ULTIMATE MAG

PRODUCT TECHNICAL EDUCATION SHEET

Ultimate MAG is a superior multi-magnesium supplement formulated with five of the highest quality and most clinically studied forms of magnesium to support deep restorative sleep whilst also targeting nervous system health, stress, cellular energy, heart health and muscle tension. Ultimate MAG combines magnesium critical for total body wellbeing with two digestive "activators" Ginger and Acacia to support optimal digestive function for the rapid absorption and utilisation of these important forms of magnesium.

INDICATIONS

- Light sleeping, waking in the night
- Unrefreshing sleep
- Easily woken by noise
- Snoring
- Muscle twitching – day and night
- Restless legs
- Muscle aches and tension
- Mood imbalances, worries and anxiety
- Head injuries
- Stress management
- Headaches or migraines
- Ringing in ears
- Cardiovascular health
- Nervous system support
- Premenstrual cramps
- Magnesium deficiency

INGREDIENTS

Ingredient	Per capsule	Per dose
Magnesium Amino Acid Chelate	200mg	800mg
Magnesium Aspartate	100mg	400mg
Magnesium Citrate	225mg	900mg
Magnesium Phosphate	73mg	292mg
Magnesium Orotate	38mg	152mg
Total Magnesium	**635mg**	**2,540mg**
Total Elemental Magnesium	**100mg**	**400mg**
Acacia senegal (Acacia Gum)	25mg	100mg
Zingiber officinale (Ginger powder)	8mg	32mg

COMPANION PRODUCTS

CleverSleep® Practitioner Only Products: MAX Sleep, Liquid MAG and Neuro Health PLUS

FEATURES & BENEFITS

Feature	Benefit
High strength multi-magnesium	Five clinically proven forms of magnesium to support deep "slow brain wave" and restorative sleep, target stress, relax muscles, improve cellular energy and heart health.
Magnesium oxide free formula	Gentle on the digestive system
Therapeutic doses of magnesium	Supports overall health and wellbeing with the required amount of elemental magnesium to correct nutritional deficiency and optimise health.
Ginger and Acacia Gum for digestive support	Research shows that 76% of magnesium is absorbed in the gut. To support maximum magnesium absorption Ultimate MAG also combines two digestive activators in the form of Ginger and Acacia (a prebiotic) to enhance digestive function.

DOSAGE INSTRUCTIONS

For best results, use for a minimum of one month and ongoing or as directed by your healthcare professional.

Adult:
A minimum of 4 capsules with water before bed.

Children:
Aged 9+ years: Take 4 capsules with water before bed.

Aged 4 – 8 years: Take 1 capsule with water before bed.

Dosage for under 4 years of age should be at the discretion of health practitioner.

Note: 1 capsule = 100mg elemental magnesium

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MAGNESIUM RECOMMENDED DAILY INTAKE (RDI)

Nutrient Reference Values for Australia and New Zealand (2006)

Infants and Children	Elemental RDI
0-6 months	30mg/ day
7-12 months	75mg/ day
1-3 years	80mg/ day
4-8 years	130mg/ day
9-13 years	240mg/ day

Adults	Elemental RDI
14 – 18 years old Male	410mg/day
14 – 18 years old Female	360mg/day
19 – 30 years old Male	400mg/day
19 – 30 years old Female	310mg/day
30 + Male	420mg/day
30 + Female	320mg/day
Pregnancy: 14 – 18 years old	400mg/day
Lactation: 14 – 18 years old	360mg/ day
Pregnancy: 19 – 30 years old	350mg/day
Lactation: 19 – 30 years old	310mg/day
Pregnancy: 30 +	360mg/day
Lactation: 30 +	320mg/day

MAGNESIUM RESEARCH

Magnesium is required as a cofactor for over 600 enzymatic processes, having a crucial role in energy production (ATP), supporting muscles and nerve function. ATP is required universally for energy production for every bodily function, glucose utilisation, synthesis of fat, protein, nucleic acids, and coenzymes. Therefore, it is important to highlight that ATP metabolism, muscle contraction, relaxation, normal neurological function, and release of neurotransmitters are all magnesium-dependent.[1]

Magnesium acts on several physiological steps involved in mediating the stress response of the central nervous system. One mechanism is that it indirectly reduces the release of two key stress hormones, adrenocorticotropic hormone and cortisol. Magnesium also exerts long-term neuroprotective and anti-oxidant effects against future stress.[2]

Clinical uses of magnesium:

- Supports sleep, stress, and insomnia[2]
- Increases slow-wave sleep (the most restorative sleep phases - theta and delta)[2]
- Mediates the stress response of the sympathetic nervous system[2]
- Reduces cortisol (stress hormone) overproduction[2]
- Helps reduce restless leg syndrome.[3]

MAGNESIUM IS A KEY INGREDIENT TO:

- Support sleep, stress and insomnia[2]
- Increase slow-wave sleep (the most restorative sleep phases theta and delta)[2]
- Mediate stress response of the nervous system[2]
- Reduce stress hormone (cortisol) production[2]
- Help reduce restless leg syndrome[3]

MAGNESIUM REQUIREMENTS:

Optimal levels of magnesium the body needs to support health and wellbeing is calculated at approximately 4.5mg of magnesium per kilogram of body weight per day.[2]

ADDITIONAL MAGNESIUM:

However, extra magnesium is needed by the general population especially in times of stress, sleeping challenges, injury, pregnancy and breastfeeding.[2]

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MAGNESIUM DISTRIBUTION

The majority of the body's magnesium (around 99%) is found within our bones, muscles, and soft tissue with half of this amount, residing in the surface of our bones. Extracellular magnesium accounts for no more than 1% of total magnesium levels and is primarily found in our blood (serum, and red blood cells).[4]

MAGNESIUM ABSORPTION AND EXCRETION

Magnesium is mainly absorbed in the small intestine, specifically in the duodenum and ileum by both active and passive processes. Up to 76% of magnesium intake is absorbed in the gut and the rest is excreted by the kidneys and faeces (see Figure 1.0)[5], with the majority of excretion occurring at night,[6]
The current magnesium status of a person is strongly related to the rate of absorption in the gut over total magnesium intake. Lower levels of Magnesium and deficiencies in the body is mainly due to faster rates of absorption and excretion, compromising the body's ability to utilise and store magnesium.

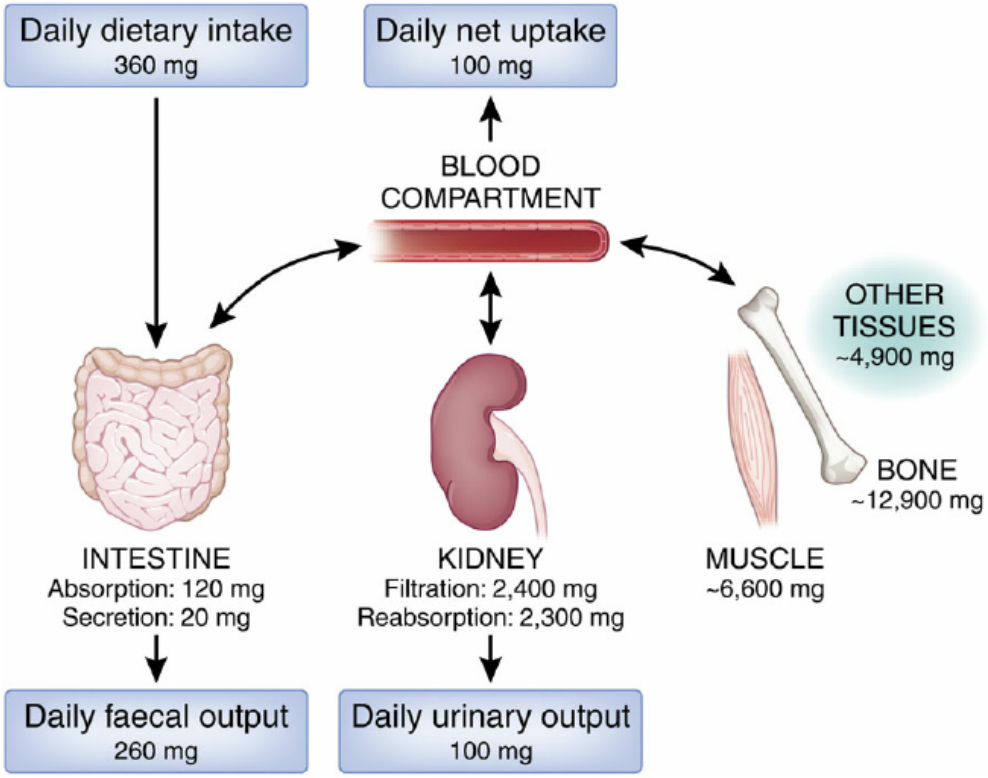

Fig. 1.0 Magnesium (Mg) homeostasis. Panels represent the daily amount of Mg intake and excretion. A daily net intake of 100 mg Mg in the intestine results in a balanced 100 mg excretion in the kidney. In times of Mg shortage, other tissues such as bone and muscle provide Mg to restore blood Mg levels.

From de Baaij, Jeroen & Hoenderop, Joost & Bindels, René. (2012). Regulation of magnesium balance: Lessons learned from human genetic disease. Clinical Kidney Journal. 10.1093/ndtplus/sfr164[6]

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SIGNS AND SYMPTOMS OF MAGNESIUM DEFICIENCY

- Sleeping issues
- Muscular weakness
- Muscle twitching
- Abdominal cramps
- Ataxia
- Vertigo
- Depression or apathy
- Irritability
- Anxiety
- Agitation
- Confusion
- Forgetfulness
- Poor attention and concentration
- Cardiovascular disease
- Hypertension
- Asthma
- Migraines or tension headaches
- Premenstrual tension
- Sensitivity to loud or sudden noise
- Low circulating levels of parathyroid hormone
- Tingling or numbness
- Low calcium levels
- Retention of sodium
- Low blood potassium levels

AT RISK GROUPS OF MAGNESIUM DEFICIENCY

- People with gastrointestinal disease – chronic diarrhoea, fat malabsorption resulting from irritable bowel diseases, gluten sensitivity enteropathy (Coeliac disease), resection, or bypass of the small intestine (especially ileum) may cause malabsorption and magnesium loss.
- People with type 2 diabetes and insulin resistance due to increased urinary excretion.
- Alcohol dependence may result in depleted magnesium status, as it decreases the secretion of pancreatic enzymes, thus interfering with the breakdown of nutrients into absorbable molecules the body can use. Alcohol damages the stomach and intestinal lining which prevents optimal absorption of magnesium.
- People older than 60 years of age due to impaired magnesium absorption, poor dietary habits, and the interaction of medications that interfere with magnesium absorption.
- Athletes can have a higher magnesium requirement due to nutrient losses through the kidneys and sweat. This is more common in high-performance athletes.
- People taking proton pump inhibitors for more than two months.[7] [8]

However, it can be argued the general population is also at risk of a magnesium deficiency. This is due to our modern, fast-paced lifestyles contributing to an increase in worldwide stress and anxiety levels demanding higher cellular magnesium requirements than ever before. Coupled with this, it is also difficult to obtain the recommended daily intake of magnesium through diet alone. This is due to industrialised agricultural methods resulting in lower levels of magnesium in our soils, higher intakes of processed foods, calcium fortification and supplements competing with magnesium for absorption.[9]

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MAGNESIUM AMINO ACID CHELATE

INGREDIENT RESEARCH

- Highly absorbable
- Magnesium bound to multiple amino acids and is used to effectively restore magnesium levels.[10]

MAGNESIUM ASPARTATE

INGREDIENT RESEARCH

- High bioavailability
- Magnesium with aspartic acid are critical components of protein biosynthesis
- Magnesium and aspartic acid synthesise amino acids as part of the citric acid cycle
- Beneficial for cellular energy production, metabolism and balanced neurochemistry
- Support for exercise recovery and performance.[11]

MAGNESIUM CITRATE

INGREDIENT RESEARCH

- Evidence shows superior absorption and significantly increased plasma and salivary Mg concentrations after 60 days of supplementation compared to Mg Oxide and Mg amino acid chelate.[12]
- Well absorbed by the digestive system
- A highly effective form of magnesium supplementation.[13]

MAGNESIUM PHOSPHATE

INGREDIENT RESEARCH

- It is a form of magnesium that has an excellent affinity with nerves and muscles
- Indicated to support energy production and normal nerve function
- Indicated to alleviate muscle cramping, spasming, twitching, and headaches.[14]

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MAGNESIUM OROTATE

INGREDIENT RESEARCH

- Magnesium bound to orotic acid
- Studies show Magnesium orotate supports heart health. (see figure 2.0)[15]
- Magnesium orotate improves symptoms of heart failure, angina symptoms, and exercise performance. (see Figure 3.0)[15]
- A study evaluated magnesium orotate on mortality and clinical symptoms of patients with severe heart failure, finding a significant improvement in survival as well as cardiac symptoms and overall quality of life.[16]
- Magnesium orotate supplementation can improve exercise tolerance in patients with coronary heart disease.[17]
- Orotate found to penetrate the cell membrane, enabling the effective delivery of magnesium ions into the innermost layers of the cellular mitochondria and nucleus.[18]

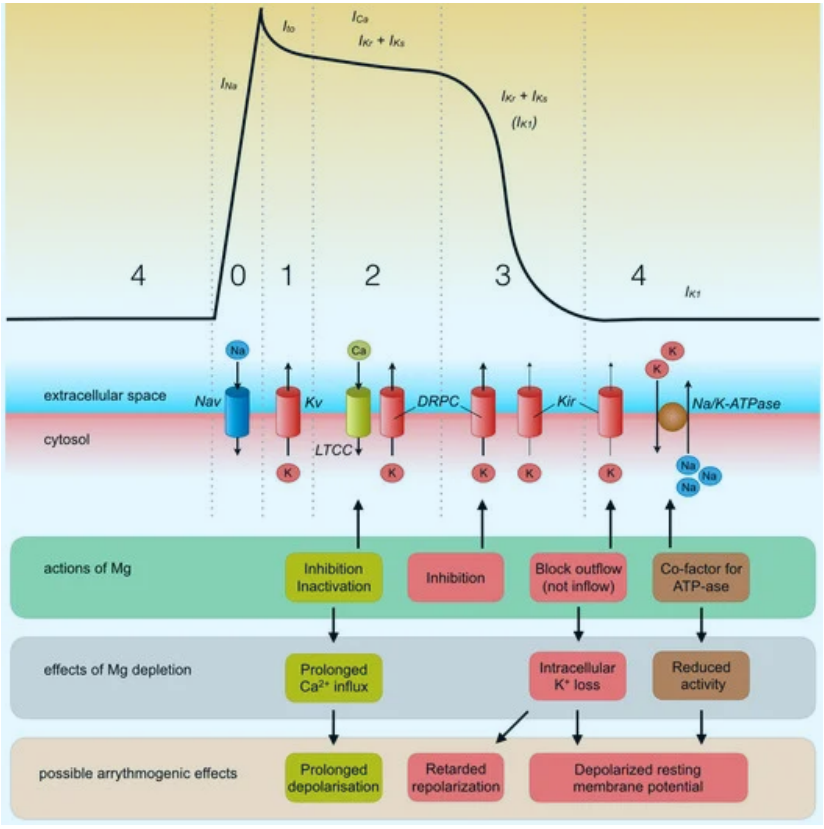

Figure 2.0 Cardiac excitation and potential effects of magnesium depletion.
Processes during the different phases of the action potential are shown as INa: inward sodium current; Ito: transient outward potassium current; ICa: inward calcium current; IKr + IKs: outward potassium current through delayed rectifier potassium channels; IK1: potassium current through inwardly rectifying potassium channels; Nav: voltage-gated sodium channel; Kv: voltage-gated potassium channel; LTCC: L-type calcium channel; DRPC: delayed rectifier potassium channel; Kir: inwardly rectifying potassium channel; Na/K-ATPase: sodium/potassium-ATPase.
From Leenders NHJ, Vervloet MG. Magnesium: A Magic Bullet for Cardiovascular Disease in Chronic Kidney Disease? Nutrients. 2019; 11(2):455. https://doi.org/10.3390/nu11020455[15]

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MAGNESIUM OROTATE CONTINUED

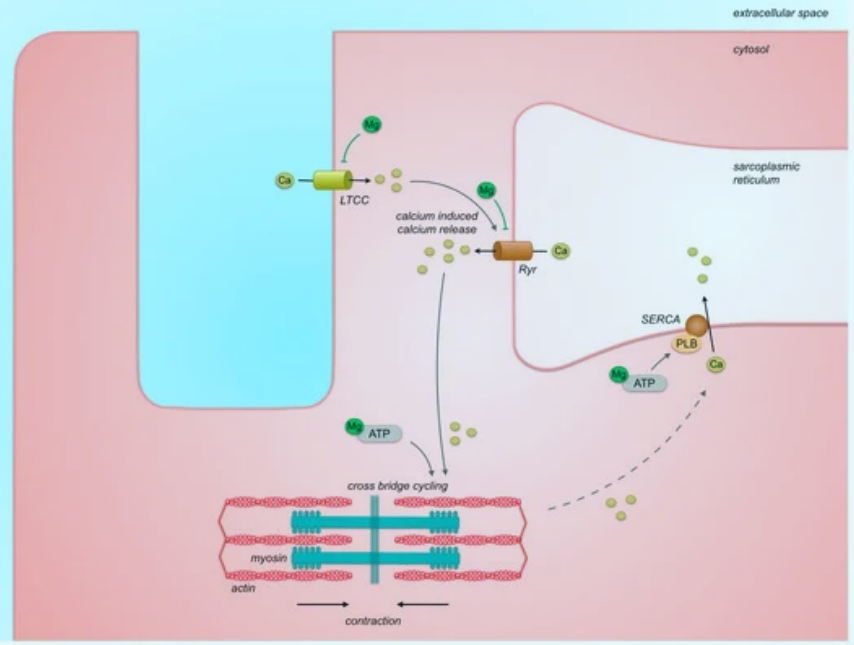

Figure 3. 0 Cardiac excitation-contraction coupling.
After initial depolarisation, calcium influx via L-type calcium channels triggers calcium release from the sarcoplasmic reticulum via Ryanodine receptors. The amplified cytosolic calcium concentration triggers cross-bridge cycling of actin and myosin filaments leading to muscle contraction. Re-uptake of calcium into the sarcoplasmic reticulum via the phosphorylated-phospholamban-activated SERCA-pump leads to muscle relaxation. Actions of magnesium are shown. Arrows indicate stimulating effects, and right-angled line endings indicate inhibiting effects. LTCC: L-type calcium channel, Ryr: ryanodine receptor, PLB: phospholamban, SERCA: sarco/endoplasmic reticulum calcium ATPase
from Leenders NHJ, Vervloet MG. Magnesium: A Magic Bullet for Cardiovascular Disease in Chronic Kidney Disease? Nutrients. 2019; 11(2):455. https://doi.org/10.3390/nu11020455[15]

ACACIA SENEGAL (ACACIA GUM)

INGREDIENT RESEARCH

- Acacia senegal (Acacia gum) is a soluble dietary fibre, composed mainly of complex polysaccharides
- Traditionally used in some cultures to improve digestion and intestinal transit time.[19]
- Acacia gum is a prebiotic fibre shown to increase Bifidobacterium and Lactobacillus bacteria in the gut to the same level as an equal dose of inulin and resulted in fewer gastrointestinal side effects such as bloating and gas.[20]

ZINGIBER OFFICINALE (GINGER)

INGREDIENT RESEARCH

- Zingiber officinale (Ginger) is known to have a digestive stimulant carminative, a peripheral circulatory stimulant, a spasmolytic, and has anti-inflammatory actions.[21]
- Enhances gastrointestinal motility
- Stimulates gastric emptying
- Ginger is commonly used for gastrointestinal disturbances such as diarrhoea, irritable bowel syndrome, nausea, and loss of appetite.[22]

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CAUTIONS

Magnesium supplementation may decrease the absorption of some medications.

Ultimate MAG should be used 2 hours away from medications, special attention should be given to patients taking tetracycline or quinolone antibiotics.

Magnesium supplementation can cause loose bowel movements. The threshold at which this may occur varies between people. The effect is normally temporary but if your patient feels uncomfortable, or this is not manageable please split the dosage until bowel movements stabilise.

Drug, nutrient, diet, or dietary interactions:

- Kidney problems, such as kidney failure. Compromised kidney function impairs the body's ability to clear magnesium. Taking extra supplementation can cause magnesium to build up to dangerous levels.
- Diuretics such as furosemide and hydrochlorothiazide used to reduce hypertension act on the kidneys to remove sodium and chloride in the body and increase the flow of urine (diuresis). This may deplete magnesium levels.
- Lactulose, Miralax®, and Senna® which are laxative medications may reduce magnesium absorption.
- Oral contraceptive pills may decrease magnesium absorption.
- Osteoporosis medications such as Fosamax® or Actonel®. These medications act to enhance magnesium absorption in bones.
- Magnesium in higher doses has been shown to prolong clotting time and potentially interact with anticoagulant medicines used to treat bleeding disorders.
- Digoxin and gabapentin absorption rates may be affected by magnesium and need to be taken 2 hours before or after supplementation.
- Magnesium supplementation increases the absorption of diabetes medication specifically sulfonylureas. Take 2-4 hours away from them to avoid blood sugar levels dropping to an unhealthy level.
- Hypertension medication can block calcium channels. Magnesium can also block calcium from entering the cells and therefore taking Magnesium may cause the patient's blood pressure to drop to an unhealthy level.

CONTRAINDICATIONS

Anyone with an allergy or sensitivity to any of the ingredients.

This technical education sheet was created by the CleverSleep® Research team for healthcare professionals. This information is not intended to replace medical advice. It is designed to provide the most updated information about our products. All the scientific research used to validate this document is available upon request or through the research section of our website www.cleversleep.co.nz.