

Appeal by experts: Diagnose biofactor deficiencies and compensate for them in a targeted manner!

At this year's symposium of the Society for Biofactors (GfB), renowned experts from the fields of internal medicine, geriatrics and neurology pointed out in the form of a consensus how important it is for the daily work on the patient to have a basic knowledge of biofactors. In the view of the medical specialists, the assessment of the biofactor status within the framework of comprehensive patient care is indispensable, as numerous symptoms and diseases can be associated with a deficiency of vitamins, minerals and trace elements.

Older people in particular are among the risk groups for biofactor deficiency^{1,2}, with studies showing that the intake of most biofactors by senior citizens is below the D-A-CH reference values.³ "Reduced thirst and taste perception, chewing and swallowing disorders, mental deficits, absorption disorders, chronic diseases or drug interactions promote a biofactor deficit," Prof. Dr. med. Marija Djukic, a specialist in Neurology, Neurological Geriatrics and Senior Geriatrician at the Evangelical Hospital in Göttingen also warned at the GfB Symposium.

The lack of vitamins and minerals can cause a variety of internal, neurological and psychiatric symptoms in the elderly individual. "According to current studies, cardiovascular diseases, osteoporosis, polyneuropathy, depression and neurodegenerative diseases such as dementia or brain-organic psychosyndrome in particular can be linked to an undersupply of biofactors," emphasised Prof. Djukic, highlighting in particular the insufficient supply of many senior citizens with the biofactors vitamin B₁₂ and vitamin D₃.

Biofactor deficiency in senior citizens: consider vitamins B₁₂ and D₃

Around one third of people over the age of 65 are affected by vitamin B₁₂ deficiency, while among those over 85 the figure is 37.6%⁴ and for senior citizens in in-patient nursing homes it is even as high as 40%.⁵ In addition to the classical vitamin B₁₂ deficiency disease, macrocytic anaemia, an insufficient supply of the biofactor can lead to funicular myelosis, polyneuropathy, dementia and organic psychosyndrome.

The vitamin D₃ supply of older people is also seen as critical. From the age of 60, the body's own vitamin D₃ synthesis via the skin decreases and liver and kidney performance decline, so that less active vitamin D₃ can be formed. Furthermore, many senior citizens are dependent on care and immobile and therefore spend less time outdoors, so that endogenous synthesis via the skin is further reduced.⁶ Vitamin D₃ deficiency – 25(OH)D < 70 nmol/l – is not only associated with the development of osteoporosis, but also with various other diseases in old age. These include cardiovascular diseases such as heart attacks and strokes, cancers, neurodegenerative diseases such as Alzheimer's or Parkinson's, as well as auto-immune and inflammatory diseases.

The biofactor magnesium in internal medicine practice: Which patients are affected by a deficiency?

“Not only insufficient alimentary intake, but also malabsorption syndromes due to chronic intestinal diseases and drug interactions can trigger a magnesium deficit,” warned Prof. Klaus Kisters, Chief Physician of Medical Clinic I at the St. Anna Hospital in Herne at the GfB symposium. In addition, many diseases are known in which a magnesium deficiency may be pathophysiologically involved. These include, in particular, diabetes mellitus and cardiovascular diseases such as hypertension, cardiac insufficiency, cardiac arrhythmias or arteriosclerosis, so that magnesium deficiency must always be considered as a matter of principle in affected patients.

Normal serum values do not rule out magnesium deficiency

Only about 1% of the body’s magnesium stores is in the blood – with 60% being found in the bones and 39% in the muscles and organs. In magnesium deficiency, the organism releases the biofactor from bones or muscle cells in order to keep the magnesium serum content constant.

This makes the laboratory diagnosis of magnesium deficiency more difficult, with the target values for magnesium being defined as 0.8 mmol/l in the serum, although 0.85 mmol/l is better.^{7,8} It is helpful to measure the levels of ionised magnesium, which is the magnesium that is actually active. Frequently the ionised magnesium level is already decreased, while the serum levels are still within the normal range. In general, however, in addition to the laboratory analysis, attention should be paid to the patient’s medical history and symptoms of deficiency⁹.

For substitution, 300 to 500 mg of magnesium per day are recommended – in individual cases also higher – and organic magnesium compounds in an oral form are to be preferred due to their better bio-availability. It should also be taken into account that vitamin D₃ and magnesium have a synergistic effect.¹⁰ “Due to the synergism of the two biofactors, not only should magnesium deficiency be avoided, but attention should also be paid to a sufficient supply of vitamin D₃ in order to reduce consequential damage and increase the patients’ quality of life,” explains Prof. Kisters.

Nerves need B vitamins

At the Society for Biofactors (GfB) symposium, neurologist Prof. Karlheinz Reiners went into the importance of the B vitamins for the nervous system and highlighted in particular the consequences of a deficiency of vitamins B₁ (thiamine) and vitamin B₁₂.

Vitamin B₁ deficiency leads to disturbances in carbohydrate metabolism. Since the nerve tissue is dependent on the provision of sufficient energy from this source and does not accumulate any appreciable reserves, a deficiency can have a rapid impact – affecting both brain function and the excitation conduction in the peripheral nerves. “The peripheral nervous system reacts to vitamin B₁ deficiency with the development of polyneuropathy, which makes itself noticeable through sensory disturbances, especially in the feet, such as tingling, burning and numbness, as well as neuropathic pain,” warned Prof. Reiners. This is of particular relevance for patients with diabetes mellitus, who are at an increased risk of both vitamin B₁ deficiency and the development of neuropathy.¹¹

For oral therapy, the fat-soluble vitamin B₁ precursor benfotiamine – a substance for supplementation that is five times more bio-available than the water-soluble thiamine salts – is available.

Brain and nerve functions impaired by vitamin B₁₂ deficiency

In vitamin B₁₂ deficiency, there are disturbances to nerve cell function both in the brain and in nerve conduction in spinal cord pathways and peripheral nerves, especially in the function of sensitive nerve fibres. The consequence of vitamin B₁₂ deficiency is therefore above all a sensory disorder which manifests itself not only in the surface perception, but also in so-called depth sensitivity, so that paraesthesias and gait unsteadiness or even severe ataxia considerably impair the quality of life. "The therapy of vitamin B₁₂ deficiency has been greatly facilitated by the availability of the high-dose oral form with 1,000 µg per tablet, which enables absorption independently of the intrinsic factor by passive diffusion throughout the small intestine and is preferred by most patients to parenteral substitution, which is usually required for life," says Prof. Reiners.

Avoiding biofactor deficiency in the patient

In the opinion of experts, acquiring basic knowledge in the field of biofactor deficiency is a must for every therapist in comprehensive patient care. "In order to be able to detect an undersupply of vital vitamins, minerals and trace elements, attention should be paid in daily practice to the three pillars of patient history, clinical symptoms and laboratory diagnostics," is how Prof. Hans Georg Classen, Chairman of the GfB, summarises this year's symposium. Therefore, by detecting a biofactor deficit and supplementing it in a targeted manner, the deficiency can be compensated for and deficiency-related diseases counteracted.

Source:

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Bibliography:

¹ Hesecker H et al.: ErnSTES-Studie, in DGE: Ernährungsbericht (Nutrition Report) 2008, 157-204

² Max Rubner-Institut (MRI): Nationale Verzehrsstudie II. Ergebnisbericht, Teil 2. (National Consumption Study II. Result Report, Part 2.) Karlsruhe, 2008. https://www.mri.bund.de/fileadmin/MRI/Institute/EV/NVSII_Abschlussbericht_Teil_2.pdf, p. 123-124

³ D-A-CH Referenzwerte für die Nährstoffzufuhr, 2. Auflage, 1. Ausgabe (Reference Values for Nutrient Intake, 2nd edition, 1st issue) 2015. <https://www.dge.de/wissenschaft/referenzwerte/>

⁴ Conzade R et al.: Prevalence and predictors of subclinical micronutrient deficiency in German older adults: results from the population-based KORA-Age Study. *Nutrients* 2017, 9: 1276

⁵ Andrès E et al.: Vitamin B12 deficiency in elderly patients. *CMAJ* 2004, 171(3): 251-259

⁶ Biesalski HK: Ernährungsmedizin (Nutritional Medicine) 2018, Stuttgart: Thieme Publishing House, p. 177

⁷ Spätling L et al.: Diagnostik des Magnesiummangels. Aktuelle Empfehlungen der Gesellschaft für Magnesium-Forschung e. V. (Diagnosis of magnesium deficiency. Current recommendations of the Society for Magnesium Research) *Fortschritte der Medizin* 2000, 118: 49-53

⁸ Workinger JL et al.: Challenges in the diagnosis of magnesium status. *Nutrients* 2018, 10: 1202 ff

⁹ Ausführliche Informationen zu Magnesium erhalten Sie unter (Detailed information on magnesium can be found at) www.gf-biofaktoren.de.

¹⁰ Gröber U, Schmidt J, Kisters K: Magnesium in prevention and therapy. *Nutrients* 2015, 7: 8199-8226
DOI: 10.3390/nu7095388

¹¹ Reiners K, Haslbeck M: Sensorimotorische diabetische Neuropathien (Sensorimotor diabetic neuropathies). *Diabetologie* 2016, 2: 92-103