

# Hypertension

**Zinc** Regulates angiotensin and endothelin, two enzymes that directly affect blood pressure; De ciency causes blood vessels to constrict. <sup>37,38</sup>

**Copper** Regulates enzymes that keep blood vessels dilating properly; Depletion causes hypertension; Supplementation trials positive. <sup>34,35,36</sup>

**Magnesium** Promotes dilation of blood vessels; Low intracellular levels are a well established cause of hypertension. <sup>31,32,33</sup>

**Calcium** Optimal calcium status reduces vasoconstriction; Particularly effective for salt-sensitive hypertension as it increases sodium excretion. <sup>9,29,30</sup>

**Folate** Lowers blood pressure by improving endothelial function, or the ability of blood vessels to properly dilate. <sup>27,28</sup>

**Carnitine** Lowers blood pressure in the same way as ACE inhibitors, a common hypertension drug which reduces angiotensin, a substance that causes arteries to constrict; Its role in fat metabolism explains this effect. <sup>25,26</sup>

**Oleic Acid** The bene ts of olive oil for blood pressure are largely due to its high oleic acid content, which protects endothelial cells (inner lining of blood vessels) from in ammation. <sup>22,23,24</sup>

**Cysteine** Anti-hypertensive effects stem from its role as a potent antioxidant; Effective vasolidator. <sup>20,21</sup>

**Lipoic Acid** Improves vascular tone; Causes vasolidation; Works like calcium channel blocker meds; Recycles vitamins C, E and Cysteine. <sup>18,19</sup>

**Glutathione** Oxidative stress, which often manifests as glutathione de ciency, can induce hypertension. <sup>39,40</sup>

**Biotin** Pharmacological doses reduce systolic blood pressure by activating an enzyme (cGMP) that causes smooth muscle to relax. <sup>1,2</sup>

**Vitamin A** Suppresses the growth of vascular smooth muscle, thus keeping blood vessels (lumen) clear and wide. <sup>3,4</sup>

**Vitamin B2** People with a certain gene (called MTHFR type TT) tend to respond well to B2 therapy for lowering blood pressure. <sup>5,6</sup>

**Vitamin B6** Lowers homocysteine, a toxin that makes arteries stiff and raises blood pressure; Low B6 is strongly linked to hypertension. <sup>6,7,8,9</sup>

**Vitamin C** Improves the ability of blood vessels to react appropriately to relaxation signals; Increases nitric oxide, a powerful vasodilator. <sup>9,10,11</sup>

**Vitamin D** Low vitamin D is strongly linked to hypertension, possibly due to its role in calcium transport; Augments blood pressure lowering effect of calcium; Keeps blood vessels smooth and healthy. <sup>9,12,13</sup>

**Vitamin E** Increases nitric oxide synthase, an enzyme that causes blood vessels to dilate; Protects blood vessels from damage. <sup>14,15</sup>

**Coenzyme Q10** Improves bioenergetics of blood vessel wall; De ciency highly correlated to hypertension; Bene ts of CoQ10 often not seen for several weeks. <sup>9,16,17</sup>

Additional nutrients affect blood pressure. This list is non-exhaustive.