

## **For stress-related heart diseases avoid magnesium deficiency**

**Chronic stress can influence the development and progression of cardiac diseases. This article describes the links between stress and the heart and the role of the biofactor magnesium in stress-related heart disease.**

Chronic stress cannot always be alleviated by lifestyle changes or relaxation methods alone. It is also important to prevent a deficiency of magnesium, an essential biofactor. Biofactors include vitamins and minerals - substances that the body needs for its physiological functions and that have a health-promoting or disease-preventing biological activity. Although magnesium is not an approved drug to combat stress, an adequate supply can help to reduce stress and mitigate its harmful effects on health.<sup>1,2</sup>

- Magnesium and cortisol: Cortisol increases the renal excretion of magnesium, and a magnesium deficiency increases the release of cortisol. Magnesium also indirectly reduces the release of ACTH and can therefore lower cortisol levels.<sup>3</sup>
- Magnesium and HPA: Magnesium influences the activity of enzymes and receptors that are involved in the synthesis, release and effect of 5-HT. In addition, magnesium is a cofactor of tryptophan hydroxylase, which is also involved in 5-HT synthesis.<sup>4</sup>
- Glutamatergic transmission: Magnesium inhibits glutamate directly and indirectly by blocking the glutamate N-methyl-D-aspartate (NMDA) receptor and promoting its reuptake into synaptic vesicles by stimulating sodium-potassium ATPase.
- GABA transmission: There is evidence of GABA-agonistic activity of magnesium.
- Magnesium and neuroprotection: Studies have shown a positive effect of the biofactor magnesium on the expression of BDNF in the brain.<sup>5</sup>
- Magnesium and oxidative stress: Magnesium plays a role in reducing oxidative stress by inhibiting the production of reactive oxygen species, increasing the activity of antioxidant enzymes and reducing oxidative damage to lipids, proteins and DNA.<sup>6</sup>
- Magnesium could also play a role in the GUTS model, in which the biofactor influences the perception of safety or uncertainty due to its calming effect.

### **Magnesium deficiency and stress: what is the study situation?**

Both experimental and clinical studies have shown a connection between magnesium deficiency and stress symptoms. However, the results of intervention studies are also promising. There is evidence that subjects with mental and physical stress benefit from daily magnesium supplementation - especially if the subjects had a low magnesium status or a subclinical magnesium deficiency at the start of the study.<sup>7,8</sup> Supplementation was not only able to compensate for the underlying magnesium deficiency, but also led to increased stress tolerance).<sup>9</sup>

### **What role does magnesium play for the heart?**

And what makes this biofactor so important when it comes to stress and the heart is the fact that, according to studies, a magnesium deficiency also correlates directly with high blood pressure, heart failure and other heart diseases and that magnesium supplementation can have a positive effect on these diseases.

### **If a magnesium deficiency is suspected**

Serum magnesium is the most frequently used laboratory parameter for assessing clinical magnesium status. However, there has long been a lack of uniform consensus on the serum value above which a magnesium deficiency is actually present. In 2022, an international recommendation for the standardization of the serum magnesium reference range was published. According to this, a serum value of 0.85 mmol/l magnesium is the minimum target.<sup>10</sup> According to current data, serum magnesium levels below 0.85 mmol/l are associated with increased health risks.<sup>11</sup>

### **Conclusion for practice**

#### **Pay attention to magnesium status in stress-related heart disease**

In addition to drug treatment, measures for stress reduction and mental stabilization and a heart-healthy diet, a magnesium deficiency should be avoided in affected patients. The biofactor magnesium not only has a stress-relieving effect but, according to studies, can also have a direct positive effect on hypertension and various heart diseases.

Further information on magnesium can be found here.

### ***Literature:***

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