designs for health® Australia

Tri-Mag Active Muscle

Maintains and supports healthy muscle function and supports energy production

Oral Powder

OVERVIEW

- Contains a unique and specific blend of three magnesium forms for optimal neuromuscular support – aspartate, glycerophosphate and citrate
- Supports healthy muscle and nervous system function
- Contains 150 mg Nicotinamide riboside to enhance NAD+ production
- Contains 3 g Taurine to provide further support for cardiovascular and skeletal muscle function and enhance muscle performance and stamina
- Supports energy production
- Provides support for healthy bone building and bone mass
- Assists carbohydrate metabolism and supports healthy blood glucose levels

Active Ingredients (per 10 g dose)	
Magnesium aspartate dihydrate	1.4 g
Equiv. Magnesium	105 mg
Magnesium glycerophosphate	1.15 g
Equiv. Magnesium	127 mg
Magnesium citrate	792.1 mg
Equiv. Magnesium	128 mg
Total Magnesium	**360 mg**
Taurine	3 g
Nicotinamide riboside chloride	150 mg
Potassium aspartate	47.6 mg
Equiv. potassium	10 mg

BENEFITS TO YOUR PATIENT

- Improvements in muscle performance
- Nutritional support for peak muscle and nerve health and function
- Nutritional support for electrolyte balance, oxygen utilisation, ATP production, physical fitness and recovery
- Supportive nutritional bone care
- Metabolic support for carbohydrate breakdown and optimal energy production

Pack Size	300 g
Servings Per Pack	30 serves

Excipients

Colloidal anhydrous silica, natural guava powder, lemonade powder, maltodextrin, Stevia rebaudiana

Directions for Use

Adults, mix 10 g (two level scoops) into 200 mls of water and consume immediately, or as directed by your healthcare professional.

Allergen Information

No added: dairy, lactose, gluten, nuts or soy

Warnings

Vitamin and/or mineral supplements should not replace a balanced diet. Not to be taken by children under 12 years old. Contains sugars (including ribose) and sulfites.

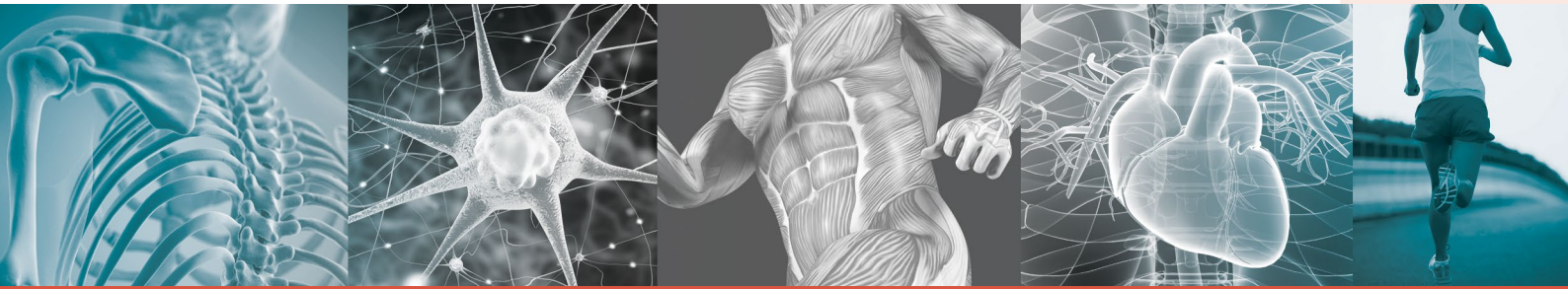
Vegan Friendly

No Added Gluten

No Added Soy

No Added Dairy

No Added Nuts



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EDUCATION

Magnesium

Magnesium is one of the most ubiquitous and essential minerals in the body. It is a critical nutrient in almost every cellular metabolic and biological process, with enzyme databases listing over 600 enzymes that use magnesium as a co-factor and a further 200 being directly activated by magnesium.[1]

As a structural component of the hydroxyapatite mineral matrix of bone, a natural calcium channel blocker, a required element for electrolyte balance and proper functioning of sodium-potassium pumps, magnesium plays a crucial role in supporting physical strength and mobility, muscle contraction, neurological health and cardiac function. Magnesium's role as an enzyme cofactor for processes that generate ATP underlies its importance in energy production and metabolic processes. Protein synthesis (DNA and RNA), carbohydrate metabolism and neurotransmission are also fundamental metabolic processes that are reliant upon adequate magnesium status.[2,3,4,5]

Cardiovascular and neuromuscular health & function – the Sodium-Potassium ATPase pump

Magnesium is a critical regulator of the activity rate of the Sodium-Potassium ATPase pump (Na+, K+- ATPase pump) which is required for removal of sodium from inside the cell in exchange for potassium.[6] This makes Magnesium vital for maintaining the electrical potential of skeletal muscles and nerves, and for neurotransmission across neuromuscular junctions.

Magnesium deficiency can affect pump activity leading to increases in intracellular sodium, potassium and calcium.[6,7] Calcium homeostasis (in part reliant on magnesium driven calcium efflux) is vital for the health of the cardiovascular system as an imbalance can contribute to alterations in blood vessel function (vasospasm and smooth muscle function) and heart rhythm.[6,7]

Magnesium is intimately involved in both contraction and relaxation phases of muscle movement. Right from the start, magnesium is involved the production of energy that fuels muscle function by being involved in oxygen utilisation, the production of energy (ATP and phosphocreatine) and the balance of electrolytes (particularly sodium, calcium and potassium) which is critical for the maintenance of electrical potentials that drive muscle activity.[9]

Magnesium is a critical co-factor in acetylcholine-receptor binding which triggers the initial electrical potential – the maintenance of which is influenced by magnesium (via ATPase pumps). Magnesium then regulates troponin expression and stabilises actin by creating an ATP-magnesium-actin bond without which, cross bridge formation does not occur. ATP (synthesised and then coupled with magnesium) then fuels the contraction phase.[10,11]

The relaxation phase is also mediated by magnesium. The rate of cross bridge disengagement is influenced by magnesium, as is the rate of calcium removal from the cell via calcium pumping mechanisms and competitive binding.[10]

Energy production

Magnesium is involved in the production of energy in several ways. Firstly, it is a co-factor in ATP synthesis and regeneration, and then a co-factor in every other process in which ATP is transferred and utilised.[1,10] It is also involved in the maintenance of red blood cell membranes thereby supporting oxygen transport, the oxidation of pyruvate and subsequent creation of acetyl CoA, adequate functioning of mitochondrial enzyme processes and the metabolic breakdown of carbohydrates and fatty acids.[10]

Carbohydrate metabolism

Magnesium plays a role in insulin signalling, insulin receptor kinase phosphorylation and the post receptional activity of insulin.[12] It is involved in glycogen breakdown, affecting the activity of phosphorylase b kinase which in-turn releases glucose-1-phosphate for use. Magnesium also directly influences the activity of the GLUT4 receptor, allowing glucose entrance into the cell,[4,12] and is a co-factor in every enzymatic reaction involved in glycolysis.[12] Magnesium therefore plays a major role in the maintenance of blood glucose and cellular glucose metabolism.

Bone health, mass and density

The human body contains about 25g of magnesium and about 60% of this is held in the bone. A third of this sits on the surface, ready to replenish extracellular magnesium levels when they run low. The rest is tightly bound in hydroxyapatite crystals.[7]

Magnesium is required for the activation of Vitamin D which then assists with calcium absorption and metabolism. It also plays a key role in bone strength, remodelling and conservation. It is therefore extremely important for normal bone composition and structure.[7,8]

Taurine

Taurine is a non-essential sulphated amino acid that shows similar biological activity to magnesium. Taurine works alongside magnesium to stabilise electrically active cell membranes in skeletal and cardiac muscle and modulate calcium movement in and out of cells. This has a protective effect in the cardiovascular system by supporting healthy heart function (including heartbeat and cardiac output). It also limits neurotransmitter release resulting in an inhibition of neuronal excitement.[3,14]

Taurine may also support muscle function and enhance muscle performance by alleviating muscle soreness (through antioxidant mechanisms), modulating calcium activity, improving ATP efficiency in the mitochondria, supporting energy production via the glycolytic pathway, improving anaerobic capacity and reducing lactate accumulation in skeletal muscle.[14,15]

Nicotinamide riboside

Nicotinamide riboside is a biological precursor of Nicotinamide adenine dinucleotide (NAD+) – a vital intermediate in several metabolic processes. NAD+ has been shown to be an important factor in healthy ageing, potentially through its antioxidant and protective effects. The systems that seem to benefit the most from increases in NAD+ levels after NR supplementation are the musculoskeletal, cardiovascular and nervous systems.[16]

ATHLETES

Strenuous exercise may increase Mg requirements by up to 20%, and intakes less than 260mg/day for active men and 220mg/day for active women may cause Magnesium deficiencies. RDIs for this group may need be higher than the RDIs for the general population.[9,13]

Magnesium losses in this group can be due to:

- Urination (exercise may temporarily increase urinary magnesium excretion)
- Excessive sweating
- Energy production†
- Oxygen uptake†
- Electrolyte balance
- Elevated cortisol levels

†Exercise induces a redistribution of magnesium to accommodate metabolic needs (oxygen utilisation, glycolysis and/or lipolysis).[9]

References supplied on request.