

**DR.VEGAN<sup>®</sup>**

# Fuelling the brain

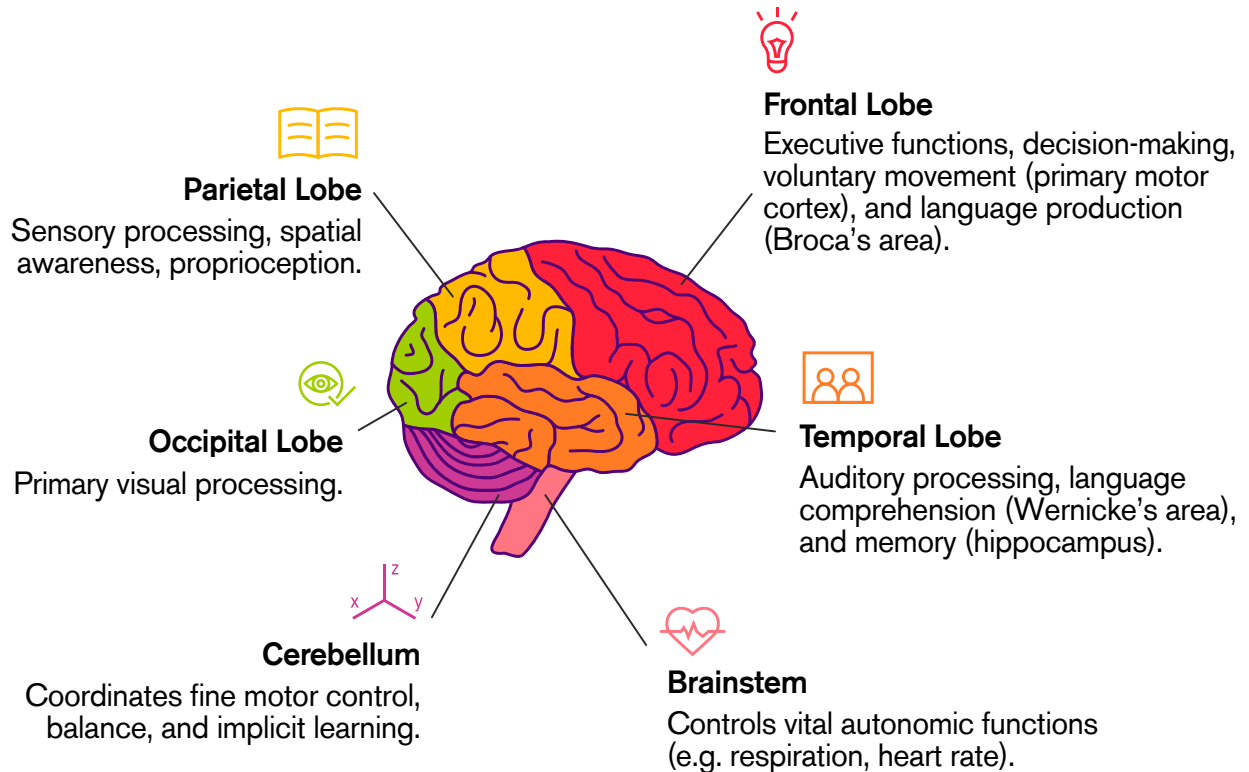
*Supporting focus, memory, and  
mental performance*

*Practitioner Paper ▪ For practitioner use only*

# BRAIN FUNCTION AND COGNITIVE PROCESSES

## Neuroanatomy and functional areas of the brain

**Cerebral cortex:** Responsible for higher cognitive functions, sensory processing, and voluntary motor activity. The cerebral cortex consists of four lobes:



*Lateral View*

- **Limbic system:** Regulates emotions, memory and motivation.
- **Hippocampus:** Critical for memory consolidation.
- **Amygdala:** Processes emotions, especially fear and reward.
- **Basal ganglia:** Involved in movement regulation, habit formation and procedural learning.

## Neuroanatomy and functional areas of the brain

Neurotransmitters are chemical messengers that facilitate communication between neurones.

Key neurotransmitters include:

<b>Glutamate</b>	The primary excitatory neurotransmitter; essential for synaptic plasticity, learning, and memory.
<b>GABA (Gamma-Aminobutyric Acid)</b>	The main inhibitory neurotransmitter; regulates neuronal excitability and prevents excessive stimulation (target of benzodiazepines and barbiturates).
<b>Dopamine</b>	Involved in reward processing, motivation, motor control (Parkinson's disease) and psychiatric conditions (schizophrenia).
<b>Serotonin (5-HT)</b>	Regulates mood, appetite, sleep and cognition. Implicated in depression and anxiety disorders.
<b>Norepinephrine</b>	Modulates attention, arousal, and stress responses (targeted in ADHD and PTSD treatments).
<b>Acetylcholine</b>	Important for cognition, memory and neuromuscular transmission (affected in Alzheimer's disease and myasthenia gravis).
<b>Endorphins and enkephalins</b>	Act as natural painkillers and modulate stress responses.

## Cognitive Processes

Cognitive processes refer to mental functions involved in acquiring knowledge and understanding.  
These include:

**Perception:** Interpretation of sensory input (visual, auditory, tactile and olfactory)

**Attention:** Selective focus on specific stimuli while ignoring distractions.

**Memory:** Includes short-term (working memory), long-term (explicit and implicit memory), and procedural memory.

**Learning:** Involves synaptic plasticity and long-term potentiation (LTP) in the hippocampus.

**Language processing:** Broca's area (speech production) and Wernicke's area (language comprehension).

**Executive functions:** Higher-order cognitive processes like planning, decision-making and impulse control (mediated by the prefrontal cortex).

## Neural plasticity and learning

**Synaptic plasticity:** Changes in synaptic strength underpin learning and memory.

**Long-term potentiation (LTP):** Strengthening of synaptic connections, crucial for memory storage.

**Neurogenesis:** Limited adult neurogenesis occurs in the hippocampus and olfactory bulb.

**Hebbian learning:** Involves synaptic plasticity and long-term potentiation (LTP) in the hippocampus.

## Brain disorders affecting cognition

🌿 **Neurodegenerative diseases:** Alzheimers, Parkinsons and Huntingdons.

🌿 **Psychiatric conditions:** Schizophrenia, major depressive disorder and bipolar disorder.

🌿 **Neurological disorders:** Stroke, epilepsy and traumatic brain injury (TBI).



## **DIET AND LIFESTYLE TIPS FOR CLIENTS**

A brain-healthy diet reduces inflammation, optimises neurotransmitter function and promotes neuroprotection.

### **Omega 3 Fatty Acids (DHA and EPA)**

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Essential for neuronal function and reducing neuroinflammation.  
Sources include flaxseeds, chia seeds, walnuts and algae oil.

### **Antioxidants and polyphenols**

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Help reduce oxidative stress and protect neurones. Sources include berries, dark chocolate (70%+ cocoa), green tea and turmeric.

### **B Vitamins**

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Crucial for neurotransmitter production and preventing cognitive decline. Sources include leafy greens and whole grains.

### **Magnesium**

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Supports learning and memory by enhancing synaptic plasticity.  
Sources include nuts, seeds, dark leafy greens and whole grains.







## **Choline**

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A precursor to acetylcholine, vital for memory and cognition.

## **Vitamin D**

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Deficiency is linked to cognitive decline and neurodegenerative diseases.

## **Mediterranean Diet**

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Rich in healthy fats, antioxidants and anti-inflammatory foods.

## **Mind diet**

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A combination of the Mediterranean and DASH diets designed specifically for brain health.

## **FOODS TO AVOID OR LIMIT**

### **Ultra-processed foods and trans fats**

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These are linked to inflammation and cognitive decline.

### **Excess sugar and refined carbs**

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These spike blood sugar, increasing the risk of Alzheimers.

### **Excess alcohol**

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Alcohol damages neurones and impairs cognitive function.

## **LIFESTYLE CHANGES FOR COGNITIVE FUNCTION**

### **Engage in lifelong learning**

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Reading, puzzles and playing musical instruments. Try learning new skills to strengthen neural connections.

### **Exercise**

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Aerobic exercise such as brisk walking, swimming and cycling boosts blood flow and enhances brain-derived neurotrophic factor (BDNF), which promotes neuroplasticity. Strength training helps reduce brain atrophy in ageing. Yoga and tai chi improve cognitive function and reduce stress.

### **Sleep hygiene**

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Aim for 7-9 hours of quality sleep per night to support memory consolidation. Maintain a consistent sleep schedule and avoid screens before bed.

### **Stress management**

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Chronic stress increases cortisol, which can damage the hippocampus (memory centre). Mindfulness meditation, deep breathing and nature exposure reduce stress-related brain shrinkage.







## **Social connection**

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Social isolation is a risk factor for dementia. Encourage strong social networks, community engagement and meaningful relationships.

## **Avoid neurotoxic substances**

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Stop smoking, as it is linked to faster cognitive decline and neurodegeneration. Limit alcohol, as excessive intake increases dementia risk.

## **Regular health monitoring**

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### **Blood pressure:**

Hypertension increases the risk of stroke and dementia.

### **Blood sugar:**

Insulin resistance contributes to Alzheimers (sometimes called Type 3 diabetes).

### **Cholesterol**

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High LDL is linked to vascular dementia.

## Brain Fuel®

*Brain Fuel® is an award-winning supplement with scientifically studied botanicals, vitamins and minerals, including BacoMind®, Phosphatidylserine and Ginkgo, to improve memory recall, focus and cognitive performance. Brain Fuel® focuses your attention and supports your concentration, energy and mood every day.*



	PER CAPSULE	EC NRV % *
BacoMind® (Bacopa Monnieri Extract)	300mg	**
Ginkgo Biloba Extract	150mg	**
Phosphatidylserine	40mg	**
Vitamin B1 (Thiamin)	3mg	272
Vitamin B3 (Niacin)	33mg	206
Vitamin B5 (Pantothenic Acid)	12mg	200
Vitamin B6	10mg	714
Vitamin B12	105µg	4200
Organic Turmeric	50mg	**
Zinc	3mg	30%

\* NRV= Nutrient Reference Value

\*\* No NRV Established

### Ingredients

BacoMind® Bacopa Monnieri Extract, Ginkgo Biloba Extract, Phosphatidylserine (contains Soya), Organic Turmeric, Niacin (Nicotinamide), Vitamin B5 (Pantothenic Acid), Vitamin B6 (Pyridoxine Hydrochloride), Vitamin B12 (Methylcobalamin), Vitamin B1 (Thiamin Hydrochloride), Zinc Citrate, Capsule Shell (Hydroxypropyl Methylcellulose).

### Free from

Added Sugar, Starch, Sweeteners, Gluten, Wheat, Lactose, Dairy, Artificial Flavours, Colours and Preservatives.

## Pairs well with



Vegan Omega 3



Choline



Gut Works®

## Directions

- 🌱 Take one capsule each day, ideally with food.
- 🌱 Best taken in the morning or during the day to fuel the day ahead.
- 🌱 Best results are obtained when taken for three months and beyond.

## What customers can look forward to

### 1-2 Weeks

Afternoon slumps should become less frequent as energy levels start improving.  
Support for brain fog.

### 2-4 Weeks

Improvement in mental performance, sharper reactions, focus and clearer thinking.

### 1-2 Months

Improvement in productivity. Antioxidants provide neuroprotection.

### 3 Months

Improvement in memory recall and visual retention. For the elderly, attention, cognitive processing and working memory could be improved.

## KEY INGREDIENTS IN BRAIN FUEL®

Maintaining optimal brain health and cognitive function is essential for overall health and wellbeing. Several nutrients have been identified as essential for supporting brain function.



### **BacoMind® (Bacopa Monnieri Extract)**

Bacopa Monnieri Extract, also known as BacoMind®, has been traditionally used in Ayurvedic medicine to enhance cognitive function.<sup>1</sup> The extract has been shown to improve attention, cognitive processing and working memory in healthy elderly individuals by suppressing acetylcholinesterase (AChE) activity.<sup>1</sup> AChE is an enzyme that breaks down the neurotransmitter acetylcholine, which plays a crucial role in memory and learning. By inhibiting AChE, Bacopa Monnieri Extract may increase acetylcholine levels, improving cognitive function. A meta-analysis of randomised controlled trials found that Bacopa Monnieri has the potential to improve cognition, particularly speed of attention. The analysis included nine studies with 518 subjects and found that Bacopa Monnieri improved cognitive function, as measured by the Trail B test and choice reaction time.<sup>2</sup> A randomised double-blind placebo-controlled trial found that Bacopa Monnieri improved attention, cognitive processing and working memory in healthy elderly subjects.<sup>3</sup> The study used a standardised extract of Bacopa Monnieri and found that it suppressed acetylcholinesterase (AChE) activity, which may contribute to its cognitive-enhancing effects.



### **Ginkgo Biloba Extract**

Ginkgo Biloba Extract has been used for centuries to improve cognitive function and memory.<sup>4</sup> The extract contains flavonoids and terpenoids, which have antioxidant and anti-inflammatory properties.<sup>5</sup> Ginkgo Biloba Extract has been shown to improve cognitive function in individuals with mild cognitive impairment, possibly by reducing oxidative stress and inflammation in the brain.<sup>6</sup> Additionally, the extract may improve blood flow to the brain, leading to enhanced cognitive function.<sup>7</sup>

Several clinical trials have investigated the effects of Ginkgo Biloba on brain health and cognition. A randomised, double-blind, placebo-controlled trial found that Ginkgo Biloba improved cognitive function in patients with dementia of Alzheimer's type.<sup>8</sup> Another study found that Ginkgo Biloba enhanced cognitive function in patients with mild cognitive impairment.<sup>9</sup>



### **Phosphatidylserine**

Phosphatidylserine is a phospholipid that plays a crucial role in neuronal membrane structure and function.<sup>10</sup> The nutrient has been shown to improve cognitive function in older adults, possibly by reducing cognitive decline and improving memory.<sup>11</sup> Phosphatidylserine may also have neuroprotective effects, reducing the risk of age-related cognitive decline and dementia.<sup>12</sup> A meta-analysis of clinical trials on Phosphatidylserine and brain function found that the nutrient improved cognitive function in older adults, particularly in the areas of memory and executive function.<sup>13</sup>

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### **Vitamin B1 (Thiamin)**

Thiamin, also known as Vitamin B1, is essential for energy production in the brain.<sup>14</sup> Thiamin deficiency can lead to impaired cognitive function, including memory loss and confusion.<sup>15</sup> The vitamin plays a crucial role in the synthesis of neurotransmitters, such as acetylcholine, and is involved in the maintenance of healthy neuronal membranes.<sup>16</sup> A meta-analysis found that thiamine supplementation improved cognitive function in patients with mild cognitive impairment or Alzheimer's disease.<sup>17</sup>

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### **Vitamin B3 (Niacin)**

Niacin, or Vitamin B3, is involved in energy production and has antioxidant properties. Niacin deficiency can lead to impaired cognitive function, including memory loss and confusion.<sup>18</sup> The vitamin may also have neuroprotective effects, reducing the risk of age-related cognitive decline and dementia.<sup>19</sup>

Another meta-analysis found that thiamine supplementation improved cognitive function in patients with mild cognitive impairment or Alzheimer's disease.<sup>20</sup>

Several clinical trials have investigated the effects of niacin on cognitive function in humans. One study found that Niacin supplementation improved cognitive function in patients with mild cognitive impairment.<sup>21</sup> Another study found that Niacin supplementation had no significant effect on cognitive function in healthy older adults.<sup>22</sup>





## **Vitamin B5 (Pantothenic Acid)**

Pantothenic acid, also known as Vitamin B5, is essential for energy production and the synthesis of neurotransmitters. Vitamins are crucial in maintaining healthy neuronal membranes and have been shown to improve cognitive function in individuals with neurodegenerative diseases.<sup>23</sup>

A meta-analysis of clinical trials on Vitamin B5 and brain health found that the nutrient had a positive effect on cognitive function in patients with mild cognitive impairment or Alzheimer's disease.<sup>24</sup> Another meta-analysis found that Vitamin B5 supplementation improved cognitive function in healthy older adults.<sup>25</sup>

Several clinical trials have investigated the effects of Vitamin B5 on brain function and cognition. A randomised, double-blind, placebo-controlled trial found that Vitamin B5 supplementation improved cognitive function in patients with mild cognitive impairment.<sup>26</sup>

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## **Vitamin B6**

Vitamin B6 synthesises neurotransmitters, such as serotonin and dopamine, and is crucial in maintaining healthy neuronal membranes. The vitamin has been shown to improve cognitive function in older adults, possibly by reducing cognitive decline and improving memory.<sup>27</sup> Vitamin B6 may also have neuroprotective effects, reducing the risk of age-related cognitive decline and dementia.<sup>28</sup>

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## **Vitamin B12**

Vitamin B12 is essential for the synthesis of neurotransmitters and the maintenance of healthy neuronal membranes.<sup>29</sup> Vitamin B12 deficiency can lead to impaired cognitive function, including memory loss and confusion.<sup>30</sup> The vitamin may also have neuroprotective effects, reducing the risk of age-related cognitive decline and dementia.<sup>31</sup>

A meta-analysis of clinical trials on Vitamin B12 and brain health found that the nutrient had a positive effect on cognitive function in patients with mild cognitive impairment or Alzheimer's disease.<sup>32</sup> Another meta-analysis found that Vitamin B12 supplementation improved cognitive function in healthy older adults.<sup>33</sup> Several clinical trials have investigated the effects of Vitamin B12 on brain function and cognition. A randomised, double-blind, placebo-controlled trial found that Vitamin B12 supplementation improved cognitive function in patients with mild cognitive impairment.<sup>34</sup>



## Organic Turmeric

Organic Turmeric contains Curcumin, a polyphenolic compound with anti-inflammatory and antioxidant properties.<sup>35</sup> Curcumin has been shown to improve cognitive function in individuals with neurodegenerative diseases, possibly by reducing oxidative stress and inflammation in the brain.<sup>35</sup> The compound may also have neuroprotective effects, reducing the risk of age-related cognitive decline and dementia.<sup>35</sup>

A meta-analysis of clinical trials on turmeric and brain health found that the spice had a positive effect on cognitive function in patients with mild cognitive impairment or Alzheimer's disease.<sup>36</sup> Another meta-analysis found that turmeric supplementation improved cognitive function in healthy older adults.<sup>37</sup> Several clinical trials have investigated the effects of Turmeric on brain function and cognition. A randomised, double-blind, placebo-controlled trial found that Turmeric supplementation improved cognitive function in patients with mild cognitive impairment.<sup>38</sup> Another study found that Turmeric supplementation had no significant effect on cognitive function in healthy older adults.<sup>39</sup>

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## Zinc

Zinc is an essential mineral that plays a crucial role in neuronal function and synaptic plasticity.<sup>40</sup> Zinc deficiency can lead to impaired cognitive function, including memory loss and confusion.<sup>41</sup> The mineral may also have neuroprotective effects, reducing the risk of age-related cognitive decline and dementia.<sup>42</sup>

A randomised, double-blind, placebo-controlled trial found that Zinc supplementation improved cognitive function in patients with mild cognitive impairment.<sup>43</sup> Another study found that Zinc supplementation had no significant effect on cognitive function in healthy older adults.<sup>44</sup> A survey of Zinc supplementation in children with attention-deficit / hyperactivity disorder (ADHD) found that Zinc improved attention and reduced symptoms of ADHD.<sup>44</sup>

## DRUG INTERACTIONS

Interaction Severity	Major	Talinolol	Ginkgo may increase the level and effects of this drug.
	Moderate	Anticholinergic Drugs	Bacopa and Phosphatidylserine may counteract the effects of these drugs.
		Cevimeline	Bacopa and Phosphatidylserine may increase the adverse effects of this drug.
		Cholinergic Drugs	Bacopa may increase the effects of these drugs.
		Alprazolam	Ginkgo may decrease the blood level of this drug.
		Anticoagulant / Antiplatelet Drugs	Ginkgo and Turmeric may increase the risk of bleeding when taken with these drugs. Niacin may increase the effects of these drugs.
		Anticonvulsants	Ginkgo may increase the risk of seizures in those taking these drugs.
		Antidiabetes Drugs	Ginkgo may alter the effect of these drugs. Niacin may decrease the effects of these drugs. Turmeric may increase the risk of hypoglycaemia when taken with these drugs.
		Atorvastatin	Ginkgo increases the clearance of this drug.
		Efavirenz	Ginkgo may decrease the effect of this drug.
		P-glycoprotein Substrate	Ginkgo may increase the level of drugs metabolised by this pathway.
		Risperidone	Ginkgo may inhibit the metabolism of this drug.
		Rosiglitazone	Ginkgo may decrease the effects of this drug.
		Seizure Threshold Lowering Drugs	Ginkgo may increase the risk of convulsions when taken with this drug.
		Simvastatin	Ginkgo may decrease the effects of this drug.
		Alkylating Agents	Ginkgo may decrease the effects of this drug.
		Tacrolimus	Ginkgo and Turmeric may increase the effects of this drug.
		Trazodone	Ginkgo may increase the level and effects of this drug.

Warfarin	Ginkgo and Turmeric may increase the risk of bleeding when taken with this drug.
Antihypertensive Drugs	Niacin and Vitamin B6 may increase the risk of hypotension when taken with these drugs.
Gemfibrozil	Niacin may increase the risk of myopathy in those taking this drug.
HMG-CoA Reductase Inhibitors	Niacin interferes with the action of these drugs.
Sulfinpyrazone	Niacin interferes with the action of this drug.
Amiodarone	Vitamin B6 may increase the phyto-sensitivity effects of this drug.
Phenobarbital	Vitamin B6 can reduce the effects of this drug.
Phenytoin	B6 may reduce the levels and effects of these drugs
Alkylating Agents	Turmeric may reduce the effects of these drugs.
Amlodipine	Turmeric may reduce the level of this drug.
Antitumor Antibiotics	Turmeric may reduce the effects of these drugs.
Hepatotoxic Drugs	Turmeric may increase the risk of liver toxicity when taken with these drugs.
Methotrexate	Turmeric may increase the side effects of this drug.
Norfloxacin	Turmeric may increase the side effects of this drug.
Organic Anion-transporting Polypeptide Substrates.	Turmeric may increase the levels of these drugs.
Sulfasalazine	Turmeric may increase the side effects of this drug.
Tamoxifen	Turmeric may decrease the effects of this drug.
Cephalexin	Zinc may increase the clearance of this drug.
Cisplatin	Zinc may interfere with the action of this drug.
Integrase Inhibitors	Zinc may decrease the level of these drugs.
Quinolone Antibiotics	Zinc may decrease the level and effects of these drugs.

Interaction Severity	Moderate	Ritonavir	Zinc may decrease the level and effects of this drug.
		Penicillamine	Turmeric may decrease the effects of this drug.
		Tetracycline Antibiotics	Zinc may decrease the level and effects of these drugs.
	Minor	Thyroxine	Bacopa may increase thyroxine. Niacin may decrease blood levels of thyroxine.
		Omeprazole	Ginkgo may decrease the effect of this drug.
		P-glycoprotein Substrates	Turmeric may increase the absorption of these drugs.

*Drug-nutrient interactions have been taken from the Natural Medicines Database, October 2024. Please do your own due diligence before recommending this product to individuals taking medicines.*

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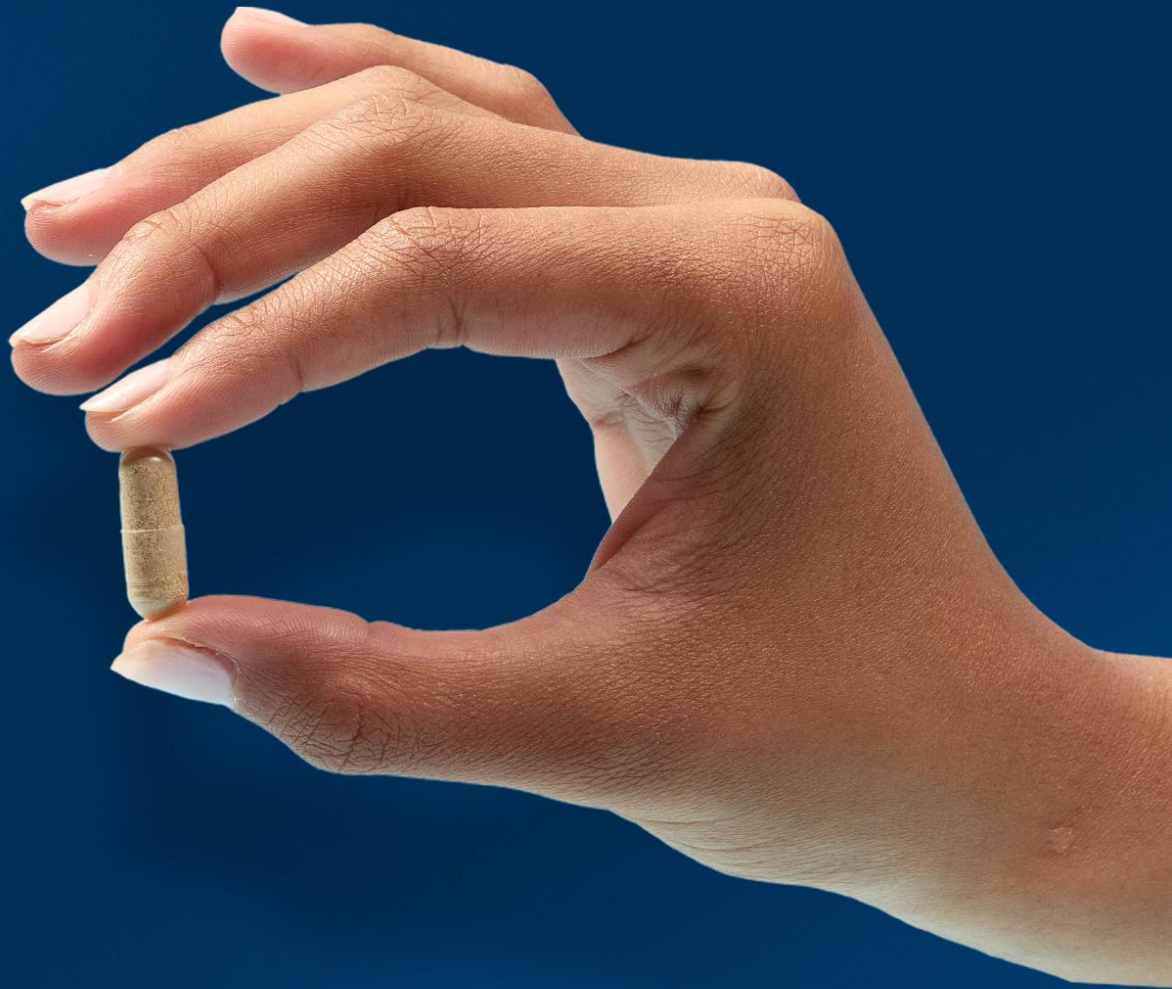


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