

NANOEMULSIFIED



# KIDNEY CARE

THIS INFORMATION IS PROVIDED AS A MEDICAL AND SCIENTIFIC EDUCATIONAL RESOURCE FOR THE USE OF PHYSICIANS AND OTHER LICENSED HEALTH CARE PRACTITIONERS ("PRACTITIONERS"). THIS INFORMATION IS INTENDED FOR PRACTITIONERS TO USE AS A BASIS FOR DETERMINING WHETHER TO RECOMMEND THESE PRODUCTS TO THEIR PATIENTS. ALL RECOMMENDATIONS REGARDING PROTOCOLS, DOSING, PRESCRIBING AND/ OR USAGE INSTRUCTIONS SHOULD BE TAILORED TO INDIVIDUAL NEEDS OF THE PATIENT CONSIDERING THEIR MEDICAL HISTORY AND CONCOMITANT THERAPIES. THE DIETARY SUPPLEMENTS OFFERED BY QUICKSILVER SCIENTIFIC ARE NOT INTENDED FOR USE BY CONSUMERS AS A MEANS TO CURE, TREAT, PREVENT, DIAGNOSE, OR MITIGATE ANY DISEASE OR OTHER MEDICAL CONDITION.

**Kidney Care** is a blend of botanicals and nutraceuticals that support healthy kidney function and detoxification. The array of botanicals and nutraceuticals in this formula includes ferulic acid, Astragaloside IV, goldenrod, dandelion leaf extract, Zhu ling, He Shou Wu root extract, and Fu Ling extract.

## EDUCATION

### HEALTHY KIDNEY FUNCTION IS ESSENTIAL FOR DETOXIFICATION

Our kidneys filter an astounding 150 quarts of blood every day, helping us rid our bodies of a variety of endogenously-produced and exogenously acquired toxins, including ammonia, urea, creatinine, and toxins derived from phase II hepatic detoxification, and industrial toxins such as heavy metals.<sup>1</sup> This filtration process takes place within the renal proximal tubules - millions of tiny tubes that support fluid regulation and homeostasis of the body. Interestingly, the renal proximal tubules are also a crucial site for activation of vitamin D from its inactive form, 25-hydroxyvitamin D, into its active form, 25-dihydroxyvitamin D.<sup>2</sup>

Alongside the liver and the gastrointestinal system, the kidneys play a crucial role in detoxification; their small size and delicate structure make them more susceptible to damage directly by toxins and through the detoxification process. Supporting kidney health is thus an essential yet often overlooked element of detoxification protocols.

Our kidneys engage several processes to filter toxins from our blood and prepare them for elimination in the urine. First, the glomeruli, tiny clusters of looped blood vessels in the kidneys, filter out many small- and medium-sized substances. The proximal tubules of the kidneys harbor active transporters, including multidrug resistance-associated proteins (MRPs) that usher toxins from the blood into the urine. Passive diffusion of some toxins, namely fat-soluble toxins, also occurs in the renal tubules. Notably, the kidneys use adenosine triphosphate (ATP), the body's cellular energy currency, to fuel the active transporters in the kidneys; if the mitochondria of kidney cells cannot produce sufficient ATP, the kidneys' ability to eliminate toxins will be compromised.<sup>3</sup>



## Supplement Facts

Serving Size: 5 mL (1 tsp.)  
Servings Per Container: 20

Amount Per Serving	% Daily Value	
Astragaloside IV extract (Astragalus membranaceus root)	5 mg	**
Ferulic Acid	20 mg	**
<b>Proprietary Blend</b>	1100 mg	**
Dandelion ( <i>Taraxacum officinale</i> ) leaf extract, Goldenrod ( <i>Solidago gigantea</i> aerial parts) extract, Fu Ling ( <i>Poria cocos</i> ) sclerotium extract, Zhu Ling ( <i>Polyporus umbellatus</i> ) fruiting body extract, He Shou Wu ( <i>Fo-ti</i> ) root extract ( <i>Polygonum multiflorum</i> ), Citrus and juniper berry essential oils		

Percent Daily Values are based on a 2,000 calorie diet.

\*\*Daily Value Not Established

**Other Ingredients:** Glycerin, water, ethanol, tocopherol, highly purified phospholipids, natural mixed tocopherols, natural flavoring

## **MANY ENVIRONMENTAL AND ENDOGENOUS TOXINS HARM KIDNEY FUNCTION**

Many substances we encounter in our daily lives are toxic to the kidneys. In fact, declines in kidney function with age may be due to kidney damage accumulated throughout one's lifetime in response to the toxin burden one has accrued. Since 1990, the prevalence of chronic kidney disease (CKD) has increased nearly 30% globally, a phenomenon likely due to an increased toxic burden and an increased prevalence of chronic conditions, such as type 2 diabetes and hypertension, that ultimately harm the kidneys.<sup>4</sup> Cadmium, a heavy metal released into the environment through smelting and the burning of fossil fuels, is highly toxic to the kidneys and can accumulate in these organs, causing lasting damage.<sup>5</sup> Lead, mercury, and uranium are also nephrotoxic.<sup>6,7,8</sup> Microplastics are also a growing threat to our kidneys, triggering mitochondrial dysfunction and inflammation in kidney cells.<sup>9</sup>

Endogenously-produced toxins, including endotoxin (lipopolysaccharide) derived from an imbalanced gut microbiota and high blood sugar derived from an unhealthy diet and lifestyle, are also harmful to the fragile kidneys and can induce oxidative stress and microvascular damage.<sup>10,11</sup> These findings explain why gut dysfunction and diabetes are risk factors for kidney dysfunction.<sup>12</sup>

Persistent organic pollutants (POPs) such as pesticides, the herbicide glyphosate, and non-stick chemicals, such as perfluorooctanoic acid (PFOA), are also toxic to the kidneys and are very difficult for the body to metabolize on its own.<sup>13</sup> In other words, we routinely face a plethora of toxins both in our environment and inside our bodies that can harm our fragile, vital kidneys.

## **TIME-HONORED HERBS SUPPORT KIDNEY STRUCTURE AND FUNCTION**

Both traditional Western herbalism and Traditional Chinese Medicine (TCM) harbor repertoires of herbs used to support healthy kidney function.

**Dandelion Leaf (*Taraxacum officinale*):** In TCM, dandelion leaf is considered an anti-toxin herb. It has long been used in Western herbalism as a diuretic. Modern-day research validates the traditional use of this herb, demonstrating its diuretic actions in healthy subjects.<sup>14</sup> Dandelion leaf is rich in phytochemicals such as  $\beta$ -sitosterol,  $\alpha$ -amyrin, stigmasterol, quercetin glycosides, chicoric acid, and sesquiterpene lactones.  $\beta$ -sitosterol has been found to inhibit kidney damage in rats exposed to toxic industrial solvents and modulates aberrant cell proliferation in the kidneys, exerting nephroprotective effects.<sup>15,16</sup> Quercetin glycosides exert antioxidant effects in the kidneys, protecting the kidneys against toxin-induced oxidative stress in the delicate renal tubular cells.<sup>17</sup> Chicoric acid prevents kidney damage induced by the chemotherapy drug methotrexate by downregulating the pro-inflammatory NLRP3 inflammasome and upregulating the antioxidant Nrf2 pathway.<sup>18</sup>

**Goldenrod (*Solidago gigantea*):** Like dandelion leaf, goldenrod acts as a diuretic, gently flushing the body by increasing urine output. Historically, goldenrod has been used for various kidney disorders, including kidney stones, UTIs, and overactive bladder issues.<sup>19</sup>

**Fu Ling (*Poria cocos*):** *Poria cocos*, also known as "Fu Ling" in TCM, is a medicinal fungus that grows around the roots of pine trees in China, Japan, Korea, and North America. Poricoic acid A (PAA), derived from *Poria cocos*, has been found in combination with melatonin to inhibit renal fibrosis, stemming the tide of the acute kidney injury, which can ultimately lead to chronic kidney disease (CKD) over time.<sup>20</sup> Poricoic acid ZG and ZH have also been found to attenuate renal fibrosis by functioning as RAS (renin-angiotensin system) inhibitors. In animal research, *Poria* has also been found to exert diuretic effects by inhibiting renal aquaporin-2 without the excessive loss of electrolytes caused by pharmaceutical diuretics like furosemide.<sup>21</sup> Also, in animal studies, it is an effective treatment for chronic kidney injury.<sup>22</sup>

**Zhu Ling (*Polyporus umbellatus*):** *Polyporus umbellatus* is an edible mushroom species that grow on old beeches or oak. Known as "Zhu Ling" in Traditional Chinese Medicine, this mushroom has been used medicinally to address urinary and kidney dysfunction, including scanty urine and edema.<sup>23</sup> *Polyporus* exerts diuretic activity by regulating the genetic expression of aquaporins, transmembrane proteins that function as molecular water channels, in the kidneys.<sup>24</sup> It protects against kidney injury and fibrosis by regulating fatty acyl metabolism in the kidneys.<sup>25</sup>

**He Shou Wu (*Polygonum multiflorum*):** He Shou Wu is another Chinese herb with a rich history of use in supporting healthy kidney function. He Shou Wu contains a bioactive compound called 2,3,4,5-Tetrahydroxystilbene-2-O- $\beta$ -D-glucoside (THSG) that is structurally similar to resveratrol and has been shown to protect the kidneys against anthropogenic chemical-induced toxicity while also reducing the expression of genes involved in kidney fibrosis through the Nrf2 antioxidant pathway.<sup>26</sup>

**Astragaloside IV:** Astragaloside IV, derived from *Astragalus membranaceus* root, is a phytochemical with tonifying effects on the kidneys. In kidney disease caused by diabetes, a process called “epithelial-to-mesenchymal transition” is critical in the progression of damage to kidney tubules. Astragaloside IV inhibits this process by reducing oxidative stress in renal tubular cells.<sup>27</sup> It also protects against endoplasmic reticulum stress<sup>28</sup> and against damage to the podocytes of the kidneys by enhancing AMPK-regulated autophagy.<sup>29</sup> Podocytes are specialized cells of the kidneys that play an essential role in preventing proteins from the blood from leaking into the urine. Damage to podocytes is a hallmark of kidney disease. Astragaloside IV also protects against apoptosis, or programmed cell death, of podocytes by upregulating the Klotho pathway, a critical longevity pathway.<sup>30</sup>

The Klotho protein is a transmembrane protein that is expressed in the liver, kidney, gut, and spleen. It regulates multiple pathways and proteins involved in the aging process, including proteins in the fibroblast growth factor (FGF), phosphate homeostasis, and insulin signaling.<sup>31</sup> Klotho levels decline in the body during the aging process. When Klotho declines, a major shift occurs in phosphate metabolism that ultimately harms the kidneys. Phosphate is required by the body for bone growth, energy storage in adenosine triphosphate (ATP), and nerve and muscle function. The kidneys regulate phosphate metabolism in partnership with bone tissue, vitamin D, and parathyroid hormone. Declines in Klotho expression promote hyperphosphatemia (elevated phosphate), accelerating kidney and systemic aging.<sup>32</sup>

Low Klotho levels also contribute to endothelial dysfunction and hypertension, both of which influence kidney dysfunction and aging. Astragaloside IV's ability to modulate Klotho and kidney function may thereby support healthy aging of the entire body.

Astragaloside IV also exerts regenerative effects on kidney function. It improves kidney function in diabetic mice by inhibiting microRNA-21, a signaling molecule linked to kidney fibrosis.<sup>33</sup>

**Ferulic acid:** Ferulic acid is a phytochemical found in various fruits and vegetables that attenuates oxidative damage, inflammation, and damaging levels of autophagy in the kidneys. These mechanisms protect against hyperglycemia-induced kidney damage and kidney ischemia-reperfusion injury.<sup>34,35</sup>

Our kidneys are amazingly resilient organs. However, our modern-day world increasingly places undue stress on our kidneys through toxin exposures, unhealthy eating patterns, and chronic disease processes that damage delicate kidney structures. Time-honored botanicals and nutraceuticals may support healthy kidney function, aiding these crucial organs in their essential metabolic and detoxification activities.

**Quicksilver Delivery Systems®** improve upon liposomal and emulsification technology with smaller, more stable particles made from the highest-grade ingredients available. In addition to exceptional absorption rates, these tiny liposomal and nanoemulsified particles increase diffusion across mucus membranes, enhance lymphatic circulation of nutrients and support cellular delivery.