

## **Special Features of Magnesium Orotate in the Treatment of Cardiovascular Diseases Associated with Diabetes mellitus**

*Professor Dr. med. J. Schmidt, Applied Pharmacology and Clinical Pharmacotherapy, Dresden*

Epidemiological studies have convincingly shown that magnesium deficiency increases the risk of cardiovascular diseases. This is of particular significance for diabetics with their increased risk due to cardiovascular comorbidities. In view of the fact that more than 75% of all diabetics die of cardiovascular diseases, this easily preventable risk factor should receive greater attention in practice. As the majority of cases of magnesium deficiency cannot be corrected by the optimisation of the diet, or can only be rectified to an unsatisfactory extent, additional substitution with magnesium salts is required. For this, there are various magnesium salts available. These are predominantly preparations with pharmacodynamically ineffective inorganic or organic anionic components. One clinically relevant peculiarity is magnesium orotate. Orotic acid, a vitaminoid, is the biological precursor of pyrimidine nucleotides, which are essential for the synthesis of ribonucleic acid, RNA-dependent protein synthesis, the formation of phospholipids and the energy metabolism. The turnover of pyrimidine is very high, above all in the heart at only low concentrations. In the case of hypoxic damage or physical performance requirements in particular, this quickly results in deficits with negative effects on contractility, ischaemic tolerance and heart rhythm. Furthermore there is ischaemically induced Mg loss.

Experimental studies have shown that if the heart is subjected to an increased stress or ischaemic damage, treatment with orotic acid improves the contractile properties of the heart muscle and increases the tolerance with respect to ischaemic or toxically induced damage. Orotic acid promotes cellular metabolic processes, improves cardiac adaptation to increased physical stress requirements and reduces cellular magnesium losses, as ATP is an important intracellular fixator of magnesium.

Magnesium orotate therefore combines in itself the cardio protective properties of magnesium and orotic acid and leads to the optimisation of the magnesium effect by reducing cellular magnesium loss. This explains the particular features of the effect, which has also been confirmed in clinical studies. These effects come into play in particular in patients with circulatory disorders of the heart, those with cardiac arrhythmias, heart failure or when adapting to increased physical stress requirements. Clinical studies have shown that this biofactors combination improves the resistance and efficiency of the endangered and pre-damaged heart, reduces angina pectoris attacks, stabilises heart rhythm and also lowers elevated blood pressure values. At the same time, animal studies have indicated a protective effect of magnesium orotate with respect to atherosclerotic vascular changes. The efficacy of the combination was superior to the effect of the individual components of magnesium and orotic acid.