The A-Z of supplements is a handbook providing useful information on key nutrients and supplements, all supported by scientific literature. An understanding of different nutrients and supplements and their potential uses, along with an appreciation of scientific studies, will greatly assist your clients when trying to choose the right supplements to support their health and wellbeing.

The information provided is intended to guide you through the various applications of certain key nutrients and supplements. It is a training guide that is not meant in any way to imply that the stated nutrients and supplements can be used to treat, prevent or cure disease. The “May be Supportive for” sections in the booklet refer to recommendations generally made with regard to the specific nutrients and supplements and are based on scientific literature. Food supplements are not intended to substitute a varied balanced diet and a healthy lifestyle or medications. If your custom is pregnant, nursing, taking any medication or has any diagnosed medical conditions, they should consult with their doctor before taking any supplements.

## CONTENTS

<table>
<thead>
<tr>
<th>Supplements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5-HTP (5-hydroxytryptophan)</td>
<td>11</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>13</td>
</tr>
<tr>
<td>Açaí Berry</td>
<td>15</td>
</tr>
<tr>
<td>Acetyl L-Carnitine (ALC)</td>
<td>17</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>19</td>
</tr>
<tr>
<td>Algae</td>
<td>21</td>
</tr>
<tr>
<td>Alpha-Lipoic Acid</td>
<td>24</td>
</tr>
<tr>
<td>L-Arginine</td>
<td>27</td>
</tr>
<tr>
<td>Artichoke</td>
<td>29</td>
</tr>
<tr>
<td>Ashwagandha</td>
<td>31</td>
</tr>
<tr>
<td>Astaxanthin</td>
<td>33</td>
</tr>
<tr>
<td>Astragalus</td>
<td>35</td>
</tr>
<tr>
<td>Vitamin B1</td>
<td>37</td>
</tr>
<tr>
<td>Vitamin B2</td>
<td>38</td>
</tr>
<tr>
<td>Vitamin B6</td>
<td>39</td>
</tr>
<tr>
<td>Vitamin B12</td>
<td>41</td>
</tr>
<tr>
<td>Beetroot</td>
<td>43</td>
</tr>
<tr>
<td>Beta Glucans</td>
<td>44</td>
</tr>
<tr>
<td>Ingredient</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Betaine Hydrochloride</td>
<td>46</td>
</tr>
<tr>
<td>Bilberry</td>
<td>48</td>
</tr>
<tr>
<td>Biotin</td>
<td>50</td>
</tr>
<tr>
<td>Blueberry</td>
<td>52</td>
</tr>
<tr>
<td>Borage Seed Oil</td>
<td>53</td>
</tr>
<tr>
<td>Boron</td>
<td>55</td>
</tr>
<tr>
<td>Boswellia</td>
<td>56</td>
</tr>
<tr>
<td>Broccoli</td>
<td>57</td>
</tr>
<tr>
<td>Bromelain</td>
<td>59</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>61</td>
</tr>
<tr>
<td>Calcium</td>
<td>64</td>
</tr>
<tr>
<td>Caprylic Acid</td>
<td>67</td>
</tr>
<tr>
<td>Caricol® (papaya puree)</td>
<td>68</td>
</tr>
<tr>
<td>L-Carnitine</td>
<td>69</td>
</tr>
<tr>
<td>Carnitine (other forms)</td>
<td>71</td>
</tr>
<tr>
<td>Carotenoids</td>
<td>73</td>
</tr>
<tr>
<td>Cayenne</td>
<td>75</td>
</tr>
<tr>
<td>Celadrin®</td>
<td>77</td>
</tr>
<tr>
<td>Cherry</td>
<td>79</td>
</tr>
<tr>
<td>Choline</td>
<td>81</td>
</tr>
<tr>
<td>Chondroitin</td>
<td>83</td>
</tr>
<tr>
<td>Chromium</td>
<td>85</td>
</tr>
<tr>
<td>Cider Vinegar</td>
<td>88</td>
</tr>
<tr>
<td>Cinnamon</td>
<td>89</td>
</tr>
<tr>
<td>Coenzyme Q-10 (Ubiquinone)</td>
<td>91</td>
</tr>
<tr>
<td>Conjugated Linoleic Acid (CLA)</td>
<td>93</td>
</tr>
<tr>
<td>Copper</td>
<td>95</td>
</tr>
<tr>
<td>Cranberry Berries</td>
<td>97</td>
</tr>
<tr>
<td>Curcumin</td>
<td>98</td>
</tr>
<tr>
<td>L-Cysteine</td>
<td>101</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>103</td>
</tr>
<tr>
<td>Dandelion</td>
<td>106</td>
</tr>
<tr>
<td>DHA (Docosahexaenoic acid)</td>
<td>108</td>
</tr>
<tr>
<td>Dong Quai</td>
<td>110</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>112</td>
</tr>
<tr>
<td>Echinacea</td>
<td>115</td>
</tr>
<tr>
<td>Elderberry Berries</td>
<td>117</td>
</tr>
<tr>
<td>Evening Primrose Oil</td>
<td>118</td>
</tr>
<tr>
<td>Eyebright</td>
<td>120</td>
</tr>
<tr>
<td>Fenugreek</td>
<td>121</td>
</tr>
<tr>
<td>Fibre</td>
<td>122</td>
</tr>
<tr>
<td>Flaxseed Oil (Linseed Oil)</td>
<td>125</td>
</tr>
<tr>
<td>Ingredient</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Folic Acid/Folate</td>
<td>128</td>
</tr>
<tr>
<td>Garlic</td>
<td>130</td>
</tr>
<tr>
<td>Ginger</td>
<td>133</td>
</tr>
<tr>
<td>Ginkgo</td>
<td>135</td>
</tr>
<tr>
<td>Glucosamine</td>
<td>137</td>
</tr>
<tr>
<td>L-Glutamine</td>
<td>139</td>
</tr>
<tr>
<td>L-Glutathione</td>
<td>142</td>
</tr>
<tr>
<td>Glycine</td>
<td>144</td>
</tr>
<tr>
<td>Gotu Kola</td>
<td>146</td>
</tr>
<tr>
<td>Grapefruit</td>
<td>148</td>
</tr>
<tr>
<td>Grape Seed Extract</td>
<td>150</td>
</tr>
<tr>
<td>Green Tea</td>
<td>152</td>
</tr>
<tr>
<td>Hawthorn Berries</td>
<td>154</td>
</tr>
<tr>
<td>Hops</td>
<td>156</td>
</tr>
<tr>
<td>Horse Chestnut</td>
<td>158</td>
</tr>
<tr>
<td>Hyaluronic Acid</td>
<td>159</td>
</tr>
<tr>
<td>Inositol</td>
<td>160</td>
</tr>
<tr>
<td>Iodine</td>
<td>161</td>
</tr>
<tr>
<td>Iron</td>
<td>163</td>
</tr>
<tr>
<td>Isoflavones</td>
<td>165</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>167</td>
</tr>
<tr>
<td>Korean Ginseng</td>
<td>168</td>
</tr>
<tr>
<td>Lecithin/Phosphatidylcholine</td>
<td>170</td>
</tr>
<tr>
<td>Licorice Root</td>
<td>172</td>
</tr>
<tr>
<td>L-Lysine</td>
<td>174</td>
</tr>
<tr>
<td>Magnesium</td>
<td>176</td>
</tr>
<tr>
<td>Manganese</td>
<td>179</td>
</tr>
<tr>
<td>Medicinal Mushrooms</td>
<td>181</td>
</tr>
<tr>
<td>L-Methionine</td>
<td>183</td>
</tr>
<tr>
<td>Milk Thistle</td>
<td>185</td>
</tr>
<tr>
<td>MSM/Sulphur</td>
<td>187</td>
</tr>
<tr>
<td>N-Acetyl Cysteine (NAC)</td>
<td>189</td>
</tr>
<tr>
<td>Nettle Leaf</td>
<td>191</td>
</tr>
<tr>
<td>Niacin</td>
<td>193</td>
</tr>
<tr>
<td>Oligomeric Proanthocyanidins</td>
<td>196</td>
</tr>
<tr>
<td>Olive Leaf</td>
<td>199</td>
</tr>
<tr>
<td>Omega-3 Fatty Acids</td>
<td>201</td>
</tr>
<tr>
<td>Omega-6 Fatty Acids</td>
<td>203</td>
</tr>
<tr>
<td>Omega-9 Fatty Acids</td>
<td>205</td>
</tr>
<tr>
<td>Oregano</td>
<td>206</td>
</tr>
<tr>
<td>L-Ornithine</td>
<td>208</td>
</tr>
<tr>
<td>PABA</td>
<td>210</td>
</tr>
<tr>
<td>Supplement</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Pancreatin</td>
<td>211</td>
</tr>
<tr>
<td>Pantothenic Acid</td>
<td>213</td>
</tr>
<tr>
<td>Papain</td>
<td>215</td>
</tr>
<tr>
<td>L-Phenylalanine and</td>
<td>217</td>
</tr>
<tr>
<td>DL-Phenylalanine (DLPA)</td>
<td></td>
</tr>
<tr>
<td>Phosphatidylserine</td>
<td>219</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>220</td>
</tr>
<tr>
<td>Pomegranate</td>
<td>221</td>
</tr>
<tr>
<td>Potassium</td>
<td>223</td>
</tr>
<tr>
<td>Probiotics</td>
<td>225</td>
</tr>
<tr>
<td>L-Proline</td>
<td>228</td>
</tr>
<tr>
<td>Pumpkin Seed</td>
<td>229</td>
</tr>
<tr>
<td>Pycnogenol®</td>
<td>230</td>
</tr>
<tr>
<td>Quercetin</td>
<td>232</td>
</tr>
<tr>
<td>Red Clover</td>
<td>234</td>
</tr>
<tr>
<td>Resveratrol</td>
<td>236</td>
</tr>
<tr>
<td>Rhodiola</td>
<td>238</td>
</tr>
<tr>
<td>D-Ribose</td>
<td>240</td>
</tr>
<tr>
<td>Rosemary</td>
<td>242</td>
</tr>
<tr>
<td>Rutin</td>
<td>244</td>
</tr>
<tr>
<td>Sage</td>
<td>246</td>
</tr>
<tr>
<td>Schisandra</td>
<td>247</td>
</tr>
<tr>
<td>Saw Palmetto</td>
<td>248</td>
</tr>
<tr>
<td>Scutellariae</td>
<td>249</td>
</tr>
<tr>
<td>Selenium</td>
<td>250</td>
</tr>
<tr>
<td>Shark Cartilage</td>
<td>252</td>
</tr>
<tr>
<td>Shark Liver Oil</td>
<td>254</td>
</tr>
<tr>
<td>Siberian Ginseng</td>
<td>256</td>
</tr>
<tr>
<td>Spinach</td>
<td>258</td>
</tr>
<tr>
<td>Svetol®</td>
<td>259</td>
</tr>
<tr>
<td>Taurine</td>
<td>260</td>
</tr>
<tr>
<td>L-Theanine</td>
<td>262</td>
</tr>
<tr>
<td>L-Tyrosine</td>
<td>264</td>
</tr>
<tr>
<td>Turmeric</td>
<td>266</td>
</tr>
<tr>
<td>Ubiquinol (KanekaQH®)</td>
<td>268</td>
</tr>
<tr>
<td>UC-II® Cartilage</td>
<td>270</td>
</tr>
<tr>
<td>Whey Protein</td>
<td>271</td>
</tr>
<tr>
<td>White Willow Bark</td>
<td>274</td>
</tr>
<tr>
<td>Yarrow</td>
<td>276</td>
</tr>
<tr>
<td>Zinc</td>
<td>278</td>
</tr>
<tr>
<td>References</td>
<td>282</td>
</tr>
</tbody>
</table>
SUPPLEMENTS
5-HTP (5-hydroxytryptophan)

5-HTP is a chemical that the body makes from tryptophan, an essential amino acid. After tryptophan is converted into 5-HTP, the chemical is then changed directly into serotonin.

**Appetite Control**
- 5-HTP has been shown to have a potentially supportive effect in weight loss due to its role in increasing the feeling of satiety.¹

**Mood Regulation**
- 5-HTP is a precursor for serotonin and thus in theory may be supportive for improving mood.²
- 5-HTP has been shown to be more effective in reducing depression than its precursor tryptophan.³

**Pain Relief**
- Chronic headache pain has been suggested to be alleviated by the use of 5-HTP.⁴,⁵
- It has also been shown that people with fibromyalgia have seen positive effects when using 5-HTP.⁶

**Sleep Promoting**
- 5-HTP is the precursor to serotonin which is converted to melatonin which promotes the sleep-wake cycle.⁷

**May be Supportive for:**
- Mild/moderate depression
- Insomnia
- Migraines and headaches

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**CONTRAINdications/Drug Interactions:**
None known.
**Vitamin A**

Retinol and beta-carotene

Vitamin A is the name for a group of fat soluble vitamins and beta-carotene with vitamin A activity.

**Eye Health**

- Vitamin A is needed by rods and cones in the retina to allow for night and daytime vision.\(^8\)
- Low vitamin A status can cause impaired adaption to light changes, poor vision, and potentially hardening of the cornea.\(^8\)

**Growth and Development**

- Vitamin A influences growth and development by its effect on glycoprotein synthesis, which in turn may result in maintenance of proper cellular function and gene expression.\(^8\)
- Deficiencies are especially apparent in the lining of the cornea of the eyes, respiratory tract, intestinal tract, skin, urinary tract and the ducts of secretory glands.\(^8\)

**Immune Support**

- Vitamin A possesses antiviral and immune-enhancing properties.\(^9\)
- Essential for proper function and growth of the thymus gland, and preventing thymus wasting by oxidative stress.\(^8\)

**Respiratory Health**

- Abnormal production of the epithelial lining and respiratory protective secretions results in hyper-keratinisation of the respiratory tract. Vitamin A is essential for regulation of the epithelial lining and respiratory protective secretions.\(^10\)

**Skin Health**

- Vitamin A influences mucin and keratin production and supplementation has been shown to benefit skin disorders due to this influence.\(^10,11\)
- Deficiency can increase keratin production, resulting in hyperkeratinisation.\(^12\)

**May be Supportive for:**

- Tissue healing/repair
- Skin health (general)
- Acne
- Psoriasis
- Eye health
- Respiratory health
- Immune system support and improved thymus function

*Please note: Although certain carotenoids (e.g. beta-carotene) convert into vitamin A in the body, they are not associated with the same risks/precautions as pre-formed vitamin A (retinol and its derivatives).*

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Due to an increased risk of causing birth defects, vitamin A supplementation (as retinol) should NOT exceed 7,500µg (10,000IU) during pregnancy without doctor’s supervision; regular consumption of liver should also be avoided when pregnant.

Retinol is stored in the liver and supplementation in massive doses over extended periods can lead to toxicity. Toxicity symptoms (e.g. headache, chapped lips, dry fissured skin, brittle nails, alopecia, gingivitis, anorexia, irritability, fatigue, nausea) may occur in adults who take excessive doses over several years.

High levels of vitamin A are not recommended for those with chronic kidney complaints.

High-potency supplemental intake should be avoided in oral contraceptive users.
**Açaí Berry**

*Euterpe oleracea*

The açaí (pronounced Ah-Sa-E) palm tree, *Euterpe oleracea*, is found in Central and South America and is most plentiful in Brazil, particularly in the flood plains of the Amazon. For centuries, açaí, which translates to “fruit that cries,” has been included in the diets of the Amazon’s native peoples.

**Anti-inflammatory**

- Açaí contains anthocyanins, such as cyaniding 3-glucoside (C3G) and cyaniding 3-rutinoside.
- Açaí pulp, primarily C3G helps modulate pro-inflammatory cytokines and could be valuable for chronic inflammation conditions.\(^\text{13}\)
- Açaí was found to be a potential COX-1 and COX-2 inhibitor.\(^\text{13}\)

**Antioxidant**

- C3G has been shown to have the best oxygen radical absorbance capacity of the antioxidants found in açaí.\(^\text{14}\)
- C3G is also considered to be as good, if not better, than vitamin E for UV damage protection.\(^\text{15}\)

**Cardiovascular Support**

- C3G has been shown to decrease cholesterol and triglyceride oxidation, a known atherosclerotic risk factor.\(^\text{16}\)
- Açaí’s anti-inflammatory properties may reduce heart disease risk.\(^\text{17}\)

**Cholesterol Management**

- Açaí berries are rich in phytosterols which have been shown to reduce cholesterol.\(^\text{18}\)
- Anthocyanins within açaí also promote blood flow and inhibit cholesterol synthesis.\(^\text{19}\)

**May be Supportive for:**

- Protection for cardiovascular health (including cholesterol management)
- Inflammation
- Antioxidant protection
- Skin health
- Vascular health (e.g. varicose veins, phlebitis, haemorrhoids)
- Ageing

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
ACETYL L-CARNITINE (ALC)
ALC is able to cross the blood brain barrier, so is most useful for brain health.

Ageing
- Mitochondrial dysfunction has been shown to occur as we age.
- Research has suggested that L-Carnitine can attenuate mitochondrial dysfunction potentially reversing the effects of aging.\textsuperscript{20}

Athletic Performance
- Carries long chain fatty acids into the mitochondria (the energy-producing components of cells) to be metabolised into energy.\textsuperscript{22}
- Research has shown that carnitine supplementation has improved exercise performance due to its role in fatty acid transport into the mitochondria.\textsuperscript{23}

Mental Health
- Acetyl L-carnitine is naturally found within the central nervous system.
- It is used within several neural pathways; brain energy, phospholipid metabolism, neurohormones, and neurotransmitters.
- Research suggests that it may prevent neurochemical effects of stress exposure.\textsuperscript{21}

May be Supportive for:
- Improved memory and mental alertness (especially in older adults)
- Senile dementia and Alzheimer’s disease
- Depression
- Ageing
- Atherosclerosis

Please note: In the case of enhancing brain function, ALC is preferred to L-Carnitine. When considering cardiovascular health, L-Carnitine is considered more appropriate.

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.
**ALFALFA**

*Medicago sativa*

Alfalfa is a perennial, clover-like, leguminous plant of the pea family.

**Anti-arthritic**
- Alfalfa is reported to reduce arthritic symptoms, most likely due to mild anti-inflammatory and diuretic actions.\(^{24}\)

**Digestive Support**
- Chlorophyll within alfalfa may have healing properties making it suitable for inflammatory bowel disease and conditions relating to excessive intestinal permeability.\(^{25}\)
- Chlorophyll has been shown to kill certain odour causing bacteria in the digestive tract and accelerate the rate of healing.\(^{25a}\)

**Diuretic**
- Alfalfa possesses significant diuretic activity, which may be of value in local oedema and excessive fluid retention in general.\(^{26}\)

**Nutritive**
- Alfalfa is a rich source of chlorophyll, protein, minerals, vitamins (especially vitamin K) and enzymes.

**May be Supportive for:**
- Arthritic conditions
- Fluid retention
- Nutritional support during convalescence
- Minor stomach and digestive disorders

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**CONTRAINdications/DRUG INTERACTIONS:**
Reports suggest that alfalfa should be avoided in individuals with Systemic Lupus Erythematosus (SLE).
**ALGAE**

**Anti-bacterial**
- Chlorophyll possesses anti-bacterial effects, which may help with wound healing and reduce human odour production.  

**Blood Building**
- Fat-soluble chlorophyll is suggested to enhance haemoglobin and red blood cell production.
- Particularly suitable for those prone to anaemia or women with heavy menstrual flow, due to the presence of iron, B12, and folic acid within algae.

**Deodorising**
- Chlorophyll appears to bind to various odour-causing compounds, potentially killing human odour causing bacteria.

**Detoxification**
- Chlorophyll helps protect cells from toxic influences, and helps the body detoxify through particular enzymes and amino acids.
- Scientific studies have shown detoxification of toxins such as lead, mercury, cadmium, arsenic, pesticides, insecticides and PCB's from the body.

**Intestinal Repair**
- Chlorophyll's healing properties makes it suitable for inflammatory bowel disease and excessive intestinal permeability conditions.

**Nutritive**
- Algae are rich in chlorophyll, amino acids (as highly digestible protein), vitamins, minerals, carotenoids, fatty acids, nucleic acids (RNA/DNA) and enzymes.

**Wound Healing**
- Chlorophyll is useful for internal and external healing (topical administration).

**Main Types of Algae Available:**

**Spirulina (Blue-Green)**
Although its chlorophyll content is substantially lower than chlorella, spirulina is still one of the best sources of chlorophyll. It is also 65 to 71% complete protein and remarkably rich in essential nutrients.

**Chlorella (Green)**
Chlorella is a single-celled fresh water algae, rich in chlorophyll, but also an excellent source of other nutritional factors and one of the most powerful detoxifiers of all foods. It does not contain as much protein or beta-carotene as spirulina, but has higher levels of chlorophyll and twice the levels of nucleic acid. Because of these high levels of nucleic acid, chlorella can help to speed up the renewal and healing of damaged tissue internally, and in external use, this is called the chlorella growth factor or CGF.

**Klamath (Blue-Green)**
Aphanizomenon Flos-Aquae algae found in the Klamath Lake in Oregon, USA, is the richest known supplemental source of chlorophyll and is also rich in essential nutrients.
May be Supportive for:

- General nutritional support
- Nutritional support on calorie restricted diets
- Digestive ulcers or irritation
- Immune support
- Liver support and detoxification, including heavy metals
- Fatigue
- Blood building
- Digestive disorders
- Intestinal gas
- Foul smelling stools
- Nutritional support in convalescence
- Children's nutrition
- Radiation exposure
- Cholesterol and mild hypertension
- Kidney detoxification
- Fibromyalgia

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.

**ALPHA-LIPOIC ACID**

Also known as thioctic acid, this is a sulphur-containing, vitamin-like substance. It is both fat and water-soluble and has a wide range of uses.

**Anti-ageing**

- Free radical damage and glycation are perhaps the two major factors in the ageing process and body degeneration in general. 33
- Due to its impact on blood sugar metabolism and subsequent reduction of blood sugar levels, alpha-lipoic acid has been shown to inhibit glycation. 34

**Antioxidant**

- Alpha-lipoic acid has antioxidant properties and has been shown to aid liver detoxification. Alpha-lipoic acid aids the recycling of antioxidants such as glutathione, CoQ-10 as well as vitamins C and E. 35

**Athletic Performance**

- Alpha-lipoic acid is a coenzyme essential for metabolising fats and carbohydrates to produce ATP, the energy molecule found in cells, via the Krebs cycle. 44
- Alpha-lipoic acid improves the uptake of glucose by muscle cells (which then use it to produce energy) and therefore decreasing the amount of glucose taken up by fat cells (so less fat is stored by the body). 45
- As there is an increase in ATP production and an improved recovery time, theoretically more physical activity can be tolerated.
**Blood Sugar Management**
- Alpha-lipoic acid assists a better utilisation of glucose by muscles, reducing blood sugar levels, and acts as a cofactor in the production of cellular energy (ATP).\(^{36}\)
- Low levels of alpha-lipoic acid often occur in diabetics, which increases the chance of glycation – this can lead to common problems in diabetics such as diabetic neuropathy and kidney problems.\(^{37}\)

**Cell Production**
- Due to its relatively small molecular size, alpha-lipoic acid protects both outside and inside cell membranes, including the membrane around the nucleus, which houses the DNA.\(^{36}\)

**Excess Metal Removal**
- Chelates heavy metals for harmless removal from the body.\(^{38}\)
- May also be supportive for other excess metal related conditions, e.g. iron in hemochromatosis.

**Lipid Protection**
- Alpha-lipoic acid directly and indirectly protects fats.\(^{39}\)
- It helps to recycle vitamin E to its tocopherol form and protects LDL cholesterol from oxidative damage.\(^{40}\)
- Research suggests that it also may even revert oxidised LDL cholesterol into its non-oxidised form.\(^{41}\)

**Liver Protection**
- Lipoic acid has demonstrated liver protective properties.\(^{42}\)
- Lipoic acid facilitates glutathione production.\(^{38}\)

**Nervous System Support**
- Studies suggest alpha-lipoic acid may aid in nervous system repair in those with damage caused by excessive blood sugar and have documented its positive effect on nerve cell membrane fluidity and blood flow.\(^{43}\)

**May be Supportive for:**
- Antioxidant protection
- Excessive blood sugar
- Cardiovascular health
- Heavy and excess metal removal
- Anti-ageing
- Sports nutrition
- Nerve damage/pain
- Liver protective

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
L-Arginine

L-arginine is a non-essential amino acid. It is obtained from the diet and is necessary for the body to make proteins. It is classified as a semi-essential amino acid, because it is produced by the body, but often not in sufficient quantities and extra amounts thus need to be consumed through food. Amongst many other functions, it ensures vascular relaxation (widening of blood vessels), which improves blood flow and the supply of nutrients throughout the body.

Athletic Performance

- Can enhance high intensity exercise tolerance and enhance performance and body composition.46, 47
- As a precursor of creatine and its potential to increase endogenous growth hormone, it makes a popular supplement among those who wish to improve their physical performance.

Cardiovascular Support

- L-arginine is a nitric oxide precursor and thus plays a role in regulating vasodilation.48
- L-arginine's role in vasodilation can be supportive in improving circulation and also reduce endothelial dysfunction, a risk factor in cardiovascular disease development.49

Male Sexual Function and Fertility

- As a precursor of Nitric Oxide (NO), arginine may be involved in facilitating penile erection and may provide significant improvement for Erectile Dysfunction (ED).50
- Improves supply of nutrients due to action of NO and improved circulation of nutrients including to the testicles. It is indeed possible that NO plays many more important roles in the generation of human sperm cells. Several studies have shown that the amino acid L-arginine is able to increase the sperm quality.51

May be Supportive for:

- Angina
- Athletic performance
- Erectile dysfunction and infertility
- Boost immune function
- Congestive heart failure
- Atherosclerosis
- Headaches from blood vessel swelling

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.
Artichoke

*Cynara scolymus*

Artichoke is a perennial plant native to the Mediterranean regions but it can be grown in other parts of the world, such as the United States of America. Although artichoke is considered a food, it is also used within herbal teas and liqueurs.

**Antioxidant**

- The phenolic and flavonoid compounds found within artichoke have been shown to have free radical scavenging potential and thus may protect cells against oxidative damage.\(^{53}\)

**Anti-microbial**

- Phenolic compounds found within artichoke leaf have been suggested to have potential anti-microbial characteristics against gram-negative and gram-positive bacteria.\(^{54}\)

**Cholesterol Management**

- A recent Cochrane review suggested that artichoke leaf extract was supportive in reducing both total cholesterol and LDL cholesterol.\(^{55}\)

**Vascular Endothelial Function**

- Artichoke leaf has been shown in research to downregulate iNOS expression, which is believed to be linked to endothelial dysfunction during periods of vascular inflammation.\(^{56}\)

**May be Supportive for:**

- Cholesterol management
- Viral/bacterial/fungal infections
- Cardiovascular health

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**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
ASHWAGANDHA

*Withania somnifera*

Ashwagandha is a small, branched, erect Indian herb that grows in the highlands of Himalayan India, North Africa and the Middle East.

**Adaptogenic Properties**

- Research has shown ashwagandha to exert adaptogenic effects which are believed to be more potent than that of panax ginseng.\(^{58}\)

**Anti-inflammatory**

- Research has shown ashwagandha exerts anti-inflammatory properties and therefore warrants its use in inflammatory conditions.\(^{57}\)

**Anti-microbial**

- The withanolide content of ashwagandha has been shown to exert anti-microbial and cell protective properties.\(^{58}\)

**Cardiovascular Support**

- Withanolides may influence cardiac muscle contractility and possess blood pressure lowering properties.\(^{57}\)

**Immune Support**

- It has been suggested that ashwagandha may be able to boost a weakened immune system or suppress an overactive one, thus its potential use in autoimmune disorders.\(^{57}\)

**May be Supportive for:**

- Arthritis
- Inflammatory conditions
- Anti-stress
- Autoimmune conditions
- Viral/bacterial/fungal infections
- Cardiovascular health
- Chronic fatigue syndrome (ME)

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
**Astaxanthin**

A pinkish-red carotenoid that is responsible for the pink colouration of salmon and flamingos, astaxanthin comes from marine sources, primarily micro-algae. It is able to operate in lipid and aqueous environments and has far-reaching potential.

**Antioxidant**

- Astaxanthin is a potent antioxidant with anti-inflammatory properties and thus protects cells against oxidative damage.\(^{59}\)

**Cardiovascular Support**

- Oxidised LDL is a cardiovascular disease risk factor due to its role in atherosclerosis development.\(^{60}\)
- Astaxanthin has also been shown to increase HDL cholesterol.\(^{59}\)

**Cell Production**

- Astaxanthin is a carotenoid, which has been shown to increase cell to cell communication at gap junctions within the body, therefore increasing the likelihood of maintaining cellular homeostasis.\(^{61}\)

**Eye Health**

- Many different studies have shown that astaxanthin is supportive in improving visual acuity and eye accommodation reflex.\(^{62}\)
- Its antioxidant potential may also be supportive in protecting the eye against oxidative damage.\(^{62}\)

**Male Fertility**

- Studies have suggested that astaxanthin is potentially supportive towards sperm motility and fertility.\(^{62}\)

**Prostate Support**

- Research has suggested that astaxanthin may be helpful in human prostatic hyperplasia, due to its involvement in 5-α-reductase.\(^{63}\)

**Skin Health**

- Astaxanthin has been shown to help protect the skin against damaging UV exposure.\(^{64}\)

**May be Supportive for:**

- Cardiovascular health
- Antioxidant protection
- Cell protection
- General eye health
- Cataracts and macular degeneration
- Cholesterol regulation
- Nervous system protection

**Contraindications/Drug Interactions:**

None known.
Astragalus

*Astragalus membranaceus*

Astragalus is a perennial herb that is native to Mongolia and Northern China.

**Adaptogenic (Anti-stress)**

- Astragalus may increase stressor tolerance and potentially improve endurance during exercise.\(^6^5\)

**Cardiovascular Support**

- Astragalus has been shown to possess a vasodilatory action, lower blood pressure and increase heart muscle contraction.\(^6^5\)

**Diuretic**

- Astragalus is considered to be a gentle diuretic, thus potentially benefiting conditions such as nephritis or kidney inflammation.\(^6^5\)

**Immune Stimulant**

- Research has shown astragalus reduces the incidence and duration of the common cold, as a result of increasing white blood cell activity and interferon production and secretion.\(^6^6\)

**May be Supportive for:**

- Immune enhancement
- Anti-viral
- Increasing endurance
- Anti-stress
- Cardiovascular health
- Water retention

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
**Vitamin B1**

*Thiamin*

Vitamin B1 is a water-soluble vitamin within the “B” group of vitamins.

**Essential Coenzyme**
- Vitamin B1 is an essential coenzyme for thiamine pyrophosphate synthesis, required for energy production.\(^5\)

**Mental Health**
- Thiamin is hypothesised to play an important role in mental health, due to its role in neurotransmitter synthesis.\(^6\)

**Nervous System Support**
- Thiamin deficiency has been associated with severe memory deficits within humans.\(^6\)
- Thiamin deficiency is inversely associated with depression in adults.\(^6\)

**May be Supportive for:**
- Age-related memory loss
- Alzheimer’s disease
- Alcohol-related side effects and alcoholism
- Multiple sclerosis
- Fatigue
- Stress (as a component of B-complex supplementation)

**Contraindications/Drug Interactions:**
None known.

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**Vitamin B2**

*Riboflavin*

Vitamin B2 is a water-soluble orange-yellow crystal of the “B” Vitamin group.

**Essential Coenzyme**
- Vitamin B2 is an essential coenzyme of flavin mononucleotide and flavin adenine dinucleotide, which are required for ATP formation, glutathione regeneration and fatty acid and amino acid synthesis.\(^7\)

**Eye Health**
- Long term supplementation with vitamin B2 has been linked with the reduction of developing cataracts.\(^\)
- Its role in glutathione regeneration also supports eye health due to glutathionines antioxidant potential.\(^\)

**Migraine Support**
- There is suggestion that vitamin B2 supplementation may be supportive in relieving migraines by stimulating mitochondrial energy production.\(^\)

**May be Supportive for:**
- Eye irritation (sore, red, tired, light-sensitive)
- Cataract prevention (not to exceed 10mg per day)
- Migraine headaches
- Sickle cell anaemia
- Stress (as a component of B-complex supplementation)

**Contraindications/Drug Interactions:**
None known.
Vitamin B6

Pyridoxine

Vitamin B6 is one of the 8 “B” group of vitamins. The more bioavailable and active form of vitamin B6 is also known as Pyridoxal-5’-Phosphate or P-5’-P.

Cardiovascular Support

- Vitamin B6, B12 and folic acid have all been associated with reducing homocysteine levels. Elevated homocysteine levels are associated with the development of cardiovascular disease e.g. atherosclerosis.75

Essential Coenzyme

- Vitamin B6 is a coenzyme for over 140 metabolic enzymes (4% of total enzymes), which include amino acid transamination, gene expression regulation and regulation of hormone activity.76

Female Health

- Vitamin B6 has been shown to relieve premenstrual tension symptoms due to its supportive role in female hormone balancing.77
- Oral contraceptives have also been shown to deplete vitamin B6 levels, along with other vitamins and minerals.78

Mental Health

- P-5’-P is an essential cofactor in the biosynthesis of serotonin, dopamine and GABA.73
- Low levels of these neurotransmitters have been linked to neurological disorders.74

Nervous System Support

- It is suggested that vitamin B6 deficiency is one of the most common vitamin deficiencies associated with peripheral neuropathy development e.g. carpal tunnel syndrome.79

May be Supportive for:

- Premenstrual Tension (PMT)
- Cardiovascular disease (i.e. atherosclerosis, hypertension)
- Fluid retention
- Pregnancy-related sickness (nausea, vomiting)
- Carpal tunnel syndrome / Repetitive Strain Injury (RSI)
- Autism
- Hyperactivity
- Depression
- Diabetic neuropathy
- Asthma
- Hypochlorhydria (low stomach acid)
- MSG (monosodium glutamate) sensitivity
- Stress (as a component of B-complex supplementation)

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.
**Vitamin B12**

*Cobalamin*

Vitamin B12 is a water-soluble red crystalline vitamin of the “B” group.

**Blood Building**

- Vitamin B12 status is believed to influence DNA methylation, which is associated with disease development.\(^8^0\)

**Cardiovascular Support**

- Vitamin B12 is involved in the methylation of homocysteine. Elevated levels of homocysteine are associated with cardiovascular disease development.\(^8^1\)

**Essential Coenzyme**

- Vitamin B12 is the coenzyme for methylmalonyl-CoA mutase, an enzyme associated in the metabolism of branch chained amino acids and odd-chained fatty acids.\(^8^1\)
- Vitamin B12 is also a methyl donor and thus methylates homocysteine to methionine.\(^8^1\)

**Mental Health**

- Deficiencies in vitamin B12 have been associated with neurological disorders due to its involvement in nerve cell health, methyl donation and fatty acid synthesis.\(^8^1\)

**Nervous System Support**

- Vitamin B12 is associated with peripheral neuropathy and myelopathy which can lead to severe motor problems if not corrected.\(^9^2\)

- Deficiencies of vitamin B12 have been indicated as a factor in multiple sclerosis development.\(^8^3\)

**May be Supportive for:**

- Pernicious anaemia
- Nervous system disorders (e.g. diabetic neuropathy, multiple sclerosis [MS])
- Depression
- Insomnia
- Memory loss/reduced cognitive function
- Cardiovascular disease (when associated with elevated homocysteine levels)
- Hives (urticaria)
- Asthma (especially when associated with sulfite sensitivity)
- Male infertility (low sperm count)
- Tinnitus
- Fatigue

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
**Beta vulgaris**

Beetroot is an herbaceous biennial plant found throughout the Mediterranean, Atlantic Coast of Europe, Near East and India. It is considered to be high in antioxidants and contains a wide range of vitamins and minerals.

**Anti-inflammatory**
- The betalain pigments found in beetroot have anti-inflammatory properties, due to their role in the reduction of oxidative damage.\(^{84}\)

**Antioxidant**
- Beetroot has been shown to possess extensive antioxidant activity.\(^{85}\)
- Beetroot’s antioxidant activity is protective against oxidative stress, a known contributor to irregular cell replication.\(^{86}\)

**Cardiovascular Support**
- Beetroot contains nitrate which is used within the nitric oxide pathway for vasodilation of blood vessels, thus benefiting the cardiovascular system.\(^{87}\)
- Beetroot’s nitrate content may help protect against cardiovascular disease due to it potentially reducing blood pressure.\(^{88}\)

**May be Supportive for:**
- Athletes
- Antioxidant protection
- Hypertension/vasodilatory
- Intestinal health

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.

**Beta Glucans**

Beta 1,6 glucans carries many of the same benefits and may be present in many beta 1,3 glucan supplements, however, most of the research has centred on beta 1,3, glucan which is derived from the cell wall of S. cerevisiae yeast.

**Antibiotic and Anti-viral Properties**
- Beta 1,3 glucans have been shown in research to reduce the time taken to fight off infection when used with antibiotics, compared to using antibiotics alone.\(^{90}\)

**Antioxidant**
- Beta 1,3 glucans are considered to be an effective antioxidant and free radical scavenger.\(^{91}\)

**Cholesterol Management**
- Research suggests that beta 1,3 glucans role in macrophage activation reduces plaque formation on arterial walls and mediates lipid accumulation.\(^{89}\)

**Immune Support**
- Beta 1,3 glucans stimulate the immune system to fight against foreign pathogens by macrophage activation.\(^{92}\)

**Oral Health**
- Research has suggested that beta 1,3 glucans may be supportive in healing mouth ulcers.\(^{93}\)
May be Supportive for:

- Immune boosting
- Cell protective
- Antibiotic
- Antiviral
- Candida
- Anti-cholesterol

CONTRAINDICATIONS/DRUG INTERACTIONS:
Pregnant and nursing mothers should avoid beta 1,3 glucans. Perhaps best avoided at first in cases of severe candidiasis.

BETAINES HYDROCHLORIDE
Betaine hydrochloride is a type of substance that plays a role in digestion as well as functioning as a methyl donor in the body.

Hypochlorhyria

- Low stomach acid can result in poor digestion of food. Betaine hydrochloride has been shown to be supportive in aiding digestion by increasing stomach acid content.94

Immune Support

- Stomach acid is one of the first line defences in preventing pathogenic bacteria from entering the human body, therefore hypochlorhydria may not prevent infectious agents from entering the body.95

Mineral Deficiency

- Hydrochloric acid is involved in the absorption of minerals, therefore hypochlorhydria may result in mineral deficiencies.96

Pancreatic Insufficiency

- Hypochlorhydria may cause an inhibition of pancreatic enzymes. This may be due to the chyme not being acidic enough to trigger the secretion, resulting in insufficient breakdown of food.97

May be Supportive for:

- Indigestion
- Flatulence or bloating
- IBS
- Malabsorption
- Leaky gut disorder
- Allergy
- Incomplete digestion
- Mineral deficiency
CONTRAINdications/DrUG Interactions:
Do NOT use in cases of stomach or duodenal ulcer. Extra stomach acid created by betaine hydrochloride supplementation may exacerbate symptoms.
Do NOT chew.

Bilberry

Vaccinium myrtillus

Bilberry has been used for centuries to prevent long term diseases, such as macular degeneration. This is due to it containing active components, such as anthocyanosides, which protect against free radical damage.

Antioxidant

- Anthocyanins possess antioxidant properties and can protect against oxidative damage.\(^9^8\)

Cardiovascular Support

- Anthocyanosides within bilberry are thought to be effective in reducing vascular permeability and redistribution of blood flow.\(^9^9\)

Eye Health

- Bilberry has been shown in research to enhance vision acuity and adjustment to darkness.\(^1^0^0\)
- Bilberry has been shown in research to be protective against glaucoma development due to its role in collagen enhancement and its antioxidant properties.\(^1^0^0\)

Fatigue

- The antioxidant properties of bilberry have been shown to have some beneficial effects for chronic fatigue syndrome.\(^1^0^1\)

May be Supportive for:

- Chronic fatigue syndrome
- Glaucoma prevention
- Improving vision
- General cardiovascular health
**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Anticoagulant or antiplatelet medications.
Anti-diabetic medication.

**BIOTIN**

*Vitamin H*

Biotin is a water-soluble “B” group vitamin.

**Blood Sugar Management**

- It is suggested that biotin’s role in carbohydrate metabolism may be supportive in regulating blood glucose levels.\(^{102}\)

**Essential Coenzyme**

- Biotin is essential for the synthesis and function of carboxylases within the human body.\(^{103}\)
- Carboxylases allow for carbohydrates to be metabolised for energy production.

**Hair, Skin and Nail Health**

- People with poor nail health have been shown to respond to biotin supplementation.\(^{104}\)
- Biotin may be supportive in reducing hair loss in those with alopecia.\(^{105}\)
- Biotin deficiencies are associated with the development of skin disorders, such as periorificial dermatitis.\(^{106}\)

**May be Supportive for:**

- Dandruff
- Alopecia [hair loss] (when associated with seborrheic dermatitis)
- General hair and scalp health
- Brittle nails
- General nail health
- General skin health
- Hyperglycaemia
- Diabetic neuropathy
CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

BLUEBERRY
Vaccinium angustifolium

The Blueberry is a type of berry native to the USA.

Anti-bacterial
• Blueberry is a rich source of chlorogenic acid which has been shown to be effective against pathogenic bacteria.\(^{107}\)

Anti-fungal
• Chlorogenic acid also inhibits fungal growth, suggesting potential benefits in conditions such as candidiasis.\(^{108}\)

Anti-viral
• Chlorogenic acid is believed to inhibit RNA-dependant DNA polymerase (inhibits viral replication).\(^{109}\)

May be Supportive for:
• Colds and flu
• Herpes virus
• Candida albicans infection
• Urinary tract infections

CONTRAINDICATIONS/DRUG INTERACTIONS:
Caution with anti-diabetic medication – check with doctor.
The borage, or starflower plant produces seeds that are a rich source of the essential fatty acid gamma-linolenic acid (GLA), an omega-6 fatty acid. Most of the health benefits of borage seed oil are due to its high content of GLA. The oil is usually taken internally as a capsule, but can also be applied topically. Of the three oils that are good sources of GLA - borage, evening primrose and blackcurrant seed - borage has the highest concentration.

**Autoimmune Disorders**
- Borage seed oil may alleviate rheumatoid arthritis due to its GLA content suppressing various inflammatory eicosanoids.\(^{110,111}\)

**Cardiovascular Support**
- Borage has been used successfully to lower blood pressure in hypertension patients and in patients with stressed induced hypertension.\(^{112,113}\)

**Female Health**
- Borage oil may be helpful for PMS, by providing pre-formed GLA for those who are unable to convert it from other sources.\(^{114}\)

**Inflammation**
- Borage seed oil may suppress inflammation primarily due to the GLA content inhibiting the activity of certain inflammatory eicosanoids.\(^{115}\)

**Skin Health**
- GLA may alleviate dry skin, improve hydration, provide anti-inflammatory support and increase cell resilience.\(^{116}\) It may therefore be a useful aid for eczema or atopic dermatitis.

**May be Supportive for:**
- Eczema/seborrheic dermatitis
- PMS
- Inflammation
- Rheumatoid arthritis
- Hypertension

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
Boron is a hard, metalloid micro mineral.

**Female Health**
- Research has suggested that boron supplementation significantly influences oestrogenic activity.117
- It is also suggested that boron may have a beneficial impact on calcium levels in the body.118

**Joint Support**
- Boron supplementation has been shown to be supportive for joints in those with osteo, rheumatoid and juvenile arthritis.119

**Skeletal Health and Bone Density**
- Research has shown that boron reduces calcium excretion, thus has a potential benefit on bone density.119
- Boron is also required for 25-cholecalciferol into active form vitamin D, which facilitates calcium absorption.118

**May be Supportive for:**
- Osteoporosis
- Fractures
- Skeletal health (general)
- Menopause
- Osteoarthritis
- Rheumatoid arthritis
- Juvenile arthritis

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Doses exceeding 100mg per day may cause side effects such as dermatitis, diarrhoea, nausea, vomiting and fatigue.
Very high doses may cause an increased excretion of vitamin B2.

Boswellia is a moderate to large branching tree native to India, Northern Africa and the Middle East.

**Anti-arthritic/Anti-inflammatory**
- The boswellic acid has been shown to exert anti-inflammatory and anti-arthritic activity.120
- Boswellia is also believed to improve blood supply to arthritis damaged joints, thus increasing nutrient availability to damaged joints.120

**Cardiovascular Support**
- Boswellia may also aid circulatory disorders e.g. local oedema and vascular dysfunction in lower limbs.121

**May be Supportive for:**
- Arthritis
- Sports injuries
- Lower limb circulatory disorders
- Oedema

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.

Boswellia serrata

Boswellia is a moderate to large branching tree native to India, Northern Africa and the Middle East.

**Anti-arthritic/Anti-inflammatory**
- The boswellic acid has been shown to exert anti-inflammatory and anti-arthritic activity.120
- Boswellia is also believed to improve blood supply to arthritis damaged joints, thus increasing nutrient availability to damaged joints.120

**Cardiovascular Support**
- Boswellia may also aid circulatory disorders e.g. local oedema and vascular dysfunction in lower limbs.121

**May be Supportive for:**
- Arthritis
- Sports injuries
- Lower limb circulatory disorders
- Oedema

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
**BROCCOLI**

*Brassica oleracea*

Broccoli is a green cruciferous vegetable. Broccoli is a source of many phytochemicals that may have wide-ranging health properties. These include isothiocyanates such as sulforaphane and indole-3-carbinol (I3C), which are extensively researched for their health benefits.

**Antioxidant**

- Broccoli’s antioxidant properties makes it effective in preventing free radical damage.\(^{122}\)

**Bacterial Inhibitor**

- Isothiocyanates found in broccoli strongly inhibit the growth of *E. coli* and other microbes.\(^{123}\)

**Cell Support**

- Isothiocyanates have been shown to protect and switch on phase II enzymes such as glutathione S-transferase, detoxifying free radicals and damaging chemicals, allowing for excretion.\(^{124}\)

**Oestrogen Detoxification**

- Research has found indoles in broccoli bind/detoxify excess oestrogens which are associated with diseases of oestrogen dominance.\(^{125}\)

**Phytonutrient Source**

- Broccoli is a rich source of phytonutrients, including fibre, beta-carotene and other carotenoids, vitamin C, vitamin K, polyphenols and anthocyanidins.\(^{122}\)

**May be Supportive for:**

- Rich source of beneficial nutrients
- Antioxidant
- Cell protective
- Oestrogen reduction
- Helping prevent food poisoning

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
**Bromelain**

Bromelain is a general term for a family of closely-related sulfhydryl-containing proteolytic enzymes.

**Antibiotic**
- Bromelain has been shown to have antibiotic properties, and also enhance the effectiveness of prescribed antibiotics.\(^{126}\)

**Anti-inflammatory**
- Research has shown bromelain to inhibit inflammation and facilitate injury healing. Particularly good for short-term inflammation due to its quick effect.\(^{127}\)

**Autoimmune Conditions**
- Proteases have been shown to be beneficial for autoimmune conditions (e.g. scleroderma and rheumatoid arthritis),\(^{128}\) by digesting circulating immune complexes.

**Digestive Support**
- Bromelain assists in the digestion of proteins within the digestive system.\(^{129}\)
- Poor digestion can lead to digestive disorders and potentially toxin build-up within the whole body.\(^{129a}\)

**Immune Support**
- Digestive enzymes are used by white blood cells to digest viruses or bacteria and thus reducing immunological stress.\(^{130}\)
- Its effect on the immune system may also reduce immune system hyperactivity in those with allergic or autoimmune tendencies.\(^{130a}\)

**May be Supportive for:**
- Protein digestion
- Inflammation
- Joint health
- Pain relief

*Please note: for the below applications bromelain should be taken on an empty stomach, at least half an hour before food.*
- Bacterial infections
- Cardiovascular health
- Respiratory infections (including coughs)
- Autoimmune conditions

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
May increase the effectiveness of the drug warfarin, check with a doctor. Do not use on an empty stomach where a stomach ulcer is present.
**Vitamin C**

Vitamin C is a water soluble vitamin of which rose hips and acerola are well known sources. Bioflavonoids, such as hesperidin and rutin, are plant sourced secondary metabolites which enhance the absorption and bioavailability of vitamin C.\(^{131}\)

**Anti-allergic**

- Vitamin C can help reduce, and even block, allergies and sensitivity reactions.\(^{132}\)
- The ability of vitamin C to lower histamine makes it useful in the management of allergic conditions such as hayfever, asthma, eczema, hives (urticaria), etc.\(^{133}\)

**Antioxidant**

- Vitamin C contributes to the protection of cells from oxidative stress/damage.\(^{133a}\)
- Recycles oxidised vitamin E back into its active form.\(^{134}\)
- Elevates levels of the potent antioxidant glutathione.\(^{135}\)

**Cardiovascular Support**

- Higher vitamin C blood levels correlate to lower total cholesterol and triglyceride levels and increased HDL cholesterol (HDL cholesterol facilitates removal of LDL cholesterol from the arteries).\(^{136}\)
- Vitamin C supplementation has been shown to lower blood pressure in those with raised blood pressure.\(^{137}\)
- Higher blood levels of vitamin C are associated with a lower risk of future atherosclerosis.\(^{138}\)

**Immune Support**

- Boosts white blood cell function and antibody production.\(^{143}\)
- Low levels of vitamin C have been attributed to reduced immune function during infection.\(^{143a}\)
- Supplementation may reduce the severity and duration of cold symptoms.\(^{144}\)

**Connective Tissue Repair**

- Vitamin C is important to the health of all the body's connective tissue (i.e. skin, blood vessels, joints, digestive and respiratory tracts and eyes), primarily through its role in collagen synthesis.\(^{140a}\)
- Vitamin C deficiency can lead to poor wound healing.\(^{145}\)
- Gum bleeding may occur due to a vitamin C deficiency.\(^{140a}\)

**Eye Health**

- Due mostly to its role in collagen synthesis, vitamin C is essential to the integrity of the connective tissue of the eyes.\(^{140a}\)
- Supplementation may help prevention of age related macular degeneration.\(^{141}\)
- Vitamin C may also protect against diabetic eye damage (retinopathy), both by inhibiting glycation (sugar-induced damage) of eye tissue and reducing capillary permeability.\(^{142}\)

**Cell Support**

- Helps repair mitochondria in the body's cells, aiding energy production.\(^{139}\)
- High vitamin C intake is associated with lower incidence of abnormal cells and cellular damage within several areas of the body.\(^{139a}\)
- The antioxidant effects of vitamin C may help protect chromosomes from oxidative damage.\(^{140}\)
Protection from Toxins

- Supplementation with Vitamin C may help the body excrete toxic environmental minerals such as aluminium, cadmium and lead.
- May reduce the toxicity of alcohol and help prevent hangovers.\textsuperscript{146}

May be Supportive for:

- Antioxidant
- Cardiovascular disease (atherosclerosis, high blood pressure, etc.)
- Viral, bacterial, fungal infections
- General immune support
- Allergic reactions (eczema, asthma, hayfever, hives, etc.)
- Cell protection
- Degenerative eye disease
- Detoxification
- Poor wound healing
- General skin health
- Bleeding gums
- Arthritis
- Bone health
- Stress
- Longevity

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.

\textbf{CALCIUM}

Calcium is the most abundant mineral and approximately 99\% of the total calcium in the body is found within the bones and teeth.

\textbf{Blood Clotting}

- Calcium has been shown to have a positive influence on the blood's ability to clot due to its role in the formation of blood platelets, production of fibrin and activation of prothrombin.\textsuperscript{147}

\textbf{Cardiovascular Support}

- Higher dietary calcium has been shown to be associated with a reduction in the risk of high blood pressure due to its role in pumping sodium from the cell.\textsuperscript{148}

\textbf{Muscular Health and Function}

- Calcium is required for muscle contraction due to its role in ATP hydrolysis and neurotransmitter activity and thus has a role in the transmission of nerve impulses.\textsuperscript{149}

\textbf{Nervous System Support}

- Calcium concentration in the terminal membrane dictates the quantity of certain neurotransmitters, thus influencing nerve sensitivity and irritability.\textsuperscript{150}
- Calcium deficiency is linked to muscle spasms and twitches due to hypersensitive nerves.\textsuperscript{151}
Skeletal Health and Bone Density

- Calcium is an important component of bones, with it playing an important role in bone density and strength.\textsuperscript{152}

- Bones are constantly being broken down and built up. Calcium stimulates the release of calcitonin, which stimulates the migration of calcium from the blood to rebuild bone tissue.\textsuperscript{153}

- Long term calcium deficiency predisposes individuals to rickets and osteomalacia.\textsuperscript{152}

- Calcium is an important mineral for post-menopausal women who are predisposed to osteoporosis.\textsuperscript{153}

May be Supportive for:

- Osteoporosis
- Osteomalacia
- Rickets
- Fractures
- Bone health (general)
- Dental health (general)
- Muscle spasms and twitches
- Leg cramps
- Nervous tension
- Irritability
- Hypertension
- Pre-eclampsia
- Acid stomach (as an antacid)
- Excessive lead levels
- Histamine detoxification

CONTRAINDICATIONS/DRUG INTERACTIONS:

In order to avoid an increased risk of calcium deposition in the soft tissues (including kidney stones), daily dosages should be lower than 2000mg. Please note: Certain experts believe that ensuring adequate magnesium intake and using calcium in the citrate form would lower the risk of soft tissue deposition. Research suggests that this is certainly the case for kidney stone formation.

Cancer patients and people with hyper-parathyroid disorder should not use calcium supplements unless on the advice and under the strict monitoring of a doctor.

Calcium supplements should not be taken with blood pressure lowering drugs unless under medical supervision, as it may compound the effect of the drugs – in the case of calcium channel blocking anti-hypertensives, calcium may interfere with the drug’s action.

Calcium supplements should not be taken with digitalis unless under medical supervision.

Calcium may decrease the absorption of various drugs such as bisphosphonates (etidronate), fluoroquinolone antibiotics, 4-quinolones, tetracyclines and fluoride. It is recommended that calcium is taken at least two hours away from administration of the drug.

Taking calcium with the drug tamoxifen may lead to excessive blood calcium levels.

Strict medical supervision is required if patients taking cardiac glycosides receive parenteral calcium administration (the combination may increase the risk of heart arrhythmias).

Unless vitamin C is taken at the same time, high dose calcium may reduce iron absorption.
**CAPRYLIC ACID**
A saturated fatty acid, this compound is derived from tropical oils such as palm and coconut.

**Candida Overgrowth**
- It is suggested that caprylic acid, incorporated into candida cell membranes, causes them to rupture and die.\(^{154}\)
- Caprylic acid should be introduced gradually to avoid or reduce the “die off” reaction as a result of increased toxic load as candida dies.

**Anti-microbial**
- Caprylic acid has been shown to be effective against gastrointestinal yeast species.\(^{155}\)
- Caprylic acid has been shown to inactivate *E. coli* and *Salmonella ssp*.\(^{156}\)

**May be Supportive for:**
- Candida
- Yeast overgrowth

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Dosage should be lower to start with to ensure a “die-off” reaction does not occur, which is where the liver is unable to cope with the rate at which candida is being destroyed.

**CARICOL® (papaya puree)**
Caricol® is a proprietary patented formula comprising of pureed papaya made to a specific recipe. It is made from the pulp of organic tree-ripened papaya and preserved with lemon juice concentrate.

**Constipation**
- Caricol® has been shown in studies to alleviate constipation, even in those who were suffering from chronic constipation.\(^{157}\)

**Diarrhoea**
- It was also shown to be effective in reducing diarrhoea in patients who were suffering from chronic diarrhoea.\(^{157}\)

**Irritable Bowel Syndrome (IBS)**
- The same study showed that Caricol® was supportive in relieving IBS symptoms in those suffering from ROME III criteria IBS.\(^{157}\)

**May be Supportive for:**
- Indigestion
- Heartburn
- Flatulence
- Irritable bowel syndrome
- Constipation
- Diarrhoea

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
L-Carnitine

This is not an essential amino acid, so can be synthesised in the body. However, certain conditions can lead to carnitine deficiency e.g. poor absorption, dietary deficiency of essential amino acids (especially lysine and methionine), cofactor deficiency (iron, vitamins B3, B6, and C), and a high fat diet. (see also Carnitine (other forms)).

Athletic Performance

- Carries long chain fatty acids into the mitochondria to be metabolised into energy.
- Vital in organs such as the heart, which use fatty acids as a main source of energy. It may increase energy producing enzymes and improve cardiovascular function in endurance athletes.\(^\text{158}\)

Cardiovascular Support

- A deficiency has been identified in a number of heart conditions, including angina, arrhythmia and cardiovascular disease.
- Carnitine supplementation may improve oxygen utilisation, resulting in improved exercise tolerance and heart function.\(^\text{159}\)
- Studies suggest that carnitine may improve cardiac function in congestive heart failure – by alleviating shortness of breath and general weakness.\(^\text{160}\)

Lipid-lowering Agent

- Research shows carnitine can reduce cholesterol and triglyceride levels, while improving the ratio between HDL (good) and LDL (bad) cholesterol. Improving the cholesterol ratio is thought to be one of the most important factors in preventing cardiovascular disease.\(^\text{161}\)

Liver Support

- Carnitine is required for the metabolism and utilisation of fatty acids in the liver.
- A deficiency promotes the development of liver complaints associated with abnormal fat handling.\(^\text{162}\)
- Alcohol impairs carnitine function, which may explain why carnitine appears particularly helpful in alcohol induced fatty liver and cirrhosis.

Male Fertility

- Carnitine is found in high concentrations in the epididymis of the testes, where sperm mature and acquire their motility.
- Carnitine concentrations in semen appear to correlate positively with both the number of sperm and sperm motility.\(^\text{163}\)

May be Supportive for:

- Atherosclerosis
- Angina, cardiomyopathy, heart arrhythmia
- Cholesterol and triglyceride reduction
- Muscle weakness and endurance exercise
- Weight management
- Male infertility
- Liver congestion/fatty liver
- Alcoholic cirrhosis

Please note: In the case of enhancing brain function, ALC is preferred to L-Carnitine. When looking at cardiovascular health, L-Carnitine is considered more appropriate.

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.
CARNITINE (OTHER FORMS)
Carnitine is synthesized from the essential amino acids lysine and methionine. Found abundantly in skeletal and heart muscle. It is involved in energy metabolism and mitochondrial protection. It carries fat, in the form of fatty acids, to the mitochondrial inner membrane where energy is produced. It is made in the body, but can also be consumed through food. Carnitine can be found in many forms, including acetyl L-Carnitine, L-Carnitine tartrate, L-Carnitine fumarate, and the most common form, free-form L-Carnitine. The attachment of a chemical group called an acetyl group changes the carnitine’s structure enabling it to cross the blood brain barrier. Attaching a second amino acid enhances gut absorption and provides additional actions and benefits. (see also L-Carnitine).

Acetyl L-Carnitine Arginate
• Acetyl L-Carnitine is able to cross the blood brain barrier attached to arginine
• Similar structure to acetylcholine, the neurotransmitter involved in memory and thought processes
• Acts as an antioxidant in the brain
• Brain function enhancement
• Protective effect on nerve cells
• Arginine improves nitric oxide levels so will provide vasodilatory properties in vessels and improved circulation in the brain
• Studies suggest that carnitine and arginine together will help improve male sperm count and motility in infertile men.164

Acetyl L-Carnitine Taurate (ALCT)
• Taurine is known for its focus on the heart, eyes and liver. Energy levels in these important organs are enhanced by the addition of taurine. In animal research, taurine protected against heart failure, reducing mortality by nearly 80%.165

L-Carnitine Fumarate
• This is L-Carnitine combined with fumaric acid into L-Carnitine fumarate. It is considered a stable form for some capsules or tablets. Fumarate, or fumaric acid, is an important compound, which is also naturally present in the body. As a component of the Krebs cycle, fumaric acid plays a key role in generating energy.

Glycine Propionyl L-Carnitine (gPLC)
• gPLC is a molecular-bonded form of L-Carnitine and the amino acid glycine. gPLC is categorized in the same family as carnitine and is very important in the formation of creatine.
• An antioxidant against free radical damage and lipid peroxidation.
• gPLC is more effective than carnitine for use in sports, especially endurance sports, both before and after training. During stamina sports carbohydrate fuel sources can diminish. At this point they turn to fats for energy and gPLC can help improve their metabolism within the muscles.166
• Studies show an increase in blood levels of nitrite/nitrate (a marker for nitric oxide), thus gPLC is an excellent addition to a heart support programme, surpassing L-carnitine efficiency.166

May be Supportive for:
• Alzheimer's disease
• Senile dementia
• Brain health
• Improved memory/ mental alertness
• Cardiovascular health
• Central and peripheral nervous system support

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.
Carotenoids

Carotenoids are provitamin A nutrients which are converted into vitamin A (retinol) in the human body. They also provide some fruit and vegetables with their colour.

Antioxidant

- Carotenoids are believe to protect cells from free radical damage due to their free radical scavenging properties.\(^\text{167}\)
- Lutein and zeaxanthin are carotenoids which are considered to be protective against free radical damage within the eye and thus may be supportive in reducing the risk of age-related macular degeneration.\(^\text{168}\)
- Carotenoids have the ability to protect against cell abnormalities within the body due to their antioxidant potential.\(^\text{169}\)

Gap Junction Communication

- Carotenoids have been associated with gap junction up-regulation, suggesting that they may be involved in cellular repair.\(^\text{170}\)

Immune Support

- Astaxanthin, a keto-carotenoid, has shown its supportive role in enhancing both cell-mediated and humoral immune response in humans.\(^\text{171}\)

Major Provitamin A Carotenoids:

- Beta-carotene 100%
- Cryptoxanthin 50-60%
- Alpha-carotene 50-54%
- Gamma-carotene 42-50%

(% vitamin A activity compared to beta-carotene standard)

Major Non-Provitamin A Carotenoids:

- Lycopene
- Zeaxanthin
- Lutein
- Capsanthin

May be Supportive for:

- Antioxidant (all – especially alpha and beta-carotene and lycopene)
- Singlet oxygen quenching (especially lycopene, astaxanthin, gamma, alpha and beta-carotene)
- Cell protection (all – especially lycopene and alpha-carotene)
- Vitamin A precursor (some - especially alpha, beta and gamma-carotene – see above)
- Skin health (especially beta-carotene and mixed carotenoids)
- Respiratory [including lung] health (especially lycopene, alpha-carotene, lutein and beta-carotene [from natural sources only - not synthetic form])
- Eye health (especially lutein, zeaxanthin and astaxanthin)
- Prostate health (especially lycopene)
- Cardiovascular health (especially beta-carotene and mixed carotenoids)
- Female reproductive health (especially alpha and beta-carotene and cryptoxanthin)
- Immune health (especially beta and alpha-carotene)

Contraindications/Drug Interactions:

None known.
Cayenne

Capsicum frutescens/Capsicum annuum

Cayenne is a shrub which originates from Central and South America but now also grows in subtropical and tropical climates. Native Americans have used cayenne as a food and for its health benefits for at least 9,000 years.

Anti-bacterial

- Cayenne has been shown to have potent anti-bacterial effects which are further enhanced by its immune boosting properties.\(^{172}\)

Cardiovascular Support

- Cayenne has been shown to regulate blood flow and strengthen the heart, arteries and capillaries due to its circulatory stimulation properties.\(^{173}\)

Digestive Stimulant

- Cayenne has been suggested to stimulate digestive secretions and may help overall digestive function.\(^{174}\)

Pain Relief

- Cayenne is believed to influence prostaglandin activity and may block the sensation of pain due to its capsaicin content. The anti-pain effects are especially prominent with topical use.\(^{175}\)

May be Supportive for:

- Poor circulation
- Cold extremities
- Arthritic pain
- Bacterial infections
- Gastric insufficiency

Contraindications/Drug Interactions:

Should be used on the side of caution if currently taking anti-coagulant medications.
Cayenne can cause a burning feeling when eliminated in stool, but should dissipate with regular use.
Celadrin®

Celadrin® is a natural matrix of cetylated, esterified fatty acids derived from beef tallow. Esterification is a process where fatty acids are stabilised by combining them with alcohol – in this case cetyl alcohol. The resulting esterified fatty acids are very stable and will not react with oxygen. The specific components of Celadrin® are cetyl myristoleate, cetyl myristate, cetyl palmitoleate, cetyl laureate, cetyl palmitate, and cetyl oleate.

Anti-inflammatory

- Celadrin® penetrates the cell membrane which enhances membrane health, integrity and cell-to-cell signalling.\(^{176}\)
- Research suggests Celadrin® inhibits pro-inflammatory prostaglandin synthesis.\(^{176}\)
- Clinical trials suggest that Celadrin® modulates inflammatory process in conditions such as arthritis.\(^{177}\)

Arthritis

- Research has shown that Celadrin® may improve knee range of motion and overall joint function, with the potential to be an alternative to the use of non-steroidal anti-inflammatory drugs for people suffering with osteoarthritis.\(^{177}\)

Psoriasis

- Preliminary research suggests Celadrin® to be beneficial for psoriasis.\(^{176}\)

May be Supportive for:

- Osteo/rheumatoid arthritis
- Psoriasis
- Minor aches/pains
- Backache
- Sprains and bruises
- Inflammatory conditions

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known
Cherry

Prunus cerasus

Cherries are the fruit of the Prunus species of shrubs, which originate from Europe and West Asia, though are now grown in many different locations across the world.

Antioxidant

- The anthocyanins and polyphenols within cherry have been shown to possess antioxidant properties.\(^{178}\)

Cardiovascular Support

- The antioxidant properties of cherry suggest a potential role in reducing the oxidation of LDL cholesterol, a known risk factor in the development of cardiovascular disease.\(^{179}\)

Pain Relief

- Cherry is believed to alleviate pain associated with gout.\(^{180}\)

Osteoarthritis

- Cherry intake has been shown to reduce C-reactive protein levels, which is a key indicator in inflammation.\(^{181}\)
- Anthocyanins found in cherry also reduce nitric oxide synthesis and pro-inflammatory factors.\(^{181}\)

May be Supportive for:

- Osteoarthritis
- Inflammation
- Cardiovascular disease risk reduction

Contraindications/Drug Interactions:

None known
Choline is an essential water soluble B vitamin, which is required for various nervous system components.

**Cardiovascular Support**

- High homocysteine levels are associated with increased cardiovascular disease risk. Choline is involved in the reduction of plasma homocysteine levels.\(^{182}\)
- Choline plays an important role in lipid metabolism, thus potentially lowering cholesterol.\(^{182}\)

**Liver Support**

- Choline is essential for phosphatidylcholine synthesis which is considered a lipotropic agent.
- Lipotropic agents may help protect against various liver diseases, for example non-alcoholic fatty liver disease.\(^{183}\)

**Mental Health**

- Higher choline intake has been associated with increased cognitive performance.\(^{184}\)

**Nervous System Support**

- Choline is a component of the neurotransmitter acetylcholine, which is used in the body for excitatory nerve conductions.\(^{185}\)
- Choline is a component of phosphatidylcholine, which is a component of the myelin sheath that insulates nerve cells for more efficient nerve conduction.\(^{186}\)

**May be Supportive for:**

- General mental function
- Memory enhancement
- Liver support
- Gallstones
- Cardiovascular health (e.g. cholesterol lowering)
- Nerve disorders (e.g. multiple sclerosis [MS])
- Bipolar (manic) depression (NOT clinical [non-bipolar] depression – see contraindications)
- Constipation (due to weak intestinal peristalsis)
- Laxative dependence

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

No known toxicity for levels found in supplements.

Do not supplement with choline and phosphatidylcholine in clinical (non-bipolar) depression unless under doctor's supervision, as it may deepen depression in some cases.

High-dose phosphatidylcholine may cause nausea, diarrhoea or reduced appetite.

Large doses of choline (as choline chloride) may cause ‘fishy’ body odour.
CHONDROITIN

Chondroitin is a polysaccharide chain of sugars which is commonly used as a supplement for osteoarthritis due to its vital role as a building block for cartilage.

Cardiovascular Support

• Chondroitin sulphate is a glycosaminoglycan, which are essential in maintaining vascular integrity by providing elasticity, support and protection. This includes protection against atherosclerosis development due to its link to thrombomodulin.188
• Studies suggest that chondroitin may protect against varicose veins.189

Joint Protection and Repair

• Chondroitin sulphate is a glycosaminoglycan, which are believed to be clinically beneficial in the treatment of degenerative joint disorders.187
• Chondroitin sulphate helps stimulate synthesis of cartilage compounds and inhibits joint damaging enzymes.187

Tissue Repair

• Chondroitin is used by chondrocytes to rebuild tissue compounds and help prevent enzymatic destruction of the connective tissue.187

May be Supportive for:

• Joint health
• Sports injuries
• General connective tissue support
• Vascular health
• Cardiovascular health
• Osteoarthritis
• Aiding rehydration of cartilage

CONTRAINDICATIONS/DRUG INTERACTIONS:
If taking warfarin please check with a doctor as chondroitin in conjunction may increase bleeding.
CHROMIUM

Chromium is an essential mineral required by the body to help regulate blood sugar levels through increasing insulin sensitivity.189a

Anti-ageing

- Chromium is linked with decreased glycation which has been linked to skin health and the damaging of structural proteins (collagen), thus chromium indirectly exerts anti-aging properties.190

Blood Sugar Management

- Chromium has been shown to be supportive in balancing blood sugar levels in both hypo and hyperglycaemic individuals.191
- Chromium’s blood sugar balancing properties are due to its role in increasing cell insulin sensitivity and being a primary component of glucose tolerance factor molecules.192
- “Syndrome X” is the combination of a pre-diabetic state with an increased risk of cardiovascular disease and is commonly associated with obesity.192

Cardiovascular Support

- Excessive insulin within the blood has been shown to increase blood triglyceride levels and elevate LDL cholesterol. Chromium is believed to be supportive in reducing the risk of cardiovascular disease by balancing blood sugar.192
- Chromium’s blood sugar balancing properties reduce the chance of glycation, a process which can cause damage to artery walls, a known risk factor for atherosclerosis development.193

Skin Health

- Research has suggested links between insulin sensitivity and its effect on skin health, primarily due to its role in acne development.194

Sports Nutrition

- Supplementation of chromium in sports people is believed to increase lean body mass percentage due to its involvement in insulin sensitivity.195

May be Supportive for:

- Blood sugar control (general)
- Non-insulin dependent diabetes
- “Borderline” diabetes
- Hypoglycaemia
- Cravings for sugar and refined carbohydrates
- High cholesterol
- High triglycerides
- Cardiovascular disease (general)
- Weight management
- Sports nutrition
- Bodybuilding
- Acne
- Slowing the ageing process
CONTRAINDICATIONS/DRUG INTERACTIONS:

Chromium should only be supplemented in the trivalent form. Insulin dependent diabetics should not take chromium supplements unless on the advice and under the strict monitoring of a doctor, as the chromium may compound the drug’s effect and lead to difficult management of insulin dosage and even dangerous drops in blood sugar. Non-insulin dependent diabetics taking diabetic medication other than insulin should only take chromium supplements on the advice and under the strict monitoring of a doctor.

Non-medicated, non-insulin dependent diabetic patients should only take chromium supplements on the advice and under the monitoring of a doctor.

Individuals with hypoglycaemia should only use chromium supplements on the advice and under the monitoring of a qualified doctor. Some hypoglycaemics will experience severe drops in blood sugar as a result of chromium supplementation.

Yeast-derived chromium supplements should not be used by patients taking monoamine oxidase (MAO) inhibitors unless on the advice and strict monitoring of a doctor. Yeast-free chromium supplements can be used as an alternative.

It has been reported that if taken in the evening, chromium may lead to more vivid and colourful dreams and a reduced need for sleep.

CIDER VINEGAR

Anti-microbial

- Acetic acid is a component within cider vinegar which has been shown to have anti-microbial properties.196

Antioxidant

- Polyphenols found within cider vinegar suggest that it possesses antioxidant properties.196

Cholesterol Management

- Research has shown that apple cider vinegar is beneficial in reducing LDL cholesterol and increasing HDL cholesterol.197

Weight Management

- Research has shown that acetic acid (active component of cider vinegar) increased satiety, leading to a decreased calorie intake.196, 198

May be Supportive for:

- Bacterial Infections
- Burns
- Those looking to reduce cholesterol
- Individuals looking to increase satiety and reduce calorific intake

CONTRAINDICATIONS/DRUG INTERACTIONS:

Caution with high amounts if taking digoxin, diuretic drugs or insulin.
Cinnamon
*Cinnamomum cassia*

Cinnamon comprises mainly volatile oils and flavonoids with the volatile oils mainly comprising of cinnamaldehyde (60-80%). The flavonoids are primarily proanthocyanodins and cinnamtannins.

**Antioxidant**
- Cinnamon has been shown in research to be an effective free radical scavenger and is considered to one of the more potent antioxidants.\(^{199}\)

**Blood Sugar Management**
- Cinnamon is thought to increase insulin sensitivity in those who have insulin resistance due to its ability to stimulate insulin receptors.\(^{200}\)

**Circulatory/Anti-inflammatory**
- Research has suggested that the cinnamaldehyde content of cinnamon is an inhibitor of platelet aggregation by inhibiting the release of arachidonic acid from platelet membranes.\(^{199}\)
- Its role in inhibiting arachidonic acid release may also suggest a potential supportive action for inflammatory conditions.\(^{199}\)

**Digestive Support**
- Research has shown that volatile oils in cinnamon have anti-spasmodic action and kill pathogens within the digestive system.\(^{201}\)
- Cinnamon extract has been shown to be effective when used as an anti-fungal treatment.\(^{202}\)
- Cinnamon may be an effective anti-bacterial agent against candida within the digestive tract.\(^{202}\)

**May be Supportive for:**
- Blood sugar management
- Antioxidant
- Circulation
- Inflammatory conditions
- Flatulence
- IBS
- Abdominal distension
- Candidiasis

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
**Coenzyme Q-10 (Ubiquinone)**

Coenzyme Q-10 (ubiquinone) is found in every plant and animal cell, although dietary sources are not likely to be sufficient to make up a deficiency. Coenzyme Q-10 is an essential component of the mitochondria (the powerhouse of the cells), due to its role in energy production. **Also see Ubiquinol – reduced coenzyme Q-10, bio-ready form.**

**Antioxidant**

- Coenzyme Q-10 is considered to be a potent antioxidant within the mitochondria and can help reduce free radicals within the body directly or in conjunction with α-tocopherols.\(^{203}\)

**Athletic Performance**

- Coenzyme Q-10 is suggested to potentially increase stamina by decreasing fatigue onset, by increasing circulation, oxygen availability and reducing free radical formation.\(^{209}\)

**Cardiovascular Support**

- Coenzyme Q-10 is required for fatty acid metabolism within the mitochondria of the cardiac cells and fatty acids are the primary energy source for the heart,\(^{204}\) ensuring effective mechanical pumping for effective circulation of the blood.
- Its antioxidant protection of blood lipids protects against atherosclerotic development, by regulating nitric oxide pathways.\(^{205}\)
- Beta blockers and statins can block coenzyme Q-10 synthesis, so supplementation alongside these medications may be supportive (under supervision of a healthcare practitioner).\(^{206}\)

**Immune Support**

- Studies on age related immune suppression have shown an improvement in antibody production with supplementation of coenzyme Q-10.\(^{207}\)

**Pain Relief**

- Coenzyme Q-10 synthesis is reduced in patients who use statins. Supplementation with coenzyme Q-10 can restore body stores and relieve statin-induced myalgia.\(^{206}\)

**Tissue Repair**

- Coenzyme Q-10 is believed to support the immune system for tissue repair, thus resulting in faster healing.\(^{208}\)

**Weight Management**

- Coenzyme Q-10 facilitates stored fat metabolism, and may aid a weight management programme.\(^{207}\)

**May be Supportive for:**

- Cardiovascular health
- Hypertension
- Angina
- Cardiomyopathy
- Heart arrhythmia
- Fatigue
- Weight management
- Gum disease
- Immune function
- Sports nutrition
- Antioxidant protection

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Anyone on heart medication should consult their doctor as coenzyme Q-10 may alter/reduce the need for their medication, monitoring is necessary.
**Conjugated Linoleic Acid (CLA)**

Conjugated linoleic acid is an omega-6 fatty acid which is a mixture of different isomers of linoleic acid. Conjugated linoleic acids are often found in dairy and meat products.

**Body Composition/Weight Management**

- Research has shown that CLA’s may be supportive in reducing fat-mass at dosages greater that 3.2g per day.\(^{210}\)
- This review also showed that an increase in CLA intake resulted in greater fat loss when comparing studies.\(^{210}\)

**Cholesterol Management**

- A review on preliminary research results show that CLA may be supportive in management of LDL cholesterol levels.\(^{211}\)

**Glucose Metabolism**

- Research has shown that CLA may be supportive in normalising glucose metabolism by potentially improving insulin sensitivity.\(^{211}\)

**Immune Support**

- Preliminary research has shown that CLA may be supportive for the immune system due to its potential role in immunoglobulin synthesis.\(^{211}\)

**May be Supportive for:**

- LDL cholesterol management
- Weight management
- Immune system support
- Inflammation
- Glucose metabolism

**Contraindications/Drug Interactions:**

None known.
Copper is a mineral that the body requires in small amounts for the synthesis of red blood cells, immune system health, nerve cell health, as well as acting as an antioxidant.

Antioxidant
- Copper is known to be part of superoxide dismutase, a powerful antioxidant, which protects cells and tissues against free radical damage, which can cause inflammation.\(^{212}\)

Connective Tissue Support
- Lysyl oxidase is an enzyme required for collagen and elastin integration into tissue which is dependent on copper.\(^{213}\)
- Collagen and elastin integration into tissue is essential for tissue structure, stability, and elasticity.

Essential Coenzyme
- Copper is an essential coenzyme for several enzymes involved in many metabolic pathways, thus a deficiency will adversely affect biological functions.\(^{214}\)

May be Supportive for:
- Connective tissue health
- Arthritis
- Sprains
- Strains
- Repetitive strain injury (RSI)
- Anaemia
- Vascular instability
- Cardiovascular disease
- Anaemia
- Cataracts
- Antioxidant protection
- Zinc excess (see Contraindications/Cautions below)

CONTRAINDICATIONS/DRUG INTERACTIONS:
Symptoms of copper toxicity include nausea and vomiting, headache, diarrhoea, gastric pain, dizziness, insomnia, weakness, high blood pressure, jaundice and racing heart. Excessive copper intake may cause a metallic taste in the mouth. Copper accumulation in tissues is a common feature of many health disorders. Supplementation should not be taken in the event of tissue copper excess unless on the advice and under the monitoring of a qualified healthcare practitioner.
Individuals suffering from Wilson’s Disease should avoid supplements containing copper.
People who suffer with haemochromatosis should not take copper unless on the advice and under the strict monitoring of a doctor.
High doses of copper can adversely affect zinc status (and vice versa). Although there are differing scientific views on what constitutes an optimal ratio between copper and zinc, it is thought that a ratio for long-term intake between 1:7.5 and 1:10 (copper to zinc) is probably appropriate.
CRANBERRY BERRIES

Vaccinium macrocarpon

Cranberries are native to North America where they were used to treat bladder and kidney disease. They are now used by many as a preventative measure for urinary tract infection.

Anti-bacterial

- Research has shown that active compounds within cranberry berries inhibit pathogenic bacteria adherence within the urinary tract.²¹⁵

Antioxidant

- The rich flavonoid content of cranberries offers potent protection against oxidative damage.²¹⁶

Nutritive

- Cranberry is a rich source of vitamins, minerals, and flavonoids.

May be Supportive for:

- Urinary tract infections (e.g. cystitis)
- Protection against free radicals

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.

CURCUMIN

Curcumin is the active constituent found within turmeric root. Curcumin was first isolated in 1815 and has been used since in India, due to its supportive role in a wide range of illnesses. Recently curcumin has become a focus of research due to its potentially supportive role in a wide range of disorders and diseases.

Athletic Performance

- Eccentric movement (lengthening of a muscle under load) during exercise results in small amounts of damage occurring to the muscles cell membranes which causes an inflammatory response. This inflammatory response can result in muscle soreness and stiffness, and is often referred to as delayed onset muscle soreness (DOMS).
- Preliminary research has shown that curcumin is effective in reducing muscle damage and muscle recovery time.²²²
- Athletes may also find that joints become inflammed as a result of repetitive use or impact on the surfaces. Curcumin may be supportive in reducing the inflammation around these joints.²²³

Cardiovascular Support

- Inflammation has been shown in research to be involved in the development of cardiovascular disease.²¹⁷
- Curcumin has anti-inflammatory properties and thus may be supportive in reducing the risk of developing cardiovascular disease. This is due to inflammation of the vascular endothelium leading to damage and potentially atherosclerotic plaque development.²¹⁸
**Digestive Support**

- Curcumin's anti-inflammatory properties have been shown in research to be supportive for inflammatory gastrointestinal disorders, such as Crohn's disease.\(^\text{221}\)
- This is due to its role in regulating the production of inflammatory cytokines, interleukin-6 (IL-6) and tumor necrosis factor alpha (TNF-\(\alpha\)).\(^\text{221}\)

**Inflammation**

- Curcumin has been shown in research to inhibit the production of tumour necrosis factor-alpha (TNF-\(\alpha\)), interleukins-1,6 and 8, and cyclooxygenase-2 (COX-2),\(^\text{224}\) all of which are involved in the inflammatory response, as a result of infection or injury within the body.

**Joint Support**

- Research has suggested the use of curcumin in those who are suffering from inflammatory joint disorders, such as arthritis, due to its role in regulating the body’s inflammatory response.\(^\text{223}\)
- Curcumin is believed to also suppress any catabolic mediator synthesis by chondrocytes within the joints thus helping reduce cartilage breakdown.\(^\text{223}\)

**Mental Health**

- There is an increasing prevalence of neurodegenerative diseases which is believed to be due to oxidative damage occurring within the brain, causing inflammation.\(^\text{219}\)
- Curcumin’s anti-inflammatory properties have been shown in research to be supportive in managing the symptoms of neurodegenerative disorders such as Alzheimer’s disease.\(^\text{217}\)
- The brain consumes up to 20% of oxygen inhaled via the lungs, meaning it can be exposed to oxidative damage. Curcumin’s antioxidant properties may be supportive against oxidative damage within the brain.\(^\text{220}\)

**May be Supportive for:**

- Osteoarthritis
- Alzheimer’s disease
- Dementia
- Cardiovascular disease
- Inflammatory gastrointestinal disorders
- Inflammatory disorders
- Delayed onset muscle soreness

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Should not be taken alongside blood thinning medication without medical supervision.
**L-Cysteine**

Cysteine is a semi-essential amino acid used within the body to synthesise proteins e.g. glutathione. A semi-essential amino acid means it can be biosynthesised within the human body but requires many different elements to be present to be synthesised.

**Alcoholism**

- Research suggests that cysteine may blunt dopamine release as a result of alcohol consumption, thus may potentially reduce alcohol consumption in alcoholics.\(^{225}\)

**Antioxidant**

- Both alone and as part of glutathione, cysteine is an effective free radical scavenger.\(^{226}\)
- Cysteine is part of glutathione peroxidase, which has a role in the reactive oxygen species and peroxide radical scavenging for the protection of cell membranes.\(^{227}\)

**Cardiovascular Support**

- Cysteine can prevent LDL cholesterol oxidation.\(^{228}\)
- NAC (the more potent form of cysteine) has been shown to significantly lower lipoprotein A.\(^{228}\)

**Detoxification**

- Cysteine has been suggested effective in increasing glutathione, a compound required for phase II liver detoxification.\(^{230}\)
- Approximately 60% of toxins passing through the liver are detoxified via glutathione conjugation.
- Cysteine also has anti-oxidative properties which can enhance its liver protection abilities.\(^{230}\)

**Excess Metal Removal**

- Glutathione conjugation also allows for chelation of heavy metals to aid removal from the body, a process which requires cysteine.\(^{229}\)

**May be Supportive for:**

- Liver protection and liver disorders
- Detoxification
- Heavy metal poisoning
- Free radical-related disorders in general
- Atherosclerosis

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Cysteine may produce a false positive in diabetic tests for ketone bodies. Best avoided by children, pregnant women and nursing mothers. Vitamin C supplementation is often recommended when taking L-Cysteine to aid absorption.
**Vitamin D**

*Cholecalciferol*

There has been renewed interest in vitamin D recently, with new research showing that the health benefits of this nutrient stretch way beyond bone health.

Vitamin D is a fat-soluble nutrient required for the absorption and utilisation of calcium and phosphorus. Two forms are available from foods - ergocalciferol (D2) and cholecalciferol (D3).

**Parathyroid Hormone Imbalances**

- A vitamin D dependent mechanism controls regulation of calcium and phosphorous via the production of parathyroid hormones.\(^{231}\)
- With this in mind, vitamin D supplements may be supportive for parathyroid hormone imbalances.

**Anti-microbial**

- Low vitamin D status can increase susceptibility to tuberculosis contraction, due to its role in the immune function (T cells).\(^{232}\)

**Blood Sugar Management**

- Low vitamin D status has been shown to be associated with type II diabetes.\(^{233}\)

**Bone Health**

- Necessary for growth, development and maintenance of bones and teething children to avoid rickets.\(^{234}\)
- In its most active form it works with calcium to control bone formation.\(^{235}\)

**High Blood Pressure**

- Vitamin D status has been shown to be an independent risk factor of cardiovascular disease events which may be due to increased blood pressure.\(^{236}\)

**Immune Support**

- Scientific evidence suggests vitamin D is a key factor for the innate and adaptive immune system.\(^{237}\)

**Influenza**

- Vitamin D has been linked to reducing influenza infection risk due to its role in the innate and adaptive immune system.\(^{238}\)

**Multiple Sclerosis (MS)**

- Higher maternal milk consumption and vitamin D intake during pregnancy may be associated with lower risk of developing MS in offspring.\(^{239}\)
- Vitamin D status has been associated with an increased risk of MS development.\(^{240}\)

**Osteoarthritis**

- Contributes to maintain healthy cartilage.\(^{241}\)
- Research has suggested that a deficiency in vitamin D can result in increased osteoarthritis incidence and progression.\(^{242}\)

**Seasonal Affective Disorder (SAD)**

- Vitamin D deficiency has been associated with depression and seasonal affective disorder.\(^{243}\)
May be Supportive for:
- Aid to calcium absorption
- Bone health
- High blood pressure
- Blood sugar imbalances
- Weight management
- Mood disorders (e.g. depression)
- Immune health

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

DANDELION

*Taraxacum officinale*

Dandelion is found in the temperate conditions of Europe, Asia and North America. Though dandelion is usually regarded as a weed, it contains a wide range of vitamins and minerals.

**Anti-bacterial/Immune Support**
- Inulin, found in dandelion, is an immunostimulant and may possess anti-bacterial properties. ²⁴⁴

**Digestive Stimulant**
- Dandelion’s bitter principles are thought to promote the release of other digestive secretions,²⁴⁵ thus may be useful for conditions where there is low levels of digestive secretions.

**Diuretic**
- Dandelion is a diuretic but its high potassium content addresses the problem of potassium excretion posed by other diuretics.²⁴⁶

**Liver and Gallbladder Support**
- Dandelion has been shown to enhance bile flow, improving conditions such as liver congestion, bile duct inflammation, hepatitis, gallstones, and jaundice.²⁴⁵
- Dandelion acts as a lipotropic agent due to its high choline content and bitter principles.

**Nutritive**
- Dandelion is a relatively rich source of nutrients, including vitamins A, C, D, B complex (particularly choline, which aids liver function) and a variety of minerals.
Weight Management

• Dandelion has a positive influence on excess body fluid elimination, due to its diuretic effect and thus may be useful for weight management.247

May be Supportive for:

• Gallstones
• Elevated cholesterol
• Poor fat digestion
• Liver congestion
• Bile duct inflammation
• Indigestion
• Insufficiency of digestive secretions

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.

DHA (Docosahexaenoic acid)

A long chain polyunsaturated fatty acid derived from dietary Alpha-Linolenic Acid (ALA) and found preformed in oily fish such as sardines, mackerel and salmon. DHA is an omega-3 fatty acid and is found in high concentrations in the brain and retina.

Attention Deficit Hyperactivity Disorder (ADHD)

• Low DHA blood levels have been suggested to be a marker of ADHD within individuals.248

Eye Health

• DHA has been linked to protection against age related macular degeneration development, due to it being a key fatty acid in the retina.250

• It has also been suggested that DHA is essential in retina development both while in the womb and after birth.251

Growth and Development

• Prenatal and postnatal DHA insufficiencies have been associated with poor or abnormal neuronal development due to a variety of structural changes and thus is crucial for brain development.249

• As previously stated, DHA is a key nutrient in the development of the eyes and brain of infants.251, 252

• Therefore, it has been suggested that infants who receive adequate levels of DHA have better eye sight and higher IQ’s.253

• It is suggested that pregnant women should aim to achieve between 200-300mg/d of DHA during pregnancy and nursing.254
Mental Health

- DHA is an important molecule in the brain, with DHA being the predominant omega-3 fatty acid found within the brain.\(^{248}\)

May be Supportive for:
- Retinal health
- ADHD
- Brain development
- Mental health
- Learning difficulties

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.

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**DONG QUAI**

*Angelica sinensis, Angelica polymorpha*

Dong quai (also known as “female ginseng”) is often used in traditional Chinese medicine to help with female reproduction problems. It is found at high altitude in the cold, damp, mountains of China, Korea, and Japan.

**Anti-allergic**

- Research suggests that dong quai inhibits the production of allergy-related antibodies.\(^{255}\)

**Cardiovascular Support**

- Dong quai may be supportive in dilating blood vessels due to its muscle relaxing properties.\(^{256}\)
- Dong quai is also suggested to possess anti-platelet/anti-coagulant properties.\(^{256}\)

**Female Health**

- Dong quai contain phytoestrogens which have been shown to modify oestrogenic activity in the body, due to their ability to bind to oestrogen receptors.\(^{257}\)
- Phytoestrogens can occupy receptors thus reducing the effect of endogenous oestrogen on the cell.
- Dong quai can also work in the opposite way in which the phytoestrogen binds to open oestrogenic receptors.

**Pain Relief**

- Dong quai is believed to possess a muscle-relaxant quality which can benefit painful conditions e.g. headaches and menstrual cramps.\(^{256}\)
May be Supportive for:

- Premenstrual syndrome
- Food and environmental allergies
- Irregular menstruation
- Chronic pain
- Menstrual cramps
- Muscle cramps
- Menopausal symptoms (e.g. hot flushes) poor circulation

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

VITAMIN E

Vitamin E is a fat-soluble vitamin and is made up of tocopherols and tocotrienols (alpha, beta, delta, and gamma). Naturally vitamin E is found in nuts, nut oils, olive oil, green leafy vegetables and avocados, to name a few.

Antioxidant

- Vitamin E inhibits lipid peroxidation and thus helps prevent LDL oxidation occurring.  
  
- Its antioxidant activity is also believed to be enhanced by vitamin C.
- Vitamin E contributes to the protection of cells from oxidative stress/damage.

Blood Sugar Management

- Vitamin E has been suggested to be beneficial for regulating adipokines by decreasing reactive oxygen species.
- Adipokines are cytokines which are secreted by adipose tissue and play a role in blood sugar regulation.

Cardiovascular Support

- Preliminary research has shown that vitamin E helps prevent LDL oxidation, a risk factor associated with cardiovascular disease development.
**Female Health**

- Vitamin E combined with vitamin C has been shown in research to help relieve oxidative stress in diabetic post-menopausal women, who are at greater risk of this due to lower circulating oestrogen.265
- Post-menopausal women are also at greater risk of developing osteoporosis. Alpha-tocopherols have been shown to have a beneficial effect on the bone health of post-menopausal women.266
- Preliminary research has shown that vitamin E may be supportive in reducing premenstrual syndrome symptoms.267

**Mental Health**

- Due to vitamin E being a fat-soluble antioxidant it is believed that it may be supportive in neurological disorders such as Alzheimer’s disease.262
- It is also suggested that sleep deprivation can result in memory impairment. Vitamin E has shown to help with sleep and improve memory function.263
- Vitamin E supplementation has been associated within lower amyothrophic lateral sclerosis rates due to its role as an antioxidant.264

**Skin Health**

- Vitamin E and C and zinc have been shown to be beneficial for skin health.268
- Vitamin E’s role in skin health is believed to be due to its antioxidant properties.

**May be Supportive for:**

- Antioxidant
- Cardiovascular disease (atherosclerosis, arrhythmias, etc.)
- Circulatory disorders (intermittent claudication, ‘restless legs’, Raynaud’s disease, etc.)
- Cell protection
- Skin disorders (e.g. eczema, seborrhoeic dermatitis)
- Poor wound healing
- Menopausal symptoms (hot flushes, vaginal atrophy)
- Premenstrual tension
- Fibrocystic breast disease
- Degenerative eye disease (cataracts, macular degeneration)
- Pre-eclampsia
- Diabetes
- Digestive ulcers
- Male infertility
- Nervous system disorders
- Dementia
- Parkinson’s disease
- Tardive dyskinesia
- Arthritis
- Muscle cramps

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
Echinacea

Echinacea purpurea, Echinacea angustifolia

Echinacea is a Native American plant which has been used in history by the Native Americans to treat infections and wounds.

Anti-bacterial

• Active compounds found in echinacea have been shown to exhibit a mild anti-bacterial effect on the body.\textsuperscript{269}

Anti-fungal

• Macrophage anti-fungal ability has been shown to be enhanced by echinacea.\textsuperscript{270}

Anti-inflammatory

• Polysaccharides in echinacea have been shown to exert anti-inflammatory activity.\textsuperscript{270}

Anti-viral

• Compounds found in echinacea have been shown to block viral receptor sites and inhibit the effect of hyaluronidase.\textsuperscript{270}

Immune Stimulant

• Echinacea has been shown to possess immune-stimulatory properties which may be supportive during time of infection.\textsuperscript{270}

Wound Healing

• Research has been shown echinacea to promote wound healing due to its role in promoting connective tissue regeneration and it's anti-inflammatory effect, when applied topically.\textsuperscript{270}

May be Supportive for:

• Viral infections (e.g. colds, influenza, herpes, etc.)
• Bacterial infections
• Candida albicans infections
• Arthritis and other inflammatory conditions
• Eczema, acne and other bacterially-related and/or inflammatory skin conditions
• Wound healing

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.
Elderberry Berries

*Sambucus nigra*

Elderberries grow on a large shrub called an elder which is native to Europe, Africa, parts of Asia, and also has become widespread in the USA. *Sambucus nigra* has been used for centuries to treat wounds, respiratory illnesses, colds and flu and potentially reduce nasal congestion, due to its ability to reduce swelling.

**Anti-viral**

- Elderberry extract administration has been shown to reduce the duration of influenza symptoms.\(^{271}\)
- It is also believed to be supportive against herpes and Epstein-Barr virus by inhibition of viral replication.\(^{272}\)

**Antioxidant**

- Elderberry contains antioxidants/free radical scavenging nutrients e.g. polyphenols.\(^{273}\)

**Nutritive**

- The elderberries themselves are rich in several beneficial nutrients such as vitamin C, B vitamins, flavonoids, carotenoids, etc.

**May be Supportive for:**

- Influenza
- Common cold
- Herpes
- Chronic fatigue syndrome (ME)
- Protection against free radical damage

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.

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Evening Primrose Oil

Evening primrose oil is a source of Gamma-Linolenic Acid (GLA), which can sometimes be limited due to its conversion from linolenic acid requiring the enzyme delta-6-desaturase. Evening primrose provides approximately 10% GLA.

**Diabetic Neuropathy**

- Research has suggested that evening primrose may be supportive in relieving diabetic neuropathic pain due to its role in anti-inflammatory prostaglandin production.\(^{273}\)

**Female Health**

- Scientific studies have demonstrated that omega-6 fatty acids in the form of GLA from evening primrose oil may be helpful in reducing the pain and tenderness associated with pre-menstrual breast pain and fibrocystic breasts.\(^{274}\)
- GLA is suggested by research to be helpful in relieving some symptoms of premenstrual syndrome (e.g. mood changes), due to its role in anti-inflammatory prostaglandins production.\(^{277}\)

**Inflammation**

- In theory, the GLA content of evening primrose oil is believed to be anti-inflammatory, due to its role in anti-inflammatory prostaglandins.\(^{276}\)

**Skin Health**

- Evening primrose oil has been suggested to be supportive for skin health due to its GLA content and it’s role in anti-inflammatory prostaglandin production.\(^{278}\)
May be Supportive for:
• Inflammatory conditions (with omega-3)
• PMS
• Dysmenorrhea (painful periods)
• Fibrocystic breast disease
• Endometriosis
• Ovarian cysts
• Dry skin, eczema and other skin conditions
• Diabetic neuropathy

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

EYEBRIGHT
Euphrasia parthenium
Eyebright is an herbaceous flowering plant found typically in alpine or sub-alpine meadows where snow is common.

Astringent
• As an astringent, eyebright is often used for reducing excessive discharges of the eyes and sinuses.176

Eye Health
• Eyebright has been shown to support mucous membranes which are supportive to the eye.176
• Research has shown eyebright to reduce sinus congestion, stinging, sensitivity to light, weeping eyes and catarrhal conditions.176

May be Supportive for:
• Eye strain or fatigue
• Conjunctivitis
• General eye irritation
• Catarrhal conditions

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.
**Fenugreek**

*Trigonella foenum-graecum*

Fenugreek is an aromatic Mediterranean plant and its seeds are often used as a common ingredient in dishes from the Indian subcontinent.

### Blood Sugar Management
- Fenugreek has displayed blood sugar balancing effects in research.\(^279\)

### Cholesterol Management
- Research suggests fenugreek lowers total cholesterol and triglyceride levels and increases HDL.\(^280\)

### Digestive Support
- Fenugreek has been shown to increase gastric secretions and have a soothing effect on irritated or inflamed mucous membranes.\(^281\)

### Expectorant
- Fenugreek is most commonly used in traditional herbal medicine as an expectorant or an aid for catarrh removal from the respiratory tract.\(^282\)

**May be Supportive for:**
- Atherosclerosis
- High cholesterol and triglycerides
- Catarrh
- Diabetes
- Digestive discomfort

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.

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**Fibre**

Fibre is found in both soluble and insoluble forms. Insoluble fibre remains unchanged when passing through the intestines, whereas soluble fibres are changed and form a gel-like substance within the intestines.

### Bacterial Dysbiosis Prevention
- Soluble fibre has been shown to block adherence of foreign bacteria in the gut and thus inhibiting foreign bacterial proliferation.\(^283\)

### Cholesterol Management
- Research has shown that a higher fibre intake is associated with a lower total cholesterol due to its role in binding of cholesterol and removing it from the body.\(^284\)

### Constipation
- Soluble fibre has been shown in research to be beneficial for chronic idiopathic constipation, but should be assessed on an individual basis.\(^285\)
- Fibre supplements have also been shown to be beneficial in children who have constipation.\(^286\)

### Detoxification
- In order to detoxify the body many toxins and hormones are excreted into the gut from the liver via the gall bladder. Soluble fibre facilitates the efficient removal of these components in the faeces.

### Digestive Support
- Fermentation of fibre within the gut by intestinal flora can result in short chain fatty acid production and thus influence energy production for colonocytes.\(^287\)
Irritable Bowel Syndrome (IBS)

- Psyllium fibre has been shown to be beneficial for people with IBS (D) (Rome II criteria), by absorbing water and thus alleviating diarrhoea.

May be Supportive for:
- Constipation
- Diarrhoea
- Elevated cholesterol
- Hyper-oestrogenism
- Prevention of digestive bacterial imbalance (dysbiosis)
- IBS
- Diverticular disease

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

Common Supplemental Sources of Fibre

The term fibre refers to elements within plant foods that are indigestible. Fibre encompasses components of plant cell walls such as cellulose, lignins and gums. They are broadly categorised as being either soluble or insoluble.

Psyllium Seed Husks

Psyllium seed husks provide a natural source of dietary fibre that contains both soluble and insoluble fibres. Psyllium will swell in fluid and as a result may be helpful in promoting the formation of soft, hydrated faeces.

Apple Pectin

Pectins are found in the outer skin and rind of fruits and vegetables. Apple peel contains approximately 15% pectins. Pectins have gel-forming characteristics that are responsible for the cholesterol-lowering effect associated with soluble fibres.

Oat Bran

Classified as a source of hemicelluloses that offer the benefits of both soluble and insoluble fibres. Oat bran may therefore increase stool weight and promote regular bowel motion.

Flaxseed Meal

Another source of both soluble and insoluble fibres.

Please note: Soluble fibres should be taken with an adequate amount of fluid, preferably in between meals.
**Flaxseed Oil (Linseed Oil)**

*Linum usitatissimum*

Flaxseeds and their oil are an excellent source of essential fatty acids, providing omega-3, 6 and 9 fatty acids in desirable ratios. However, whilst alpha-linolenic acid and linoleic acid have the potential to provide the important prostaglandin series 1 and 3 it should be noted that their production is reliant on adequate enzyme function.

Omega-3:Omega-6:Omega-9 ratio = 3.5:1:1

57% Omega-3 fatty acids (ALA)
16% Omega-6 fatty acids (Linoleic acid)
18% Omega-9 fatty acids

**Cell Support**

- Poor cell membrane integrity is associated with fish oil deficiency, potentially resulting in inefficient cellular function, cell dehydration, or even cell death.
- Research has shown that omega-3 rich diets can prevent inappropriate cell proliferation.

**Cholesterol Management**

- Omega-3 fatty acids have been shown to lower cholesterol and triglyceride levels.
- When metabolised into series 3 prostaglandins, ALA has a potent cholesterol lowering effect and prevents platelet aggregation.

**Immune Support**

- High levels of ALA in flaxseed oil may be supportive in autoimmune conditions.
- Deficiencies in zinc can result in reduced ALA to EPA and DHA conversion, limiting flaxseed oil supplementation benefits.

**Inflammation**

- Flaxseed oil contains omega-3 and 6 fatty acids and has a potential anti-inflammatory role (via conversion to prostaglandin series 1 and 3).
- Imbalance in pro-inflammatory (series 2 prostaglandins) and anti-inflammatory prostaglandins is a major factor in chronic inflammation.
- Omega-6 in the form of GLA has shown beneficial effects in inflammatory conditions.

**Mental Health**

- Alpha-linolenic acid is a major source of DHA, which is essential for the brain.
- Low DHA levels may predispose people to early senility and poor cognitive function.
- ALA conversion to DHA requires an enzyme which naturally declines with age, so preformed DHA may be more beneficial to the elderly.

**Skin Health**

- Essential fatty acids contribute to the overall health of skin, as well as balancing inflammatory and anti-inflammatory prostaglandins, which are especially important in inflammatory skin conditions.

**May be Supportive for:**

- Skin problems
- Cardiovascular disease
- Hypercholesterolemia
- Cellular support
- Rheumatoid arthritis
- Autoimmune diseases generally
- Chronic inflammatory conditions
- Immune support
Folic Acid/Folate

Folate, folacin, pteroylmonoglutamic acid

Folic acid/folate is also known as vitamin B9 and is part of the water-soluble B vitamins.

Cardiovascular Support

- Elevated levels of serum homocysteine are associated with cardiovascular disease development.\(^\text{300}\)
- Folic acid is involved in the methylation of homocysteine which reduces serum homocysteine levels, reducing the risk of cardiovascular disease development.\(^\text{301}\)
- Folic acid should be taken alongside vitamin B12 to aid the conversion of folic acid to folate. Folate is the active form and can help reduce risk of cardiovascular disease development.\(^\text{300}\)

Foetal Growth and Development

- There is an increased folic acid breakdown during pregnancy due to the rapidly growing foetus.
- Low folate status during pregnancy has been linked to birth defects, such as neural tube defect.\(^\text{302}\)
- Many experts suggest a preventative dose of 400\(\mu\)g before and during pregnancy.\(^\text{303}\)
- Folic acid supplementation has been shown to reduce the risk of neural tube defect.\(^\text{304}\)

Mental Health

- Folic acid is involved in the folate cycle, which influences neurotransmitter synthesis.\(^\text{305}\)
- A low folate status can result in depression, poor mental development and reduced overall cognitive performance.\(^\text{305}\)
May be Supportive for:

- Prevention of neurological birth defects (neural tube defects, e.g. spina bifida)
- Cardiovascular disease (i.e. atherosclerosis)
- Depression
- Senility (i.e. Alzheimer’s disease)
- Anaemia
- Cervical dysplasia
- Osteoporosis
- Periodontal (gum) disease (preferably as a mouth rinse)
- Histapenia (abnormally low histamine levels)

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

GARLIC
Allium sativum

Garlic originated from Asia but is now grown across the world. It has been used for thousands of years as a food and medicine, and is prized for its anti-microbial properties.

Anti-bacterial
- Research has shown the effectiveness of garlic against a variety of bacteria, including some that are antibiotic resistant.  

Anti-fungal
- Research shows that garlic demonstrates significant anti-fungal effects e.g. candida albicans.

Anti-inflammatory
- Sulphur compounds in garlic have been shown to inhibit release of inflammatory compounds which is complemented by its antioxidant properties.

Anti-parasitic
- Garlic has been shown to be effective against roundworm and hookworm.

Anti-viral
- Garlic has been shown to be anti-viral towards herpes simplex (1&2), parainfluenza (type 3), human rhinovirus (type 2).
Blood Sugar Management

• Garlic’s allicin content has been shown to have a significant hypoglycaemic action due to sulphur compounds reducing insulin destruction in the liver.\(^{309}\)

Cardiovascular Support

• Compounds within garlic may reduce pre-existing atherosclerotic plaques.\(^{309}\)

• Research suggests its role in improving the HDL to LDL ratio by suppressing LDL formation while leaving HDL levels unchanged.\(^{309}\)

• Research also suggests that garlic possesses a blood pressure lowering effect.\(^{309}\)

Immune Stimulant

• Garlic has been shown to increase immune cell activity, by exerting a positive effect on immunoreactions and phagocytosis.\(^{309}\)

May be Supportive for:

• Viral infections (e.g. colds, flu, herpes)
• Bacterial infections
• Fungal infections (e.g. candida albicans)
• Parasitic infections
• Respiratory congestion
• Cardiovascular disorders (high cholesterol and triglycerides, atherosclerosis, high blood pressure, thrombosis)
• Food poisoning
• General infections
• MRSA

CONTRAINDICATIONS/DRUG INTERACTIONS:

Regularly eating large amounts of fresh garlic may be irritating to the digestive tract.

Not recommended in large quantities if taking the prescribed anticoagulant drug warfarin.

Best avoided in large quantities during pregnancy or lactation.

Caution with insulin - check with a doctor.
Ginger
Zingiber officinalis

Ginger is the root of the Zingiber officinalis plant which is native to Asia. It has been used for thousands of years as a food and as a medicine within Asian, Indian, and Arabic herbal traditions.

Anti-emetic
• Studies have suggested ginger’s role in relieving nausea.\textsuperscript{110}

Cholesterol Management
• Ginger has been shown to reduce serum and hepatic cholesterol levels and increase bile excretion.\textsuperscript{255}

Digestive Stimulant
• Ginger is considered to be an aromatic bitter, thus potentially stimulating the release of gastric secretions.\textsuperscript{310}
• Ginger also contains proteases that are thought to be as effective as other proteolytic extracts.

Digestive Support
• Ginger has been shown to simultaneously improve gastric motility and exert antispasmodic effects on smooth muscle of the digestive tract.\textsuperscript{310}

Stomach Protective
• Research suggests that ginger may be helpful in preventing ulcer formation, however pre-existing ulcers may be aggravated by its aromatic bitter characteristics.\textsuperscript{311}

May be Supportive for:
• Indigestion, gas, abdominal bloating and discomfort
• Irritable bowel syndrome
• Nausea
• Bile insufficiency
• Stomach acid insufficiency
• Pancreatic insufficiency
• Hypochlorhydria (low stomach acid)
• Cholesterol reduction
• Stomach protection (due to NSAID side effects)

CONTRAINDICATIONS/DRUG INTERACTIONS:
Not recommended for use in patients with pre-existing gastric (stomach or duodenal) ulcers, unless directed by a medical practitioner.
**GINKGO**

*Ginkgo biloba*

*Ginkgo biloba* is a tree species native to China with a long history of being used within traditional Chinese herbal medicine.

**Anti-allergic**

- Research has shown that ginkgo inhibits platelet-activating factor$^{312}$ thus reducing inflammation.

**Antioxidant**

- The flavoglycoside content of ginkgo has been shown to have antioxidant capabilities.$^{312}$

**Cardiovascular Support**

- Ginkgo is believed to be supportive in cases of peripheral arterial disease where arterial obstruction or narrowing causes a blood flow reduction.$^{312}$

**Mental Health**

- Research has shown that ginkgo increases cerebral blood flow, thus increasing oxygen and glucose utilisation in the brain.$^{312}$
- It is also suggested that ginkgo has a positive influence on neurotransmitter function, thus improving short term memory, mental alertness, and cognitive performance.$^{313}$

**May be Supportive for:**

- Cerebrovascular disease
- Poor memory
- Lack of alertness
- Senility
- Alzheimer’s disease
- Age related depression
- Tinnitus (when associated with circulatory dysfunction)
- Cold extremities
- Oedema
- Allergies
- Asthma
- Antioxidant

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
Glucosamine is made up of glucose, a sugar that the body burns for fuel, and glutamine (an amino acid). It is an important part of the mucopolysaccharides, which provide structure to bone, cartilage, skin, nails, hair and other body tissues.

Cardiovascular Support
- Glycosaminoglycans provide arteries with support and elasticity, as well as protection and aiding repair, preventing arterial dysfunction and potentially atherosclerosis.\textsuperscript{318}

Connective Tissue Support
- Chondrocytes in the joint use glucosamine to produce glycosaminoglycans and glycoproteins for joint repair and strengthening cartilage and connective tissue.\textsuperscript{314}

Intestinal Permeability
- Glycosaminoglycans and glycoproteins are an integral part of cell membranes and connective tissue, which may stabilise the lining of the gut in the case of intestinal damage.\textsuperscript{315}

Joint Protection and Repair
- Glucosamine is used to repair, strengthen and improve integrity of cartilage.\textsuperscript{316}
- Research has shown that glucosamine can relieve symptoms associated with osteoarthritis and initiate joint repair.\textsuperscript{317}

May be Supportive for:
- Joint health
- Bone health
- Sports injuries
- General connective tissue support
- Cardiovascular health
- Vascular health
- Leaky gut
- Varicose veins

CONTRAINDICATIONS/DRUG INTERACTIONS:
Although interactions are rare, diabetics should be monitored if they intend to use glucosamine.
Allergy - the most common supplemental form is derived from shellfish.
L-Glutamine
Glutamine is a conditionally essential amino acid, meaning that the body’s ability to synthesise glutamine may be insufficient for demand.

Anti-ulcer Agent
- As a major metabolic fuel for the endothelial cells of the intestinal tract, glutamine has been shown to speed the rate of healing of digestive ulcers.319

Athletic Performance
- Glutamine improves nitrogen balance, increases protein synthesis, and decreases 3-methylhistidine (a marker of muscle catabolism) excretion.320
- Research also suggests it may increase human growth hormone secretion whilst decreasing muscle pain after a workout.321, 322
- It may stimulate the accumulation of muscle glycogen, which provides an added advantage for endurance athletes who rely heavily on glycogen stores.322a

Cravings
- Glutamine can convert to sugar for energy production via gluconeogenesis.322a
- This, in combination with the effect on brain chemistry, has been shown to significantly reduce craving for alcohol in clinical research.323

Immune Support
- It is suggested that glutamine supplementation can reduce length of stay in hospital due to its role in reducing inflammation and infection, while decreasing wound healing time.329
- Proper functioning depends on glutamine as a fuel for growth and proliferation.327

Intestinal Support
- It promotes cellular repair and reverses mucosal atrophy.327
- It improves gut barrier function, as well as immune activity in the gut, and intestinal permeability.328

Mental Health
- It readily passes the blood-brain barrier and within the brain is converted to glutamic acid, which the brain needs to function properly.324
- It provides an energy source for the brain, and plays a role in mental alertness and memory enhancement.325
- It also increases the amount of gABA, which is needed to sustain proper brain function and mental activity.326

May be Supportive for:
- Mental alertness
- Memory enhancement
- Intestinal permeability (‘Leaky gut’ disorder)
- Stomach and duodenal ulcers
- Ulcerative colitis and Crohn’s disease
- Athletic performance
- Alcoholism
- Blood sugar imbalance
- Sugar addiction
Glutathione is a non-essential nutrient as it is synthesised within the body using cysteine, glutamic acid and glycine.

**Antioxidant**
- Glutathione combines within selenium to form glutathione peroxidase, a potent free radical scavenger, important for the protection of cell membranes.\(^{229}\)

**Cardiovascular Support**
- Glutathione can prevent LDL oxidation, a known risk factor in heart disease.\(^{228}\)
- Glutathione may inhibit platelet aggregation and improve haemostatic and haemorrheological factors in atherosclerosis.\(^{228a}\)

**Detoxification**
- Glutathione is required for substance detoxification within the liver, by a process called conjugation.
- Conjugation occurs within the phase II detoxification, where approximately 60% of the toxins are neutralised.\(^{230}\)

**Male Fertility**
- Glutathione has been shown to have positive effects on sperm motility and sperm counts.\(^{330}\)

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**CONTRAINDICATIONS/DRUG INTERACTIONS:**
High dosages of glutamine may affect anticonvulsant medication. Avoid if sensitive to monosodium glutamate or suffering kidney or liver problems. May be beneficial alongside human growth hormone, indomethacin, methotrexate and paclitaxel.
**Glycine**

Glycine is a nonessential amino acid and the smallest of the amino acids. It can be found in protein rich food such as meat, fish and dairy. It is considered the simplest amino acid in the body and is largely associated with the building of proteins.

**Athletic Performance**

- Research has suggested that glycine may be supportive in increasing growth hormone synthesis within the human body, thus potentially increasing muscle strength.\(^{331}\)

**Cardiovascular Support**

- Glycine has been shown to be supportive in nitric oxide production and may be helpful in regulating blood pressure.\(^{332}\)
- It may also be helpful in reducing the risk of having a stroke, due to its involvement in nitric oxide production.\(^{333}\)

**Immune Support**

- Glycine has been suggested to have immune-modulatory properties by suppressing the activation of transcription factors and formation of free radicals and inflammatory cytokines.\(^{334}\)

**Nervous System Support**

- Glycine has been shown to have anxiety-reducing properties, by antagonising noradrenaline release.\(^{335}\)

**Sleep**

- Research has shown that accumulation of glycine in the pineal gland can benefit sleep quality and efficacy, by improving REM sleep.\(^{336, 337}\)

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**May be Supportive for:**

- Liver protection and liver disorders
- Detoxification
- Heavy metal poisoning
- Free radical-related disorders in general
- Atherosclerosis
- Male infertility

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Maybe beneficial alongside cisplatin and doxorubicin. Best avoided by children, pregnant women and nursing mothers.
Gotu Kola

Centella asiatica

Gotu Kola is a perennial plant native to India, Japan, China, Indonesia, South Africa, Sri Lanka and the South Pacific. It has been used for thousands of years in India, China and Indonesia, to heal wounds, improve mental clarity and treat skin conditions.

Cardiovascular Support

• Studies have shown Gotu Kola’s effective action on varicose veins and venous insufficiency by enhancing connective tissue structure and improve venous circulation.

Mental Health

• Gotu Kola has been shown to improve concentration, attention, and have anti-stress and anti-anxiety effect.

Skeletal Muscle Strength

• Research has shown that supplementation of Gotu Kola has shown increased muscle strength in the elderly.

Skin Health

• Gotu Kola promotes glycosaminoglycan, a major component of connective tissue for skin dermis integrity.
May be Supportive for:

- Varicose veins
- Cold extremities
- Cellulite
- Skin (e.g. varicose) ulcers
- Keloid scars
- Poor skin healing
- Scleroderma
- Mental function

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Caution with sedatives, anti-diabetics, anti-lipidemics – check with a doctor.

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**GRAPEFRUIT**

*Citrus paradisi*

Grapefruit is a subtropical fruit found in many locations across the world, such as USA, Mexico, India and South Africa.

**Anti-microbial**

- Research shows that grapefruit may have anti-microbial properties due to its flavonoid content.\(^{341}\)

**Athletic Performance**

- Polyphenol content of grapefruit is believed to help with repairing muscle micro-damage after exercise.\(^{345}\)
- Grapefruit is also believed to reduce oxidative stress biomarkers which are known to increase as a result of exercise.\(^{344}\)

**Cardiovascular Support**

- Grapefruit contains polyphenols which have been shown in research to be supportive in reducing the risk of cardiovascular disease development.\(^{342}\)
- Polyphenols have also been suggested to be anti-inflammatory for blood vessels, which is a known biomarker in atherosclerosis development.\(^{342}\)
- Polyphenols are also considered to be an antioxidant and reduce LDL oxidation, another contributing factor in atherosclerotic development.\(^{342}\)

**Weight Management**

- Research has shown that grapefruit and grapefruit juice can reduce energy intake and total triglyceride levels.\(^{345}\)
May be Supportive for:
• Athletes
• Bacterial infections
• Cardiovascular health

CONTRAINDICATIONS/DRUG INTERACTIONS:
Grapefruit is known to interact with many different medications. A general practitioner should be consulted before taking any food supplement that contains grapefruit.

GRAPE SEED EXTRACT
Vitis vinifera

Much of the research into Oligomeric Proanthocyanidins (OPC’s) used extracts of grape seeds. OPC’s are combinations of flavonoids that occur together in various plants. OPC’s are predominantly found in purple/blue fruits and vegetables.

Antioxidant
• Grape seeds may retard the ageing process due to the antioxidant properties. 346

Anti-inflammatory
• There are various avenues whereby OPC’s may reduce or prevent inflammation. 347
• They inhibit the release or production of histamine and inflammatory prostaglandins and enzymes.
• Free radicals can also trigger inflammation, so the antioxidant effect of OPC’s is beneficial in this respect too. 348

Collagen Stabilisation
• OPC’s bind to collagen and maintain or restore its flexibility and integrity; important for skin, bone, blood vessel, and muscle cell structure and function. 349

Enhances Vitamin C
• Flavonoids such as OPC’s protect vitamin C in the body and appear to aid the entry of vitamin C into cells. 350
Protects Capillaries

- OPC’s inhibit excessive permeability of capillaries by collagen strengthening effect, helping to reduce easy bruising and the appearance of thread veins.\(^{351}\)
- This also makes general circulation more efficient, which can help reduce problems such as oedema.\(^{352}\)

Protects DNA

- Most recent research suggests grape seed extract may help to prevent damage to the Deoxyribonucleic Acid (DNA) content of cells.\(^{353}\)

May be Supportive for:

- Vascular disorders (e.g. varicose veins, phlebitis, haemorrhoids)
- Improved circulation
- Arthritis
- Allergic reactions (e.g. hay fever, food allergies)
- Protects the skin from wrinkles and lack of elasticity (anti-aging)
- Promotes healing
- Prevents and treats oedema

**CONTRAINICATIONS/DRUG INTERACTIONS:**
Grape seed should be taken on the side of caution when blood thinning medication is also being taken.

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Green Tea

*Camellia sinensis*

Green tea is made from unfermented tea leaves and believed to contain high levels of antioxidants. It has been used within traditional Chinese and Indian medicine for a number of decades due to its potential health benefits.

Anti-microbial

- Green tea is believed to have potent activity against harmful bacteria and viruses due to the direct effect of catechins and indirect effect of raised glutathione peroxidase levels.\(^{354, 355}\)

Anti-allergic

- Flavonoids in green tea have been shown to inhibit histamine release.\(^{355}\)

Antioxidant

- Green tea has been shown to be a very potent free radical scavenger.\(^{355}\)
- Research has shown that green tea raises the activity of glutathione peroxidase.\(^{355}\)

Thermogenic

- Green tea contains theophylline and caffeine which have been shown to enhance fat metabolism.\(^{355}\)
- Increased fat metabolism results in increased free radical production, thus the antioxidant content of green tea can be beneficial.\(^{355}\)
May be Supportive for:
• Protection against free radicals
• Bacterial infections
• Viral infections
• Weight management

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

HAWTHORN BERRIES
Crataegus oxyacantha
Hawthorn shrubs are found on hillsides and sunny wooded areas across the world. The berries have been used since the first century to support a range of conditions.

Antioxidant
• Flavonoids have direct antioxidant properties.356
• Free radicals are detrimental to the cardiovascular system, by potentially oxidising LDL, alongside oxidative damage to vascular endothelial cells.357

Cardiovascular Support
• Flavonoid components of hawthorn berries have a vasodilatory action, which is beneficial to the circulatory system.356
• Flavonoids also protect blood vessels from damage and speed up their repair, due to their effect on collagen stability and antioxidant properties.358

Blood Pressure Support
• Hawthorn’s vasodilation properties positively influence inflammatory prostaglandin production.356
• Hawthorn is a clinically proven treatment for hypertension.359
Cardiovascular Support
- Hawthorn enhances circulation, enhancing coronary artery blood flow which allows more efficient delivery of oxygen and nourishment to the heart.\textsuperscript{356}
- Hawthorn influences enzymes for energy metabolism within the heart muscle.\textsuperscript{360}
- Hawthorn berries have been shown to be effective in the treatment of angina and other weak heart conditions.\textsuperscript{361}

Connective Tissue Stabiliser
- Flavonoids exert a collagen-stabilising effect, enhancing connective tissue strength and integrity.\textsuperscript{361}

May be Supportive for:
- Angina
- High blood pressure
- Poor circulation
- Cardiomyopathy (weak heart muscle)
- Atherosclerosis
- Heart arrhythmia

CONTRAINdications/DRUG INteractions:
Caution with anti-hypertensives, cardiac glycosides and central nervous system depressants - check with a doctor.

Hops
*Humulus lupulus*
Hops are the female flowers of the *Humulus lupulus* plant and primarily used across the world as a flavouring and stability agent for beer. They are used in brewing because of their antibacterial effect, however they are also used as a traditional herbal medicine to treat anxiety, restlessness and insomnia.

Anxiety
- Hops have been shown to reduce anxiety within humans, due to its sedative effects.\textsuperscript{362}

Female Health
- The hormone balancing properties of hops suggest its potential beneficial effect in reducing menopausal symptoms.\textsuperscript{364}

Insomnia
- Hops have been shown to have sedative effects and may improve sleep quality in those who work on rotating night shifts.\textsuperscript{362}
- Research has shown the combination of hops with valerian to be more effective than valerian alone in individuals with insomnia.\textsuperscript{363}

Weight Management
- Phytochemicals found in hops are believed to increase insulin sensitivity, reduce plasma glucose, triglycerides and free fatty acids.\textsuperscript{365}
May be Supportive for:

- Anxiety
- Stress
- Insomnia
- Weight management
- Menopausal/postmenopausal women

CONTRAINDICATIONS/DRUG INTERACTIONS:
Should be avoided if on medication with sedative properties.

HORSE CHESTNUT

Aesculus hippocastanum

Horse chestnut trees are native to South East Europe but is now widely grown in temperate countries across the world.

Capillary Function

- Horse chestnut reduces capillary fragility by reducing the number of small pores in capillary walls, potentially reducing lower limb oedema.\(^{366}\)

Vein Function

- Horse chestnut has been shown to increase the contractile potential of elastic fibres in veins, resulting in improved lower limb circulation.\(^{367}\)
- Research has shown the combination of hops with valerian to be more effective than valerian alone in individuals with insomnia.\(^{363}\)

May be Supportive for:

- Varicose veins
- Oedema
- ‘Heavy legs’
- General enhancement of lower limb circulation
- Cold feet

CONTRAINDICATIONS/DRUG INTERACTIONS:
Caution with anticoagulants, especially warfarin and aspirin – check with a doctor.
Hyaluronic Acid

Hyaluronic acid is naturally found in the body. The biggest concentrations are found in the eyes and joints, and is the major water-retaining molecule in the connective tissues.

Eye Health
- Hyaluronic acid is a natural component of the vitreous humor of the eye and so may help with dry eyes.368

Osteoarthritis
- Research has suggested that hyaluronic acid may help reduce joint pain in those with osteoarthritis.369

Skin Health
- Hyaluronic acid has been shown to retain moisture in the skin-helps form the skin’s natural moisturising factor.370
- Lack of hyaluronic acid may increase aspects of the ageing process such as wrinkles and loss of skin elasticity.371
- There is suggestion that hyaluronic acid may help with wound healing.372

May be Supportive for:
- Osteoarthritis
- Dry eyes
- Dry skin
- Wound healing
- Skin aging

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

Inositol

Lipotropic Agent
- Inositol is considered to be beneficial for liver detoxification, mainly due to its role in the breakdown of fat within the body.373 Fat build up around the liver and in the liver can cause a sluggish liver and also non-alcoholic liver disease.
- Inositol is a component of phosphatidylinositol, a phospholipid found in lecithin.373

Mental Health
- Inositol is a second messenger pathway which is linked to dopamine, serotonin and glutamate receptor levels within the body.374
- Inositols involvement with serotonin levels suggests that it may be supportive for depression.374

Nervous System Support
- Inositol is a component of nerve cell membranes and also has a role in neurotransmition, thus is an important component for the nervous system.373

May be Supportive for:
- Liver and gall bladder support
- Panic attacks
- Anxiety-related disorder
- Obsessive-compulsive disorder (OCD)
- Depression
- Diabetic neuropathy
- General mental function

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.
Iodine is a mineral found in some foods. The body needs iodine to make thyroid hormones. These hormones control the body’s metabolism and many other important functions. It is often found in supplement form as the seaweed kelp. It is the iodine form (negatively charged ions, i.e. salt) of iodine which is essential to humans. The body does not make iodine, so it is an essential part of our diet.

**Female Health**

- Research indicates that iodine supplementation may be an effective tool in the treatment of fibrocystic breast disease (FBD) which manifests itself as benign cysts.  
- Animal studies have shown that induced iodine deficiency results in mammary gland changes similar to FBD.

**Growth and Development**

- Low iodine status has been linked to impaired growth in young children.

**Thyroid Function**

- Iodine is essential for thyroid gland function. Lack of iodine can result in reduced thyroid hormone production.
- A lack of dietary iodine has also been linked to goitre.
- Conversely, excess iodine can imbalance thyroid function and cause hyperthyroidism.

**Weight Management**

- Basal metabolic rate can be affected by thyroid function. For example, an underactive thyroid can make a person more susceptible to gaining weight.

**May be Supportive for:**

- Hypothyroid (under-active thyroid)
- Fibrocystic breast disease
- Growth and development
- Weight management (when hypothyroid)

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Caution: Excess iodine may cause hypothyroidism. High doses of iodine may only be used under the supervision of a healthcare practitioner.

Be cautious with anti-thyroid medication, unless under strict supervision.
Iron

Iron is an essential mineral required by the human body for many different biological pathways, however too much iron can result in toxicity within the body.

Blood Building

• Iron is the main component of haemoglobin and account for the red colour of red blood cells.

• Iron is essential in the transport of oxygen and other gases around the body to metabolic active cells and tissue.

• Anaemia is a condition which occurs as a result of iron deficiency and is particularly a problem in young women, pregnant women, elderly women, vegans or vegetarians, and children.

Essential Coenzyme

• Energy utilisation and metabolism, collagen synthesis, brain neurotransmitters, and DNA, all involve iron due to it being a component in coenzymes associated with the synthesis of these compounds.

Oxygen Utilisation

• Iron is a component in myoglobin, which has a greater affinity for oxygen, allowing muscle to retain oxygen.

May be Supportive for:

• Iron deficiency anaemia
• Fatigue (if iron deficient)
• Weakness (if iron deficient)
• “Restless legs” syndrome
• Pregnancy
• Heavy periods
• Excessive loss of blood (i.e. menstruation, peptic ulcers, ulcerative colitis / Crohn’s disease)

Contraindications/Drug Interactions:

None known.
**Isoflavones**

Isoflavones are organic compounds found in foods, especially legumes, but also some other foods. Some of these have oestrogenic activity.

**Cardiovascular Support**

- Genistein and daidzein may help prevent cardiovascular disease in various ways, including:
  - Reducing cholesterol and free radical oxidation of cholesterol.\(^{381}\)
  - Reducing platelet aggregation.\(^{382}\)
  - Reducing arterial stiffness.\(^{383}\)

**Cell Production**

- Isoflavones such as genistein appear to possess many mechanisms which may inhibit cell damage including:
  - Helping to inhibit an enzyme that stimulates abnormal growth of cells.\(^ {384}\)
  - Aiding in reverting certain damaged cells back into normal cells, due to its antioxidant activity.\(^ {385}\)
  - Helping to inhibit oestrogen-dependant cell damage through blocking excessive oestrogenic activity.\(^ {386}\)

**Oestrogen Support**

- Phytoestrogens have the ability to bind to certain oestrogen receptors and block human oestrogen from binding to these receptors, however the phytoestrogens only exhibit a 1/1000th or less effect on these receptors compared to human oestrogen.\(^ {387}\)
- They may also be beneficial for those with insufficient oestrogen by providing an oestrogenic effect e.g. during menopause.\(^ {387}\)

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**May be Supportive for:**

- Female hormonal imbalance (e.g. premenstrual tension, menopausal symptoms)
- Osteoporosis via oestrogenic activity
- Prevention of cardiovascular disorders
- Cholesterol management
- Cell protection

**Contraindications/Drug Interactions:**
Extremely high doses are probably best avoided in those with under-active thyroid.
Vitamin K

Vitamin K is a fat-soluble vitamin required from the complete synthesis of specific proteins.

Blood Clotting

- Vitamin K is essential for blood coagulation due to it being required for Gla protein synthesis, which is involved in blood clotting.\(^{388}\)

Bone Health

- Low vitamin K status has been associated with low bone mass, osteoporosis and fracture risk.\(^{388}\)
- Vitamin K has also been linked to circulating osteocalcin levels which are bone building molecules due to their role in bone reabsorption.\(^{388}\)
- Research has shown that vitamin K reduces urinary calcium excretion and increases bone mass.\(^{389}\)

Cardiovascular Support

- Insufficient levels of vitamin K are believed to result in calification of blood vessel walls, reducing their elasticity and thus increasing the risk of atherosclerotic plaque development due to endothelial damage.\(^{390}\)

May be Supportive for:

- General bone health
- Osteoporosis
- Cardiovascular health (vitamin K2)
- Excessive bleeding due to poor scab formation
- Excessive menstrual bleeding (menorrhagia)
- Preventing haemorrhage in new-borns

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.

Korean Ginseng

Panax ginseng

Korean ginseng is found throughout East Asia and Russia but grows natively in the remote forests of Manchuria and North Korea. It has been used widely over a number of years within traditional Chinese medicine and western herbal preparations.

Adaptogenic

- Korean ginseng possesses adaptogenic properties, which helps normalise the body’s response to stress triggers.\(^{391}\)
- It has been shown to reduce the manufacture and secretion of adrenal hormones, while also strengthening the adrenal glands.\(^{391}\)

Immune Support

- Korean Ginseng has been shown to enhance white blood cell activity, as well as the potential to reduce stressor effects on the body.\(^{391}\)
- Its adaptogenic properties support the reduction of the negative effect of stressors on the immune system.\(^{391}\)

Mild Stimulant

- Korean ginseng is believed to be the most stimulating ginseng, due to its different ratio of active ginsenosides Rb1 and Rg1.\(^{392}\)

Nervous System Support

- Its adaptogenic properties provide non-specific support for the CNS, which helps restore proper neurological function.\(^{391}\)
May be Supportive for:

- Stress (mental/physical/environmental)
- Fatigue
- Weak immunity
- Physical endurance during exercise
- Lack of mental alertness

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

LECITHIN/PHOSPHATIDYLCHOLINE

Lecithin provides a natural source of polyunsaturated fatty acids including essential fatty acids. It also contains choline and inositol in their highly absorbable ‘phospholipid’ forms as well as other vitamins, minerals and nutritional factors. Phosphatidylcholine is a biologically active source of choline found in lecithin (a more concentrated form, often described as triple strength lecithin).

Athletic Performance

- Lecithin has been suggested as an ergogenic aid due to its content of choline and effect on acetylcholine. Choline and acetylcholine have been linked to delayed muscle contraction when sufficient levels are not present.\textsuperscript{395}

Cholesterol Management

- Lecithin forms part of the lipoproteins, which are cholesterol-carrying vehicles in our blood, enabling them to be distributed more efficiently and keeping cholesterol from sticking to arterial linings.\textsuperscript{392a}
- Lecithin has been shown to lower cholesterol levels and protect cholesterol from oxidation, due to being a component in lecithin-cholesterol acyltransferase.\textsuperscript{393}

Liver Support

- Phosphatidylcholine has been shown to help with non-alcoholic fatty liver disease, due to its role within lipotropic mechanisms such as secretion of very low density lipoprotein (VLDL) from the liver.\textsuperscript{394}
Mental Health

- Lower levels of Phosphatidylcholine have been found in those with neurological disorders such as Alzheimer’s disease and dementia, due to its role in membrane-mediated cell signalling and cell membrane structure.

May be Supportive for:

- Acetylcholine deficiency e.g.: Alzheimer’s disease, bipolar depression, tardive dyskinesia, Huntington’s Chorea, Friedrich’s ataxia, olivoponto-cerebellus atrophy, myasthenia gravis
- Cholesterol management
- Liver support e.g. alcoholism, hepatitis, cirrhosis, detoxification, fat metabolism
- Sports endurance
- Brain function

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

Licorice Root

*Glycyrrhiza glabra*

Licorice grows wild in parts of Europe and Asia, and the roots and underground stems are used to make licorice confectionery. The licorice root which contains a compound 50 times sweeter than sugar, has also been used within Eastern and Western Medicine in the treatment of various illnesses.

Adrenal Tonic

- Licorice has been shown to counteract the effects of adrenal hormone insufficiency, potentially making it a treatment for “adrenal exhaustion”.
- Licorice root has also been suggested to counteract side effect of long term corticosteroid drug use.

Anti-allergic

- Inhibition of prostaglandins and histamine activity suggests a potential anti-allergic mode of action for licorice.

Anti-inflammatory

- Licorice inhibits phospholipase A2 and has a cortisol-like effect which gives it anti-inflammatory properties.

Anti-ulcer

- Deglycyrrhised licorice (DGL) is clinically proven to treat ulcers in the upper digestive tract due to its ability to stimulate normal defence mechanisms.
- DGL improves intestinal tract mucosal surface integrity, increasing intestinal cell life span and blood supply to the intestinal mucosa.
Anti-viral

- Active compounds in licorice enhance interferon activity, which result in an inhibitory effect on viruses associated with common colds, herpes infections and chronic fatigue syndrome.\textsuperscript{398}

Detoxification

- Licorice is a powerful detoxifier and has shown liver supportive attributes.\textsuperscript{401}

Female Health

- Licorice contains phytoestrogenic components which bind to oestrogen receptors, inducing a reduced response (1/1000th) and occupies receptors in the case of excess levels of oestrogen.\textsuperscript{396}

May be Supportive for:

- Ulcers (stomach and duodenal)
- Female hormone imbalance (e.g. premenstrual tension)
- Chronic fatigue syndrome (ME)
- Common cold and influenza
- Herpes infections
- Arthritis
- Allergies
- Adrenal exhaustion
- Liver toxicity

CONTRAINDICATIONS/DRUG INTERACTIONS:

Chronic high dose usage of non-deglycyrrhised licorice should be avoided if suffering with high blood pressure or oedema unless under medical supervision.

Caution with non-deglycyrrhised licorice alongside anti-arrythmics, anti-hypertensives, cardiac glycosides, corticosteroids, diuretics – check with doctor.

L-LYSINE

Lysine is an essential amino acid and thus must be obtained from an individual’s diet due to the human body being unable to synthesis it. Lysine is essential for growth, calcium absorption and energy production.

Bone Health

- Increased calcium excretion has been shown to be a result of lysine deficiency, therefore potentially beneficial for those at risk of osteoporosis.\textsuperscript{402}

Cardiovascular Support

- Research has suggested that lysine strengthens artery wall integrity, thus inhibiting/speeding up healing of arterial lesion formation.\textsuperscript{402}
- Lysine is a precursor of carnitine, a potent cardiovascular tonic.\textsuperscript{402}

Herpes Prevention and Support

- Lysine supplementation has been shown in research to be supportive in recovery and preventive reoccurrence of herpes infection.\textsuperscript{403}
- Better results have been shown when combined with vitamin C, zinc, and a diet which promotes increased lysine to arginine ratio.\textsuperscript{403}

May be Supportive for:

- Cold sores
- Osteoporosis
- Shingles
- Atherosclerosis
- Genital herpes
CONTRAINDICATIONS/DRUG INTERACTIONS:
No drug interactions noted.
Should not be taken for longer than 6 months as may cause arginine imbalance.
People with allergies to eggs, dairy or wheat should not take lysine.

MAGNESIUM
Magnesium is an essential mineral required by every organ within the body for energy production, enzyme activation, and the relaxation phase of muscle contractions.

Anti-stress
- Magnesium is involved in adrenal health and adrenal stress hormone synthesis and deficiency has been associated with stress response.\(^{404}\)

Cardiovascular Support
- Magnesium’s role in the relaxation phase of muscle function and blocking of calcium uptake suggests its importance heart and vascular disorders e.g. arrhythmias, hypertension.\(^{405}\)
- Magnesium has also been shown to facilitate artery dilation, reducing pressure on the artery walls and thus reducing the risk of atherosclerotic plaque development.\(^{406}\)
- Energy production within cardiac muscle is also influenced by magnesium thus providing a stronger contraction and increasing the hearts ability to pump blood around the body.\(^{407}\)

Energy Production and Enzyme Function
- Magnesium deficiency has been shown in research to potentially result in general fatigue and fatigue-related disorders, due to its role in energy production.\(^{408}\)
- Magnesium is involved in the metabolism of carbohydrates within the body and the synthesis and secretion of insulin.\(^{409}\)
- Magnesium is also a coenzyme for DNA replication.\(^{405}\)
Female Health

- Magnesium deficiency has been shown to be an influencing factor in hormone imbalance, primarily premenstrual tension.\(^{405}\)
- Magnesium deficiency is also associated with lower levels of aldosterone and low levels of mood enhancing hormones.\(^{405}\)

Muscular Function

- Magnesium has been shown to be required for the muscle relaxation phase of muscles.\(^{409}\)
- Magnesium is also involved in the nerve conductivity through its influence on neurotransmitters, thus influencing muscular function and its potential as a preventive for muscular dysfunction (e.g. muscle cramps).\(^{405}\)

Nervous System Support

- Magnesium and calcium work together to produce proper nerve impulses. A deficiency in magnesium can result in muscle spasm and cramp.\(^{405}\)

Pain Relief

- Magnesium is believed to be supportive in relieving pain-related disorders such as migraine, tension headaches and fibromyalgia. This is believed to be due to its role in muscle, nerve, and blood vessel relaxation.\(^{410}\)

Regulation of Calcium Deposition

- Magnesium’s influence on calcium metabolism and regulation has been suggested to prevent calcium deposition in soft tissue (e.g. kidneys).\(^{411}\)
- This prevention of calcium deposition may be supportive in reducing kidney stones or calcification of arteries (major factor in atherogenesis).\(^{412}\)

Skeletal Health

- Approximately 60% of the body’s magnesium is found in bone tissue.\(^{404}\)
- Magnesium is important in regulating calcium within bones and teeth and also the activity of vitamin D which can facilitates calcium absorption.\(^{413}\)
- It is believed that magnesium is almost, if not as important, as calcium in bone and teeth strength.\(^{413a}\)

May be Supportive for:

- Cardiovascular health (general)
- Cardiac/circulatory conditions e.g. hypertension, arrhythmia
- Cerebrovascular disease (i.e. stroke)
- Hormonal imbalance related conditions
- Central/peripheral nervous system conditions e.g. fibromyalgia
- General pain
- Muscle function (cramps, spasm, etc.)
- Osteoporosis
- General fatigue
- Fatigue-related disease
- Stress

CONTRAINDICATIONS/DRUG INTERACTIONS:

Moderate to high doses of magnesium may cause loose stools, especially if taken in the form of epsom salts, magnesium chloride or magnesium hydroxide.

Patients with atrioventricular blockage or other severe forms of heart disease should not take magnesium supplements unless on the advice and under the strict monitoring of a doctor.

Patients with kidney disease should not take magnesium supplements unless on the advice and under the strict monitoring of a doctor.

Patients taking drugs for cardiovascular disease or heart defects should not take magnesium supplements unless on the advice and under the strict monitoring of a doctor.

Patients taking the drugs warfarin or tetracycline should not take magnesium supplements unless on the advice and under the strict monitoring of a doctor.

Because very high intakes of magnesium can reduce the absorption of calcium (and vice versa), it is normally recommended that these minerals should be taken together when used in higher amounts (unless otherwise directed by a qualified healthcare practitioner).
Manganese is a trace mineral found in tiny amounts within body tissue.

**Antioxidant**
- Manganese is a component of superoxide dismutase, a potent antioxidant which protects cells from oxidative damage and disease development within more prone areas of the body (e.g. joints).  

**Connective Tissue Support**
- Manganese is involved in essential coenzymes for protection of oxidative damage to connective tissue, thus potentially slowing down the aging process.  

**Essential Coenzyme**
- Manganese has been shown to be an essential coenzyme for glucose utilisation and metabolism, along with synthesis of protein, fatty acids, and cholesterol.  

**Joint Support**
- Manganese also protects joints against oxidative damage (see above).  
- Manganese has been shown to play a role in joint integrity due to its involvement in cartilage and bone growth and stability.  

**May be Supportive for:**
- Arthritis
- Sprains
- Strains
- RSI (repetitive strain injury)
- Tendonitis
- Cataract prevention
- Diabetes
- Epilepsy

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Although standard doses of manganese found in supplements are unlikely to cause side effects or toxicity, very high levels of exposure (usually from environmental or occupational exposure) can lead to many symptoms of manganese toxicity, such as symptoms resembling Parkinson’s disease and Wilson’s disease, irritability, depression, insomnia, hallucinations, delusions, violent acts, defects in motor function, loss of appetite, impotence, weakness, difficult breathing and leg cramps.

Patients suffering from Parkinson’s disease or Wilson’s disease should only take manganese on the advice and under the strict monitoring of a doctor.

High intakes of manganese may interfere with the absorption of iron, zinc and copper. If suffering with iron-deficiency anaemia, it is advisable to consult a qualified healthcare practitioner before taking a manganese supplement.
**MEDICINAL MUSHROOMS**

Medicinal mushrooms are a collection of various species of mushrooms which often grow in dark damp places. Mushrooms such as maitake, are considered to be medicinal mushrooms, due to their beta glucan content.

**Maitake (Grifola frondosa)**
- Maitake mushrooms contain phytonutrients which contribute to its potential health benefits (e.g. alpha and beta glucans).\(^4\)\(^1\)\(^8\)

**May be Supportive for:**
- Immune support
- Cell protective
- Anti-hypertensive
- Liver function

**Reishi (Ganoderma lucidum)**
- Reishi mushrooms are very rich in health promoting phytonutrients such as polysaccharides, triterpenes and phytosterols.\(^4\)\(^1\)\(^8\)

**May be Supportive for:**
- Immune function
- Cell function
- Liver function
- Anti-allergic
- Cholesterol management
- Protective against radiation
- Anti-bacterial
- Anti-hypertensive

**Shiitake (Lentinus edodes)**
- Shiitake mushrooms are believed to have health promoting properties due to their active phytonutrient components (e.g. eritadenine, lignins).\(^4\)\(^1\)\(^9\)

**May be Supportive for:**
- Immune function
- Anti-bacterial
- Cholesterol management
- Anti-viral
- General cardiovascular support
- Cell function
- Anti-parasitic
- Liver function

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
L-Methionine

Methionine is an essential amino acid, meaning it is not synthesised within the human body and therefore must be obtained from food sources or supplements.

Anti-allergic

- Methionine role in reducing histamine levels can result in an anti-allergic response.\(^{420}\)

Detoxification

- Methionine aids SAMe synthesis and thus supports detoxification by allowing methylation to occur.\(^{421}\)
- Detoxification of toxins occurs by the conjugation of numerous toxins, free radicals and by products of metabolic pathways.

Histadelic (high histamine) Disorders

- Methionine can reduce excessive histamine levels.\(^{422}\)
- Methionine has been successful in treatment of psychological disorders (e.g. schizophrenia and depression).\(^{523}\)

Hyperoestrogenism

- Methionine can facilitate the removal of oestrogen by inactivation in the liver via methylation.\(^{424}\)
- Methionine promotes the excretion of oestrogen via the conjugation alignment pathway.\(^{424a}\)
- Excessive oestrogen is often associated with premenstrual syndrome, along with other female complaints.\(^{425}\)

Lipotrophic Agent

- Methionine inhibits fatty deposit accumulation and promotes bile excretion.\(^{525a}\)
- Bile binds toxins, allowing for their removal from the body.

Liver Function

- Methionine required for glutathione synthesis, which is a potent antioxidant used in the liver to detoxify toxins.\(^{526}\)

May be Supportive for:

- Fatty liver
- Detoxification
- Food allergies
- Environmental allergies (e.g. hayfever)
- PMS
- Endometriosis
- Fibroids
- Depression (when associated with high histamine levels)
- Schizophrenia (when associated with high histamine levels)

CONTRAINDICATIONS/DRUG INTERACTIONS:

May be beneficial alongside acetaminophen, methotrexate and gentamicin.

It is advised to ensure adequate intake of vitamins B6, B12 and folic acid when taking high levels of L-Methionine.

Persons with bi-polar (manic) depression should not take methionine or SAMe.

Best avoided by pregnant women and nursing mothers.

Sufferers of neoplastic disease should avoid.

Caution with schizophrenia, hepatic and renal failure – only under medical supervision.
**Milk Thistle**

*Silybum marianum*

Milk thistle is indigenous to Europe and some parts of the United States of America. It has been used for centuries in traditional herbal medicine for treatment of liver disease but is believed to have other uses.

**Antioxidant**

- *Silybin* found within milk thistle is considered to react with hydroxyl radicals.427

**Liver Support**

- Milk thistle is believed to be supportive in preventing liver damage as a result of liver disorders.428

**Mushroom Poisoning**

- Research suggests that the *silybin* content of milk thistle makes it supportive in prevention of severe liver damage within 48 hours of *Amanita phalloides* ingestion.429

**Non-alcoholic Fatty Liver Disease**

- *Silymarin* is believed to be supportive in liver cell regeneration by increasing ribosomal protein synthesis.430
- The *silymarin* and *silybin* content of milk thistle is believed to be supportive in increasing insulin sensitivity, decreasing lipid peroxidation, and increasing glutathionine levels, thus having a positive effect on liver health.430

**May be Supportive for:**

- General liver support
- Liver detoxification
- Non-alcoholic fatty liver disease

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
**MSM/SULPHUR**

Sulphur compounds play many roles in the body’s organs and systems. There are several sulphur bearing supplements such as garlic, cysteine, methionine and alpha-lipoic acid, but MSM (methylsulfonylmethane) is the most concentrated source available.

**Anti-inflammatory**
- Sulphur's role in cell flexibility and permeability allows for toxins to be removed from the body, reducing swelling and pain.

**Anti-parasitic**
- It is thought that MSM competes for receptor sites on mucosal membranes so that parasites cannot attach.

**Allergies**
- Research suggests that MSM may be supportive for season allergic rhinitis.

**Antioxidant**
- Sulphur is a free radical scavenger and flushes out toxins, which if left to build up, can result in cell membranes becoming inflexible and damaged.

**Connective Tissue Support**
- Sulphur is necessary for new cell production and is essential for collagen and keratin synthesis, vital for hair, nails and skin maintenance.
- Sulphur has been shown to enhance wound repair and prevent cross-linking of collagen.

**Detoxification**
- Sulphur keeps cells flexible and permeable allowing for nutrients to enter and toxins to be flushed out more readily.
- Sulphur is also required for glutathione peroxidase synthesis, essential for liver detoxification.

**Excess Metal Removal**
- Sulphur containing compounds chelate heavy metals and assist their removal, as they can be very destructive in the body.

**Joint Protection and Repair**
- Preliminary research suggests MSM provides significant relief from arthritis and other types of joint injury.
- Indirect anti-inflammatory properties may benefit joint protection and repair.

**Muscle Soreness**
- Preliminary research suggests MSM reduces muscle soreness after resistance exercise.

May be Supportive for:
- Antioxidant protection
- Arthritis
- Inflammation
- Detoxification, including excess and heavy metals
- Food allergies
- Hair, skin and nail health
- General connective tissue support including joints, blood vessels, eyes, etc.
- Parasites
- Wound healing

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Some literature suggests that MSM augments warfarin, so supplementation alongside should be avoided.
N-Acetyl Cysteine (NAC)

N-Acetyl Cysteine is formed by binding an acetyl group to cysteine’s nitrogen atom.

Antioxidant

- Forms part of a potent antioxidant enzyme called glutathione peroxidase, allowing for the reduction of reactive oxygen species and peroxide radicals.²²⁷
- Its antioxidant potential may be supportive in reducing oxidative cell membrane damage.

Anti-viral

- Raised glutathione inhibits spread of viruses.²⁹⁹

Cardiovascular Support

- Reduces LDL oxidation and lipoprotein A concentrations, which are both known for their role in cardiovascular disease.²²⁸

Detoxification

- Cysteine is an amino acid required for glutathione production and is considered to be the most likely to regulate glutathione synthesis, which is important for liver detoxification.²³⁰
- NAC has been shown in studies to be the most effective method of increasing glutathione levels.²²⁸
- Research suggests that NAC is one of the most effective methods of elevating glutathione, a compound required for phase II liver detoxification in a process called conjugation.²⁶⁷

Excess Metal Removal

- Up-regulation of glutathione conjugation allows for the increased chelation of heavy metals, aiding removal from the body.²²⁹

Respiratory Support

- NAC dissolves mucus improving symptoms of chronic bronchitis, asthma, cystic fibrosis and emphysema.⁴³⁹
- Smokers may benefit NAC supplementation due to its antioxidant properties.²²⁷

May be Supportive for:

- Liver protection and liver disorders
- Detoxification
- Heavy metal poisoning
- Free radical-related disorders in general
- Atherosclerosis
- Cystic fibrosis
- Chronic respiratory congestion
- Viral disorders
- Smokers

Contraindications/Drug Interactions:

Cysteine may produce a false positive in diabetic tests for ketone bodies.
Best avoided by children, pregnant women and nursing mothers.
Vitamin C supplementation is often recommended when taking L-Cysteine to aid absorption.
**Nettle Leaf**

*Urtica dioica*

Nettle leaf is native to Eurasia and is often known for its ability to provide a sharp sting when the leaves are touched. However, it is suggested to be supportive for certain conditions.

**Anti-inflammatory**
- Nettle has been shown to inhibit inflammatory prostaglandins and leukotrienes synthesis, thus decreasing inflammation.\(^{440}\)
- Its antioxidant potential may be supportive in reducing oxidative cell membrane damage.

**Anti-allergic**
- Hay fever and other allergies are believed to be suppressed by nettle, due to it being a rich source of quercetin (anti-histamine).\(^{440}\)

**Diuretic**
- Research has shown nettle leaf’s ability to increase urinary flow by relaxing the urinary tract.\(^{441}\)

**Haemostatic**
- Nettle is believed to arrest mild haemorrhaging, which may warrant its use in women who suffer from heavy periods.\(^{440}\)

**May be Supportive for:**
- General fluid retention
- Lower limb oedema
- Arthritis
- Hay fever and other allergic reactions
- Excessive bleeding
- Heavy periods

**Contraindications/Drug Interactions:**
None known.
Niacin

Nicotinamide

Niacin (vitamin B3) is a water soluble vitamin involved in hormone production, carbohydrate metabolism and healthy skin, hair, eyes and liver. Its coenzyme is nicotinamide, which generally has different applications.

Cholesterol and Fat Regulation

- Niacin has been shown to reduce total cholesterol levels within humans.\(^{442}\)
- Niacin is also believed to increase levels of HDL (good cholesterol).\(^{442}\)
- It has been said that niacin can provide a greater reduction in cardiovascular disease risk compared to prescribed medications.\(^{442}\)

Cardiovascular Support

- Niacin has been shown to reduce LDL cholesterol, a known risk factor in cardiovascular disease.\(^{442}\)
- Niacin has also been shown to increase blood flow in circulatory disorders (e.g. Raynaud’s disease).\(^{443}\)

Essential Coenzyme

- Niacin is converted to coenzymes nicotinamide adenine dinucleotide (NAD\(^+\)) and nicotinamide adenine dinucleotide phosphate (NADP\(^+\)) which is used in energy production, hormone and DNA synthesis and body tissue growth.\(^{444}\)

Histamine Regulation

- Niacin has been used to raise abnormally low histamine levels to aid copper detoxification. This occurs due to Niacin stimulating histamine release from under the skin surface.\(^{445}\)

May be Supportive for:

- Elevated cholesterol levels
- Elevated triglyceride levels
- Elevated lipoprotein A levels
- Cardiovascular disease
- Impaired peripheral circulation
- Raynaud’s disease
- Intermittent claudication
- Excessively low histamine levels
- Acute (not chronic) schizophrenia [when associated with excessively low histamine levels]

CONTRAINDICATIONS/DRUG INTERACTIONS:

Niacin may cause temporary ‘flushing’ (redness, tingling, sensation of heat, itchiness), especially in doses above 50-100 mg. The ‘niacin flush’ has not been shown to be harmful to the body.

Please note: The duration and severity of the flushing depends on the person, the dosage and the quantity and type of food and/or drink in the stomach at the time. With consistent daily use of a particular dose of niacin, the severity of the flush will typically diminish gradually, to the point that the flush will eventually cease to occur after ingestion.

High-dose niacin in any form should be avoided in those with pre-existing liver disease (or elevated liver enzymes) or gall bladder disease, unless under medical supervision.

It is advised that liver function and cholesterol testing be periodically carried out on those using long-term high-dose niacin (i.e. more than 2000mg per day) in any form.

Long-term, high-dose niacin should be avoided in diabetics unless medically supervised, as it may impair glucose tolerance and decrease effectiveness of anti-diabetic drugs.

High-dose niacin should be avoided in cases of pregnancy, peptic ulcers or gout unless under medical supervision.

Taking high-dose niacin with alcohol, beta-blockers, mecamylamine or pargyline may cause severe hypotension (low blood pressure).

High-dose niacin may occasionally cause nausea and gastric irritation.

High-dose niacinamide may cause depression in some adults.
OPC’s are combinations of flavonoids that occur together in various plants, predominately in purple/blue fruit and vegetables. There are thousands of flavonoids that have been categorised to date, these compounds are largely responsible for the colours of fruits and vegetables and provide protection against oxidative and free radical damage.

**Anti-allergic**

- OPC’s role in inhibiting histamine release may help reduce allergic reactions.\(^{350}\)
- OPC’s role in the strengthening of collagen may reduce tissue susceptibility to allergic processes.\(^{446}\)

**Anti-inflammatory**

- OPC’s may reduce inflammation, by the inhibition of histamine and inflammatory prostaglandin release.\(^{446a}\)
- OPC’s are also free radical scavengers, which can result in reduced inflammatory response.\(^{350}\)

**Anticoagulant**

- 100mg to 120mg of Pycnogenol\(^8\) demonstrated a similar effect to 500mg of aspirin in reducing blood clotting without increased bleeding.\(^{447}\)

**Antioxidant**

- It is suggested that proanthocyanidins are free radical scavengers and 50 times more effective than vitamin E and 20 times more effective than vitamin C.\(^{350}\)
Collagen Stabilisation

• OPC's bind to collagen and maintain or restore its flexibility and integrity.\textsuperscript{351}

• Important for skin, bone, blood vessel, and muscle cell structure and function.\textsuperscript{349}

Enhancing Vitamin C

• Flavonoids such as OPC's protect vitamin C in the body and appear to aid the entry of vitamin C into cells.\textsuperscript{350}

Protects Capillaries

• OPC’s inhibit excessive capillary permeability by strengthening collagen.\textsuperscript{447a}

• This may in turn make circulation more efficient, with the potential effect of reducing oedema.\textsuperscript{352}

May be Supportive for:

• Protection against heart disease
• Vascular disorders (e.g. varicose veins, phlebitis, haemorrhoids)
• Improved circulation
• Arthritis
• Allergic reactions (e.g. hay fever, food allergies)
• Protecting the skin from wrinkles and lack of elasticity (anti-ageing)
• Promotion of healing
• Possible protection against eye disorders by improvement of micro-circulation in the eye (e.g. cataracts, macular degeneration, diabetic retinopathy)
• Prevention and treatment of oedema
• Anti-clotting without increased bleeding
• Reducing bruising and thread veins
• Can be added to creams, as topical application appears to have anti-ageing and collagen strengthening effects as well

CONTRAINDICATIONS/DRUG INTERACTIONS:
Pycnogenol®/Pine Bark - none noted, although it may be best to be cautious with warfarin.
Grapeseed extract – in theory, the same caution as above.
Olive Leaf

Olea europaea

Olive leaf is from the olive tree which is native to the Mediterranean region. The therapeutic properties of olive leaf have been known since ancient times.

Anti-microbial
• Research suggests that olive leaf extract inhibits gram-negative bacteria and gram-positive bacteria, parasites, and yeast. This is due to its potential to inhibit enzymes required for bacterial replication.\(^{448}\)

Anti-coagulation
• Polyphenols found within olive leaf have been shown to decrease platelet aggregation.\(^{449}\)

Antioxidant
• Olive leaf is believed to be a potent free radical scavenger.
• Oleuropein (the active compound in olive leaf) has been shown to decrease LDL oxidation, a known risk factor in cardiovascular disease.\(^{450}\)

Blood Sugar Management
• Research has shown that olive leaf extract has the potential to balance blood glucose levels in humans.\(^{449}\)

Hypothyroidism
• Preliminary research results suggest that olive leaf extract significantly reduces circulatory thyroid stimulating hormone levels.\(^{451}\)

May be Supportive for:
• Candida
• Hypothyroidism
• Bacterial infection
• Parasite

CONTRAINdications/DRUG INTERACTIONS:
None known.
Omega-3 Fatty Acids

Omega-3 fatty acids are polyunsaturated fatty acids (PUFAs) and consist of Alpha-linolenic Acid (ALA), Eicosapentaenoic Acid (EPA) and Docosahexaenoic Acid (DHA). ALA is most commonly found within plant oils, whereas EPA and DHA are most commonly found in marine oils.

Mental Health

• Omega-3 fatty acids are components of cell membranes within the brain, and DHA is the predominant fatty acid found within the brain.252
• Recent research has shown that omega-3 supplementation can increase cognitive performance.452
• Low DHA levels have also been associated with attention deficit hyperactivity disorder.248
• Preliminary research has shown that omega-3 fatty acid may be supportive in reducing depression onset and also during major depressive episodes.456

Wound Healing

• A recent review of current literature suggests that omega-3 supplementation may be beneficial in supporting wound healing after stressful trauma.457

Autoimmune Disorders

• Research has suggested that as well as omega-3 fatty acids anti-inflammatory role, they may be supportive in autoimmune disorders (e.g. rheumatoid arthritis).290

Cardiovascular Support

• Both EPA and DHA have been shown to be supportive in reducing platelet aggregation and potential thrombosis.453

Dysmenorrhea

• Omega-3 intake has been associated with a supportive effect in those who are suffering with dysmenorrhea and is believed to be due to its anti-inflammatory action.454

Foetal Growth and Development

• As previously stated, DHA is a key nutrient in the development of an infant’s eyes and brain.456a
• Therefore, it has been suggested that infants who receive adequate levels of DHA have better eye sight and higher IQ’s.253
• It is suggested that pregnant women should aim to achieve between 200-300mg/d of DHA during pregnancy and nursing.254

Inflammation

• Omega-3 supplementation has been linked with a decreased inflammatory response.455

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.
**Omega-6 Fatty Acids**

Omega-6 fatty acids are polyunsaturated fatty acids, which are found in marine oils and plant oils (e.g. evening primrose oil). They are believed to have a pro-inflammatory effect when not in balance with omega-3 fatty acids.

**Diabetic Neuropathy**

- Research has suggested that GLA may be supportive in relieving diabetic neuropathic pain due to its role in anti-inflammatory prostaglandin production.\(^{275}\)

**Female Health**

- GLA (omega-6 fatty acid) is suggested by research to be helpful in relieving some symptoms of premenstrual syndrome (e.g. mood changes), due to its role in anti-inflammatory prostaglandins production.\(^{277}\)

**Inflammation**

- In theory, omega-6 fatty acids are believed to be anti-inflammatory, due to their role in anti-inflammatory prostaglandins production.\(^{276}\)
- This may not always be true though, due to omega-6 fatty acids increasing arachidonic acid levels within cells, which increase series 2 prostaglandin production (pro-inflammatory).\(^{276}\)

**Skin Health**

- GLA has been suggested to be supportive for skin health due to its role in anti-inflammatory prostaglandin production.\(^{278}\)

**May be Supportive for:**

- Inflammatory conditions (with omega-3)
- PMS
- Dysmenorrhea (painful periods)
- Fibrocystic breast disease
- Endometriosis
- Ovarian cysts
- Dry skin, eczema and other skin conditions
- Diabetic neuropathy

**Contraindications/Drug Interactions:**

None known.
**Omega-9 Fatty Acids**

Omega-9 fatty acids are monounsaturated fatty acids, which are found in foods such as almonds, avocados, rapeseed and peanut oil, and mustard seed.

**Cardiovascular Support**
- Research suggests that oleic acid may be supportive in reducing LDL cholesterol and vasoprotective.\(^458\)

**Cell Support**
- Omega-9 fatty acids are important components of cell membranes and are crucial in maintaining proper cell function.\(^460\)

**Glucose Tolerance**
- Monounsaturated fatty acids have been shown to be supportive in glucose metabolism and thus potentially control blood sugar levels.\(^459\)

**May be Supportive for:**
- Cardiovascular disease
- Cell membrane integrity
- Gallstones
- Hypercholesterolemia
- Hypertension
- Hypoglycaemia (blood sugar control)
- Intestinal health

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.

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**Oregano**

*Origanum vulgare*

Oregano is a perennial herb that is native to warm-temperate western and south-western Eurasia and Mediterranean region.

**Anti-microbial**
- Thymol and carvacrol found in oregano oil are suggested to possess anti-bacterial and anti-fungal capabilities.\(^461\)

**Anti-catarrhal**
- Oregano oil is believed to be supportive in breaking up and eliminating mucous.\(^462\)

**Anti-spasmodic**
- Oregano has been shown to be anti-spasmodic, soothing the muscle lining of the digestive tract and settling flatulence.\(^463\)

**Antioxidant**
- Thymol is considered to be a potent antioxidant.\(^464\)

**Cough Suppressive**
- Oregano’s anti-catarrhal and anti-spasmodic activity may explain its suggested ability to suppress coughs.\(^462\)
May be Supportive for:

- Bacterial infections
- Fungal infections (e.g. candida albicans)
- Chronic coughs
- Bronchitis
- Protection against free radical damage
- Indigestion and flatulence

CONTRAINDICATIONS/DRUG INTERACTIONS:
Excessive use should be avoided in pregnancy.

**L-ORNITHINE**
A non-essential amino acid, the most popular role for L-ornithine is in sports.

**Athletic Performance**

- In combination with arginine, ornithine has been shown to increase growth hormone release.\(^{468}\)
- A physical trial on cycling found that ornithine significantly reduced the subjective feeling of fatigue as well as maintaining the pedalling speed over that of the placebo group.\(^{466}\)

**Convalescence**

- In theory ornithine may support a reduction lean muscle breakdown when considered to be in a hyper catabolic state due to its role in growth hormone synthesis.\(^{467}\)

**Immune Support**

- Ornithine is a component of ornithine \(\alpha\)-ketoglutarate, which has been shown to modulate immune function.\(^{468}\)

**Wound Healing**

- Ornithine has been shown to be essential for collagen synthesis and wound repair due to it being the precursor for polyamine and proline synthesis.\(^{469}\)
May be Supportive for:
- Athletic performance (especially strength training/muscle building)
- Infection
- Cirrhosis
- Detoxification
- Healing of injuries
- Convalescence

CONTRAINDICATIONS/DRUG INTERACTIONS:
Should NOT be supplemented in cases of active herpes infection or schizophrenia.
Should be avoided by pregnant women and nursing mothers.

PABA
Para-aminobenzoic acid

Essential Coenzyme
- PABA has been linked as a precursor to coenzyme Q-6. A coenzyme used in the production of coenzyme Q-10 within cells in the body.\textsuperscript{471}
- PABA is also thought to be linked with folate synthesis and metabolism.\textsuperscript{472}

Eye Health
- Preliminary research is suggesting that PABA may help protect retinal function and attenuate retinal degeneration.\textsuperscript{470}

Skin Health
- PABA is believed to have an anti-fibrotic action, and be supportive in managing the symptoms of scleroderma and Peyronie’s disease.\textsuperscript{473}

May be Supportive for:
- Scleroderma
- Peyronie’s disease (excessive fibrous tissue build-up in the penis)

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.
**Food Allergies**

- Food allergies may be a result of not having the correct enzyme to digest our foods, resulting in an immune reaction within the gut due to undigested food entering the intestines.  \(^{477}\)

**Weight Management**

- Pancreatic insufficiency is associated with weight loss in patients with reduced pancreatic enzyme production due to maldigestion. \(^{478}\)

**May be Supportive for:**

**Before food:**

- Autoimmune diseases
- Cardiovascular with regard to reducing blood clots
- Inflammation, including sports injuries, inflammatory bowel disease, rheumatoid arthritis
- Pancreatic insufficiency (e.g. pancreatitis, cystic fibrosis)
- Shingles

**With food:**

- Candida
- Food allergies
- Weight management

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
PANTOTHENIC ACID
Vitamin B5

Adrenal Gland Support
• Stress can result in high demands on the body for energy and vitamin B5 is a precursor to coenzyme A which is involved in energy production.479
• Deficiency of pantothenic acid often results in symptoms such as fatigue and irritability, which are frequently associated with adrenal exhaustion.480

Essential Coenzyme
• Vitamin B5 is required for energy metabolism due to it being a precursor for coenzyme A (CoA).479
• Coenzyme A has a function in the synthesis of acetylcholine, cholesterol, phospholipids and the porphyrin ring (building block for haem molecule) in haemoglobin and myoglobin.481

Lipid-lowering (pantethine only)
• Pantethine (metabolite of vitamin B5) is believed to lower LDL cholesterol and increase HDL cholesterol within the body.482

Intestinal Function
• Vitamin B5 is synthesised by human gut flora along with many other B vitamins.483

Skin Health
• Inflammation of the skin is thought to be reduced, due to pantothenic acids role in coenzyme A synthesis.484
• Pantothenic acid is also believed to have antibacterial and skin softening properties.484

May be Supportive for:
• Stress
• Adrenal exhaustion
• Chronic fatigue
• Physical endurance
• Chronic constipation and laxative dependence
• Lupus erythematosus
• High cholesterol and triglycerides (pantethine only)

CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.
**PAPAIN**

Papain is a powerful digestive enzyme commonly found and extracted from the papaya fruit (*Carica papaya*), it is also referred to as papaya proteinase. The papaya enzyme, papain, plays a key role in digestive processes involving the breakdown of tough protein fibres. For this reason, it has been commonly used in its native South America as a digestive support for meat eaters.

**Anti-inflammatory**

- Papain is a proteolytic enzyme that especially when used with other proteases has been used for its anti-inflammatory properties including conditions of the musculoskeletal system such as joint pain, osteoarthritis and for autoimmune diseases such as rheumatoid arthritis.\(^{485, 486}\)

**Antioxidant**

- Papain has antioxidant properties. Research found that papain can offer a potential alternative to chemical additives for increased survival of probiotic bacteria in yogurt due to its anti-oxidant properties.\(^{487, 488}\)

**Digestive Support**

- Papain has been linked to aiding the digestion of gluten and thus may be supportive for those with coeliac disease.\(^{489}\)

**Skin Health**

- Papain (applied topically or ingested orally) may improve the visual appearance of the skin, by dissolving cross-links in collagen, responsible for skin wrinkling and accelerating the turnover of skin cells.\(^{487, 490}\)

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**Wound Healing**

- Papain has traditionally been used for the treatment of burns, bedsores, wound healing, and skin ulcers. Papain is thought to have antiseptic and anti-inflammatory properties.\(^{491}\)

**May be Supportive for:**

- Bloating/wind
- Indigestion
- Wound healing
- Osteoarthritis, rheumatoid arthritis
- Dry skin
- Ageing skin/wrinkles

**CONTRAINdications/Drug Interactions:**

None known.
**L-Phenylalanine and DL-Phenylalanine (DLPA)**

Phenylalanine is an essential amino acid (i.e. it cannot be made by the human body).

### Appetite Control
- Cholecystokinin (CCK) is an intestinal hormone that signals the brain to feel satisfied when enough food is consumed. Phenylalanine is strongly involved in the release of CCK.\(^{492}\)

### Energy
- Due to its role as a precursor for norepinephrine, phenylalanine may help stimulate the production of energy.\(^{493}\)
- This energy increase may help those with chronic fatigue syndrome.\(^{493a}\)

### Mental Health
- Research has shown that L-Phenylalanine is a precursor to neurotransmitters such as norepinephrine and dopamine.\(^{494}\)
- It has been suggested by research that low levels of dopamine are markers of low mood.\(^{495}\)

### Pain Relief
- DLPA is supportive in pain relief due to its role in endorphin synthesis within the body.\(^{496}\)

### May be Supportive for:
- Mood elevation
- Concentration
- Memory
- Anxiety
- Mental fatigue
- Chronic pain relief
- Appetite reduction
- Energy levels

### Contraindications/Drug Interactions:
None known.
**PHOSPHATIDYLSERINE**

Phosphatidylserine is an important phospholipid membrane component. It plays a key role in the cell cycle signalling, specifically in relationship to apoptosis.

**Mental Health**

- Phosphatidylserine has been shown in many human studies to be supportive in managing the symptoms of Alzheimer’s disease. Even in those with severe cognitive impairment.497
- Phosphatidylserine has been shown to be supportive in improving learning, memory, concentration and recall, in those who have age-associated memory impairment.497

**Stress Management**

- Research has shown phosphatidylserine may modulate the release of cortisol release in stressful situations by regulating the releasing of corticotropin-releasing factor from the hypothalamus.497

**May be Supportive for:**

- Cognitive function
- Alzheimer’s disease
- Stress management

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Should be avoided if currently taking acetylcholinesterase inhibitors and anticholinergic or cholinergic medication.

**PHOSPHORUS**

Phosphorus is an essential macromineral. After calcium, it’s the most abundant mineral in the human body. About 85 percent of the phosphorus in the body is in bones. This mineral is used by practically every cell in the body and is absorbed in the small intestines and stored in the bones. Healthy kidneys excrete extra amounts not needed by the body. Phosphorus is also required for a variety of biochemical processes including energy production.

**Bone Health**

- When phosphorus and calcium bind to one another, calcium phosphate is formed which maintains the hardness and strength of skeletal tissue.498
- Calcium works in tandem with phosphorus to stimulate parathyroid hormone release.499

**Cell Support**

- Phosphorous is also a key element in the makeup of phospholipid cell membranes.

**Energy Production/Enzyme Activation**

- Phosphorous is a key molecule in energy production as its part of the Adenosine Triphosphate (ATP) molecule which is used by the body for energy production.

**May be Supportive for:**

- Osteoporosis
- Low energy

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Phosphorus deficiency and toxicity are not very predominant; excesses of phosphorus may alter calcium balance, and phosphorus deficiency may lead to energy and metabolic problems.
Pomegranate

Puника granatum

The pomegranate tree is native to Iran but is now grown in the Mediterranean, Asia, Africa and Europe. The pomegranate fruit has been used in ancient traditional medicine for thousands of years due to its antioxidant and anti-microbial health benefits.

**Anti-microbial**
- Ellagic acid and alkaloids found within pomegranate have been shown to inhibit pathogenic bacteria.\(^ {500} \)

**Cardiovascular Support**
- Pomegranate has been shown to inhibit LDL-oxidation, a known risk factor in cardiovascular disease.\(^ {500} \)
- It has also been shown to be cardio-protective by increasing blood flow to the heart due to its antioxidant properties.\(^ {500} \)
- Research has shown that pomegranate preserves the body’s level of nitric oxide, thus maintaining and increasing blood flow to the heart.\(^ {501} \)

**Liver Protection**
- Ellagic acid is thought to protect the liver from chemically induced toxicity.\(^ {500} \)

**May be Supportive for:**
- Fungal infections (e.g. candida albicans)
- Bacterial infections
- Viral infections (e.g. common cold, influenza, herpes)
- Liver toxicity
- Jaundice
- Hepatitis
- General liver support

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
POTASSIUM

Potassium is essential for the proper function of all cells, tissues and organs, due to its role as an electrolyte and the conduction of electrical impulses for muscle contraction.

Cardiovascular Support

• Potassium is believed to have effect on cardiovascular health due to its role in muscle contraction, glycogen storage and fluid levels.\(^{502}\)

• Potassium deficiency has been shown to be linked to arrhythmias and congestive heart failure because of its link to muscle contraction.\(^{503}\)

• Potassium and sodium levels are influenced by one another and this has been shown to be supportive in reducing blood pressure.\(^{502}\)

Fluid Balance and Sodium Regulation

• Potassium maintains fluid balance within cells by regulating quantities of sodium that can enter the cells, as excess sodium within cells results in fluid retention.\(^{504}\)

Neuromuscular Health and Function

• Potassium is also required for proper nerve and muscle function due to its role in triggering nerve impulses stimulated by neurotransmitters.\(^{505}\)

• Potassium deficiency can lead to muscle fatigue and weakness as a result of impaired glycogen storage.\(^{505a}\)

• Potassium’s role in sodium balance, muscle function and glycogen storage is particularly important in heart and blood vessel health.\(^{506}\)

May be Supportive for:

• Cardiovascular health - general (see Contraindications/Drug Interactions below)
• High blood pressure
• Fluid retention
• Fatigue
• Exhaustion
• Muscle weakness
• Sports nutrition
• Stress

CONTRAINDICATIONS/DRUG INTERACTIONS:

Patients with kidney disease should not take potassium unless on the advice and under the strict monitoring of their doctor. Especially in those with defects in potassium excretion (i.e. kidney disease), potassium toxicity can lead to muscle weakness, appetite loss, hypotension, paralysis of legs and/or arms, irregular heartbeat, coma or even fatal renal or cardiac failure.

For the average person, potassium toxicity may occur if dietary intake and/or supplemental daily intake exceeds 18 grams (18,000mg.), although it is worth noting that potassium toxicity is very rare in individuals with normal renal function.

Unless on the advice and under the strict monitoring of a doctor, very high doses are also not recommended in patients with digestive system ulcers, intestinal obstruction, severe dehydration, serious burns, heart blockage or Addison’s disease.

High doses of potassium should not be used by people taking AC inhibitor medication, potassium-sparing diuretics, NSAIDs (especially in the elderly), heparin or trimethoprim/sulfamethoxazole unless on the advice and under the strict monitoring of a doctor.

There are reports that the drug haloperidol may either raise or lower potassium levels; potassium status should be checked prior to increasing potassium intake if taking haloperidol.

Supplements or medications containing high doses of potassium salts (potassium chloride, etc.) may in some people cause abdominal cramping, diarrhoea, nausea and/or vomiting. Digestive ulcers may also occur, especially in those taking high doses of modified-release potassium. Such symptoms will generally not occur with equivalent amounts of potassium from food sources.
Probiotics are microorganisms normally found within some foods. When they occur in the gut, they adhere to the intestinal lining as well as reside in the lumen, where they help prevent the adherence of pathogenic bacteria to the intestinal wall. Some probiotics may also synthesise nutrients for use within the human body and may also play a role in immunity.

Antibiotic Support

- It is well known that probiotics may be supportive during antibiotic treatment, due to antibiotics negatively affecting gut flora, potentially causing inflammatory bowel conditions and overgrowth of pathogenic bacteria.\(^5\)\(^1\)

Anti-microbial

- It has been suggested in research that probiotics are able to synthesise anti-microbial substances which inhibit the growth of foreign bacteria in the digestive system.\(^5\)\(^0\)\(^7\)

Candidiasis

- Probiotics have been shown to inhibit candida growth within the digestive tract due to their ability to produce anti-candida substances.\(^5\)\(^0\)\(^8\)

Digestive Support

- Different probiotic strains have been shown to be beneficial for digestive function within the intestines due to synthesis of enzymes (e.g. lactase activity).\(^5\)\(^0\)\(^9\)

Dysbiosis

- Probiotics are considered to be an important factor in gut health.
- Dysbiosis is the proliferation of undesirable bacteria in the digestive system and it is believed that good gut flora is supportive in reducing dysbiosis, thus supportive in inflammatory bowel conditions.\(^5\)\(^1\)\(^0\)

May be Supportive for:

- Infectious diarrhea (traveller's diarrhoea)
- IBS
- Constipation
- Diverticulitis
- Flatulence and bloating
- Coeliac disease
- Candidiasis
- Indigestion
- Intestinal permeability
- Parasites
- Bacterial dysbiosis
- Allergy

CONTRAINDICATIONS/DRUG INTERACTIONS:

None known.

Strain Specific Information

*LACTOBACILLUS PLANTARUM 299V™*

It is well documented that Lp299v™ has a high tolerance to acidic conditions, where the pH is normally below 4, such as in lactic acid fermentation of foods. This helps it to survive through the acidity of the human stomach. One of the most researched areas in relation to Lp299v™ is regarding excess flatulence, bloating and abdominal discomfort which can be associated with gastrointestinal disorders such as Irritable Bowel Syndrome (IBS).\(^5\)\(^1\)\(^2\)
**LACTOBACILLUS ACIDOPHILUS LA-5®**

*L. acidophilus* is one of the most widely researched of all probiotic bacteria in relation to human health. It is a natural inhabitant of the small intestine, upper part of the colon, the mouth and the vagina. This micro-organism enhances lactose digestion and has the potential to inhibit the growth of pathogenic organisms, and inhibits the growth of candida albicans.\(^{512}\)

**BIFIDOBACTERIUM LACTIS BB-12®**

As with *L. acidophilus*, *B. lactis* has been widely researched for its benefits in human health. A natural inhabitant of the colon and lower part of the small intestine, these important bacteria tend to decline with age. They compete for implantation sites with pathogenic organisms and synthesise various organic acids that further promote a healthy intestinal environment. They also manufacture various B vitamins and are responsible for the formation of faeces.\(^{513a}\)

**BIFIDOBACTERIUM LONGUM**

*B. longum* is another natural inhabitant of the large intestine. Along with other bifidobacteria such as *B. lactis*, they prevent invading pathogens from colonising the intestine by competing for absorption sites and producing various acids that prevent the proliferation of unfriendly bacteria.\(^{513b}\)

**BIFIDOBACTERIUM INFANTIS**

Along with other bifidobacteria such as *B. lactis* and *B. longum*, *B. infantis* make up the majority of the flora in the large intestine of babies. They help to promote weight gain in babies and synthesise various B vitamins. They also produce lactic and other organic acids that inhibit pathogenic organisms by lowering the pH (raising the acidity) of the bowel.\(^{513c}\)

**LACTOBACILLUS BULGARICUS**

*L. bulgaricus* is a transient (i.e. non-resident) strain of bacteria in the human intestine. It is important for the production of organic acids that lower the pH (raise the acidity) of the gut, making it an undesirable environment for unfriendly organisms. *L. bulgaricus* also produces lactase for the digestion of milk sugar.\(^{514}\)

**STREPTOCOCCUS THERMOPHILUS TH-4®**

*S. thermophilus* is another well researched transient (non-resident) strain that produces lactic acid from the fermentation of dietary carbohydrates, resulting in lower pH and therefore inhibition of undesirable organisms in the gut. This micro-organism also produces lactase for the digestion of milk sugar.\(^{515}\)

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**L-PROLINE**

Proline is a non-essential amino acid due to human DNA carrying a genetic code for its synthesis within the human body.

**Ageing**

- Proline assists in the synthesis of collagen which naturally declines as you age.\(^{516}\)
- Proline and vitamin C could enhance the skin protection affects.\(^{516a}\)

**Cardiovascular Support**

- Proline may inhibit breakdown of arterial collagen and speed healing of arterial lesions, a precursor to heart disease.\(^{517}\)

**Joint Support**

- Proline is one of the most abundant compounds in the collagen structure of joint membranes.\(^{516}\)

**Wound Healing**

- Proline is necessary for collagen synthesis and repair, an important factor in healing of lesions, ulcers, burns or other forms of tissue injury.\(^{516}\)

**May be Supportive for:**

- Arthritis
- Ageing
- Sports injuries (e.g. sprains, strains, etc.)
- Ulcers
- Burns
- Cardiovascular disease (e.g. atherosclerosis)

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
**PUMPKIN SEED**

Pumpkins are native to the Americas, with the seeds being particularly treasured among Native American tribes for centuries for its dietary and medicinal properties. They are a source of a variety of nutrients, especially antioxidants.

**Anti-parasitic**
- Pumpkin seeds are traditionally used by Native American tribes as a natural treatment for parasites.\(^{518}\)

**Cardiovascular Support**
- Pumpkin seed has been shown to relax blood vessels by reversing decreased nitric oxide production, thus reducing blood pressure.\(^{518}\)
- Consumption of pumpkin seed oil is believed to be anti-atherogenic, reducing the risk of cardiovascular disease.\(^{518}\)

**Cholesterol Management**
- A pilot study has shown that pumpkin seed oil increased HDL cholesterol (good cholesterol) in postmenopausal women.\(^{519}\)

**May be Supportive for:**
- People predisposed to cardiovascular disease
- Hypertensive individuals
- Parasite infestation

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Pumpkin seed diuretic properties may result in reduced lithium excretion, thus those on lithium medication should consult a general practitioner.

**PYCNOGENOL®**

Pycnogenol\(^{®}\) is a bioflavonoid normally derived from French maritime pine bark.

**Cardiovascular Support**
- Research has shown that Pycnogenol\(^{®}\) may alleviate haemorrhoids after 7 days.\(^{520}\)
- Pycnogenol\(^{®}\) has vasodilatory properties which may be supportive role in reducing high blood pressure.\(^{521}\)
- May help alleviate and prevent varicose veins due to its blood vessel strengthening properties.\(^{522}\)

**Immune Support**
- Research has shown that Pycnogenol\(^{®}\) may be supportive in people suffering from allergic reactions due to it reducing histamine release.\(^{523}\)
- Pycnogenol\(^{®}\) may inhibit H- pylorii growth,\(^{524}\) and therefore may be supportive for people with stomach ulcers.

**Migraine and Pain**
- Pycnogenol\(^{®}\) has antioxidant properties which may reduce severity and duration of migraines.\(^{525}\)
- Research has shown that 30 mg of Pycnogenol\(^{®}\) a day may reduce pain including calf cramps, back and joint pain.\(^{526}\)

**Skin Health**
- Research has shown that Pycnogenol\(^{®}\) may be supportive in preventing sunburn.\(^{527}\)
- Pycnogenol\(^{®}\) may alleviate dry skin and reduce wrinkles due to its potential supportive effect on skin hydration status and elasticity.\(^{528}\)
May be Supportive for:

- Haemorrhoids
- Hypertension
- Varicose veins
- Allergies
- Back pain
- Joint pain
- Migraines
- Dry skin

CONTRAINDICATIONS/DRUG INTERACTIONS:
Due to its immune stimulating properties, avoid use in those with autoimmune conditions and/or taking immunosuppressant medication.

QUERCETIN
*Dimorphandra mollis*

Widely distributed in the plant kingdom and the most abundant of the flavonoid molecules, quercetin is found in many foods, including apples, onions, tea, berries and brassica vegetables.

**Anti-inflammatory**

- Quercetin inhibits histamine release by influencing two enzymes involved in the release from mast cells.\(^{529}\)
- Quercetin decreases leukotriene synthesis due to its effect on prostaglandins.\(^{529a}\)

**Anti-viral**

- Quercetin inhibits enzymes involved in virus replication and has been shown to stunt the growth of the herpes virus.\(^{529}\)

**Antioxidant**

- Quercetin is a free radical scavenger, which inhibits xanthine oxidase and lipid peroxidation and in turn reduces LDL oxidation.\(^{529}\)

**Allergies**

- Quercetin prevents leukotriene synthesis, inhibits histamine release, and reduces inflammatory prostaglandin production, which are all involved in the allergic response.\(^{529}\)

**Pain Relief**

- Quercetin has been found to relieve pain and stiffness naturally, whilst strengthening connective tissue, without damaging the gastrointestinal wall.\(^{529}\)
May be Supportive for:
• Helps prevent easy bruising
• Crohn’s disease and ulcerative colitis
• Allergies and hayfever
• Antioxidant
• Migraine headaches
• Inflammation
• Gout
• Tendinitis and bursitis
• Anti-viral
• Rheumatoid and osteoarthritis

CONTRAINDICATIONS/DRUG INTERACTIONS:
Drug metabolism via the cytochrome P450 system may be affected – check with a doctor.

RED CLOVER

Trifolium pratense

Red clover is a wild plant which is a member of the legume family and grows throughout Europe, Asia and North America.

Anti-bacterial
• Red clover possesses anti-bacterial properties against pathogenic bacteria.\textsuperscript{530}

Cell Support
• Phytoestrogens in red clover have potential cell-protecting abilities, such as inhibition of cell damaging agents and adverse cellular changes.\textsuperscript{531}

Expectorant
• An historical use for red clover is as an expectorant for clearing respiratory congestion in cases of coughs and other bronchial conditions.\textsuperscript{532}

Female Health
• Red clover is a phytoestrogen which can modify oestrogenic activity by binding to oestrogen receptors and delivering a weaker response.\textsuperscript{533}
• Red clover can also boost blood levels of oestrogen if they are too low.\textsuperscript{533a}

Male Health
• Oestrogen over activity can lead to prostate dysfunction and phytoestrogens are thought to be beneficial due to their ability to bind to oestrogen receptors.\textsuperscript{533}
May be Supportive for:
- Premenstrual syndrome (especially when associated with oestrogenic excess)
- Enlarged prostate and other prostate disorders
- Cellular protection
- Coughs and general respiratory congestion
- Bronchitis

CONTRAINDICATIONS/DRUG INTERACTIONS:
Best avoided in pregnancy. Caution with anticoagulants – check with a doctor.

RESVERATROL

Polygonum cuspidatum

Resveratrol is a polyphenol molecule found within grapes, peanuts, cranberries and others. It contains polyphenol molecules such as flavonoids, flavonols and catechins which are responsible for its health benefits.

Ageing
- Research has discovered resveratrol's role in activating a set of human proteins called sirtuins.534
- Sirtuins are involved in a number of important cellular processes, such as gene stability, DNA repair and apoptosis and thus potentially increasing lifespan.534
- Has been shown to have the same effects on insulin resistance markers as a calorie reduced diet.535

Anti-inflammatory
- Anti-inflammatory roles due to the inhibition of cyclooxygenase and detoxifying or slowing the production of superoxide radicals.536

Antioxidant
- Resveratrol is believed to be a potent antioxidant, and studies have shown its beneficial effects of protection against peroxidative stress and tissue damage due to lipid oxidation.537

Cardiovascular Support
- Believed to prevent platelet aggregation, an action believed to be linked to inhibition of compounds that promote stickiness and vasoconstriction.537
- Demonstrates inhibition of LDL cholesterol oxidation, a major risk factor in cardiovascular disease.537
May be Supportive for:
• Anti-ageing
• Cardiovascular health
• Antioxidant protection
• Inflammation

CONTRAINDICATIONS/DRUG INTERACTIONS:
Do not use when pregnant or breastfeeding. Not recommended for those prescribed warfarin for cerebrovascular disease unless monitored by a qualified medical practitioner.

RHODIOLA
Rhodiola rosea
Rhodiola typically grows in cold, high-altitude regions in the northern-hemisphere. Russian researchers classed rhodiola as an adaptogen due to its supportive effect on the adrenal glands.

Adaptogenic
• Rhodiola increases tolerance to various stressors and normalises the hypothalamus response to stress triggers.  
• Rhodiola enhances serotonin activity and may be beneficial in reducing anxiety-related symptoms associated with stress.

Anti-depressant
• Rhodiola's active compounds enhance serotonin precursor transport into the brain and reduce mood-elevating neurotransmitters.
• Studies have shown stress accelerates destruction of mood-boosting neurotransmitters such as serotonin, therefore rhodiola can help maintain serotonin levels in the brain.

Antioxidant
• The herb's active components are shown to be powerful antioxidants, especially protective against lipid peroxidation.

Athletic Performance
• Rhodiola's influence on opioid production is believed to increase exercise performance.
Male Health

• Rhodiola is traditionally used as a tonic for male sexual function, and has been shown to improve sexual function in those with a sexual dysfunction disorder (e.g. erectile dysfunction).  

Mental Health

• Rhodiola has been shown to boost learning and memory skills.

Immune Support

• Rhodiola has been shown to have an adaptogenic activity which is beneficial for the immune system when recovering from viral infections.

• *Rhodiola rosea* supplementation has been shown to aid recovery after intense exercise.

May be Supportive for:

• Adrenal support
• Athletic performance
• Sexual dysfunction disorders
• Immune system support
• Liver support

CONTRAINDICATIONS/DRUG INTERACTIONS:

Best avoided in cases of nervous excitability, exhaustion of cortical cells, feverish states and hypertensive crisis. Caution with antidepressants and anti-psychotics – check with a doctor.

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**D-RIBOSE**

D-Ribose is a simple five-carbon sugar that is made by every cell in the body and is an essential component of important biological molecules called nucleotides, which are used to make adenosine triphosphate (ATP), DNA, RNA and riboflavin.

D-Ribose is not considered to be an essential nutrient. However, research has shown that ribose administration is effective in promoting normal heart and muscle function, accelerating tissue recovery following strenuous exercise and reducing fatigue. Its role in accelerating tissue energy synthesis is the link between these supportive roles.

**Athletic Performance**

• Ribose is a building block for ATP, the lack of which is believed to be a limiting factor in exercise performance.

• D-ribose is also believed to help overcome muscle soreness and fatigue after exercise.

**Cardiovascular Support**

• D-ribose improves oxygen utilisation in congestive heart failure, a strong predictor of morbidity and mortality.

• Studies have shown that ribose improves diastolic cardiac function, exercise tolerance and quality of life within coronary artery disease and congestive heart failure patients.

• D-ribose has been shown to increase anaerobic energy reserves in healthy hearts.

**Fibromyalgia/Chronic Fatigue**

• It is believed that fibromyalgia is an imbalance between ADP and ATP and ribose is a key component of adenosine.
• D-ribose is believed to promote proper energy metabolism, restoring muscle function.\textsuperscript{549}

**May be Supportive for:**

• Cardiovascular health
• Angina
• Cardiomyopathy
• Athletic performance (recovery)
• Fibromyalgia
• Fatigue

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Pregnant women and nursing mothers should avoid supplemental D-ribose.
May cause increased uric acid levels so should be avoided by those with gout.
May cause hypoglycaemia so diabetics should use with caution and under medical supervision.

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**ROSEMARY**

*Rosmarinus officinalis*

Rosemary is native to the Mediterranean but is now widely grown in other parts of the world. Rosemary has been traditionally used to improve memory, muscle pain relief and circulatory system support.

**Anti-viral**

• Rosemary has been shown to be protective against viral pathogens, which combines well with its cell-protective properties.\textsuperscript{550}

**Antioxidant**

• Rosemary is a potent antioxidant and free radical scavenger, and has shown a reduction in lipid peroxidation.\textsuperscript{551}

**Carminative**

• Rosemary oils have soothing properties on digestion and relax the smooth muscle of the digestive tract.\textsuperscript{552}

**Detoxification and Cell Support**

• Research suggests inhibition of cytochrome P450 synthesis, preventing cell-damaging compounds and enhancement of phase II liver detoxification enzyme.\textsuperscript{553}

**Diaphoretic (induces perspiration)**

• Rosemary is traditionally believed to have a diaphoretic action which is beneficial in body temperature reduction.\textsuperscript{554}
May be Supportive for:
- Detoxification
- Cell protection
- Viral infections
- Indigestion
- Digestive spasms (e.g. irritable bowel syndrome)
- Protection against free radical damage
- Inducing perspiration when feverish

CONTRAINICATIONS/DRUG INTERACTIONS:
Do NOT use during pregnancy

RUTIN
Rutin is a bioflavonoid from quercetin.

Cardiovascular Support
- Research suggests that rutin may be supportive in strengthening capillaries.\(^{555}\)
- May help improve blood vessel elasticity and thus support blood pressure regulation.\(^{556}\)
- Rutin is suggested to be supportive for normal blood clotting.\(^{557}\)

Immune Support
- Rutin may be supportive in reducing inflammation.\(^{558}\)
- May also reduce allergies by inhibiting the release of histamine.\(^{559}\)

Metabolism
- Rutin is suggested to possess antioxidant properties.\(^{560}\)
- It may inhibit the oxidation of LDL cholesterol.\(^{561}\)
- Research has shown that Rutin may be supportive in inhibiting the cross-linking process involved in the aging process.\(^{562}\)

Skin Health
- Rutin may be supportive in the healing of bruises due to its role in strengthening blood capillaries.\(^{555}\)
SAGE

*Salvia officinalis*

Sage is a perennial evergreen shrub native to the Mediterranean region, but is grown in many places across the world. It has a long history of being used within food and medicine due to its potential health benefits.

**Anti-bacterial**
- Research has suggested that sage is an antibacterial agent against *E. coli* and *Streptococcus haemolytic* bacterial strains.\(^{563}\)

**Anti-inflammatory**
- Research has shown that sage reduces the nitric oxide production of macrophages within the body, which suggests an anti-inflammatory potential.\(^{564}\)

**Antioxidant**
- Research has shown that sage possesses antioxidant capabilities due to its phenolic compound content.\(^{565}\)

**Mental Health**
- It has been suggested by research that sage can improve symptoms of mild to moderate Alzheimer’s disease.\(^{566}\)

**May be Supportive for:**
- *E. coli* and *Streptococcus haemolytic* bacterial infections
- Inflammatory conditions
- Alzheimer’s disease

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
**Schisandra**  
*Schisandra chinensis*

Schisandra is a hardy deciduous climbing plant which is native to East Asia. It has a history of being used within traditional Chinese medicine.

**Adaptogen**
- Schisandra increases tolerance to various stressors by beneficially modifying the stress response.\(^5^6^7\)

**Liver Protection**
- Schisandrins prevent liver damage, stimulate liver repair, and normalise liver function, which appears to have a positive impact on glutathione activity and liver detoxification.\(^5^6^8\)

**Mental Health**
- Schisandra has been shown to directly stimulate the nervous system, improving mental clarity and reflex speed.\(^5^6^9\)

**May be Supportive for:**
- Stress (mental, physical and environmental)
- General mental enhancement
- Poor memory
- General liver health
- Liver toxicity
- Jaundice
- Hepatitis
- Cirrhosis

**Saw Palmetto**  
*Serenoa repens/Sabal serrulata*

Saw palmetto is a fan palm that grows in warm climates and has been used by Native Americans as a staple food and for its therapeutic properties.

**Benign Prostate Hyperplasia**
- Saw palmetto is believed to act on many different mechanisms which are associated with the development of benign prostate hyperplasia, such as modulation of apoptosis (cell death) by reversing the apoptosis/proliferation ratio.\(^5^7^0\)

**Male Pattern Baldness**
- Research has shown that saw palmetto can help with male pattern baldness due to its role in the inhibition of testosterone conversion to dihydrotestosterone.\(^5^7^1\)

**May be Supportive for:**
- Enlarged prostate
- Male pattern baldness

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Should be taken on the side of caution if taking anticoagulant/antiplatelet medication, contraceptive medication or hormone therapy medications (oestrogen).
**Scutellariae**

*Scutellaria baicalensis*

Scutellaria baicalensis is native to China and parts of Russia and has been used within traditional Chinese medicine.

**Anti-inflammatory**

- Preliminary research has shown that scutellariae possesses anti-inflammatory properties, by inhibition of the NF-κB pathways.\(^{572}\)

**Anti-allergic**

- Scutellariae has been shown to have anti-allergic properties due to its flavonoid content.\(^{572}\)

**Antioxidant**

- The flavonoid content of scutellariae also suggests it has antioxidant capabilities.\(^{573}\)

**May be Supportive for:**

- Arthritis
- Rheumatism
- Hayfever
- Asthma
- Food allergies
- Atopic (allergic) eczema
- Protection against free radicals

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Do NOT use during pregnancy. Caution with anticoagulants – check with a doctor.

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**Selenium**

Selenium is a trace mineral which is essential for normal cellular function.

**Antioxidant**

- Selenium is a crucial element which exerts its antioxidant effects by being a component in selenoproteins.\(^{574}\)
- Selenium is required for superoxide dismutase, a free radical scavenger which helps protect cells against oxidative damage.\(^{575}\)

**Cardiovascular Support**

- LDL oxidation is a key factor in cardiovascular disease development, thus antioxidants may be essential in reducing LDL oxidation.\(^{576}\)
- Selenium is also believed to have a role in anti-inflammatory mechanisms and therefore be considered to be protective against endothelial damage.\(^{576}\)

**Cell Production**

- As stated above, selenium is a mineral required for superoxide dimutase which can help protect cells against oxidative damage.\(^{574}\)
- Selenoproteins are also displayed by some immune cells within the body, making selenium an important mineral in immune function.\(^{577}\)
- Selenium is also involved in the synthesis of glutathione peroxidase, an enzyme used for liver detoxification.\(^{577}\)

**Detoxification and Liver Support**

- As mentioned, selenium is used for glutathione peroxidase synthesis, which is essential for liver detoxification.\(^{577}\)
- Glutathione peroxidase helps with the elimination/detoxification of toxins within the body, removing potential damaging molecules (e.g. pesticides).\(^{577a}\)
**Eye Health**

- Free radical damage has been suggested to be a contributing factor in deteriorating eye health and can result in cataracts and macular degeneration.\textsuperscript{578}
- Free radicals can be caused by exposure to UV rays, ozone and air pollution to name a few, so selenium’s antioxidant role can help protect against this free radical formation.

**Foetal Growth and Development**

- Sufficient levels of selenium have been shown to positively effect birth weight.\textsuperscript{579}

**Immune Support**

- Insufficient selenium has been linked to poor immune function, due to selenoproteins influencing thyroid-immune system interactions.\textsuperscript{580}

**May be Supportive for:**

- Protection against free radicals
- Slowing the ageing process
- Cell protection
- Protection against diseases associated with cell mutation
- Liver protection
- Cataracts
- Detoxification
- Elimination of and/or protection against heavy metals
- Arthritis and various other inflammatory conditions
- Cardiovascular health
- Promoting healthy foetal growth and development
- Immune dysfunction
- Thyroid dysfunction
- Male fertility problems

**SHARK CARTILAGE**

A by-product of the shark fishing industry, shark cartilage has been shown to slow/stop the production of weak, but prolific blood vessels (angiogenesis) that can be a problem in several health conditions.

**Osteoarthritis**

- Abnormal capillary growth occurs in cartilage where it has become damaged, speeding its degeneration. Inhibition of the new blood vessels can help reduce joint inflammation and pain.\textsuperscript{581}
- Shark cartilage is also believed to be supportive in cartilage repair.\textsuperscript{582}

**Psoriasis**

- In studies, shark cartilage has successfully been used internally and externally in the treatment of psoriasis, a condition based on extra capillary production.\textsuperscript{581}

**Retinopathy**

- Shark cartilage may be supportive for those predisposed to retinopathy due to its potential role in reducing abnormal blood vessel growth.\textsuperscript{581}

**Rheumatoid Arthritis**

- Shark cartilage is suggested to be supportive in inhibiting abnormal capillary growth.\textsuperscript{581}

**May be Supportive for:**

- Arthritis (rheumatoid and osteo)
- Psoriasis
- Diabetic retinopathy

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

None known.
CONTRAINDICATIONS/DRUG INTERACTIONS:
Do NOT use during pregnancy or when attempting to conceive. Avoid for at least 6 weeks after deep surgery as wound healing is delayed. Anyone who has had a heart attack should avoid shark cartilage for at least 3 weeks.

SHARK LIVER OIL
A by-product of the shark fishing industry, shark liver oil has been used by fishermen for centuries for various ailments. It is rich in alkylglycerols, special lipids that are also found in small quantities in mother’s milk, bone marrow, the liver and spleen. Shark liver oil is also a rich source of squalene, a highly unsaturated fatty material, long known for its topical application in beauty creams and ointments.

Antibiotic/Anti-fungal
• The alkylglycerols and squalene content of shark liver oil has been suggested to have antibiotic and antifungal activity, which can increase peripheral granulocyte and serum immunoglobins.\textsuperscript{583, 584}

Immune Support
• Shark liver oil is believed to strengthen the immune system and help with recovery after illness due to the alkylglycerols content.\textsuperscript{583}

Ulcers
• Research has shown that shark liver oil is supportive in reducing the reoccurrence of mouth ulcers due to its immunodulation action.\textsuperscript{585}

May be Supportive for:
• Immune health
• Anti-bacterial
• Anti-fungal
• Anti-viral
• Adjunct to chemo and radiotherapy
• Helpful for tissue repair, delayed wound healing and acne (external and internal application)
• Liver/age spots, topical application can minimise appearance
• Mouth ulcers
• Peptic, gastric ulcers
CONTRAINDICATIONS/DRUG INTERACTIONS:
None known.

SIBERIAN GINSENG
Eleutherococcus senticosus

Siberian ginseng is a shrub native to the Far East, with yellow or violet flowers and black berries in late summer. Food supplements are often made from the root of the plant.

Adaptogenic
- Though Siberian ginseng is not a true ginseng species, it is still believed to increase stressor tolerance by regulating the manufacture and secretion of adrenal hormones.586

Athletic Performance
- Research has shown that Siberian ginseng can improve performance in runners.586

Immune Support
- Siberian ginseng enhances white blood cell activity, providing support to a compromised immune system.586
- Its adaptogenic properties also suggest it promotes resistance to infection.586a

Nervous System Support
- Its adaptogenic properties suggest it may restore proper neurological function after long term stress.586

May be Supportive for:
- Stress (mental/physical/environmental)
- Fatigue
- Weak immunity
- Physical endurance during exercise
CONTRAINDICATIONS/DRUG INTERACTIONS:
Caution with digoxin – check with a doctor.

SPINACH

Spinacia oleracea

Spinach is an annual plant that is native to central and south western Asia. It is considered to have a high nutritional value.

Antioxidant

• Spinach is a natural source of vitamin C, vitamin E and lipoic acid which is known to be a potent antioxidants.40

Athletic Performance

• Spinach is considered to contain high levels of nitrates which result in vasodilation, increasing blood flow to muscles and organs.588

Blood Building

• Spinach contains iron which is used within the body to synthesise haemoglobin for red blood cell formation.587

Metal Chelation

• It is believed that the lipoic acid content of spinach may result in chelation with free copper, zinc and lead, thus stopping free radical formation.50

May be Supportive for:

• Diagnosed anaemia
• Diagnosed metal toxicity

CONTRAINDICATIONS/DRUG INTERACTIONS:
People on anti-diabetic medication should consult their general practitioner as spinach is believed to have a hypoglycaemic effect. Those who are taking warfarin should consult with their general practitioner as spinach contains vitamin K which is believed to be an anticoagulant.
Svetol®
Svetol® is a natural plant extract of decaffeinated green coffee, rich in active components but doesn’t contain certain molecules considered to be harmful to health when consumed in high doses.

Weight Management
- Svetol® has been proven in scientific studies to decrease weight, body mass index, and fat mass.589

Antioxidant
- Svetol® contains caffeic acid which is considered to be a potent antioxidant.590

May be Supportive for:
- Weight management

CONTRAINDICATIONS/DRUG INTERACTIONS:
Some medications are affected by coffee (but not because of caffeine), check with a doctor.

Taurine
Taurine is naturally found within animal tissue and is a major constituent of bile, as well as being used for osmoregulation, calcium signalling modulation and as an antioxidant.

Anti-convulsive
- Low levels in the brain have been observed in seizure disorders, suggesting taurine has an anti-convulsant effect.591

Anti-hypertensive
- Taurine plays a role in the regulation of minerals such as potassium, sodium, magnesium and calcium into and out of cardiovascular cells.592
- Research suggests hypertensive individuals have lower taurine in their blood.593

Cardiovascular Support
- Studies have shown the benefits of supplemental taurine to a variety of heart conditions including arrhythmias, cardiomyopathy and mitral valve prolapse.594

Cholesterol Management
- Research has shown taurine significantly lowers cholesterol, primarily LDL, resulting in a reduce risk of cardiovascular disease development.595

Eye Health
- Most abundant amino acid in the retina and protects the eye from toxic influences.596
- Potentially supportive in conditions such as retinitis pigmentosa and cataracts.597
L-Theanine is an amino acid that is not found in protein from foods, but is found in green tea as a free amino acid. Green tea is the second most consumed beverage in the world (after water) and many of the reported benefits to green tea consumption are thought to be attributable to its theanine content.

**Anxiety**
- Creates a sense of deep relaxation about 40 minutes after ingestion by stimulating the production of alpha brain waves.
- Its influence on neurotransmitters such as dopamine, GABA and serotonin, suggests it may be supportive for applications in stress and depression.
- Appears to counteract caffeine’s stimulatory properties which may explain why people feel relaxed after drinking green tea, despite its caffeine content.

**Cardiovascular Support**
- Research has shown that L-Theanine inhibits oxidation of LDL cholesterol. Oxidised LDL cholesterol can lead to increased artery inflammation increasing risk of heart attack or stroke.
- May help lower blood pressure in those with hypertension.

**Mental Health**
- Theanine appears to increase levels of both dopamine and serotonin in the brain and so may be valuable in increasing learning and memory.
- Has been shown to increase mental alertness and attention span.
- Research suggests it may help improve sleep quality in humans.
- Research shows it may help with prevention of Alzheimer’s and Parkinson’s Disease.

**Liver/Gallbladder Support**
- Taurine is required to form bile and bile inhibits cholesterol-based stones forming in the gallbladder.

**May be Supportive for:**
- High blood pressure
- Cardiomyopathy
- Heart arrhythmia
- Gallstones
- Poor fat digestion
- Anxiety and nervous tension
- Panic attacks
- Insomnia
- Age-related eye degeneration (e.g. cataracts, macular degeneration)
- Retinitis pigmentosa

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
Best avoided by pregnant women and nursing mothers.
Tyrosine is a non-essential amino acid which is synthesised in the body from phenylalanine.

**Anti-depressant**
- Mild depression may be alleviated with tyrosine, as it is a precursor to dopamine.\(^6\)
- Most significant results are shown when tyrosine is combined with 5-HTP.\(^2\)

**Anti-stress Effect**
- Research suggests that tyrosine has adaptogenic properties, due to its being required for stress-regulating hormone synthesis.\(^4\)
- Military personnel who were given tyrosine daily performed better under stressful conditions compared to non-supplemented participants.\(^5\)

**Appetite Suppression**
- Tyrosine is considered to suppress appetite, thus a deficiency may result in an increased appetite.\(^3\)

**Mental Health**
- Tyrosine is a precursor for noradrenaline, thus supplementation may enhance mental alertness.\(^1\)
- Low levels of tyrosine are often seen in Alzheimer’s disease.\(^5\)

**Thyroid Hormone Synthesis**
- Tyrosine is required to manufacture thyroid hormones and has potential for use in the management of hypothyroidism.\(^2\)

**May be Supportive for:**
- Fast acting sense of relaxation
- Helps with anxiety and stress
- Supports memory and learning
- Increases mental alertness and attention span
- May improve quality of sleep
- May be helpful in relation to Alzheimer’s Disease and Parkinson’s Disease
- Helps reduce artery inflammation
- May help lower hypertension

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
None known.
May be Supportive for:

- Depression
- Appetite control
- Cognitive performance
- Stress-related anxiety, mental fatigue or exhaustion
- Hypothyroidism

CONTRAINdications/DRUG INTERACTIONS:
Not to be used with MAO inhibitor drugs without the consent of a Doctor.
Should be avoided by pregnant women and nursing mothers and those with melanoma.
Use with caution in hypertension.

Turmeric is a perennial plant which grows in the tropical regions of Southern Asia with the majority coming from India. It is often used as the main ingredient within curries due to its fragrant and bitter taste. The active ingredient within turmeric is curcumin.

Anti-inflammatory

- Turmeric has been shown to display anti-inflammatory properties due to its curcumin content\(^6\) (e.g. rheumatoid arthritis).

Anti-microbial

- The curcumin content of turmeric has been shown to have antibacterial properties and may be supportive against gram-negative and -positive bacteria.\(^6\)

Antioxidant

- Turmeric is believed to possess antioxidant properties due to its role in down-regulation of nitric oxide formation, a key element in inflammation.\(^6\)

Cardiovascular Support

- Research has suggested that curcumin found within turmeric has anti-platelet activity.\(^6\)
- Turmeric is believed to protect against lipid peroxidation, a known risk factor in the development of atherosclerosis.\(^6\)
- Preliminary research suggests that turmeric reduces triglyceride levels.\(^6\)
Digestive Support

- Turmeric supplementation has been shown to decrease Irritable Bowel Syndrome (IBS) prevalence and abdominal pain/discomfort, due to its interaction in the inhibition of nuclear factor-κB.\textsuperscript{620}

Liver Protection

- Research suggests that turmeric is a liver protectant due to its anti-inflammatory, antioxidant and free-radical scavenging properties.\textsuperscript{620}

May be Supportive for:

- Inflammatory conditions, e.g. rheumatoid arthritis
- Those who are predisposed to cardiovascular disease
- Liver protection

CONTRAINDICATIONS/DRUG INTERACTIONS:
Should be taken on the side of caution in those who are taking anticoagulant medication

UBIQUINOL (KANEKAQH\textsuperscript{®})

Ubiquinol is a reduced form of coenzyme Q-10 which is the bio-ready form, as Coenzyme Q-10 must be converted into Ubiquinol before being used within the human body. Studies have shown Ubiquinol is absorbed more rapidly than coenzyme Q-10.\textsuperscript{203, 621}

Antioxidant

- Ubiquinol is considered to be a potent antioxidant within the mitochondria and can help reduce free radicals within the body, directly or in conjunction with α-tocopherols.\textsuperscript{203}

Athletic Performance

- Ubiquinol is suggested to potentially increase stamina by decreasing fatigue onset.\textsuperscript{209, 623}

Cardiovascular Support

- Ubiquinol is required for fatty acid metabolism within the mitochondria of the cardiac cells and fatty acids are the primary energy source for the heart,\textsuperscript{204} ensuring effective mechanical pumping for effective circulation of the blood.
- Its antioxidant protection of blood lipids protects against atherosclerotic development by regulating nitric oxide pathways.\textsuperscript{205}
- Beta blockers and statins can block Ubiquinol synthesis, so supplementation alongside these medications may be supportive (under supervision of a healthcare practitioner).\textsuperscript{206}

Immune Support

- Studies on age related immune suppression have shown an improvement in antibody production with supplementation of Ubiquinol.\textsuperscript{622}
UC-II® Cartilage

UC-II® cartilage is an undenatured type-II cartilage which has been shown to support joint comfort, flexibility and mobility. This compound is not absorbed in the gut for repair, but works to reduce the mechanism by which inflammation occurs.

Joint Support

- UC-II® cartilage has been shown in human trials to be supportive for joint flexibility, mobility and comfort.\textsuperscript{624}
- UC-II® has been suggested as potentially supportive for osteoarthritis, by increasing flexibility and cushion around the joint.\textsuperscript{624}

May be Supportive for:

- Cardiovascular health
- Hypertension
- Angina
- Cardiomyopathy
- Heart arrhythmia
- Fatigue
- Weight management
- Gum disease
- Immune function
- Sports nutrition
- Antioxidant protection

Contraindications/Drug Interactions:
None known.

Statin-induced Myalgia

- Ubiquinol synthesis is reduced in patients who use statins. Supplementation with Ubiquinol can restore body stores and relieve statin-induced myalgia.\textsuperscript{206}

Weight Management

- Ubiquinol facilitates stored fat metabolism, and may aid a weight control programme.\textsuperscript{207}

May be Supportive for:

- Cardiovascular health
- Hypertension
- Angina
- Cardiomyopathy
- Heart arrhythmia
- Fatigue
- Weight management
- Gum disease
- Immune function
- Sports nutrition
- Antioxidant protection

Contraindications/Drug Interactions:
None known.
**Whey Protein**

Protein contains amino acids, the building blocks of our bodies which are distributed throughout the body to aid in the synthesis of enzymes, hormones and neurotransmitters. Whey protein has the highest Biological Value (BV) of any natural protein (BV is the most widely used method for measuring protein quality), so higher than eggs, fish and meat. Whey protein powders should go through low temperature processes, which filter off the fat and lactose leaving the protein, which makes the whey easier to digest.

**Appetite Control**

- Whey protein may help with gynoid fat loss.\(^{625}\)
- May help body composition for overweight persons by stimulating the production/release of cholecystokinin (CCK), the hormone responsible for satiety.\(^{626}\)

**Blood Sugar Management**

- Blood sugar levels can be balanced by ensuring that simple carbohydrates are consumed with protein, with research showing that this delays gastric emptying and stimulates insulin secretion.\(^{626}\)
- After-meal elevations in blood sugar levels may be reduced by consuming whey protein prior to the food.\(^{627}\)

**Immune Support**

- Whey protein may enhance the function of neutrophils. Neutrophils are the most abundant type of white blood cells and form an essential part of the innate immune system.\(^{628}\)
- Whey protein is a good source of lactoferrin (an iron-carrying protein) which may help reduce inflammation.\(^{629}\)
- Whey protein is also a good source of immunoglobulin A, a type of antibody found in the body. A deficiency of IgA may be a contributing factor to reduced respiratory health.\(^{630}\)

**Requirements**

- The European Food Safety Authority (EFSA) has stated that the population reference intake (PRI) for protein is 0.83g protein per kg of body weight per day. However, these levels may only be relevant for sedentary individuals only.\(^{631}\)
- Research has shown that for active individuals, such as athletes, protein requirements may be more in the region of 1.3 to 1.8g per kg of bodyweight.\(^{632}\)
- During times of calorific deficit, up to 2.5g per kg of bodyweight has been suggested to be supportive in reducing lean body weight loses.\(^{632a}\)

**Athletic Performance**

- Whey protein is a rich source of branched chain amino acids (BCAAs). BCAAs are involved in supplying fuel to help preserve muscle tissue during exercise, thereby reducing muscle breakdown when working out and improving athletic performance.\(^{633}\)
- Whey protein may delay the onset of fatigue for those doing endurance exercise.\(^{634}\)
- Whey protein may enhance athletic performance by increasing levels of glutathione (glutathione is a major antioxidant boosting our body’s defences against oxidative damage).\(^{635}\)

**Wound Healing**

- A number of the amino acids found in protein may facilitate the healing of burns.\(^{636}\)

**May be Supportive for:**

- Blood sugar control
- Appetite control
- Convalescence
- Immune support
- Sports
- Tissue damage repair
**White Willow Bark**

*Salix alba*

White willow bark is from a large deciduous tree which is native to Europe and Western and Central Asia. Its use dates back as far as 400BC when patients were advised to chew on the bark to reduce fever and inflammation.

**Anti-inflammatory**

- White willow bark is considered to be supportive in reducing inflammation, due to its salicin content.

**Eye Health**

- Research suggests that white willow bark may be supportive in retinopathy due to its content of α-lipoic acid and carnosine.

**Hyperuricemia**

- The flavonoids, tannin, and salicylate content of white willow bark are believed to be supportive in reducing uric acid levels within the blood.

**Pain Relief**

- Research suggests that white willow bark is supportive in relieving lower back pain.

**May be Supportive for:**

- Inflammatory disorders
- Predisposition to retinopathy
- Lower back pain

**Contraindications/Drug Interactions:**

None known.
**Yarrow**

*Achillea millefolium*

Yarrow is a flower which is a member of the aster family native to temperate regions of the northern hemisphere; Asia, Europe and North America. It is popular in European folk medicine due to the potential health benefits.

**Anti-inflammatory**

- Yarrow is believed to have an inhibitory effect on the inflammatory response due to a reduction in a dendrite cells ability to induce the Th17 response, which can help with allergic rhinitis.641

**Amenorrhea**

- Yarrow may relieve pelvic congestion and improve timing of the menstrual cycle, due to its estrogenic activity.642

**Common Cold**

- Due to its anti-viral properties, yarrow may help to relieve feverish conditions such as the common colds.643

**Dysentery**

- Yarrow is part of the Achillea species which is used in traditional medicine for the treatment of gastro-intestinal disorders including stomach pain and diarrhoea.644, 645

**Gastrointestinal Problems**

- The dicafeoylquinic acids are believed to stimulate bile flow along with choleretic effect of active flavonoid found within Yarrow.646

**CONTRAINDICATIONS/DRUG INTERACTIONS:**

Should be avoided if known to be allergic to or currently taking aspirin. Should be avoided if taking anticoagulant/antiplatelet medication.
Zinc is an essential mineral for the human body as it is found in almost nearly every cell within the human body. It has been used in ancient times to help heal wounds and plays an important role in the immune system.

**Antioxidant**
- Zinc is an essential component of the potent antioxidant, superoxide dismutase, which has been shown to protect eye and joint tissue from oxidative damage.

**Blood Sugar Management**
- Zinc has been shown in research to influence the metabolism of carbohydrates which suggests that it is important in the regulation of blood sugar levels.

**Enzyme Function and Metabolism**
- Zinc is an essential component for enzymes involved in various biological and metabolic pathways within the human body.

**Eye Health**
- Research has shown that zinc’s role in the synthesis of superoxide dismutase and glucose utilisation at the eye can be supportive in protecting the eye from free radical damage.

**Foetal Growth and Development**
- Zinc deficiency within pregnant women has been linked pregnancy-related and developmental problems, e.g. neurological problems, labour problems, spontaneous absorptions, and neural tube defects.
- It has been shown that pregnant women often consume less than the Nutrient Reference Value (NRV) for zinc, thus it may be important to supplement with a prenatal supplement to ensure zinc levels are achieved.

**May be Supportive for:**
- Common cold
- Fever
- Allergic rhinitis
- Amenorrhea
- Dysentery

**CONTRAINDICATIONS/DRUG INTERACTIONS:**
- Anticoagulant or antiplatelet medication
- Lithium based medications – yarrow may reduce lithium excretion due to its diuretic effects.
- Barbiturate medications – Yarrow in combination may prolong sleep time.
Immune Support
• Zinc deficiency has been shown to compromise immunity, due to its vital role in different elements of the immune system.\textsuperscript{651}
• Zinc levels within the body have been shown to influence the release of thymulin, thus can effect immunity strength.\textsuperscript{651}
• Zinc is also believed to possess anti-viral properties which can account for its localised anti-infective activity.\textsuperscript{651}

Male Fertility
• Zinc’s association with testosterone regulation, makes it an important nutrient for influencing male fertility because of its influence on sperm mobility and count.\textsuperscript{652}

Mental Health
• Zinc has been shown in research to influence aspects of mental development, function and performance, and emotional health and psychological balance.\textsuperscript{553}
• Zinc deficiency has been shown to be a factor in different learning disorders (e.g. attention deficit disorder).\textsuperscript{653}
• Clinical trials have shown that those with dementia and Alzheimer’s disease had low levels of zinc within the brain,\textsuperscript{648} and zinc deficiency was linked to nerve cell damage and the accumulation of neurofibrillary tangles.

Prostate Health
• Prostate gland cells proliferate when triggered by DHT, thus zinc can reduce the risk of over-stimulation and thus the risk of developing an enlarged prostate.\textsuperscript{653a}

Reproductive Hormone Influence
• Lower levels of zinc have been associated with lower levels of testosterone in men,\textsuperscript{654} due to it lowering 5-alpha reductase activity which reduces the conversion of testosterone to dihydrotestosterone (DHT).
• DHT is associated with certain health disorders, e.g. hair loss, thus zinc in theory would reduce the risk of developing these health disorders.\textsuperscript{654a}

Skin Health
• Zinc has been shown to influence wound healing due to its role in protein synthesis and other related biological processes.\textsuperscript{648}
• Research has shown that zinc supplementation is supportive in acne, not only due to its influence on tissue regeneration and healing, but also its influence on immunological properties (e.g. anti-inflammatory prostaglandin encouragement).\textsuperscript{654b}

May be Supportive for:
• Immune support
• Common cold
• Male hormonal health
• Prostate enlargement
• Male fertility
• Low sperm count
• Male pattern baldness
• Polycystic ovaries
• Female infertility
• Excessive facial and body hair (women)
• Skin health
• Acne
• Psoriasis
• Eczema
• Dermatitis herpetiformis
• Wound healing
• Macular degeneration
• Cataracts
• Mental health
• Learning disorders
• Attention deficit disorder
• Hyperactivity disorder
• Dementia (including Alzheimer’s disease)
• Pregnancy
• Foetal growth and development
• Poor appetite
• Copper excess
• Wilson’s disease

CONTRAINDICATIONS/DRUG INTERACTIONS:
Long-term intake of more than 100-150mg of zinc per day may suppress immune function, lead to irritation or even damage of the stomach lining and reduce levels of HDL (good) cholesterol (potentially increasing the risk of certain cardiovascular problems).
Intake of more than 200mg per day may cause nausea, diarrhoea, vomiting and digestive pain or irritation.
Individuals with stomach or duodenal ulcers should only use zinc supplements on the consent and under the strict monitoring of a doctor.
High doses of zinc can interfere with copper utilization. Unless ingesting copper in doses sufficient to maintain an appropriate ratio between the two minerals (see italics below), long-term zinc intake in doses greater than 50mg per day may cause copper deficiency (and associated problems such as microcytic anemia, low neutrophil count and poor iron utilisation).
Although there are differing scientific views on what constitutes an optimal ratio between zinc and copper, it is thought that a ratio for long-term intake of between 7.5:1 and 10:1 (zinc to copper) is probably appropriate.
Very high doses of zinc may interfere with iron absorption and utilization.
Zinc supplements should be avoided if taking the drugs amiloride, penicillamine, tetracycline, warfarin or fluoroquinolone antibiotics, unless on the consent and under the strict monitoring of a doctor.
When taken on an empty stomach, even moderate doses of zinc can cause nausea in the lozenge form or as zinc sulphate. Thus, zinc lozenges and zinc sulphate should be taken after a meal.
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The information provided is intended to guide you through the various applications of certain key nutrients and supplements. It is a training guide that is not meant in any way to imply that the stated nutrients and supplements can be used to treat, prevent or cure disease. The “May be Supportive for” sections in the booklet refer to recommendations generally made with regard to the specific nutrients and supplements and are based on scientific literature.

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