

## **Magnesium: An essential factor in the prevention and treatment of diabetes mellitus and arterial hypertension**

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A reduced magnesium concentration is a significant pathophysiological factor for the development of insulin resistance. By influencing tyrosine kinase activity of the insulin receptor and signal transduction at the post-receptor level, magnesium improves parameters of glycaemic control. Diabetics, especially those with non-optimal metabolic control, often display - due to increased osmotic diuresis - severe renal magnesium losses which result in chronic magnesium deficiency. Numerous studies show a significantly higher incidence of hypomagnesaemia in patients with diabetics and increased insulin resistance and poorer glucose tolerance in individuals with a low serum magnesium concentration. In contrast, where the intake of magnesium in the diet was high, reduced insulin resistance was found. Placebo-controlled double-blind studies involving hypomagnesaemia diabetics and subjects with insulin resistance confirmed the efficacy of oral magnesium substitution with respect to an improvement in HbA1c, a reduction in fasting blood sugar levels and an improvement in insulin resistance. Similarly, numerous studies have shown that a magnesium balance that is in equilibrium can reduce the risk of developing diabetic sequelae. There is a negative correlation between the magnesium serum concentration and the development of coronary heart disease, diabetic retinopathy, as well as polyneuropathy, nephropathy and depression. For example, diabetics with magnesium deficiency should receive an oral dosage of 240-480 mg (10-20 mmol) of magnesium per day.

Similarly, magnesium deficiency is of major pathogenetic significance in the emergence of essential hypertension. It has been shown in numerous studies that some hypertensive patients with hypertension classified as essential, it is possible that magnesium deficiency will be present. In both manifest hypertension and borderline hypertension, the positive effect of magnesium substitution treatment on both systolic and diastolic blood pressure has been shown to be positive. Here too the recommended dosage of 240 - 480 mg (10 - 20  $\mu$ mol) of magnesium per day is standard therapy. However, in patients with severe magnesium deficiency syndrome, the dosage can lie within the gram range in individual cases. In patients with borderline hypertension and grade 1 hypertension in particular, a change to the lifestyle (lifestyle modification) and corresponding magnesium supplementation can in many cases bring about normalisation of raised blood pressure values. Magnesium intoxications are almost unheard of. Similarly, magnesium substitution is also a therapeutic option with few side effects.

In summary, the often forgotten electrolyte magnesium has an important role to play in the treatment of diabetes mellitus and hypertension. Particularly where these two disorders occur together, it is essential to ensure that the magnesium balance is intact.