

# B Supreme™



1 Vegetarian Hard Capsule

A comprehensive approach to supporting energy production and healthy nervous system function.

## OVERVIEW

- > Featuring Quatrefolic®, a highly bioavailable active form of folate
- > Contains CoQ10 to support energy production
- > Supports nervous system health and function
- > Assists glucose metabolism
- > Aids neurotransmitter synthesis
- > Supports a healthy stress response

| Active Ingredients (per vegetarian hard capsule) |                  |
|--|------------------|
| Pyridoxal-5-phosphate monohydrate                | 78.37 mg         |
| Equiv. Pyridoxine                                | 50 mg            |
| Mecobalamin (co-methylcobalamin)                 | 250 micrograms   |
| Calcium pantothenate                             | 109.17 mg        |
| Equiv. Pantothenic acid                          | 100 mg           |
| Equiv. Calcium                                   | 9.16 mg          |
| Thiamine hydrochloride                           | 112.15 mg        |
| Equiv. Thiamine                                  | 100 mg           |
| Riboflavin sodium phosphate                      | 68.49 mg         |
| Equiv. Riboflavin                                | 50 mg            |
| Levomefolate Glucosamine                         | 901.7 micrograms |
| Equiv. Levomefolic acid                          | 500 micrograms   |
| Nicotinamide                                     | 50 mg            |
| Biotin   | 2 mg             |
| Ubidecarenone                                    | 50 mg            |
| Choline bitartrate                               | 200 mg           |
| Equiv. Choline                                   | 82.26 mg         |

|                          |           |
|--------------------------|-----------|
| <b>Pack Size</b>         | 60        |
| <b>Servings Per Pack</b> | 60 serves |

| Excipients                     |
|--------------------------------|
| Colloidal anhydrous silica     |
| Hypromellose                   |
| Magnesium stearate             |
| Purified water                 |
| Silicon dioxide                |
| Chlorophyllin - copper complex |

| Directions for Use  |
|---|
| Adults, take 1 capsule daily with a meal, or as directed by your health professional. |

| Allergen Information                           |
|--|
| No added: Gluten, dairy, lactose, soy or nuts. |

| Warnings   |
|--|
| <ul style="list-style-type: none"> <li>• If symptoms persist, talk to your health professional.</li> <li>• Vitamin supplements should not replace a balanced diet.</li> <li>• Do not take while on warfarin therapy without medical advice.</li> </ul> |

Designed, encapsulated and packed in Australia from local and imported ingredients.



Vegan Friendly



No Added Gluten



No Added Soy



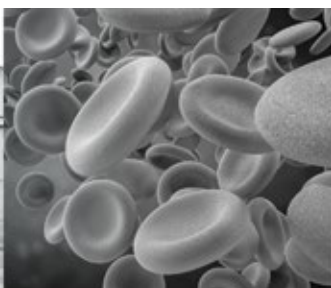
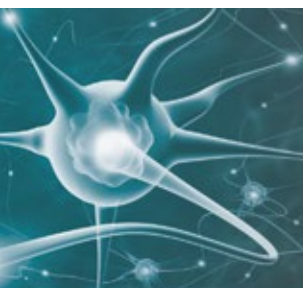
No Added Dairy



No Added Nuts



No Added Yeast



| Prescribing information        |  |   |  |
|--------------------------------|--|---|--|
| Nutrient                       | Warnings   | Contraindications   | Interactions   |
| Thiamin <sup>13</sup>          | nil  | nil   | nil  |
| Riboflavin <sup>14</sup>       | nil  | nil   | nil  |
| Niacin <sup>15</sup>           | Flushing or pruritus may occur.  | Hepatic or renal impairment and disease.  | Serious interaction with statin medications.                     |
| Pantothenic acid <sup>16</sup> | nil  | Hypersensitivity  | nil  |
| Pyridoxine <sup>17</sup>       | Long-term large doses may cause peripheral neuropathy.<br>Caution in patients with impaired kidney function. | Hypersensitivity  | Serious interaction with selinexor.                              |
| Biotin <sup>18</sup>           | nil  | nil   | nil  |
| Folate <sup>19</sup>           | Undiagnosed anaemias.  | Hypersensitivity  | nil  |
| Cobalamin <sup>20</sup>        | Monitor patients during treatment of megaloblastic anaemia.  | Hypersensitivity  | Potential interaction with dichlorphenamide and omadacycline.    |
| Choline <sup>21</sup>          | nil  | nil   | Potential interaction with Acetylcholine and Acyclovir.          |
| CoQ10 <sup>22</sup>            | nil  | Allergy or hypersensitivity, biliary obstruction, hypertensive medication, chemotherapy, radiation therapy, hepatic insufficiency and hypertension. | Mild interactions may occur with insulin and statin medications. |

## EDUCATION

Adequate intake of the B-group vitamins is fundamental to supporting all major biochemical processes in the human body. Practitioners understand the importance of replacing these water-soluble vitamins on a daily basis in order to maintain essential processes of cellular health and functioning, neurotransmitter synthesis, energy production, protein synthesis, metabolism of other essential nutrients, as well as red blood cell and haemoglobin production.<sup>1</sup>

B-group vitamins have biochemically synergistic effects in the body.<sup>2</sup> Although these vitamins are not technically related, they are referred to as a 'group' as they are found together in so many foods. B-group vitamins are found in a variety of plant and animal dietary sources, including leafy green vegetables, red meat, seafood, poultry, eggs, legumes and whole grains. It is only cobalamin that is not found in plants. Instead, cobalamin is produced by the bacteria that reside in the guts of ruminants, as well as the human colon.<sup>2</sup>

While most research centres around the non-activated B vitamins found commonly in supplements, activated B vitamins are a useful form of supplementation for circumventing a number of enzymatic steps involved in metabolic processing. Activated B vitamins, such as 5-methyl-THF, can be of a particular benefit to those with genetic polymorphisms.<sup>3</sup>

### B Vitamins and Nervous System Health

B vitamins act as coenzymes and have a number of functions in both the peripheral and central nervous systems. Of specific benefit are the B vitamins thiamine and cobalamin which are both essential to the maintenance and function of the nervous system. Deficiencies of either of these B vitamins can result in conditions of neurological dysfunction.<sup>2</sup>

Neurotransmitter synthesis requires adequate amounts of thiamine, pantothenic acid and pyridoxine. Pyridoxine is particularly well known for its effects on the adrenergic, serotonergic and glutamatergic systems.<sup>2</sup>

### B Vitamins and CoQ10 in Energy Production

> **Thiamine** plays a coenzyme role in energy transformation as thiamine diphosphate in several reactions that result in ATP generation.<sup>3</sup>

> **Riboflavin** as the coenzymes flavin adenine dinucleotide (FAD) and flavin mononucleotide (FMN) participates in the oxidation-reduction (redox) reaction that occurs during metabolism and energy production.<sup>4</sup>

> **Niacin** as nicotinamide adenine dinucleotide (NAD) is involved in energy-producing reactions, including the metabolism of macronutrients and macromolecules.<sup>5</sup>

- > As an essential precursor to the production of Coenzyme A, **pantothenic acid** is a major participant in the metabolism of nutrients and the metabolic reactions that result in energy production.<sup>3</sup>
- > The enzyme glycogen phosphorylase, which is required for the release of stored glycogen from the liver and muscles for energy, is a **pyridoxine-L-phosphate** dependent enzyme.<sup>6</sup>
- > **Cobalamin** as 5-Deoxyadenosyl cobalamin is a cofactor required in the conversion of L-methylmalonyl CoA to succinyl CoA. This process is an essential part of the extraction of energy from proteins and lipids.<sup>7</sup>
- > **Coenzyme Q10** is a cofactor in the electron transport chain and in redox reactions involved in producing ATP.<sup>8</sup>

#### CoQ10 in Cardiovascular Health

Coenzyme Q10 is found in the cell mitochondria and membranes as ubiquinol (reduced) and ubiquinone (oxidised). Organs with the highest metabolism, such as the heart, contain significant amounts of CoQ10. This is due to the action of CoQ10 as an energy transfer molecule. CoQ10 levels reduce with age, genetics, certain medications and cardiovascular diseases.<sup>9</sup>

Low endogenous amounts of CoQ10 have been associated with altered cardiovascular health, and its supplementation has been shown to have supportive effects on CV markers. It is thought that these effects are due to its antioxidant properties and its role in cellular energy metabolism and enzymology. CoQ10 has been found to affect nitric oxide metabolism, LDL oxidation and endothelial health.<sup>31</sup>

#### B Vitamins and Immune system function

Cobalamin and pyridoxine are vital for the functioning of the immune system. Cobalamin has an immunomodulatory action in cellular immunity, influencing cytotoxic cells (natural killer cells, CD8+ and T-cells).<sup>10</sup> Cobalamin also has involvement in the production of antibodies which are necessary for the clonal expansion of B-lymphocyte cells required for an effective immune response.<sup>11</sup>

Pyridoxine is necessary for the synthesis of amino acids which are required for producing cytokines. Pyridoxine is also involved in cellular immunity through differentiation, proliferation and activity of lymphocytes, as well as modulation of the Th1 immune response.<sup>11</sup>

Both B-group vitamins are also involved in intestinal immune regulation; pyridoxine does this specifically through mediation of lymphocyte migration to the intestine. Cobalamin is used by gut microbes as a cofactor in metabolic processes.<sup>11</sup>

#### B vitamins and methylation

The methylation cycle is fundamental to the optimal functioning of the immune, cardiovascular, reproductive and nervous systems, as well as gene expression and regulation. A defect in the methylenetetrahydrofolate reductase (MTHFR) enzyme can lead to under-methylation which results in inadequate conversion of folate and limited conversion of other methyl groups. The B vitamins riboflavin, pyridoxine, folate, and cobalamin are essential in supporting a healthy methylation cycle.<sup>12</sup>

#### B Vitamin Deficiency Signs and Symptoms

**Thiamine** deficiency can result in beriberi, a disorder with symptoms such as weakness, muscle wasting and peripheral neuropathy.<sup>3</sup>

Deficiency in **riboflavin** can result in skin disorders, cheilosis, stomatitis, hair loss, oedema of the mouth and throat, blurred vision and altered iron metabolism.<sup>23</sup>

**Niacin** deficiency can lead to a condition known as pellagra, which includes the symptoms dermatitis, delirium, peripheral neuritis, headaches, confusion, glossitis, angular stomatitis, cheilosis, nausea, vomiting and diarrhoea.<sup>3</sup>

**Pantothenic acid** deficiency can, in rare cases, lead to abdominal pain, vomiting and insomnia.<sup>16</sup>

Deficiency in **pyridoxine** can result in seborrheic rash, weakness, fatigue, cheilosis, glossitis, angular stomatitis, peripheral neuropathy, hypochromic and microcytic anaemia.<sup>3</sup>

**Biotin** deficiency is rare; however, symptoms include dermatitis, alopecia, brittle fingernails and perosis.<sup>18</sup>

**Folate** deficiency has been linked with cardiovascular complaints and may be a risk factor for neural tube defects during pregnancy. It can also affect red blood cell shape and size and other areas of health.<sup>24</sup>

**Cobalamin** deficiency can result in muscle cramps, dizziness, megaloblastic macrocytic anaemia, impaired gastric function, paraesthesia of the hands and feet, ataxia and fatigue.<sup>25</sup>

### Designs for Health Quality Guarantee

Designs for Health medicines that are listed on the Australian Register of Therapeutic Goods will display an AUSTL number on the label. Listed medicines in Australia need to be manufactured according to legislated standards set out in Therapeutic Goods Order 101. TGO101 legislation sets out minimum quality standards for medicines supplied in Australia that display an AUSTL number. It mandates testing for:

- Impurities such as heavy metals (including lead, mercury, cadmium and arsenic), pesticides and residual solvents
- Dissolution (to ensure the capsule will dissolve once taken)
- Uniformity (to ensure that every capsule is the same)

Final assay testing is also performed to ensure that what we have on the label is in each capsule, and microbiological testing is performed to ensure that no microbial contamination has occurred during the encapsulation and packing process.

| NUTRIENT              | BIOCHEMICAL PATHWAY   | THERAPEUTIC INDICATION  |
|-----------------------|---|---|
| Thiamine (B1)         | Thiamine plays a coenzyme role in a number of energy transformation reactions. Thiamine as thiamine diphosphate (TDP) is a coenzyme required for oxidative decarboxylation reactions essential to the production of ATP. Thiamine also plays a non-coenzyme role in nerve conduction. <sup>3</sup>  | <ul style="list-style-type: none"> <li>• Energy support</li> <li>• Neurotransmitter synthesis</li> <li>• Nervous system health</li> <li>• Glucose metabolism</li> </ul>                                   |
| Riboflavin (B2)       | Riboflavin is converted to coenzymes flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD) that are widely distributed in tissues and are involved in redox reactions. <sup>3</sup>   | <ul style="list-style-type: none"> <li>• Energy support</li> <li>• Maintenance of healthy body tissues</li> <li>• General health and wellbeing</li> </ul>   |
| Niacin (B3)           | Niacin is oxidised to coenzymes nicotinamide dinucleotide (NAD) and nicotinamide adenine dinucleotide phosphate (NADP). NAD is involved in transferring electrons through the electron transport chain to produce ATP. <sup>3</sup>   | <ul style="list-style-type: none"> <li>• Energy support</li> <li>• Maintenance of healthy body tissues</li> <li>• General health and wellbeing</li> </ul>   |
| Pantothenic acid (B5) | Pantothenic acid is a precursor for the production of Coenzyme A. CoA is essential to numerous biochemical processes regarding energy production, cell growth and metabolism. <sup>26</sup>   | <ul style="list-style-type: none"> <li>• Aids metabolism of fats and proteins</li> <li>• Energy support</li> <li>• Maintenance of healthy body tissues</li> <li>• General health and wellbeing</li> </ul> |
| Pyridoxine            | Pyridoxine is involved in the synthesis of the gamma-amino butyric acid. It also aids in release of stored glycogen from liver and muscles. <sup>17</sup>   | <ul style="list-style-type: none"> <li>• Energy support</li> <li>• Neurotransmitter synthesis</li> <li>• Healthy immune system support</li> <li>• Assists red blood cell production</li> </ul>            |
| Folate                | Erythroblasts, cells necessary for the synthesis of haemoglobin, require folate for proliferation during their differentiation. Folate is converted to tetrahydrofolate reductase and methyltetrahydrofolate and transported across cell membranes to maintain the process of erythropoiesis. <sup>7,27</sup>                                     | <ul style="list-style-type: none"> <li>• Assists red blood cell production</li> <li>• Protein metabolism</li> <li>• Helps support haemoglobin synthesis</li> </ul>  |
| Cobalamin             | B12 is bound to the proteins transcobalamin I and II which allows it to enter cells and be utilised in erythropoiesis and energy production. Cobalamin acts as a cofactor for the enzymes methylmalonyl-CoA mutase and methionine synthase - both important in the breakdown of lipids and proteins that are later used for energy. <sup>28</sup> | <ul style="list-style-type: none"> <li>• Assists red blood cell production</li> <li>• Nervous system health</li> <li>• Healthy immune system support</li> <li>• Energy support</li> </ul>                 |
| Biotin                | Biotin acts as a coenzyme within cells and is covalently bonded to the four carboxylases involved in metabolism. Biotin also plays a non-coenzyme role in cell function and cell cycle. <sup>3</sup>  | <ul style="list-style-type: none"> <li>• Supports healthy hair, skin and nails</li> <li>• General health and wellbeing</li> </ul>   |
| Choline               | Choline is involved in methyl-group metabolism, especially in the liver. Choline is oxidised to betaine and is subsequently synthesised to S-adenosylmethionine. <sup>29</sup>  | <ul style="list-style-type: none"> <li>• Healthy liver function</li> </ul>  |
| CoQ10                 | CoQ10 is essential to the process of mitochondrial oxidative phosphorylation and the production of ATP. CoQ10 converts energy from carbohydrates and fats into ATP and forms part of the electron transport chain. <sup>30</sup>  | <ul style="list-style-type: none"> <li>• Energy production</li> <li>• Cardiovascular system health</li> </ul>   |

References supplied on request.