

# Natural Therapies to Support Neuroprotection



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Neuroinflammation is a complex process that occurs as a protective mechanism in response to brain injury. It involves activation of microglia, the release of inflammatory mediators, and the production of reactive oxygen (and nitrogen) species. Chronic neuroinflammation is associated with many neurological conditions including multiple sclerosis (MS). Reducing underlying neuroinflammation can protect neuronal cells and slow symptom progression. Below are several natural therapies that, in combination with beneficial dietary and lifestyle changes, may be neuroprotective for patients with auto-immune or neuroinflammatory conditions, such as MS.

## Curcumin

Curcumin is a polyphenolic compound derived from the root of the turmeric plant, *Curcuma longa*. It has been used historically to treat inflammatory conditions, and now has decades of research to support its clinical use.<sup>1</sup> As a fat-soluble compound it can cross the blood-brain barrier and exert its neuroprotective effects by reducing mitochondrial dysfunction and oxidative stress. Curcumin has particular anti-inflammatory activity with respect to neurological disorders, because it inhibits microglial activation thereby mitigating neuroinflammation.<sup>2</sup> In animal studies, curcumin supplementation increased the production and growth of neuronal cells.<sup>3</sup> Studies in healthy, older adults demonstrated an improvement in cognitive function and memory after only one dose.<sup>4,5</sup> Two studies found that curcumin is able to modulate the immune response in people with MS.<sup>6,7</sup> Curcumin has been studied extensively in other autoimmune and inflammatory conditions as well, and its low side effect profile makes it a valuable option for patients with these conditions<sup>8</sup>

## Fumarate

Dimethyl fumarate, which is derived from fumaric acid, is used as a treatment for psoriasis, a condition with autoimmune origins. The mechanism of action for fumarate isn't fully understood, but it appears to have anti-inflammatory effects that modulate the immune response thereby reducing autoimmune reactivity. It also increases levels of the antioxidant glutathione, protecting neurons against oxidative damage.<sup>9</sup> A large two-year trial in people with MS found that fumarate reduced relapse rates more than placebo or another standard MS

drug.<sup>10</sup> Another similar trial replicated these results.<sup>11</sup> Both studies reported that brain lesions were reduced in the participants who received fumarate, but results were best when they were treated in the early stages of MS. Fumarate is available as a prescription drug and is considered safe with few significant side effects. It is also available as a supplement, but absorption is limited.

## Resveratrol

Resveratrol is a potent antioxidant found in grapes, berries, and red wine. Clinical trials in healthy adults have found resveratrol supplementation increases blood flow to the brain, and has potential neuroprotective effects that enhance cognition and memory.<sup>12</sup> Though it has been studied in other neurodegenerative conditions, no randomized trials have been conducted in people with MS.<sup>13</sup> A small, nonrandomized pilot study examined resveratrol in combination with other supplements plus a semi-vegetarian diet in people with MS.<sup>14</sup> After 6 months, no changes in neurological symptoms were noted, but serum markers of inflammation were reduced. In an animal model, resveratrol supplementation appeared to exacerbate MS symptoms,<sup>15</sup> but a later study contradicted these findings. While a glass of red wine is probably fine if tolerated, caution should be exercised with resveratrol supplementation until more clinical evidence is available.

## Rosmarinic Acid

Culinary herbs such as basil, thyme, peppermint, and rosemary contain rosmarinic acid. Cell studies demonstrate that isolated rosmarinic acid protects neurons from oxidative stress.<sup>16</sup> It also protects neurons against glutamate excitotoxicity, which can damage or destroy nerves.<sup>17</sup> In animal studies, rosmarinic acid increased the differentiation of oligodendrocytes, the cells that produce myelin.<sup>18</sup>

## References

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