojoules dramatically.

Claims made that the typical physical side effects such as bad breath, fatigue and various aches and pains are evidence

that the body is getting rid of toxins just do not stand up to scientific scrutiny. Bad breath and fatigue are simply symptoms of the body having gone into starvation mode.

The many downsides of detox diets

Apart from the false claim that a detox diet is actually ‘detoxifying’ the body, these diets have many well-documented downsides including:

- feelings of tiredness and lack of energy
- cost of the detox kit if a commercial program is followed
- expense of buying organic food if required
- purchasing of supplements if recommended by the diet
- stomach and bowel upsets
- difficulties eating out and socialising, as most restaurants and social occasions do not involve detox-friendly meals.

The biggest downside of detox diets, especially the more extreme ones, is that any weight loss achieved is usually temporary and is more the result of a loss of water and glycogen (the body’s store of carbohydrate) instead of body fat. This means that the weight lost is easily and rapidly regained once the person reverts back to a more normal eating plan. These dramatic weight fluctuations can be demoralising and lead to yo-yo dieting.

Following a typical detox diet for a few days has few real health risks in otherwise healthy individuals. Very restrictive detox diets, such as water or juice only fasting, can be an unsafe form of weight loss and should not be used for more than a few days.

The verdict of *Choice*

In 2005, *Choice* carried out a survey and expert review of popular detox diets sold in supermarkets and chemists.

Choice found no sound evidence that we need to ‘detox’, or that following a detox program will increase the elimination of toxins from your body. Some of the popular detox kits have diet plans that are far too restrictive, and give dietary advice with either poor or no rationale.

Detox diets may do little harm to most people, except perhaps for their bank balance, but neither do they do a lot of good just on their own. Concerted changes to diet and lifestyle habits are far more valuable than detox diets and supplements.

16. ‘My slow metabolism makes me fat.’

Tim Crowe

Deakin University

People who struggle to lose weight often blame their difficulty achieving a healthy weight on their ‘slow metabolism’. So is this a real barrier to weight loss, or is the real culprit an excess of food and a deficit of exercise?

First, let’s consider the term ‘metabolism’. It means the process by which the body converts food into energy. So, far from being responsible for weight gain, someone with a truly slow metabolism wouldn’t get all of the available energy from the food they eat and would actually lose weight!

A much more relevant term — and this is what most people mean when they talk about metabolism — is metabolic rate. This is the energy (measured in kilojoules) a person expends over the course of a day just to keep the body functioning. Maintaining body temperature, breathing, blood

circulation and repairing cells are all essential requirements for a functioning body. These processes are always happening and use a lot of energy.

Your basal metabolic rate (BMR) is the absolute minimum amount of energy you need just to exist, without any activity or the metabolic costs of digesting and absorbing food. BMR constitutes the largest component of your total daily energy expenditure and represents around two thirds of an average adult's energy requirements.

An accurate BMR can only be measured by monitoring the amount of oxygen inhaled and carbon dioxide exhaled. The person must be in their most restful state so these measurements are taken in the morning, after an overnight fast, with the person lying down in a comfortable environment.

Your basal metabolic rate is influenced by your body's composition. Muscle requires more energy to function than fat. That's why men, who typically have a higher muscle mass than women, will generally have a higher BMR than women. Other factors include:

- height (the taller you are, the higher your BMR will be, due to a larger skin surface area for heat loss)
- growth during pregnancy or childhood
- fever and stress
- smoking and caffeine, and
- environmental temperature (heat and cold both raise BMR).

As we get older, we tend to gain fat and lose muscle. This explains why your basal metabolic rate tends to decrease with age. Fasting, starvation and sleep can also decrease your BMR.

There are a variety of online calculators that use different equations to estimate your BMR, based on your age, sex and body weight. But when it comes to weight loss, knowing your BMR is largely irrelevant.

If you want to lose weight and your current diet and physical activity plans aren't moving it, then you either need to eat less, move more — or, preferably, both.

As we age, we tend to lose muscle and gain fat. So, can a 'sluggish metabolism' be blamed for weight gain?

With the exception of certain endocrine disorders such as hypothyroidism or Cushing's syndrome, the answer is a clear no.

Overweight people actually have higher BMRs than those of a healthy weight and this increases as more weight is added. As someone gains more weight from storing more fat, the body needs to support that excess mass to carry it around. Imagine you had to live with a 20 kg weight tied around your waist. You would struggle to deal with this for the first few weeks, but over time you would build up extra muscle — especially in your legs — to help manage it. More muscle equals a higher metabolic rate at rest.

With an increase in body size, there is also a change in internal organ size and fluid volume, which further increases the metabolic rate.

Larger portions are the norm

Another common reason a slow metabolism is blamed for weight gain is the perception that an overweight person eats very little and still gains weight. But research shows people tend to eat more than they think and will typically report eating less food than they actually do as their weight goes up.

Increasing portion sizes may also affect what people now consider an average portion size for meals they serve at home — a phenomenon called portion distortion. The bigger a person is, the more likely they are to overestimate what a 'normal' portion size is.

So, is it possible to speed up metabolism?

There are many pills, supplements and foods that claim to boost metabolism and burn fat. Most of these claims are unproven.

Some substances such as caffeine and chilli do have a small effect, but not in supplement form. In any case, increasing your metabolism isn't a shortcut to weight loss and may come with unintended side effects such as increased heart rate.

If you're struggling to lose weight, it's probably time to reassess your diet and exercise levels.

17. Organic food is more nutritious

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Nutrition

In 2009, the prestigious *American Journal of Clinical Nutrition* published a systematic review by Dangour et al. of the best available evidence on the nutritional quality of organic foods.

The researchers searched more than 50,000 articles to locate 162 studies comparing organic and conventional crops and livestock. They found that overall, conventional crops were higher in nitrogen (due to nitrogen fertilisers) and organic crops were higher in phosphorous (due to phosphorous fertilisers) and what they called 'titratable acidity', which is due to ripeness at harvesting.

But there were no differences in other vitamins or minerals analysed, including vitamin C, phenolic compounds, magnesium, potassium, calcium, zinc and copper.

One major shortcoming of the studies, however, was that half failed to indicate what body had certified the crop as organic. The conclusion was that organic and conventional crops were comparable.

Taste

A study published in 2007 by Zhao et al. in the *Journal of Food Science* looked at the same varieties of lettuce, spinach, rocket, mustard greens, tomatoes, cucumber and onions. They grew two crops alongside each other in separate plots: one was grown organically and the other using conventional agricultural techniques.

They then asked consumers to evaluate the taste and how much they liked the two types. No differences could be detected, except for a preference for the conventional tomatoes that were slightly riper.

Environmental impact

The environment is the main winner when it comes to organic farming. This is because synthetic pesticides and herbicides are not used, and crops are commonly rotated, so biodiversity is promoted.

The confusion around organics comes from mixing the issues of nutrition, taste, safety, and environment into the same argument.

Eating enough fruit and vegetables

The best way to improve the nutrient intake from vegetables and fruit is to eat more of them. Go for those that are in season and visit a growers market to discover those that are grown close to home.

You should aim to eat five serves of vegetables and two serves of fruit each day. One serve of vegetables equals 75 grams or half a cup of cooked vegetables, or one medium potato, or one cup of salad vegetables, or half a cup of cooked legumes (dried beans, peas or lentils). One serve of fruit equals 150 grams of fresh fruit, or one medium-sized piece, or two smaller pieces (stone fruits, for instance), or one cup of canned or chopped fruit.

Try these suggestions to increase your fruit and vegetable intake.

At breakfast:

- Add stewed fruit or a chopped banana to cereal.
- Grate an apple into rolled oats before cooking.
- Top toast with cooked mushrooms, tomatoes, capsicum or sweet corn.
- Heat chopped leftover vegetables and serve as a topping for toast; add an egg or reduced-fat cheese to make a meal.

For snacks:

- Cut up a fruit platter.
- Pack fresh fruit into your lunchbox.
- Top English muffins or crumpets with tomato paste, diced vegetables and sprinkle with reduced-fat cheese for a quick mini pizza.
- Serve carrot and celery sticks, florets of broccoli and cauliflower, and strips of capsicum with a low fat dip.
- Grate or dice onion, carrot, zucchini, potato and corn into a savoury muffin or into pikelet mixture.

At main meals:

- Make meat go further by adding extra vegetables to a stir-fry or a casserole.
- Add extra vegies, dried peas, beans or lentils to recipes for meatloaves, patties, stuffing, soup, stews and casseroles, pies, nachos, pasta and rice dishes, pizza and pancakes.
- Serve main meals with cooked vegetables and a salad of baby spinach leaves, cherry tomatoes and olives.
- Use capsicum, zucchini, pumpkin, eggplant, cabbage and lettuce leaves as edible containers and fill with savoury toppings.

- For easy wedges, cut potato, sweet potato, pumpkin and parsnip into wedges. Microwave until cooked; then mix with a teaspoon of vegetable oil, dried mixed herbs and cajun seasoning and bake in a hot oven until crispy.

18. Eating turkey makes you sleepy

Merlin Thomas

Baker IDI Heart & Diabetes Institute

It has been long rumoured that gobbling up turkey meat has a mysterious soporific effect, rendering its consumers progressively drowsier. Sounds like a good story, and certainly one that's worth checking out.

There are many things that determine when we feel tired and desirous of sleep. Obviously, the longer we are awake, the sleepier we become (this is called homeostatic regulation). We are usually awake for 16 hours before we get sleepy.

This is balanced against the needs of our body clock (circadian rhythm) that links sleep with the other cycles in the body, such as temperature, growth and levels of brain chemicals, like serotonin and melatonin

Our circadian rhythm is entrained by external cues such as light, temperature, activity, eating and social routines (known as zeitgebers), by altering levels of these sleep regulators to set the time on the clock.

So how could my turkey extravaganza stuff up this well-oiled apparatus?

Turkey meat is predominantly protein, like potatoes are predominantly carbohydrate. During digestion, protein is

rapidly broken down into its constituent parts, which are amino acids.

Some of these amino acids have direct action on brain chemistry.

In particular, tryptophan is an essential amino acid used by the brain for the synthesis of serotonin and melatonin. Rising levels of serotonin and melatonin in the brain signal the end of the day.

Turkey is rumoured to make you sleepy because it contains tryptophan (about 200mg/100g). Some tryptophan is also present in that glass of milk that is said to help you get to sleep at night.

But there's nothing special about turkey. Most protein rich foods have tryptophan, from meat and eggs, to soy and spirulina.

Some people do take large amounts of tryptophan to 'naturally' increase their serotonin levels and help them fall asleep. However, its sedating effect is variable and weak in most people, even in the doses used to treat insomnia (2 grams to 5 grams).

Of course, much of the evidence linking turkey to sedation is circumstantial.

Even if you are getting enough sleep, it is common to feel a temporary drop in alertness in early afternoon, especially if you are a morning person.

This 'post-lunch dip' is often attributed to overindulgence at lunchtime. However, it is not necessarily a consequence of meal ingestion.

It is quite normal to have a dip in alertness halfway between waking up in the morning and going to sleep at night, as a consequence of our circadian rhythms

So if it's not the turkey, maybe it is something that goes with it?

Some studies show that a high-carbohydrate lunch might exacerbate the post-lunch dip. So maybe it was the dessert and not the dinner.

If we eat the turkey meat on its own, all the other amino acids released following its digestion compete for transport into the brain. This makes it hard for tryptophan to get in to slow things down.

But a meal that is also rich in carbohydrates (whether dessert, rice or potatoes) also stimulates the release of insulin, which increases the uptake of most amino acids into our muscles, but not tryptophan.

This leaves tryptophan with fewer competitors to access the brain, raises up serotonin/melatonin and leads to bringing down the shades.

Meals rich in fat also have an effect on sleepiness, perhaps even greater than that of carbohydrates. This is possibly due to release of peptide hormones, like cholecystokinin (CCK). So don't eat the skin!

Finally, there is satisfaction. Cooking ingredients cannot explain the relaxing effects of good old-fashioned contentment that comes after a perfect roast.

Some of this is satiety. Some of this is psychological, much like sex. In fact, many of the same brain signals are involved.

The likely truth of the turkey myth is in the totality of the experience. Turkey meat is not a sleeping pill. But you can't replicate its actions by just listing its ingredients.

Contentment is real, and although not unique to turkey, it is seasonally reproducible.

In the same way, an apple cannot be put in a tablet. It is the crunch, the aroma, the texture, and the feel.

A turkey sandwich simply doesn't cut the mustard.

19. Low fat diets are better for weight loss

Clare Collins

University of Newcastle

We have now been advised to reduce our fat intakes for over 30 years, and low-fat products flood our supermarkets and food courts. Sadly, however, our waistlines have continued to expand and our fat intakes have not reduced.

Something is clearly awry. Somewhere along the way, 'low fat' has been misinterpreted to mean 'eat more' because it is low in fat. So rather than linger over a sliver of sponge cake that would contain about 600 kilojoules (150 calories), I can scoff a muffin the size of a small plate with as many as 2,000 kilojoules (500 calories), because the sign said 'low fat'.

Just because a food is low in fat doesn't mean it's low in total kilojoules.

What does the evidence say?

Food is made from macro-nutrients: protein, fats and carbohydrates. These each provide energy in the form of kilojoules. One gram of protein provides 17 kJ, one gram of carbohydrate provides 16 kJ and one gram of fat provides 37 kJ. Fat has the highest kilojoules, so you would think that following a diet low in fat should automatically mean you eat fewer kilojoules and lose weight. Not so.

My colleagues and I recently updated the adult weight-management guidelines for the Dietitians Association of Australia and reviewed the recent evidence comparing higher carbohydrate/lower fat diets for weight loss to higher fat/lower carbohydrate diets.

The good news was we found there were lots of studies, with a systematic review and seven recent randomised-controlled trials. Overall, when protein and energy intake were held constant across the two diets, both approaches were equally effective in achieving weight loss.

Back onto the Australian Dietary Guidelines, the latest draft says to ‘limit intake of foods and drinks containing saturated and trans fats and to include small amounts of foods that contain unsaturated fats’.

If you’re putting low-fat foods into your shopping trolley, it’s wise to stick to the ones that would have been around in your grandparent’s day. This means eating more vegetables, fruits and low-fat dairy products, plus whole grains, fish, or vegetarian sources of protein such as baked beans. It also means avoiding packaged and highly-processed low-fat foods.

If a low-fat diet is not palatable to you, you can still lose weight eating more fat, but you will need to be more aware of the kilojoule value of the foods you choose to eat.

The bottom line is that when it comes to weight loss, watch the total kilojoules, because it’s excess kilojoules rather than dietary fat that leads to weight gain.

20. Sugar is the main culprit in obesity

Peter Clifton

Baker IDI Heart & Diabetes Institute

The debate about the health implications of sugar consumption began back in 1972 when Professor John Judkin, from the University of London, published *Pure, White and Deadly*, which linked sugar intake to heart disease and type 2 diabetes.

While more recent studies — such as the long-running Nurses' Health Study — have found no such link, there are other important factors at play in the sugar debate.

Since the 1970s, we've seen a vast increase in the consumption of sugar-laden soft drinks and a dramatic rise in obesity. Children and adolescents are getting a greater proportion of their energy intake (up to 25%) from sugars, especially from soft drinks.

In Judkin's day, sugars in biscuits, cakes, desserts and other sweet treats came with some nutrients, vitamins, minerals or fibre. Soft drinks have no such redeeming features.

Overall, the increase in sugar from soft drinks has been accompanied by a decrease in sugar in other forms, so total sugar consumption has not increased.

Not all sugar is equal

Sugar is a sweet, simple carbohydrate that takes three natural forms:

- Fructose is found in fruits and vegetables such as apples, pears and onions.
- Sucrose is derived from cane and beet sugar. It's known as a disaccharide (a molecule of glucose and fructose bonded together).
- Glucose is the sugar our bodies use to power the brain, heart and muscles. The body needs to tightly regulate its glucose because excessive levels in the blood (diabetes) can damage cells.

Sugar and obesity

So, has sugar played a larger role than fat, protein and other forms of carbohydrates in Australia's obesity epidemic?

Probably not. There has been little change in the proportions of fat, carbohydrate and protein in our diet over the past

30 years. But total energy intake has increased — we're gaining weight because we're eating more of everything.

Overall, it seems that total sugar intake hasn't played an undue role in the increase in obesity.

Domestic sugar consumption fell from 55 kg per head in 1976 to 50 kg per head in 1984, and it seems to have remained stable ever since (though data is only available to 1996). Sugar production hasn't increased since 1996 and sugar-product imports are negligible, accounting for just 5% of confectionery and bakery goods.

Soft drinks are the exception and now account for a fifth of the average Australian's sugar intake. Consumption of soft drinks doubled from 47 litres per head in 1969 to 113 litres per head in 1999.

Sugar and heart disease

There's no doubt that sugar-sweetened beverages are associated with type 2 diabetes. Studies show women who consume more than one soft drink a day have a 40% to 80% increased risk of diabetes and a 28% to 32% greater risk of heart disease.

But sugar isn't alone in increasing these risks. Eating large quantities of any carbohydrate with a high glycemic index (white bread, for instance) can double the risk of heart disease and diabetes.

Likewise, consuming large amounts of trans fat has been shown to increase the risk of heart disease by 33%. So, sugar in soft drinks increases the risk of disease by a similar amount to trans fat and white bread.

Sugar and weight loss

A 2009 study of the effects of high liquid sugar intake found those who consumed a quarter of their daily energy intake as liquid sugar — either glucose or fructose — were more likely to have a greater appetite and gained around 3 kg over the 10-week study period.

They would also notice other metabolic changes, such as increased blood fats and higher insulin levels, which increase their risk of heart disease.

Even when there's no overall weight gain, excessive consumption of sucrose-based soft drink can raise liver fat. This makes insulin work less effectively, raises blood glucose and can also lead to long-term liver disease.

So, will quitting sugar help you lose weight?

Swapping soft drinks for water or even diet drinks will undoubtedly help you lose weight. And cutting out other sugar-containing foods and drinks will help you reduce your total calorie intake because of the associated reduction in starch and fat intake. This will lead to longer-term weight loss.

But removing 'natural' sugars — and therefore eliminating nutrient-rich fruits and milk — is not a sensible solution. Sugar, as a nutrient class, does not contribute any more to obesity than an excess of fat or carbohydrates.

21. Blame it on my sweet tooth

Merlin Thomas

Baker IDI Health & Diabetes Institute

My wife says she has a sweet tooth. But everyone does! It's universal to the human condition (as well as the human palate) to like something sweet.

It may even be an evolutionary advantage to seek out an energy source in the form of carbohydrates. Sweet meant ripe, and ripe meant more energy and a better safety profile. In fact, sweet preference is associated with fruit consumption. So next time your kids ask you for sweets, just think how well adapted they are.

Of course, it's nothing to do with your teeth. 'Sweet tooth' is just an expression, used in the same way as 'a head for heights', 'an ear for music', 'a nose for trouble' or 'an eye for a bargain' to denote a particular talent, as well as a proclivity towards it. In more recent times, this latter meaning has dominated and the sweet tooth has largely become a depiction of gluttony. But is there also a skill to it?

Taste perception begins on the tongue and soft palate, where receptors on the cluster of cells that make up the taste bud interact with food or beverages and the saliva in which they're dissolved. These can respond not only to simple sugars but also to other chemicals. This is how sugar substitutes (like saccharin, acesulfame K and aspartame) are able to taste as sweet as table sugar. But much less is needed to elicit the same sweet taste, and this means fewer calories.

In humans, the ability to detect and perceive the intensity of a sweet taste is subject to considerable individual variation, based on differences in concentration of taste-buds, number and type of taste receptors and signal transduction molecules. There are also large differences among people in the degree to which they like highly sweetened foods.

Humans can be loosely divided into two types. Those who like increasing levels of sugar up to a mid-range concentration, but then reach a point when things get too sweet and liking falls off. The second group also likes increasing levels of sugar up to a mid-range of concentration, but as sweetness increases, enjoyment rises — or at worst, levels off. For these people, there is no such thing as too sweet.

Sugar preferences are influenced by age and gender. Men generally prefer higher concentrations of sweet compared with women. And children have more of a sweet tooth than their parents. In fact, sweetness turns out to be the most important feature that determines what children are willing to eat. But the liking for concentrated sweetness fades rapidly during

adolescence. In animals, the ability to taste sweet and the preference for eating sweet things are loosely linked. Cats, which have no sweet receptors at all (they are carnivores), would rather lick the sweat off your arm than eat something sweet. But bears possess sweet sensors and a well-known fondness for honey. This relationship doesn't seem to hold for humans. How well you taste sweetness doesn't predict how much you like it or whether you will eat lots of sweet things. So the sweet tooth is neither super-sensitive nor overcompensating because of lack of sensitivity.

Sweet foods may also be preferred for their hedonistic as well as their comforting properties, partly through their effects on brain chemicals, including endogenous opiates. Sugar was probably the first drug. And the more enjoyable, rewarding or relaxing the experience, the more likely you'll reach for it again.

Finally, it's widely assumed that most overweight people have a sweet tooth and the over-consumption of sugary delights got them there in the first place. But body weight doesn't affect either the perception or the liking for sweet. Obesity is much more complicated. We can't just blame it on our (sweet) tooth.

22. The three-second rule (when food falls on the ground)

Philip Button

RMIT

As a food microbiologist, I have always been amazed at people's belief in the three- or five-second rule. It goes something like this: if you retrieve food dropped on the floor or another

surface within three or five seconds, it won't yet be contaminated with bacteria.

Okay, it might just be wishful thinking. Or a handy excuse not to throw otherwise good food in the bin. But it really doesn't add up.

Let's look at the facts. Disease-causing bacteria (known as pathogenic bacteria) and other microorganisms (such as viruses) are potentially everywhere and can be remarkably virulent. So, logically, it would be an easy task for a microorganism to attach itself to a surface, especially to a moist piece of food.

A study reported in a 2007 *Journal of Applied Microbiology* paper from a team at Clemson University in the United States tested the five-second rule on tile, wood and carpet. They contaminated the three surfaces with a high level of *Salmonella typhimurium* and looked at the rate in which the bacteria transferred to bread and sausages, over a period of 24 hours.

They found the most significant variable in the transfer rates from all three surfaces was not the length of time it had contact with the food. The three testing times (five, thirty or sixty seconds) made little difference in the rate of bacterial transfer.

The length of time the bacteria had been on the surface prior to contact with the food mattered more. Four hours after contamination, the same amount of bacteria remained on the carpet, while rates of bacteria on the tile and wood were slightly lower.

But another study, on bacteria in the manufacturing environment, found that the longer the food was exposed to a contaminated surface, the more bacteria it accumulated. As did an investigation on transfer between meat surfaces.

Overall, a comprehensive review on bacterial attachment to surfaces concluded that moisture, pressure and contact time increased the likelihood of bacterial transfer.

Watch what you touch

Countless studies have reported that pathogenic bacteria and viruses have a long life on inanimate objects, such as paper and public telephones, and in various public places such as classrooms, homes, offices, shops, playgrounds and other environments.

This is of particular concern because if transfer rates to food are similarly high, then there's potential for contamination of food from bacteria and other microorganisms present on inanimate objects.

Let's look at a specific personal inanimate object, regarded as indispensable in modern society, handled frequently during the day, held close to the face and placed on many surfaces — the mobile phone. Many may not consider their mobile phone as a source of microbial contamination and disease potential, but studies have shown otherwise.

A 2011 study of Ghana university students found all 100 mobile phones inspected were contaminated with bacteria and many contained recognisable pathogens. One quarter of the mobiles had *Bacillus cereus* (responsible for food poisoning) and one fifth had *Proteus mirabilis* (which can cause urinary tract infections).

Similarly, the London School of Tropical Medicine and Hygiene recently reported that one in six mobile phones in the United Kingdom is contaminated with faecal matter, including pathogenic *E. coli*.

Consequently, while some people hold onto the belief that food is safe to eat after falling on the floor, the take-home message here relates more to mobile phone surfaces than floor surfaces. Don't eat food that has fallen on your mobile phone (unless you've just cleaned it!) and don't eat food with your fingers if you've held your mobile phone.

My advice? Give your mobile phone a wipe down with a moistened cloth containing an antibacterial chemical when

you get home each day. That way, you can minimise the chances that pathogenic bacteria, viruses or other microorganisms from your day's outing aren't transferred to your home's inanimate surfaces.

And for those who hold on to the three-second rule, there'll be fewer germs to contaminate your food!

23. Light or 'lite' food is healthy

Tim Crowe

Deakin University

How much can you believe about claims made on food packaging? For any mention of the word 'light' or 'lite', feel free to add your own definition — that will have about as much credibility as any claim made by the food manufacturer.

Front-of-package labelling is a powerful marketing tool used by food manufacturers to help trigger the purchasing reflex of consumers.

But before we examine the marketing claims, let's take a step back.

Australian regulations provide a good level of consumer protection in mandating information on food labels. Products must display an ingredient list, country of origin, use-by date and a list of food additives.

There are even requirements about legibility of text and font size.

The nutrient reference panel is another requirement. All product labels must contain information on at least seven key nutrients (energy, total fat, saturated fat, protein, carbohydrate, sugar, and sodium) and additional information where key food label claims are made.

Where claims are made about the cholesterol content of a food, for example, cholesterol then needs to be listed on the nutrient information panel.

So, what types of claims can you believe on a food label?

When it comes to claims about fat, the Code of Practice for Nutrient Claims developed by Food Standards Australia New Zealand states:

- For foods labelled as ‘Low fat’ or ‘Low in fat’, they must not contain more than 3 grams of total fat for every 100 grams of food.
- For foods labelled as ‘Fat free’, they must not contain more than 0.15 grams of total fat for every 100 grams of food.

Where things start to get murky is when words are used that imply a particular characteristic of the food, but in reality have no defined meaning.

If you see foods promoted as ‘light’ or ‘lite’, you could be forgiven for thinking that the food must be low in fat and kilojoules. Wrong.

‘Light’ can mean light in colour (such as some varieties of vegetable oil), light in texture, lighter in salt, lighter in weight, lower in kilojoules, or lower in fat than a comparable product.

Consumer research by Food Standards Australia New Zealand (FSANZ) has found consumers often respond negatively to claims products are ‘light’ or ‘lite’.

Participants in the FSANZ study viewed the claims as ambiguous, misleading, confusing and outright ‘trickery’.

Most consumers didn’t know which characteristic or nutrient the claim related to, and by default assumed they referred to the nutrient in the food that most needed reducing — in most cases, fat.

Even when labels are clear and truthful, and adhere to the ‘low in fat’ definition, consumers still need to be aware.

Australian research into ‘low fat’ food options found that while these products were much lower in fat than the ‘full fat’ equivalent, the types of foods in this category were higher in kilojoules than foods in a typical Australian diet.

So, having a quarter less fat in your peanut butter still means it’s a high-fat food.

Heavy marketing of reduced-fat claims has led many consumers to perceive that these products are ‘guilt free’ and can be consumed without risk of weight gain.

So back to the issue of ‘light’ food. Unless a food clearly and transparently states on the label exactly what any claim about ‘light’ is referring to, you are likely getting more marketing spin than any health benefit.

If a food manufacturer has a good story to tell about a product, you can trust they won’t hide it in the fine print.

24. MSG is a dangerous toxin

Merlin Thomas

Baker IDI Heart & Diabetes Institute

Monosodium glutamate (MSG) is widely viewed as a dangerous food toxin that is responsible for adverse reactions to Chinese food and other meals. But is it really the MSG that’s to blame?

Glutamate is a naturally occurring amino acid, used chiefly in our body to make protein. Most of us normally eat around 10 grams of glutamate every day, much of which is released into the body when we eat and digest protein. Some protein-rich foods — such as meat, fish, chicken, dairy products, legumes and corn — are especially rich in glutamate.

But glutamate has another important property: it tastes good. When glutamate touches the taste receptors on our tongue, it gives food a savoury taste (known as unami). Mixed with our meal, glutamate is said to balance, blend and enhance the total perception of flavour. But not just any glutamate; we can't taste glutamate that is locked in protein. For it to tickle our taste buds, it must be in a 'free form'.

Some (tasty) foods — tomato products, fermented soy/fish/oyster/steak/Worcestershire sauces and long-matured cheeses such as stilton and parmesan — are high in free glutamate. Ever wonder why parmesan makes the bolognese taste better (and more meaty)? The glutamate!

Because MSG has such a bad name, many manufacturers use other sources of glutamate to give processed foods the extra taste. These include vegetable, corn, yeast or soy protein extracts, in which the glutamate has been released from the protein by enzymatic digestion or chemical hydrolysis. When dissolved in water, the free glutamate in these extracts is chemically identical to that contained in MSG, and enhances flavour in precisely the same way.

Most of us would usually eat around half to one gram of free glutamate every day as additives to our food. In Asian countries, this figure is double, reflecting the use of soy and other fermented products in cooking. A highly-seasoned banquet in a Chinese restaurant may contain up to four to five grams of free glutamate.

But glutamate isn't just found in Chinese restaurants. Many American-style fast foods contain just as much glutamate to enhance their flavour and your experience, beyond that of their competitors. Even Vegemite contains 1.4% free glutamate. A burger and chips might contain as much MSG as you'd eat at a Chinese restaurant.

A small proportion of people experience transient symptoms when they consume large amounts of free gluta-

mate (more than four to five grams) in a single meal. These reactions vary from person to person but may include headaches, numbness/tingling, flushing, muscle tightness and general weakness.

A number of scientific studies have tried to replicate this experience. Most have been too small, used unrealistically high doses of MSG, and were not undertaken in the context of food (or even with intravenous doses). Try eating a whole jar of Vegemite in one sitting and you will soon see why people don't feel so well afterwards.

More rigorous studies have failed to confirm a reproducible response to meals containing MSG, even in self-attributed 'MSG sensitive' individuals. Most reactions to a Chinese banquet probably have little to do with the MSG, as many of the same people who are 'MSG sensitive' have no problems with Vegemite or parmesan cheese.

Foods such as peanuts can trigger asthma attacks but there's no evidence that MSG has the same effect.

It has also been suggested that MSG can trigger an asthma attack. While there are lots of anecdotal reports (again, usually after Chinese food), studies with MSG-rich meals have generally failed to confirm these findings. There are many other things in food that can trigger an attack in sensitive individuals, from dairy products, eggs, peanuts and sulphites, to food colourings. But none are vilified like MSG.

Finally, it has also been suggested that MSG leads to weight gain and obesity. Of course we have a great tendency to eat more of anything that tastes better, so this comes as little surprise. MSG has even been used to promote the appetite of frail, elderly people.

The consensus among clinicians and scientists is that MSG is safe for human health. Very high doses may affect some people for a short time but there may be far more dangerous consequences that come from overeating this Christmas.

25. Drink eight glasses of water a day

Tim Crowe

Deakin University

You don't need eight of these a day to be healthy.

We have all heard the popular advice that we should drink at least eight glasses of water a day, so it may be a surprise that this is more myth than fact.

Of course our bodies need water, otherwise we would die from dehydration. But the amount needed is extremely variable and depends on a person's body size, physical activity levels, climate and what types of food they are eating.

Water makes up about 60% of an adult's body weight and is an essential nutrient, more important to life than any others.

Water helps regulate body temperature, carries nutrients and waste products throughout the body, is involved in blood transport, and allows many metabolic reactions to occur. It also acts as a lubricant and cushion around joints, and forms the amniotic sac surrounding a foetus.

It is widely believed that the 'eight glasses' myth was a US Recommended Dietary Allowance dating back to 1945.

The guide said a suitable allowance of water for adults was 2.5 litres a day, but most of this water could be found in prepared foods. If that last, crucial part is ignored, the statement could be interpreted as clear instructions to drink eight glasses of water a day.

Even a comprehensive search of the scientific literature finds no evidence to support the 'eight glasses a day' advice.

The clear reason that evidence for such prescriptive advice doesn't exist is that a person can get all the water they need without consuming a single glass.

Drinks like soft drink, fruit juice, tea and coffee, milk, and foods like fruit, yoghurt, soups, and stews all have appreciable amounts of water that contribute to fluid intake.

Australian dietary recommendations also bust the eight-glass myth; the official Nutrient Reference Values states ‘there is no single level of water intake that would ensure adequate hydration and optimal health for the apparently healthy people in the population’.

Don’t be concerned about seeing coffee listed as a fluid — the ‘coffee makes you dehydrated’ mantra is another myth that needs to be busted.

Drinks such as coffee, tea and cola do have a mild diuretic effect from the caffeine but the water loss caused by this is far less than the amount of fluid consumed in the drink in the first place.

It’s only alcoholic drinks which have a dehydrating effect.

So how do you know if you are drinking enough water?

Well. You can check this for yourself every few hours. If your urine is lightly coloured or clear, you’re drinking enough. If it’s dark, then you should drink more.

How simple is that?

26. Leave leftovers to cool before refrigerating

Clare Collins

University of Newcastle

Food poisoning doesn’t just come from dodgy kebabs, under-cooked chicken and restaurants with poor hygiene practices — it can also occur in the home. And anyone who has suffered a bout of food poisoning knows it’s not pretty.

The specific symptoms, and the time it takes until you get sick, vary depending on the pathogen and include nausea, stomach cramps, fever, vomiting and diarrhoea. People who have compromised immune function are particularly susceptible to food-borne illness, including babies, young children, pregnant women and the elderly.

Australia's surveillance system for food-borne illness is monitored by OzFoodNet. In 2009 alone, more than 2,600 Australians became ill from food poisoning; of those, 342 required hospitalisation and eight people died. OzFoodNet reported restaurants were the most common setting for food contamination.

But many mild cases of food poisoning from home-prepared foods never get reported.

Temperature danger zone

Foods that are cooked then reheated are more likely to be a risk for food poisoning. The greatest potential hazards are meats, casseroles, curries, lasagna, pizza, sauces, custards, patties, pasta, rice, beans, nuts and foods containing eggs, such as quiche.

As cooked food drops to 60°C or below, bacteria that have survived the cooking will start to multiply until the food cools down to five degrees. The longer the food is left to cool, the longer the bacteria — which causes food poisoning — has to multiply.

Food Standards Australian and New Zealand (FSANZ) provides a guide to managing potentially hazardous foods in the risky temperature zone: food should take no more than two hours to cool from 60°C to 21°C, and no more than four hours to cool from 21°C to 5°C. If you want to check this at home, invest in a good quality food probe thermometer (and follow the manufacturer's instructions).

Try to eat food promptly once cooked. Or, if you intend to store cooked foods to eat later, you can cool it on a bench as long as the temperature doesn't drop below 60°C. This is roughly when the steam stops rising. You can keep cooked meals safely in the fridge for a few days, but if you want to keep it for longer, put it straight into the freezer.

In the fridge, make sure you store cooked foods on the top shelves and raw foods on the bottom shelves to avoid any contamination from condensation on the raw food that falls onto cooked food.

And finally, when defrosting food, put it in the fridge and keep it below 5°C. Never leave it to defrost on a bench at room temperature because this places it right into the food hazard temperature zone.

When it comes to food safety, a little common sense goes a long way. Always wash your hands before handling food and use separate utensils and chopping boards for raw and cooked food. If you're in doubt about the risk of something you find lurking in your fridge or freezer, throw it out.

27. Yoghurt cures thrush

Michael Tam

University of New South Wales

Vaginal thrush, or 'vulvovaginal candidiasis' is a common condition, with around three-quarters of women experiencing an episode in their lifetime.

Many readers may be familiar with the unpleasant symptoms of vaginal thrush — vaginal itching and burning, 'cottage cheese' discharge with a yeasty smell, inflammation of the vagina and vulva, and pain while passing urine or having sex.

Most cases of thrush are uncomplicated and are due to an overgrowth of a yeast called *Candida albicans*. It is normal for *Candida* to be present in small numbers in the bowel, mouth, skin and vagina.

Reasons why there may be an overgrowth of *Candida* include:

- hormonal changes, such as pregnancy or starting on the oral contraceptive pill
- diabetes
- suppression of the immune system, such as HIV infection or chemotherapy for cancer
- antibiotic treatment.

In a survey of Australian women in general practice waiting rooms, a third reported experiencing thrush after antibiotics at some stage. Conceptually, antibiotics can kill bacteria that normally live in the vagina, while *Candida* — a fungus, not a bacteria — tends to be unaffected. With less competition, the *Candida* can overgrow, leading to the symptoms of thrush.

This leads us to yoghurt. A quick Google search reveals links to websites giving interesting and varied health advice. But the basic rationale is consistent: yoghurt is effective because it contains ‘good bacteria’, *Lactobacillus*. The idea is that in using yoghurt (by eating it, and/or by applying it directly to the vagina and vulva) the ‘good’ bacteria will help fight off the ‘bad’ *Candida*.

There is some biologic plausibility in this idea, though there is more than a smattering of sympathetic magic with how it is portrayed. However, the medical establishment shouldn’t be too smug — medical treatments for ‘vaginitis’ a century ago were positively barbaric!

A number of highly unpleasant astringent chemicals were recommended (though curiously, boric acid has stood the test of time and is still used for types of complicated or recurrent vaginal thrush).

As many as 40% of the women in the aforementioned survey who had experienced vaginal thrush tried using yoghurt to cure or prevent thrush.

So, what is the evidence?

It is important to recognise that there is a relative paucity of clinical evidence. A small (and flawed) trial from 1992 did seem to find that eating yoghurt helped, but neither yoghurt nor probiotic suppositories were demonstrated to decrease the recurrence of vaginal thrush in subsequent randomised controlled trials.

An Australian, randomised placebo-controlled trial testing to see whether oral or vaginal lactobacillus can help prevent thrush after antibiotics was similarly disappointing — neither appeared to be effective, though the author remarked that some women find that ‘yoghurt has a cool soothing effect’ and this might be a reason to use it.

In terms of recommended treatments, there are now effective therapies that are available without prescription at community pharmacies, including once-only treatments. These treatments are antifungal medications that target *Candida*.

For the typical acute and uncomplicated types of vaginal thrush, these treatments are effective at least 80% of the time. If they don't, it's time to see your regular general practitioner.

