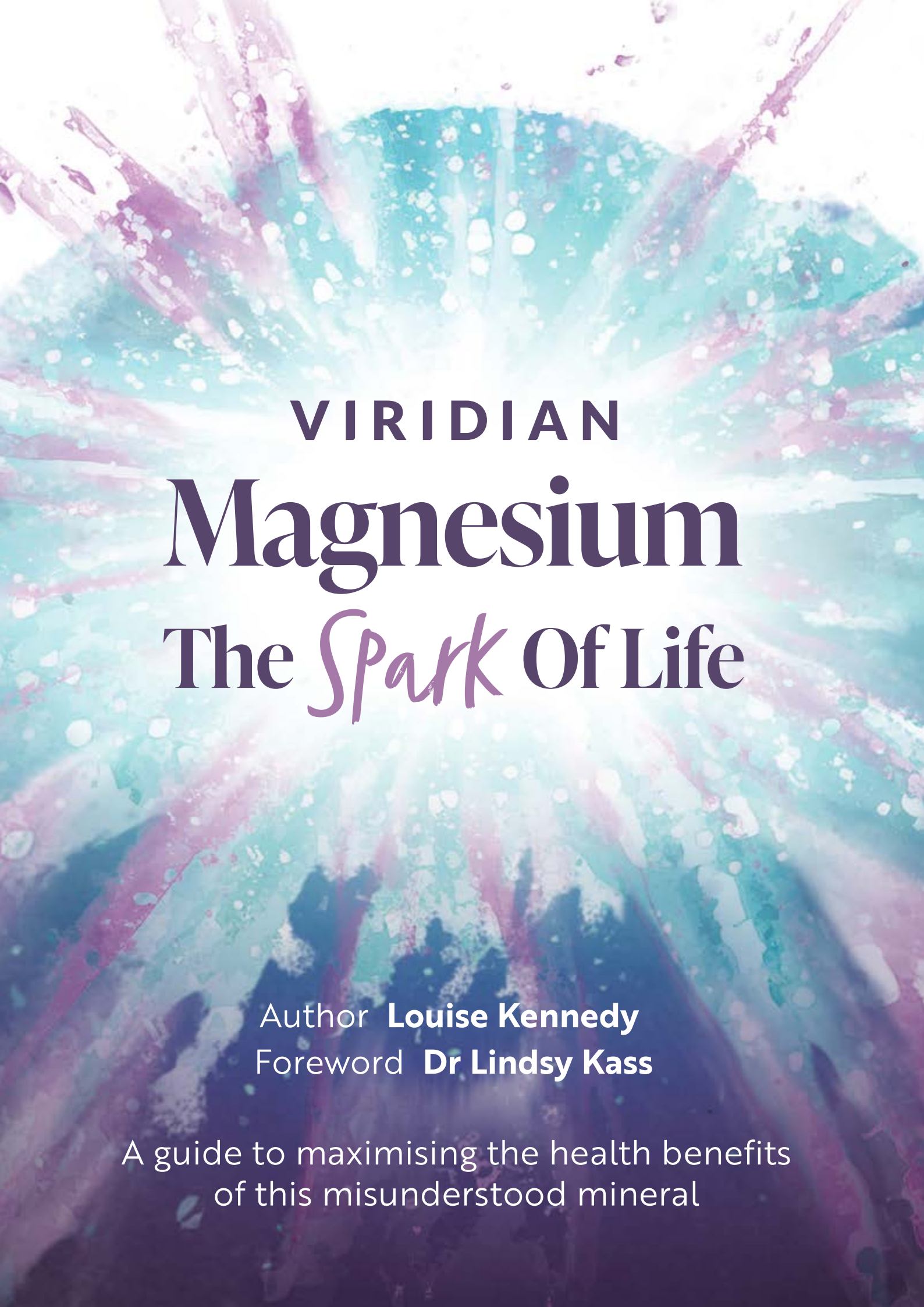
VIRIDIAN
Magnesium
The Spark Of Life
Author Louise Kennedy
Foreword Dr Lindsy Kass
A guide to maximising the health benefits
of this misunderstood mineral

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It's been called the 'mineral of the moment' but new research by Viridian Nutrition has found that some 70 per cent of people don't know it's necessary to consume enough magnesium to keep our bodies fit and healthy - or what foods it's found in.

This is worrying when figures show that up to three-quarters of us globally (World Health Organisation) are low in this misunderstood nutrient.

In recent years, magnesium supplementation has surged in popularity with global sales predicted to double by 2032 (data from Data Intello market research) thanks largely to its use as a sleep-promoting nutrient.

However, this multi-tasking mineral has a huge number of other important functions that people clearly aren't aware of.

Magnesium is a vital nutrient for the whole body. It's essential for bone and muscle health, as well as helping to regulate blood pressure - working in a similar way to calcium channel blocker medication by increasing nitric oxide and widening the arteries through vasodilation so that blood flow can be increased. It can also help with muscle cramps. Plus, it's needed for energy production and for maintaining a healthy heart rhythm, as well as helping the nervous system function properly.

Subclinical magnesium deficiency is very common and can cause chronic inflammation around the body, leading to a wide range of mental and physical health problems. However, this is often not recognised until a more severe deficiency becomes apparent.

Magnesium deficiency itself is associated with many common chronic conditions including heart disease, diabetes and osteoporosis, yet deficiency is under-diagnosed and under-recognised by health professionals. Foods rich in magnesium include fish and seafoods, whole grains, nuts and seeds. However, in the past 50 years, it is estimated that up to 40 per cent of magnesium has been lost from crops thanks to less fertile soil and newer processing techniques. As a result, our food contains less magnesium, meaning that even if the same foods were to be eaten as half a century ago, we would get less magnesium . The advent of ultra processed foods makes this even worse.

My research at the University of Hertfordshire has extensively covered the role of magnesium for both health and exercise performance. During this time, I've analysed physical data, dietary intakes and expert opinions in relation to magnesium and believe that the lack of knowledge, as well as the decrease in magnesium intake, makes this micronutrient one that clearly needs further exploration and explanation to the general public.

That's why I was keen to contribute to this white paper, which takes a deep dive into the essential but often overlooked mineral magnesium and how ensuring you get enough can help you feel better in your day-to-day life.

Dr Lindsy Kass

Senior Research Fellow in Health and Exercise Physiology and Performance Nutrition at the University of Hertfordshire

How Much Do You *Really* Know About Magnesium?

To discover just how much the average person really knows about magnesium, Viridian Nutrition commissioned a nationwide survey of more than 2,000 people which uncovered a worrying lack of understanding about this key mineral which is essential for our overall well-being.

The research revealed that the vast majority of Britons (70%) were unaware that this one simple nutrient could help benefit their entire body – with a shocking 40 per cent of those surveyed categorising magnesium as "might be beneficial" but "not essential" - highlighting a worrying lack of knowledge about this important mineral.

70 per cent of people don't know it's necessary to consume enough magnesium

Another surprising finding was that despite its current popularity as a supplement – with global sales growing around 8 per cent each year (Data Intello market research 2025) – nearly three quarters (73 per cent) don't supplement regularly or frequently with magnesium.

Furthermore, of those that do take a supplement to support their health, over half are confused about the different types of magnesium out there, what each type can do, and, perhaps most importantly, which one they should be taking for maximum benefit.

The results also shine a spotlight on a serious lack of nutritional awareness, with only one third of people (35%) regularly including magnesium-rich foods in their diet in a bid to boost their intake. And when asked about specific sources, many cited foods that are actually pretty low in magnesium as examples of what they were eating to up their levels.

Only one third of people (35%) regularly include magnesium-rich foods in their diet to boost their intake

Two-fifths said they rarely or never included food in their diet specifically to increase magnesium, suggesting many people assume they're getting enough and they think they don't need to worry about it.

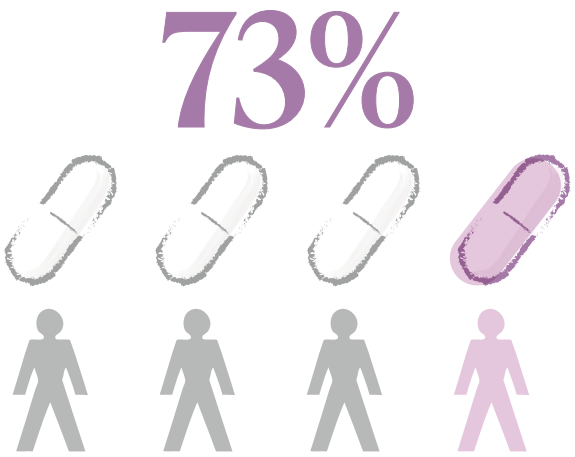
"Magnesium is found in many foods, yet our survey highlights a significant gap in nutritional knowledge," says Aimée Benbow, Lead Nutritionist at Viridian Nutrition.

"While it is possible to meet the recommended daily intake of magnesium through diet alone, it requires a conscious effort to consistently include magnesium-rich foods. "For many, supplementation provides an easier and more reliable way to ensure sufficient intake."

The exact role of magnesium in the body proved to be another blind spot with the survey revealing patchy awareness at best. Sleep support was the most commonly cited reason for taking magnesium, with one in three (34%) people taking a supplement to improve sleep. Around a third of people also cited support for muscle and nerve function, but only quarter of those surveyed believed magnesium helps to maintain strong bones – which is one of its most crucial roles, alongside its better-known counterpart, calcium. Further adding to the muddy picture, five per cent of respondents incorrectly stated that magnesium supplementation could prevent hair from turning grey – a fact sadly not backed up by the science!

"Our findings suggest that confusion surrounding magnesium's role in the body is leading to ineffective supplementation and potential health risks," warns Aimée Benbow.

As a standout supplement company that emphasises effectiveness in a crowded vitamin market, Viridian Nutrition want to help people understand more about magnesium and why it's so important - so everyone can pick the right nutritional supplements that will truly make a difference.



Nearly three quarters (73%) don't supplement regularly or frequently with magnesium

"This survey underscores the urgent need for greater public education on magnesium and its role in health," says Aimée Benbow, Lead Nutritionist at Viridian Nutrition."We've developed this comprehensive White Paper to address the widespread confusion and lack of awareness. Addressing this knowledge gap is essential to ensure individuals make informed choices for their long-term health."

Aimée Benbow

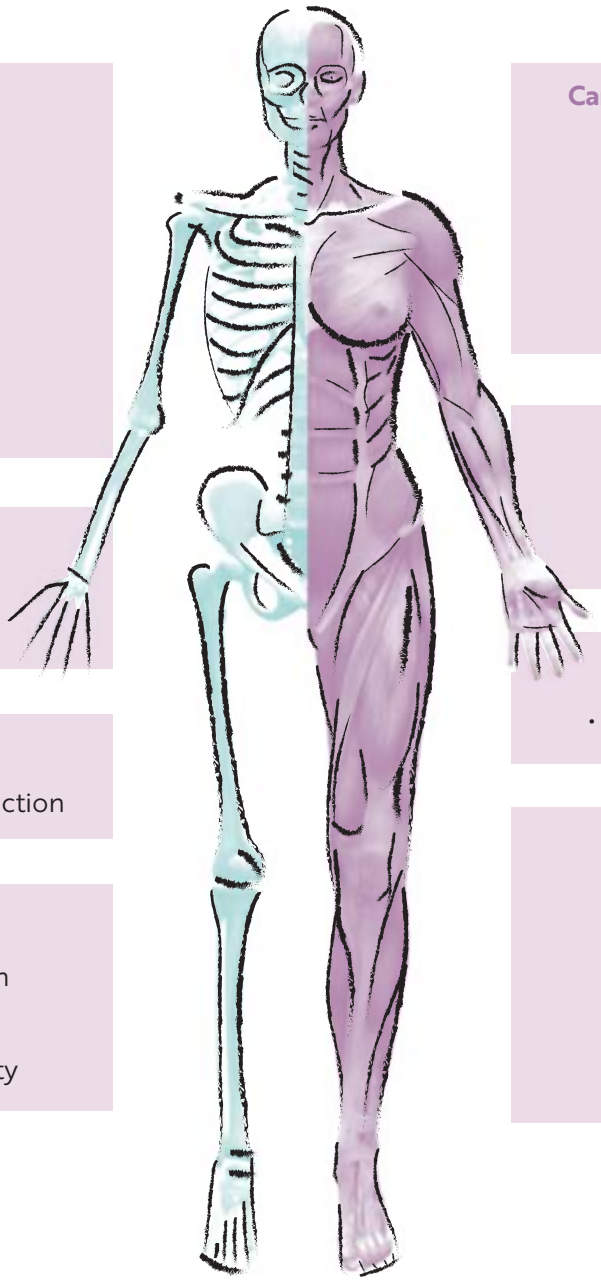
Lead Nutritionist at Viridian Nutrition.

The Magnesium White Paper

Here's what to expect

The *Multi-Tasking* Mineral: Why We Need Magnesium

Magnesium is perhaps the hardest working mineral in the body, required by every single organ, and yet shockingly almost a third (28%) of people in our survey admitted to having no idea what it does.



Neurotransmitter production

- Dopamine
- Melatonin
- Serotonin
- GABA
- Glutamate

Pancreas

- Blood sugar regulation

Hormones

- Hormone production

Bones

- Remineralisation of bones
- Vitamin D activity

Cardiovascular Health

- Heart health and function
- Regulation of blood pressure and blood vessels

Kidneys

- Kidney health
- Kidney function

Energy

- Energy production

Muscle

- Muscle function
- Muscle relaxation
- Reduction of delayed onset muscle soreness

Known as 'the spark of life', magnesium plays a critical role in more than 300 vital processes in the body, including those that control our muscles, hormone production and energy production.

Specifically, magnesium is indispensable in converting the fats, carbohydrates, and proteins we eat into adenosine triphosphate, or ATP, a molecule that gives our cells the energy they need to function and drive our metabolism. Without enough ATP, we feel tired and have no energy. "It's also essential for bone density and overall cardiovascular health," explains Aimée Benbow. "And emerging research suggests magnesium also plays a role in blood glucose control and blood pressure regulation. Furthermore, it helps our immune system function properly and controls inflammation around the body."

HOW YOUR BODY NEEDS MAGNESIUM - FROM HEAD-TO-TOE

From regulating hormones and improving insulin sensitivity to reducing inflammation, this essential mineral is vital for overall well-being. It can help boost mood, strengthen bones and keep your heart healthy. We take a deep dive into the roles.

Quality sleep
Magnesium deficiency is associated with overstimulating the central nervous system which can cause insomnia. Improving magnesium status via supplementation can improve several aspects of sleep, including quality and duration.

Better mood
Known as the 'good mood' mineral, research shows magnesium may be able to help support and regulate stress. It's involved in the production of GABA, a calming neurotransmitter (brain chemical), which helps promote feelings of happiness.

Hormone balance
There's a strong relationship between magnesium and hormone production/ regulation and low levels can contribute to premenstrual syndrome (PMS). Studies have found that supplementation in women with poor magnesium status improves PMS symptoms.

Strong bones
Adequate magnesium intake is required to successfully remineralise the bones, keeping them strong and less likely to fracture. It plays a key role in aiding the absorption of calcium into bone.

Muscle health
Magnesium is involved in helping the smooth muscle, including those in the stomach and bladder, relax and contract. Magnesium supplementation has also been found to significantly reduce the duration and intensity of muscle cramps.

> "Magnesium plays a critical role in more than 300 vital processes in the body"

Healthy heart
Magnesium behaves in similar way to calcium channel blockers used to treat high blood pressure. It increases levels of the chemical nitric oxide in the body which triggers vasodilation - the opening or widening of blood vessels which increases blood flow - and so sufficient levels are very important for cardiovascular health.

Good hydration
Magnesium is one of the four so-called 'electrolyte' minerals, vital in ensuring all the body's cells have enough water. Along with sodium, potassium and chloride, its levels become depleted through sweating, crying, vomiting and peeing and must be replenished with a mineral-rich diet or supplements. The heart, muscles and blood all require balanced quantities of electrolytes to function properly.

Energy
Magnesium is crucial for creating adenosine triphosphate or ATP, the molecule that fuels every cell in your body. Without magnesium, ATP cannot be produced, the cells cannot function optimally and this could lead to a slowdown in metabolism and leave you feeling 'flat'. Consuming magnesium is vital for energy production.

Sport performance
Magnesium is important for physical activity through many different mechanisms and deficiency can impair sports performance. Good magnesium intake improves energy release, cardiovascular function and electrolyte balance, and has been found to result in better performance in both professional sports people and normal people working out.

Kidney function
The kidneys regulate magnesium levels in the body and it's a relationship that works both ways, as magnesium is also needed by the kidneys to function properly. Low levels are associated with greater risk of chronic kidney disease.

Blood sugar balance
Low magnesium levels are linked to higher fasting blood glucose (sugar), and by extension, a higher risk of diabetes. Magnesium is involved in the process of releasing insulin in response to elevated levels of blood glucose.

Lower inflammation
Magnesium deficiency is associated with low-grade chronic inflammation around the body, which in turn has been linked to a higher risk of many chronic conditions including heart disease, allergies and auto-immune conditions such as rheumatoid arthritis and lupus.

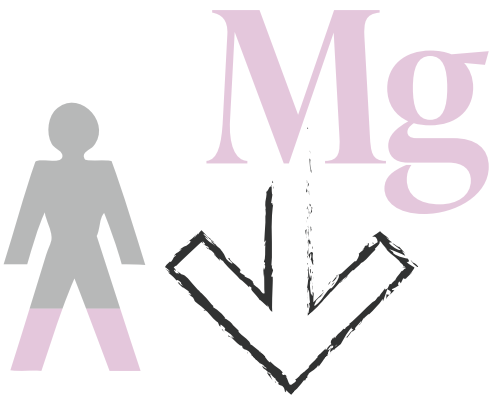
Mg for Kids

This mineral is as essential for kids and teens, as it is for adults. It helps with the same processes and in addition supports with development and growth. In children and younger adults its roles include supporting hormonal change, bone and physical development.

Are You Getting *Enough* Magnesium?

A staggering three-quarters of Brits could be low in magnesium without even realising it, according to a recent report by the World Health Organisation, potentially increasing their risk of chronic conditions such as heart disease and diabetes.

But despite magnesium being essential for energy, muscle function, and heart health, 45 per cent of people never take a magnesium supplement according to our survey - raising concerns over widespread deficiency and its hidden health risks.



75%

could be low in magnesium

45%

never take a magnesium supplement

Here are some of the factors that can seriously deplete magnesium levels in your body.

MAGNESIUM ZAPPERS

Diet
Nutrition plays a very important role in both magnesium insufficiency (low levels) and deficiency. A nutrient dense diet rich in plant-based foods will provide greater amounts of magnesium than one based around ultra-processed and high sugar foods.

Stress
The feeling of being overwhelmed prompts the brain to tell the adrenal glands (hormone producing glands that sit just above the kidneys) to release the so-called 'stress hormone' cortisol. The adrenal glands need magnesium - along with B vitamins and vitamin C - to produce cortisol, so long-term term stress can lead to magnesium depletion.

Exercise or illness
Sweating, either caused by exercise, a sauna or hot weather can deplete the body of magnesium, especially if your dietary levels aren't great already, while a bout of diarrhoea can leave your body low in electrolyte minerals, including magnesium.

Pregnancy
Pregnant women have increased magnesium requirements, but studies suggest up to 50% don't meet this through diet or by taking supplements - risking insufficiency at a critical time for their body.

Alcohol and smoking
Magnesium is needed to help the body get rid of toxins. Heavy drinking can be a risk factor for magnesium depletion, as it's required to break down alcohol and eliminate it from the body. Similarly, smoking introduces heavy metals and toxins into the body, which then requires magnesium to detoxify.

Medication
Over 100 medications have been associated with magnesium depletion, including diuretics, immunosuppressants and acid reflux medications (PPIs). Research by the European Journal of Clinical Nutrition found that up to 40% of people on diuretics may experience insufficient magnesium. Check with your GP or pharmacist.

Bowel conditions
Irritable bowel syndrome (IBS), inflammatory bowel disease and coeliac disease can all inhibit absorption of magnesium in the gut.

Could I be deficient?
A clinical magnesium deficiency in otherwise healthy people is uncommon, however habitually low intakes of magnesium can lead to what's known as magnesium insufficiency – which is thought to be very common and linked to a host of potential health problems.

Magnesium Insufficiency: An *Overlooked* Problem

Not getting enough magnesium is linked to some of the big health issues of today - including heart disease, diabetes, and migraines.

With 34 per cent of people surveyed taking magnesium to improve sleep, 30 per cent to fight fatigue, and 22 per cent to ease muscle aches, it's clear people recognise some of magnesium's benefits, but with the mineral playing such a crucial role in everything from heart health to mental wellbeing are we overlooking its full potential?

"Low magnesium can lead to many systematic problems for the body, in some cases causing them and other times exacerbating them," says Dr Lindsy Kass, "The list is very long as magnesium is essential for so many functions, but some of the more common ones include: heart palpitations, high blood pressure, type 2 diabetes, osteoporosis, migraine and PMS." Research has linked the following health problems to low magnesium.

> *Low magnesium can lead to many systematic problems for the body*

Depression and anxiety
Could this simple mineral be a missing link in the mental health crisis? Magnesium plays a key role in mood regulation and some 27 per cent of people in our survey said they struggled with depression and anxiety, yet they're seemingly unaware that magnesium could help. A 2017 study published in the journal PLOS ONE found that people on anti-depression pills who took magnesium supplements on top of their usual medication enjoyed an improvement in depression symptoms, with researchers concluding that magnesium is effective for mild-to-moderate depression in adults.

Heart disease
Magnesium plays a crucial role in heart muscle contraction and blood pressure regulation and low levels are linked to an increased risk of cardiovascular problems, such as high blood pressure, arrhythmias (irregular heartbeats), and coronary artery disease. Research published in the American Journal of Clinical Nutrition found that people with low magnesium intake were 25% more likely to develop heart disease.

Diabetes
Magnesium plays a crucial role in regulating blood sugar levels and improving insulin sensitivity, making it potentially a key player in managing or preventing type 2 diabetes. Magnesium helps insulin carry glucose into cells for energy and adequate levels may reduce the risk of insulin resistance, yet many people are still unaware of this link. Research in the Journal of the American College of Nutrition, found that nearly 40% of people with type 2 diabetes were magnesium deficient or insufficient.

Osteoporosis
Magnesium is vital for bone formation and studies show that chronic low magnesium levels can contribute to osteoporosis, a condition characterised by weak bones, reduced bone mineral density (BMD) and an increased risk of fractures. An update on magnesium and bone health published in the journal Biometals in 2021 reviewed existing research and found that in all studies examined there was a benefit both in terms of BMD and fracture risk after taking magnesium supplements.

Migraine
People with low magnesium levels are twice as likely to experience migraines, according to research in the American Journal of Clinical Nutrition. The theory is insufficiency promotes the release of neurotransmitters that cause blood vessels to constrict - a factor we know can trigger migraine. Magnesium supplementation has been shown to reduce the frequency and severity of these painful headaches. A report published in the journal Nutrients in 2025 concluded that "oral magnesium supplements are a cost-effective and well-tolerated option for treating migraine patients."

PMS
Magnesium helps regulate hormones, reduces inflammation and has been shown to help reduce symptoms of premenstrual syndrome (PMS), including bloating, cramps, mood swings and headaches. Studies have found that supplementing with magnesium can reduce the severity of menstrual symptoms.

Did You Know?

During pregnancy, low magnesium levels may lead to pre-eclampsia, low birth weight or miscarriage," says Dr Lindsy Kass. This risk can be reduced by taking a pregnancy formula supplement that contains magnesium.

Smart Ways To *Up Your Intake*

Although 35 per cent of people surveyed said they sometimes include magnesium-rich foods in their diet, many don't actually know which foods contain the mineral - meaning they may not be making the right choices.

Magnesium Rich Foods (mg/100g)			
Seeds		**Legumes and Beans**	
Sunflower Seeds	390mg	Green Beans	254mg
Sesame Seeds	370mg	Edamame (boiled)	65mg
Poppy Seeds	330mg	Pinto Beans (boiled)	56mg
Pumpkin Seeds	270mg	Chickpeas (boiled)	44mg
Nuts		Kidney Beans (boiled)	40mg
Brazil Nuts (no shell)	410mg	**Green Vegetables**	
Almonds	270mg	Baby Spinach (boiled)	112mg
Cashews	270mg	Rocket (raw)	28mg
Peanuts (no shell)	210mg	Peas (boiled)	27mg
Grains		**Fish and Seafoods**	
Bran Wheat	389mg	Sardines (canned,brine)	42mg
Quinoa (raw)	210mg	Tuna (baked)	41mg
Brown Rice (boiled)	49mg	Prawns (cooked)	36mg
Barley	22mg	Salmon (cold-smoked)	31mg
Fruits		Cod (grilled)	30mg
Banana	27mg	**Cocoa Products**	
Avocado	25mg	Chocolate (plain)	89mg

HOW MUCH IS ENOUGH?

The European Food Safety Authority recommends an intake of 300mg a day of magnesium for women aged 19-75+ and 350mg for men. But how do we hit these target amounts?

At Viridian, we take a food first approach and in an ideal world everyone would eat all the nutrients required to thrive, but the truth is, achieving enough magnesium through diet alone can be tough. Intensive farming methods, higher-than-ever intakes of ultra-processed foods (UPFs) and skipping meals due to busy lives combine to make reaching the optimum intake hard. "UPFs have decreased the consumption of green leafy vegetables, seeds and nuts which are all a key source of magnesium in a Western diet," points out Dr Lindsy Kass.

Another important factor is depleted nutrient levels in the soil due to decades of over-farming and use of fertilisers that don't contain magnesium, meaning even naturally farmed foods are unable to provide the same levels they did back in the 1940s – for example, our vegetables contain up to 40 per cent less magnesium today.

It's also worth bearing in mind that recommended dietary intakes are often set at the minimum needed to keep us functioning and not necessarily the optimum levels for peak health. Some of us also have poorer absorption of certain vitamins and minerals - due to health conditions or medication – making it impossible to hit sufficient levels through food alone. Even for those of us who do our best to eat well, the stresses of modern life can mean we struggle with consistency, leaving gaps in our nutritional requirements. This is where supplementing magnesium can be helpful.

Water works:

"Did you know magnesium is found naturally in tap water, with higher concentration in hard water areas? Although not as high as that found in mineral water, at 20-30mg of magnesium per litre, tap water does still provide a significant amount in addition to food." says Dr Lindsy Kass.

> *Achieving enough magnesium through diet alone can be tough*

Choosing The *Right* Supplement For You

When it comes to magnesium supplements, the last thing you want to do is waste money - but how do you pick an effective one?

Magnesium is available in many forms and our survey revealed that consumers are still uncertain about the different types. Indeed, over half (51%) of the people surveyed were unable to name one type of magnesium from a list of the most common supplement forms of the mineral – which means they may not be picking the best one to suit their needs.

"Because there are so many different forms of magnesium supplements available on the market, it can be confusing" says Aimée Benbow.

"Different forms have varying bioavailability - the rate at which they're absorbed - but this doesn't equal effectiveness," she explains: "Magnesium supplements can come in a free form (ionic), organic or inorganic form."

Unclear about what the different magnesium names on ingredients lists mean? Magnesium is often chelated – bound to another compound - which makes labels harder to decode. For example, magnesium citrate is formed by chelating magnesium to citric acid. There are several chelated forms of magnesium approved for use in the UK, which can provide additional benefits beyond those of magnesium alone. For instance, magnesium bound to the amino acid glycine makes magnesium bisglycinate – and glycine and magnesium can work together to support sleep. This combination is also gentle on the gut. Another example is magnesium ascorbate, which is magnesium chelated to ascorbic acid (or vitamin C) providing additional benefits to the immune system.

"But magnesium oxide (magnesium chelated to oxygen) is by far the most researched form," adds Aimée Benbow, "and has been proven to improve magnesium status as effectively as other forms, including the popular magnesium citrate (chelated to citric acid)."

Magnesium Forms	Uses	Elemental Magnesium %
Magnesium Oxide	General well-being	**60%**
Magnesium Malate	Energy/chronic fatigue	**20%**
Magnesium Citrate	Low energy/general fatigue	**15%**
Magnesium Bisglycinate	Sleep and relaxation	**10%**
Magnesium Taurate	Heart health	**7%**

Ionic magnesium meanwhile is not bound to anything – but this pure form of the mineral is a positively charged ion which makes it easier for the body to absorb and use it as it doesn't need to be broken down. Therefore, it is unbound and ready to react. Viridian source ionic magnesium from the Great Salt Lake, in Utah, a natural and clean environment for the water, rich in magnesium. The water is sun-dried for two years to increase its magnesium concentration, nothing else is added.

SHOULD I PICK A CAPSULE, POWDER OR LIQUID?

Phil Beard, nutritionist from Viridian Nutrition advises: "There's no 'one-size-fits-all' magnesium - some people benefit from a specific form, while liquid or powdered formats may also be more suitable for those who are unable to take capsules." Here's the lowdown on the most popular forms.

Capsules
Provide consistent doses removing the potential inconsistency of measuring powders or liquids. Unlike tablets, capsules don't need excipients (unnecessary extras such as binders and fillers) and can be made with only active ingredients.

Powder
Powders allow for adjustable dosing and can be added to drinks or smoothies – and are especially suitable for people who can't swallow capsules.

Liquid
Also great for those who struggle with capsules. Choose magnesium in its ionic form and add to drinks, making it ideal for on-the-go supplementation.

Topical magnesium
Creams or sprays are a current trend, but research has found that oral supplementation is far more effective, with more consistent results in raising magnesium levels.

5 WAYS TO BE SUPPLEMENT SAVVY

1. Choose purity
Always opt for a magnesium supplement that is either earth-sourced, pure and fully chelated, or in ionic unbound form and contains 100% active ingredients. This will provide the highest natural potency without any fillers, binders, glues, irradiation or lubricants.

2. Explore different forms
There is no one perfect form of magnesium for everyone, you might need to experiment to find the most effective type and dose for you. Start at a lower dose and build up slowly to larger doses if required. Ask your local health food store if you need advice. You should judge your chosen magnesium supplement after 30 days of consistent use to see if it works for you - or if you need to re-assess and try a different form and format.

3. Time your intake
Timing can also help get the most out of your supplement. For example, magnesium taken a couple hours before bedtime may help improve sleep.

4. Pair with other nutrients
When paired with other supplements, magnesium can have added benefits. For example, used with B6 and saffron, magnesium can help balance women's hormones, while taking alongside cherry extract can provide extra sleep support.

5. Check medications
If you're taking medication, it's worth checking with a health food store, GP or pharmacist for any potential interactions or contraindications, as magnesium can reduce the effectiveness of some medications.

The *Magic* Of Magnesium

HOW TAKING IT CAN IMPROVE YOUR HEALTH: WHAT THE EXPERTS SAY...

"Magnesium insufficiency is a common yet often overlooked health issue in the UK. Certain groups, such as older adults, athletes, and those with digestive disorders, are particularly at risk. Addressing magnesium insufficiency through dietary changes or supplementation could improve health outcomes."

Aimée Benbow, BSc (Hons), MSc, ANutr,
Lead Nutritionist at Viridian Nutrition.

"Taking magnesium if your levels are low really can improve your general well-being, leading to more energy, less anxiety and a better sleep pattern. It can also help to regulate blood sugar levels via its interaction with insulin and blood pressure, through increasing widening of the arteries."

Dr Lindsy Kass
Sports and Nutrition Scientist at University of Hertfordshire and leading researcher in magnesium supplementation.

"As magnesium is involved in so many different systems in the body, it will be used where it's most needed - so you'll likely see a whole range of benefits from taking a supplement."

Phil Beard, BSc (Hons), MSc
Nutritionist and Nutrition Educator at Viridian

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Magnesium

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