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Chapter 1

The urban caveman

In this chapter we are going to look at what makes the Urban Caveman diet the smart choice if you want to improve your health and increase your energy. This diet offers you Paleo-friendly alternatives to common ingredients, giving you the chance to draw your own line in the sand. If, like me, you have fallen victim to diets in the past that subsequently turned out to have been little more than a health craze you will also want to be sure that you are not embarking upon yet another fad diet. Publicised almost as soon as they are formulated, dietary fads tend to spread like wildfire amongst the overweight and the eternally optimistic, often despite having little medical validation. You always start a new diet full of hope and resolve, so it can be a bitter blow if the promised results fail to materialise. It takes determination, or perhaps desperation, not to become disheartened, and if this has happened to you in the past, it is to your great credit that you are ready to stomach (pun intended) another book about diet.

How can you be sure that any new diet is going to be worthwhile? Would over 2.5 million years of historical and scientific evidence be enough to reassure you? We have been hunter-gatherers for over 2.5 million years, living off the land for most of recorded history. Over the last 500 generations grains, dairy, sugar and beans were eaten sparingly, if at all, by most hunter-gatherers and our digestive

systems are not designed to process them in the quantities or form they are consumed today. In a comparatively short space of time they have come to dominate our diet whilst fat has been demoted and discredited. Furthermore, modern agricultural and production methods have so transformed the foods themselves that they can challenge even the most robust of digestive systems. Wheat and dairy have been especially affected. They are mass produced, selectively bred and subjected to treatments that turn them from food to foe for many people. This is why grains and dairy are often associated with allergies, digestive problems and autoimmune diseases and why most people feel better when avoiding them. For some, a period of elimination followed by a gradual introduction of traditionally grown and prepared grains and raw milks, enables them to be reintroduced without any problem whilst for others, a life-time of avoidance may be necessary.

In contrast, 19th- and early 20th-century researchers studying the dwindling numbers of hunter-gatherers around the planet, found them (at the time of the study) to be healthy, fit, lean and muscular. Totally absent were the diseases of 'civilisation': their blood pressure was average, there was no cancer, arthritis or heart disease, and mental health problems were unknown. Since our genes and digestive systems haven't changed since our nomadic days, it is reasonable to assume that the pre-industrial or even Paleo diet suits us better.

Dr Weston A Price, the Harvard-trained dentist and anthropologist previously mentioned, was interested in the teeth of nomads, and he travelled extensively during the 1920s and 30s, studying a total of 14 different hunter-gatherer tribes. His findings resulted in the seminal book *Nutrition and Physical Degeneration*, in which he provided photographic and medical evidence showing the impact on health of the introduction of the 'civilised diet' within one generation. This is worrying considering the relatively unadulterated diet of the first half of the 20th century. And he was not alone. Included in the book is a

quote from the writings of Ernest Thompson Seton (1860–1946), who compared white settlers to the American Indians: 'The civilization of the white man is a failure; it is visibly crumbling around us.' '…All historians, hostile and friendly, admit the Indian to have been the finest type of physical manhood the world has ever known. None but the best, the picked, chosen and trained of the Whites, had any chance with him.'

Surgery has arisen from the need to remove or repair diseased organs and examination of the organs of those on the typical Western diet has shown them to be misshapen and pale. Sir Arbuthnot Lane (1856–1943), an expert on the differences between the digestive systems of modern man compared to primitives, observed: 'Long surgical experience has proved to me conclusively that there is something radically and fundamentally wrong with the civilized mode of life, and I believe that unless the present dietetic and health customs of the White Nations are reorganised, social decay and race deterioration are inevitable.'

That the above observations were made almost a century ago makes them even more alarming. Of particular relevance today is the marked decline in mental health. There is an increasing incidence of anxiety disorders, schizophrenia and depression while many others require help in managing their lives, as the numbers of children now classified as having 'special needs' testifies. The sociologist John Laird wrote in 1935: 'The country's average level of general ability sinks lower with each generation.'

This was written before the advent of intensive farming practices, and the introduction of food additives, pesticides, junk foods, high-fructose corn syrup, genetic modification and other ills associated with modern food production, and it predates autism, which was first defined by Kanner in 1943. The short attention spans of a generation reared in front of television and computer screens rather than typeface and paper have further contributed to the dumbing-down process.

Archaeological examination of the remains of our primitive

ancestors has revealed a sudden decline in health upon the introduction of grains into the diet, including loss of height by an average of six inches or 15 centimetres, an increase in infectious diseases and infant mortality, and a reduction in lifespan. Bone mineral disorders, such as rickets, osteomalacia and osteoporosis began to appear for the first time, and deficiency diseases became widespread. Teeth became rotten and overcrowded. This is because grains contain a substance called 'phytic acid' that interferes with the uptake of minerals and you can read more about this in chapter 2. Things deteriorated still further with the introduction of dairy produce and the preservation of meat.

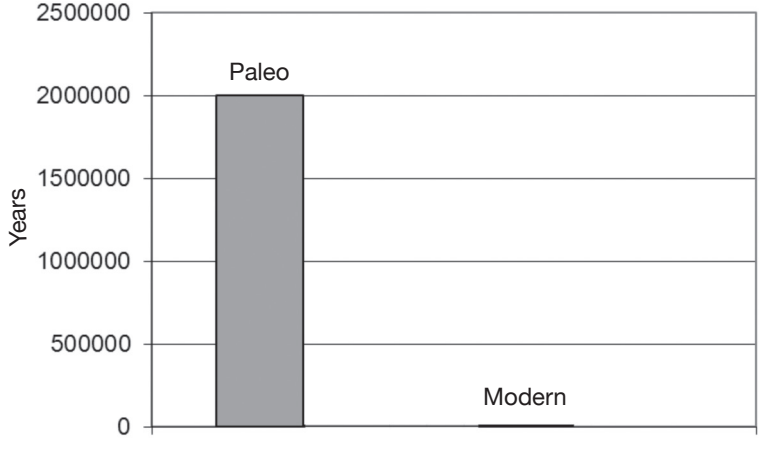

Figure 1: Graph showing the relatively short time we have been eating grains, dairy and legumes ('Modern') compared with eating a 'Paleo' diet.

As I have said, Weston Price studied a total of 14 different cultures that included the Australian Aboriginals, Africans, Polynesians and South Americans, all of whom were consuming the indigenous diets of their forebears. His conclusions were confirmed by the observations of other researchers, including Dr

Pottenger, who looked at the effects of different diets on cats, the explorer Stefansson, who studied and lived with the Inuit, and Dr Albert Schweitzer who visited Africa and wrote: 'I was astonished to encounter no cases of cancer… This absence of cancer seemed to be due to the difference in nutrition of the natives compared to Europeans.'

Like Sir Arbuthnot Lane previously, Pottenger also noted the poor condition of the internal organs of individuals consuming a Western diet. He fed four generations of cats on four different diets, after which he dissected them and photographed their organs. He found a difference between the healthy organs of the raw meat-fed cats compared with the bloated and discoloured organs of those fed a more processed diet. He also noticed that only the pens that had housed the cats eating the raw meat diet were able to support the growth of weeds. The other pens were barren.

Over a ten-year period, Dr Pottenger bred four generations of cats which he divided into groups according to what they were fed. The group reared on a diet of raw meat and milk remained healthy and fertile. However, the first generation of cats fed pasteurised, evaporated or condensed milk developed diseases towards the end of their lives. The second generation developed diseases in midlife, whilst the third developed diseases early in life, with many dying before six months of age. No fourth generation was produced in the latter group due to either infertility or miscarriage.

Explorer and anthropologist Stefansson (see page xxi) wrote, in *Cancer: Disease of Civilisation*, of a whaling ship's doctor who found only a single cancer case in 49 years among the Inuit of Alaska and Canada. Stefansson was a pioneer of Stone Age nutrition, living with and adopting the lifestyle and diet of the Eskimos. Whilst contemporary explorers were dependent upon tons of stored food for their expeditions, Stefansson relied only upon the animals he caught and the knowledge he had gained

from the Inuit. He stopped eating vegetables and ate only meat, and at a time when Dr Kellogg was gaining popularity for his cereals this was considered impossible. Doctors at a New York Hospital studied Stefansson (and a colleague who enjoyed the same diet) over a one-year period and were amazed to discover that they thrived on it. Stefansson remained on this diet until he was 60, when he married and was enticed by his much younger wife into baked foods and deserts. Eleven years later he suffered a stroke, after which he reverted back to his Stone Age diet and made an almost complete recovery. It was during this period that he wrote his seminal book.

Weston Price, who is sometimes called the Charles Darwin of Nutrition, discovered that only when 'civilised' diets were adopted did dental caries and over-crowding of teeth appear. Hunter-gatherers had no need of dentists. The teeth are the visible part of the skeleton, and the fact that grains not only provide little in the way of minerals and that they can impede the uptake of minerals is the reason for reduced bone mineralisation, reduced stature and generalised weakness which is considered normal today. Indeed, osteoporosis is attributed to 'wear and tear' rather than decades of inadequate mineralisation of the bones and joints linked in part to a lack of saturated fat and vitamins D and K..

Back problems are said to affect 80 per cent of Americans at some time in their lives. This means that our backs are too weak to hold most of us up properly, straining the muscles and causing poor postural habits which simply perpetrate the problem. Esther Gokhale, in her book *Eight Steps to a Pain Free Back,* notes that modern hunter-gatherers when studied had excellent posture and were free of back problems.

Weston Price observed that, providing the natives reverted back to their natural diets, the next generation had straight teeth and recovered their physical prowess. More than 80 years ago he concluded: 'No era in the long journey of mankind reveals in the

skeletal remains such a terrible degeneration of teeth and bones as this brief modern period records.'

Supersize nutrition

It would be impossible to replicate the hunter-gatherer diet accurately today. For a start, the foods were wild and 100 per cent organic. Now even organically produced food is often contaminated due to the infiltration of chemicals into the natural environment. Foods can also be legally classified as organic if they have been sprayed by a pesticide called rotenone or treated with antibiotics.* There has been a campaign in the US calling for a ban on the spraying of organic apples and pears with antibiotics which is set to become law in October 2014. Organic chickens have also been found to contain antibiotics. In Britain the Soil Association defines organic as 'not routinely given antibiotics'. 'Routinely' is the industry's get-out-of-jail card and permits the use of antibiotics if there is risk of infection at the farm. Furthermore, genetic intervention and selective breeding have changed the constituents of modern foods. For example, today's fruits are much higher in fructose (sugar) than they were a few decades ago. Bananas can no longer reproduce in the wild as they no longer have seeds. Wild lettuce was too tough to digest and was not part of the ancestral diet. Today's meat comes from farmed rather than wild animals and may also have been intensively reared. For all these reasons and more, it is only possible to follow the spirit of the Paleo diet – but even that could have a positive effect on health and well-being.

Weston Price found the so-called 'primitive' diets contained at least four times the water-soluble vitamins, calcium and other minerals, and at least ten times the fat-soluble vitamins which came from animal foods, such as butter, fish and meats. 'Primitive'

*According to the Soil Association a 'handful of permissions (to use rotenone) are granted each year. Rotenone may be replaced by a natural pesticide called Spinosid.

cultures also appreciated the importance of pre-conceptual nutrition, placing both prospective parents on special dietary and fitness programmes to ensure the best possible health for the next generation. The foods they were given all contained high levels of animal fats, which are rich in vitamins A, D and K. It is unusual today for parents to consider pre-conceptual health and we are still encouraged to follow a low- rather than high-fat diet.

Before the advent of modern agriculture our diet consisted mostly of wild organ meats, fish, foraged eggs, vegetables, fruits, and a few nuts and seeds. Protein came from pasture-fed animals and wild fish, both of which are high in saturated fats – the fats that a few decades ago were suddenly declared unhealthy by the health police. Today, many animals that would naturally graze on grass are instead fed grains, which changes the structure and constituents of the meat and this is why meat 'allergies' have started to appear.

Since fat is needed to make energy, the recent switch to a high carb low-fat diet has spawned some of the fatigue and weight problems common today. It is obvious that were animal fats and red meat detrimental to health we would not have thrived on them for millions of years. In fact, the recent epidemic of degenerative disease has paralleled a *reduction* in the intake of meat and animal fat. Convincing the public that healthy foods like red meat and saturated fat are bad has been a marketing triumph but a health disaster. This is examined in detail in the book *Trick and Treat* by Barry Groves.

The food pyramid, that mainstay of modern dietary dogma beloved of dieticians and doctors, advocates that the bulk of the diet should be carbohydrate-based. The emphasis is therefore on bread, cereals, rice and pasta, followed by other high-carb foods, such as fruits and vegetables, with meats and fats making up only a small proportion of the diet. In reality, this pyramid needs to be turned on its head, literally and metaphorically as it represents a complete reversal of the diets enjoyed by the more slender and

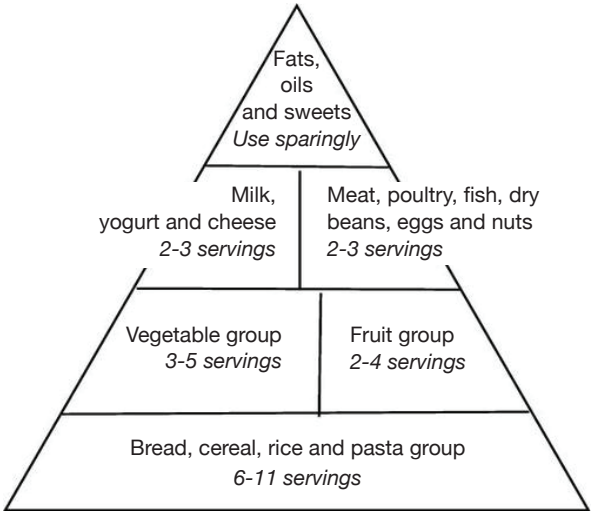

Figure 2: The Food Pyramid – current UK Government recommendations for the relative balance of the food groups

athletic hunter-gatherer. So, having looked at some of the evidence that supports the Paleo way of eating, we are now going to turn our attention to what it is about some of our most commonly eaten foods that makes them so difficult for us to digest.

The Stone Age digestive system and the modern diet

Since our genes and digestive systems haven't changed since our nomadic days it is reasonable to assume that we may be better suited to the hunter-gatherer way of eating, and there is much evidence to support this view.

Humans belong to the primate family[1] and, in common with more than 95 per cent of primates, have a single-chambered stomach that is incapable of digesting most complex carbohydrates, such as grains. In contrast, herbivores have two stomachs, which enable

them to digest carbohydrates in two stages, whilst granivores, such as chickens, have three pancreatic ducts that supply special enzymes to break down starches.

The human gut is different from that of most other primates as the bowel is much shorter, leaving a reduced surface area for absorbing nutrients from leaves and stems, which makes us reliant upon nutritionally dense foods, such as meat. Shorter intestines are found only in carnivores and primates that eat a largely meat-based diet. This characteristic is also linked to manual dexterity, and primates who rely upon a vegetarian diet do not possess the opposable thumb as we do.

The human pancreas is both an endocrine (hormonal) gland and a digestive organ. It produces juices and enzymes that assist in digestion in a part of the small intestine called the duodenum. Therefore, digestive functions constitute the bulk of its work, although due to the prevalence of diabetes today it is more commonly associated in most people's minds with the production of insulin. It may therefore surprise you to learn that less than 1 per cent of pancreatic cells produce insulin. This fact alone shows we do not have the capacity to cope with a predominantly carbohydrate-based diet.

A craving for sweet food after a meal can sometimes be due to the outpouring of insulin in response to excessive carbohydrate intake, only to abate when enough carbohydrate has been consumed to match the level of insulin. If you are in any doubt about grains being high in starch, look at the residue that remains in the sink after draining a saucepan of pasta. Eating a high-carb diet places a strain on the digestive system as a whole, suppresses the production of stomach acid and overloads the intestines and pancreas – not least because of the increased need for starch-splitting enzymes and the rapid spike in blood sugar which follows carb consumption.

Unfortunately, grains and legumes (peas, beans, lentils etc) create a double-whammy because they contain enzyme inhibitors

to protect them against predators. These enzyme inhibitors do just what their name implies, which is to prevent starch-splitting enzymes from working, rendering the food almost indigestible, as many who suffer from embarrassing wind problems have discovered.

The cumulative effects of munching your way through mountains of carbs over many years can ultimately result in the development of **insulin resistance** or type 2 diabetes and can lay the foundations for obesity and other degenerative diseases. Over time, a grain-based diet depletes enzyme levels, resulting in fatigue and sluggish digestion, and this is partly why their avoidance nearly always produces an improvement in energy and digestion and loss of weight.

What is the evidence that we are meant to eat Paleo?

The earliest human remains have been found on the African savannah. The savannah differs from the environment of many other primates who eat more vegetation in their diets. Herbivores live off the grasses of the savannah, and omnivores (humans) live off the herbivores. Adapting to life on the savannah has resulted in major differences between our primate cousins and us. Our stomachs are not as big as they are designed to digest smaller but more concentrated meals, rather than copious amounts of vegetation such as leaves and fruits that primates have to chomp through. We lack fur and are unique in having an effective cooling system in the form of sweat glands. Our brains, however, are larger which allowed the development of strategies for capturing prey, which may have been stronger or faster than us. It was only the consumption of animal-based fat and, in particular, a special type of fat called DHA from bone marrow and fish, which enabled the human brain to increase in size. Had we been predominantly vegetarian we might never have moved out

of the trees. Bipedalism, or walking on two legs, provided a wider visual range across the savannah, leaving the hands free to use a weapon or carry food. The lack of fur, combined with the effective cooling system (sweating, as I said), enabled humans to run vast distances in hot weather. As other animals slowed down in the heat of the day, humans were able to stay alert and take advantage of those animals that had become sluggish.

Scientists have studied the comparative sizes of the brains of humans and animals. The ratio between body and brain size follows what is called 'Kleiber's Law' and enables scientists to predict brain size based on body mass.[2] However, humans were found to have brains that were massively bigger than would have been expected given the comparative smallness of their bodies. This is why our brains have such a high demand for energy – energy which is dependent upon a good intake of meat and fat, and which could not be supplied by a predominantly plant-based diet.

So successful was the hunter-gatherer way of life that we were able to migrate from the African plains and colonise most parts of the globe. This period was known as the Paleolithic Era, and later gave way to the Neolithic Era when agriculture and arable farming were introduced for the first time. That was when our problems began. Not only did we lose stature, strength and stamina, but we also became territorial and competition for resources and land ownership entered our consciousness and soon led to war. Moreover, anthropological evidence has shown that it wasn't only our skeletons that were diminishing in size. The human brain also started to shrink 10,000 years ago, making our brains 8 per cent smaller than those of our Paleo ancestors. The modern trend away from meat and fat, whilst increasing the ratio of plant-based foods in our diet, is likely to be expediting this process.

The hunter-gatherer lifestyle had much to recommend it. Hunting encouraged social interaction and a sense of community,

and hunter-gatherers only worked a few hours per day, including house building, weaving and so on, leaving considerably more leisure time than we can hope for nowadays. In some ways the hunter-gatherer diet was also more diverse. Today the range of foods we select from is restricted to around 20 species of plants and animals, whilst the hunter-gatherer could choose from over 100. The diversity of available foods continues to dwindle as mass production encourages the cultivation of only a narrow range of fruits and vegetables, thus further limiting our choices, and leading to the possible extinction of some less common species. Few people realise that there exist over 100 different types of apple in the UK, but only four or five species at most can be found in the modern supermarket. Once a species has become extinct it is lost forever and it is sad that this is happening for purely commercial reasons. The spread of monoculture has implications for our countryside and heritage as well as our health, and this is discussed in chapter 10.

Even more surprising is the fact that hunter-gatherers ate a greater quantity of food than the average American – and that is no mean achievement. Nevertheless, they have been shown to have been lean and muscular, with a lower body fat ratio compared with modern man. Upon the introduction of grains into the diet, however, people became shorter, developed cavities in their teeth, died younger and started to suffer from obesity *for the first time in recorded history*. However, if a hunter-gatherer baby survived the first two years of life, his chances of surviving beyond 80 were many, many times greater than today.

Our Paleo ancestors enjoyed good health until death without the need for retirement homes. After all, a nomad had to be fit enough to keep on the move, and this included the elderly who weren't pushed around in wheelchairs or clutching on to zimmer frames. In fact, physical prowess seemed to improve with age, probably as a result of decades of exercise – not the short bursts you may engage in down at the gym, but as a way of life. Today,

due to the demands of earning a living exercise tends to drop off after leaving school and physical prowess peaks in childhood – if at all.

Until recently people had eaten the food they were designed to eat for millions of years without the intervention of technology, processing or the addition of chemicals. In fact, they even managed to grow crops without pesticides – amazing. Sadly, much of what many people consume today is not food at all but consists instead of a concoction of chemicals. 'Fortified' breakfast cereals, in which synthetic vitamins and minerals in ratios that would not be found in nature, frequently provide the first carb hit of the day and set the body up for see-sawing blood sugar, cravings and fatigue. The SAD, or Standard American Diet, which consists mostly of processed, additive-laden carbs, trans-fats and factory-farmed meat, is producing a population that is both malnourished and obese. Sadly, the SAD is catching on in the UK. We may be in the 21st century when it comes to technology, but our bodies and our genes are almost the same as they were in primitive times. We really are cavemen living in an urban environment.

It is reasonable to assume that you are reading this book because you are interested in health. Hopefully, you enjoy food too. However, you may be starting to feel a little alarmed at the prospect of cutting out grains, dairy, beans and sugar as your favourite meals start to disappear off the menu. Well, that was the motivation behind my developing the Urban Caveman diet. The Urban Caveman diet differs from a strict Paleo diet as it includes foods that would not have been available in Paleo times which would look and taste familiar to us today. Much of it is cooked, and no bugs or grubs are included! Gluten is replaced by gum or seeds in bread making – although yeast is used – and breads are made in bread-making machines. Natural sweeteners that don't spike the blood sugar, low-carb breads, cakes, ice-creams and mock cheeses mean that Paleo-style eating does not have to be

boring or deprive you of the tastes and textures you love.

A completely dairy-free diet can be unappealing and may not be healthy, as raw dairy is a great source of saturated fat and the vitamins A, D, K and E – vitamins that are widely deficient today partly because of the popularity of low-fat foods. Butter rarely presents a problem, even in those who are dairy intolerant, but if it does, ghee, goat or sheep butters are usually a satisfactory alternative. Egg yolks are often well tolerated too as it is often the egg whites which provoke an allergic reaction. Cheese substitutes can be made from coconut milk, and ice-cream from coconut cream. The replacement of wheat flour by coconut flour in cakes and biscuits makes them high in fibre and low in starch, and free-range eggs provide an easily digested source of nutrients, including protein, and healthy fats.

Chapter 2

Cereal killers

The big breakfast

When it comes to cereals, us Brits can out-eat the Americans! Crunching our way through six kilos of breakfast cereals per person per year, which is one-and-a-half kilos more than our friends across the Pond, the British cereal market is worth a jaw-dropping £1.55 billion. Twelve million loaves of bread are eaten each day in the UK, which means that the average person gets through around 43 loaves per year. Most of us begin the day with a bowl of cereal or toast, so it is not surprising that most people assume that cereals have always been a major staple of the British diet.

However, prior to the Industrial Revolution grains were largely reserved for livestock. Bread was obviously eaten, but not in the quantities it is consumed today. It was also completely different from the modern supermarket loaf. Before the invention of the combine harvester, wheat was allowed to grow several metres tall enabling its roots to penetrate deep into the nutrient-rich soil. It would also sprout upon exposure to dew, making it more digestible and increasing its nutrient content. After having been ground into flour, it was then usually fermented into a sourdough, a process that partially digests the starches and reduces levels of the anti-nutrient called phytic acid, about which more later (see page 18). Fermentation is a process in which

yeasts activate enzymes that break down the flour when added to water. Sprouting and fermentation made it possible for us to eat grass, a food for which ruminants have two stomachs. The immature, unfermented raw flour used in modern bread making has contributed to the bowel problems and gluten intolerance we see today. The genetic engineering of wheat, that final nail in the coffin of post-Paleo health, was not introduced until the middle of the 20th century, although hybridisation experiments are known to have started long before.

It's a no-grainer

We have been led to believe that whole grains are a nutritious food and a good source of fibre, important for gut health. (Grains include wheat, rye, barley, oats, rice, millet, corn, amarynth and fibre.) However, closer examination shows that they are inferior to vegetables, seafoods, meat and fruit on both counts.[1] The devil, as they say, is in the detail. Dr Loren Cordain, the world's foremost researcher into Paleo nutrition, compared the fibre content of refined and whole grains to fruits and non-starchy vegetables.[2] He found that vegetables far outstripped grains by providing a whacking 185 grams per 1,000-calorie serving compared with refined cereals with only six grams. Fruits were the second best source of fibre, coming in at 41 grams, whilst whole grains fared only a little better than refined at 24 grams. With the exception of oats, fruits and vegetables contain more soluble fibre, which can also have a cholesterol lowering effect. And that is not all.

The average calcium content of whole grains is around 15 times lower than that of vegetables. Moreover, the calcium in vegetables is better assimilated and, since the calcium-lowering effects of grains are dose-dependent, the more grains you eat the lower your calcium status becomes. This was powerfully demonstrated by a study on infants which found that blood calcium levels took a nose-dive upon the introduction of bran.[3]

So, by replacing grains with vegetables, a grain-free diet actually increases dietary fibre and boosts mineral levels.

The great grain robbery

The reason grains are at the bottom of the league when it comes to mineral status is due to the presence of the previously mentioned anti-nutrient called phytic acid. Since phytic acid prevents minerals from being absorbed, simply measuring the mineral content of grains would not give you the full picture. Minerals carry a positive charge and are attracted to the negatively charged gut wall where they line up awaiting transportation into the body. Unfortunately, phytic acid is a bit of a heavy weight when it comes to negative charges, and exerts a magnetic attraction so strong that it binds up the minerals before they even reach the gut wall. Like a sort of pied piper of minerals, phytic acid hoovers them up, forming compounds called phytates which then disappear out of the body in the stool.

This is the reason mineral levels decline exponentially in relation to the amount of grain eaten and why a reduction in stature of about six inches, or 15 centimetres, coincided with their introduction into the diet at the end of the Paleolithic period. Tooth decay, overcrowding of teeth, jaw problems, arthritis and degenerative diseases are almost exclusively confined to grain-eating populations. According to Dr Dietrich Kinghardt, the jaw is the first bone in the body to become demineralised,[4] and transmandibular joint (TMJ) pain, clicking and other jaw problems occur as the jaw bone runs out of minerals, predominantly zinc. Dr Nicolas Campos, an American chiropractor, claims that in the US TMJ problems affect a staggering 25 per cent of the population.

Obvious signs of low mineralisation may include brittle nails, thin hair, jaw deformities, over-crowded teeth, back and joint problems and hypermobility or double jointedness. However,

mineral deficiencies have the potential to wreak havoc anywhere in the body. For example, it is known that some heart attacks are caused by cramping of the heart muscle – a problem linked to magnesium deficiency. To make matters worse, we are today exposed to environmental pollutants which exert their toxic effects by displacing minerals in enzymes, organs, bones and joints, thus further increasing our need for them. Not a great situation when you consider that white flour, rice and other grains have had an average of 80 per cent of their minerals removed by the refining process. It is now apparent to many researchers that almost everyone in the civilised world suffers from the lethal combination of nutritional deficiencies and chronic toxicity. Realisation of this could revolutionise modern medicine.

Grains have become problematic over the last few decades because of changes in the way they are grown and prepared. Coeliac disease, in which bowel symptoms arise after ingestion of gluten, is thought to affect one in 100 people in the UK. Young people today are five times more likely to have the disease compared with young people in the 1950s. According to Coeliac UK, only 10 to 15 per cent of sufferers are actually diagnosed, so sensitivity to gluten is likely to be a far greater problem than is realised. Whilst doctors still rely upon biopsy to make a diagnosis of coeliac, it is now recognised that antibodies to gluten (transglutaminase and anti-gliadin) may be present in the blood even in the absence of bowel symptoms.[5] Coeliac disease is rapidly being recognised as the tip of the gluten iceberg, with problems ranging from cross-reactivity, in which gluten stimulates intolerances to other foods, to autoimmune diseases. Modern gluten, bred to be more, well, glutenous, is difficult to digest and levels have increased by 50 per cent in the modern loaf over the past 50 years. This is compounded by a lack of dietary cholesterol and fat soluble vitamins in infancy, resulting in inadequate development of our digestive systems.[6]

However, not all hunter-gatherer diets were grain-free.

Californian Indians, considered the most 'primitive' of Native Americans, have been consuming wild grains and high starch root vegetables for more than 100,000 years.[7] Arabic nations, where gluten sensitivity is rare, have a long tradition of eating wheat. Grains were traditionally soaked, sprouted or fermented into sourdoughs which not only partially digests the starches but which also significantly reduces phytic acid levels. Wild grains prepared in this way are often better tolerated, although a period of abstinence of around 18 months to two years may be necessary if you have already become sensitised. After this time you may be able to reintroduce grains on a rotational basis, starting with properly prepared wild grains. Treatments to colonise the gut with healthy bacteria, to boost secretory IgA levels and to strengthen gut wall integrity help reduce sensitivity and improve immunity. All grains contain gluten, but it is the type of gluten found in wheat, rye, barley and some oats that presents the greatest problem.

The corn maze

Many turn to corn as a replacement for wheat but corn, in common with all grains, contains gluten. Although different from that found in wheat, rye, some oats and barley, there is very little known about corn gluten. Corn is generally poorly tolerated by those sensitive to wheat as it too is high in indigestible starches. Unfortunately, removing only wheat or gluten is rarely the answer. Damage to the gut from any grain will make it nigh on impossible to digest any complex carbohydrate and the diet may need to be limited to simple sugars such as those found in non-starchy vegetables until the gut is healed.

The problem with corn is not limited to its gluten or starch content. Second to soy, it is the most genetically modified food on the planet. High in calories and low in nutrients, corn is a comparatively new food and is routinely being fed to animals,

including cows and fish, and is then indirectly ingested by humans. You may be surprised to learn that cows and fish are not natural corn eaters, and this is why farm animals fed corn have a shorter lifespan. Unlike grass-fed beef, corn-fed beef is linked to heart disease, diabetes, cancer and obesity. Corn also contains a type of sugar called fructose which is toxic to the liver. Both fructose and alcohol look the same to the liver, being metabolised in the same way and producing the same metabolites. Furthermore, corn syrup, which is often added to processed foods, is contaminated with mercury. Corn has been shown to stimulate inflammation in coeliacs who fail to realise that gluten is just the most obvious part of a wider problem.

Since the introduction of GM corn, evidence of toxicity has emerged linking it to gluten sensitivity. Eighty-eight per cent of the world's corn is now genetically modified. A study in the *Journal of Applied Toxicology* found that Bt toxin which is added to GM corn is not only resistant to digestion but actually damages gut cells, provoking gluten intolerance and autoimmune diseases. Gluten sensitivity is escalating in the US with a third of the population now having been diagnosed whilst many others struggle with irritable bowel, migraines, mood disorders and other unpleasant symptoms. Intolerance to gluten is commonly found in autism and the rise of autism by 250 per cent in the GM-sodden US directly parallels the rise of GM foods like corn in the food chain.

Rice takes

Rice is assumed to be a benign grain. However, its high starch content of 80 per cent in brown, rising to 85.8 per cent in white, combined with its sticky, glutinous consistency after cooking, make it very difficult to digest. Stimulating an excessive output of pancreatic enzymes to break down the sugars whilst providing as little as 5 per cent protein, brown rice is not quite the health

food it has been cracked up to be. Furthermore, its glue-like consistency and high sugar content could result in fermentation in a gut struggling to process it. This is why gas, bloating and sleepiness often follow its consumption. Sharing top billing with grains like wheat in the phytic acid stakes, and with its low mineral status (1 per cent calcium, 2 per cent iron and 10 per cent magnesium), rice is nutritionally inferior to vegetables and could even cause loss of more nutrients than it provides. Containing only 5 per cent protein and upwards of 80 per cent starch, rice would not be a wise choice if blood sugar or weight were an issue. Often assumed to be high in fibre, one cup of brown rice contains 3.5 grams of fibre compared with 5 grams in an unpeeled apple and 8.36 grams in a cup of raspberries.

Other grain issues

Unlike meat and fish, no grain contains the full complement of amino acids (proteins) and they are also low in fat. Those fats they do contain come with an unhealthy ratio of omega-6 to omega-3. Furthermore, since grains contain no vitamin A (or D), night blindness, infection and stunted growth are more prevalent amongst grain-eating populations. Also reported are deficiencies in vitamin B1 (thiamine) and B3 (niacin), both of which are damaged by the milling process, whilst the B vitamin biotin is almost non-existent in grains. This is unfortunate since biotin is needed to metabolise carbohydrates but is often found to be deficient in grain eaters. Nor do grains contain vitamin C, but because both biotin and vitamin C are used up when digesting them, they can cause what is known in the nutrition trade as 'negative nutrition'. In other words, nutrients are needed from other sources in order to metabolise grains.

Grains, in common with fizzy drinks, contain excessive levels of the mineral phosphorus. Whilst phosphorus is needed for calcium metabolism, both phosphorus and calcium have to be

kept within a narrow ratio. If the phosphorus to calcium ratio becomes too high, it will interfere with protein metabolism, and this can result in the breakdown of muscle to provide energy. Converting protein released from muscles into glucose is an inefficient way of producing energy, and this is one of the reasons why energy improves when you give up grains. Grain-eating can reverse the calcium/phosphorus ratio by pushing up phosphorus levels whilst calcium is lost in the stool in the form of a phytate. Everyone knows that calcium is important for bones and teeth, but less well known is its role in nervous system function, where lack of calcium can contribute to anxiety and insomnia.

Grain (and dairy) consumption can plunge the body into calcium imbalance in which calcium becomes *bio-unavailable* due to lack of co-factors, such as the other minerals and vitamins needed for its uptake. When this happens the thyroid gland can become imbalanced as calcium and potassium respectively slow and stimulate the gland. Unused calcium can become a menace, ending up being deposited along artery walls or formed into stones in the gall bladder or kidneys. Calcium balance in grain eaters will be further compromised if magnesium is low, which it invariably is, because without magnesium, calcium becomes useless.

Grains and hormones

Vitamin D behaves more like a hormone than a vitamin because it affects cells and organs throughout the body. Essential for calcium metabolism and immune function, vitamin D has been the subject of a great deal of research over the last decade which continues to reveal how crucial it is for health. However, it has been estimated that 95 per cent of us in northern latitudes could be deficient in it. This is partly due to lack of sunlight, but our old friend wheat has to bear some of the responsibility as well.

Wheat contains a **lectin**[8] (a special type of protein) called

WGA or 'wheat germ agglutinin'. Lectins can create all sorts of problems as they bind up sugars and block the carbohydrate receptors on red blood cells. They are found in all foods and are usually harmless because they are unable to cross the intestinal barrier and gain entry into the body. However, WGA has no trouble crossing the gut wall. Once in the bloodstream it does what its name implies and causes 'agglutination', or clumping, of red blood cells, thus increasing the risk of clots. By docking on to their carbohydrate receptors – in which red blood cells are abundant – WGA can then hitch-hike around the body and this is where the fun starts.

Lectins are nothing if not opportunistic, and like the Del-boy of foreign proteins, they never miss a chance. They also attach themselves to receptors for the blood sugar hormone, insulin. Hormones are a bit like a key that fits into the cell lock but if lectins have got there first hormones like insulin won't get a look in. Instead of carrying glucose into cells insulin then remains locked in the blood stream causing what is known as hyperinsulinaemia. They say the devil makes work for idle hands, and redundant insulin will always find something else to do. In women this usually means stimulating the ovaries leading to polycystic ovarian syndrome, whilst in men it may lower testosterone, causing impotence, and in both sexes it can cause inflammation, poor blood sugar regulation and disease.

Once joy-riding around the body, WGA can hop off at any point and penetrate any cell it chooses. It is the bully-boy of lectins, bypassing the gut wall, elbowing sugars and hormones out of red blood cells before muscling-in to what is called the 'nuclear pore', which is where the action is, hormonally speaking. (The nuclear pore is a bit like a nuclear bouncer deciding what goes in and what comes out of the nucleus.) Hormones work by attaching to the nuclear pore in order to stimulate cellular activity. Different cells have different jobs to do but they await directions from hormones so that their activity can be modified according

to need. However, if WGA has gate-crashed the hormonal party and assumed squatters' rights, real hormones are prevented from working, and we can only guess at the confused instructions WGA may be imparting.

Since vitamin D acts more like a hormone in the body, it too can come under the spell of WGA, and this is why chronic vitamin D deficiency is often found in wheat-eaters. WGA can incapacitate vitamin D in the same way it incapacitates other hormones. Vitamin D is needed for immunity, but since lectins also disrupt immune function and shrink the thymus, the gland that conducts the immune system orchestra, eating wheat regularly may increase the risk of infections and allergies.

Coeliac disease – the tip of the gluten iceberg

Despite modern research implicating gluten in hundreds of health problems, including autism, dementia, Addison's disease, schizophrenia, eating disorders, migraines, bipolar disorder, mental health disorders, irritable bowel syndrome, thyroid diseases, and infertility,[9] current medical dogma recognises only coeliac disease and, at a pinch, dermatitis herpetiformis as being caused by gluten intolerance. Even so, it was a decades-long struggle to get gluten's role in coeliac disease recognised at all. Previously attributed to malabsorption and problems digesting fat, it wasn't until the 1930s when Dr Dicke discovered that a wheat-free diet resulted in remission of symptoms, that the role of diet was even considered. Unfortunately, the link between diet and digestive problems still eludes many gastroenterologists today. Nevertheless, it took a further 20 years for this heretical concept to take hold as grains were considered a healthy food, so it was not until the 1960s, when tissue biopsies were developed, that coeliac disease was finally conceded as being caused by gluten sensitivity. They got there in the end! Or did they?

New research has shown that nowadays the majority of

patients with gluten intolerance suffer no digestive symptoms at all, but are more likely to present with mental health problems or autoimmune diseases. Recently, a new clinical entity has emerged known as 'non-coeliac gluten sensitivity'; although other factors in wheat have also been found to be problematic, so this too may be a misnomer. It is as if with each subsequent generation the problems caused by gluten are penetrating more deeply into the body. Dr Thomas O'Bryan, an authority on gluten sensitivity, estimates that for every person diagnosed with coeliac disease, there are at least another eight suffering from gluten-induced conditions that go unrecognised. The families of diagnosed coeliacs have been shown to produce antibodies in response to eating gluten *even though they do not suffer from the disease itself*, but often have related problems currently dipping below the gluten radar.

Conservative estimates state that over 2 million Americans suffer from coeliac disease,[10] but since 80 per cent remain undiagnosed the actual figure could be truly staggering. This may be partly due to ignorance, but also because gut biopsy is not the most reliable method of obtaining a diagnosis. In order for a positive diagnosis to be obtained, gluten has to have been eaten over a two-week period prior to biopsy and if the tissue sample is taken from a part of the gut that is not affected, a false negative will be obtained. Understandably, many people, reluctant to go back to the gluten-induced misery of coeliac, choose to forgo the test.

Meanwhile, some independent laboratories are developing more sophisticated antibody assays to help identify gluten sensitivities unrelated to coeliac disease. It takes dogged persistence to obtain a diagnosis of the condition, necessitating an average of six visits to different doctors over nearly a decade, so it is not surprising that under 20 per cent ever get picked up. Dr Fasano, who directs the Center for Celiac Research at the University of Maryland School of Medicine, believes that gluten sensitivity has now reached epidemic proportions, affecting

more than 20 million Americans – which is bad news for a nation fed from the prairies.

Mi-grain and other diseases linked to gluten

Beloved of bakers, gluten is the protein that gives bread its elasticity. Difficult to replicate, its absence in gluten-free baking is responsible for the cement-like consistency of many alternative breads on the market today. Similar in structure to the milk protein casein that gives cheese its stretchy texture, gluten (and casein) can behave rather like chewing gum in the gut, stimulating the production of mucous and generally bunging up the works and preventing nutrient absorption. Like WGA, gluten (and casein) can permeate the intestinal barrier, running rings round the immune system and causing trouble throughout the body. Since cross reactivity between similar foods has now been recognised, and gluten and casein are broken down by the same enzyme, DPP-1V or 'dipeptidyl-peptidase', it seems obvious that coeliacs almost certainly need to eliminate dairy produce as well.

The grain brain drain

The effects of gluten on the brain have been highlighted by a number of studies around the world. Dr Thomas O'Bryan quotes research in which lesions detected by MRI scans in patients with migraine or dementia lessened or disappeared within a year after switching to a gluten-free diet. In the book *Human Brain and Health and Disease*, Dr Stephen Gislason writes of the link between the opioid effects on the brain of gluten and casein in autism and allied diseases. He also found an increased incidence of depression amongst adolescents with wheat sensitivity. Other symptoms often linked to gluten intolerance include sleep disturbances, mood instability, memory loss, irritability and impaired cognition.

A trial carried out as part of the Stanley Research Programme at Sheppard Pratt, Baltimore, in February 2011 revealed an increased prevalence of antibodies to **gliadin** (a protein in wheat) in patients with bipolar disorder. There are studies going back decades confirming the link between schizophrenia and gluten sensitivity including one at the Johns Hopkins School of Medicine, also part of the Stanley Research Programme, which identified antibodies to gliadin in schizophrenics that were only slightly different from the antibodies to gliadin found in coeliacs.

ADHD has long been associated with diet, and a 12-month Italian study of 132 coeliacs aged between three and 57 years at the Regional Hospital in Bolzana discovered that the adoption of a gluten-free diet resulted in a substantial improvement in ADHD scores. A paper published in the *Journal of Attention Disorders* in November 2006 stated: '…a large number with untreated coeliac may show signs of ADHD…' In a country that gave the world pizza and pasta, that must have come as a blow to many Italians.

Even in the absence of antibodies to gluten, there is no doubt that most people experience improved memory and better concentration, and feel more alert, when following a wheat-free diet. Leaving aside the possible immunological and opioid reactions to wheat which can impair mood and cognition, the reduction in available nutrients that result from eating grains is bound to have a negative effect on brain function. In the book *Nutritional Balancing* by Dr Lawrence Wilson,[11] specific mineral imbalances are shown to be predictive of mood and behaviour, with a correlation between the presence of toxic metals and criminality.

Unless engaged in exercise, the brain has a greater demand for glucose and other nutrients than the rest of the body put together. This is why zinc deficiency and poor blood sugar regulation have a direct impact on sleep, mood, behaviour and cognition. We have already seen that WGA, the lectin found in wheat, can inhibit glucose transportation, and we know that when glucose levels drop, with the exception of the cortex, the brain starts to

shut down. The signs that this is happening can include poor concentration, anxiety and irritability – a normal state for some people today.

A dip in blood sugar also accounts for the drowsiness that can overwhelm us after a lunch of sandwiches or pasta – a phenomenon reported by teachers attempting to teach their semi-comatose charges in the afternoon. Incidentally, the only part of the brain to remain functional when there is a shortage of nutrients is the pre-frontal cortex, the part associated with aggression. An ancient survival mechanism that enabled us to defend ourselves if starving, its modern counterpart is more likely to manifest as road rage or violence. In Yorkshire, England, adolescent males were spared custodial sentences when it was demonstrated that their crimes had been committed at a time when they had been hypoglycaemic – that is, low in blood sugar.

Wheats of engineering

The genetic engineering of wheat has almost certainly driven the increase in mental and emotional problems seen today. Proteins altered by selective breeding are frequently not recognised as a food by our immune systems. Genetically weakened by agricultural breeding practices, modern grains bear no resemblance to those found in the wild.[12] Spelt and kamut, ancient forms of wheat which are sometimes better tolerated, still come with all the disadvantages associated with grains, and an immune system primed to react to wheat will react to unadulterated grains as well. Symptoms associated with the new high-gluten wheats include bloating, fluid-retention, joint stiffness, headaches, migraines, asthma, indigestion, constipation, sweet cravings, poor cognition and sluggishness, and are often alleviated upon adopting a gluten-free/dairy-free diet.

Modern wheat contains roughly 50 per cent more gluten than it did only five decades ago. To add insult to injury, genetic

engineering has made modern gluten even more indigestible. As I have mentioned, gluten gives dough its stretchy consistency, and genetically modified gluten makes it possible to bake bigger loaves from less wheat by filling them with air, but this is not something you would want to fill your gut with. When gluten hits the intestine it can be extremely tenacious, adhering to the intestinal wall like, as I have said before, bubble gum. Eating whole wheat has been likened to eating razor blades because it is also abrasive and can cause the gut to bleed. In order to protect itself, the gut may produce extra mucous which can, over time, harden into what is called 'mucoid plaque', and this can solidify along the gut wall, interfering with digestion and nutrient uptake. Lining the gut wall like an oil slick, it also makes it practically impossible for beneficial bacteria to gain a foothold. It is estimated that many of us are carrying several pounds of solidified mucous and trapped faecal matter around with us.

Nonetheless, over the last 200 years, grains have risen to supremacy and have now become the staple food of the Western world. Only 50 years ago evils like mass-produced breakfast cereals had yet to be unleashed on a population that had been accustomed to starting the day with bacon and eggs, and pasta had hardly found its way out of Italy. Nowadays, grains are invariably eaten at almost every meal, with cereal and toast for breakfast, sandwiches for lunch, and pasta, rice or pastry for dinner.

Gut out grains

Grains are not a very efficient food to produce, requiring technological intervention, such as milling, fermenting, sprouting, soaking or cooking to make them edible. To overcome the problems of digesting them, our predecessors used first to soak or ferment them over several days, and even then they were only eaten in moderation and never raw as they are today.

Grain consumption is a major contributory factor in the

development of **leaky gut syndrome**, which sets the stage for autoimmune diseases. This is a condition in which the gut wall becomes too porous, allowing leakage of incompletely digested foods into the body. You may think this might improve nutrient absorption, but sadly the opposite is true, as a damaged gut wall cannot effectively transport nutrients into the body. The risk of allergies is also increased with leaky gut syndrome, as, unable to recognise an incompletely digested food, the immune system will often mount an antibody attack instead. Thump first and ask questions later.

The reason autoimmune diseases such as rheumatoid arthritis and type 2 diabetes are linked with non-Paleo foods is that they contain proteins that are almost identical to those of our own body tissues. If the immune system fails to differentiate between a food protein and a body protein, its own tissues will also come under fire, which is likely to be why autoimmune diseases first started to appear after the Industrial Revolution.

Grains – high maintenance and low return

Despite the claims of vegetarians, only about 11 per cent of the earth's surface is suitable for grain production, whereas animals can graze on sparse, inhospitable land. Grains are also quite energy expensive to produce as they are small and difficult to harvest. The seeds need to be separated from the plant, which is time-consuming and requires more energy than the grain itself can provide, and this would certainly not have appealed to our Stone Age ancestors who downed tools after only three-hours![12]

Pesticides and grains

Grains are also a dirty food.[13] There is a deep groove in wheat that cannot be cleaned and this often gets infested with insect droppings, and urine and hair from rats and mice, necessitating the use of insecticides and fungicides. There is a high-microbe

content in grains, so protectants (such as chlorpyrifos-methyl and pyrethrins) are used to kill them off. Therefore all non-organic grains are contaminated with pesticides which can damage the liver and brain. They are also fumigated with methyl-bromide (which blocks iodine uptake needed to make thyroid hormone), aluminium phosphide and magnesium phosphide. Part of the fumigation process involves exposing the grain to high temperatures which also damage the protein content, especially the gluten, which is another reason why modern gluten is particularly difficult to digest.

Whole grains for *hell*th?

As Dr Cordain states in *The Paleo Answer,*[14] government recommendations to eat a diet predominantly based on whole grains whilst minimising meat and fat consumption fly in the face of all the evidence. If modern wheat is toxic for a significant percentage of the population, it cannot possibly be promoted as the cornerstone of a healthy diet. In view of the irrefutable case the prosecution is mounting against wheat, this advice is unhelpful if not downright dangerous for the majority of people. It is to be hoped that the whole grain dogma that has influenced modern health policies may soon be revoked, but I am not optimistic. Although elimination of gluten and grains is becoming more commonplace amongst the health conscious, there is still a long way to go before there is official condemnation of current health guidelines. Rather than waiting for an expert to tell them what their bodies already know, for increasing numbers the verdict on gluten has already been passed. Grains are inexpensive and convenient to mass produce and transport. Removing them from their primary position in the modern diet would have serious and far-reaching economic ramifications. Bear this in mind next time you see the main-stream media, or a medic, pushing the whole-grain, low-fat diet and telling you to cut down on red meat.

Quick recap

- Vegetables contain more fibre than wheat.
- Vegetables provide more calcium than wheat.
- Grains contain phytic acid which can cause minerals to be lost from the body.
- Grains don't contain the full complement of amino acids.

Personal health check

Could you be low in minerals?

Tick any of the following that apply to you:

	Brittle hair or nails		Jaw problems
	Overcrowded teeth		Muscle cramps or stiffness
	Clench jaw when asleep		Back problems
	Tinnitus (ringing in ears)		Fillings in teeth
	Double-jointed		Women only: sweet craving before periods (sign of low magnesium)
	Sweet cravings		History of gall or kidney stones
	White marks on 3 or more nails		Stretch marks (sign of low zinc)

Could you be sensitive to gluten?

Tick any of the following that apply to you or members of your family. These symptoms could also be due to other causes, but if you tick several boxes it might be worth trying a gluten-free diet.

	Addictions (food, drugs, alcohol)		Autism, chronic fatigue, eating disorders, behavioural problems or learning difficulties
	Migraine		Mental health problems
	Bloating, wind or irritable bowel		Autoimmune disease
	Depression or bipolar disorder		Food cravings
	Would find it hard to give up bread		Sleepy after meals containing wheat
	Fluid retention		Sluggishness and low energy
	Constipation or constipation alternating with loose stools		Hormonal problems
	Stiffness/muscle aches		Brain fog