News *July 28, 2024*

Vitamin B12 deficiency
Transcobalamin receptor antibodies discovered in the CNS

A vitamin B12 deficiency can cause neurological disorders. The diagnosis of suspected vitamin B12 deficiency is based on the measurement of vitamin B12 in the blood and therefore does not include any information about the concentration in the brain. In a recent study from June 2024, a CNS-specific transcobalamin receptor antibody has now been discovered that prevents the cellular uptake of the vitamin B12 biofactor in isolation in the central nervous system.

A patient with speech disorders, ataxia and tremor and a normal vitamin B12 status in the blood was examined in a research study that focused on identifying new autoantibodies in suspected neuroinflammatory diseases.[1] In this patient, the researchers discovered autoantibodies against the cell surface receptor CD320, which is necessary for the cellular uptake of vitamin B12 and thus for the transport of the biofactor through the blood-brain barrier. “While the blood tests were normal, vitamin B12 was almost undetectable in the cerebrospinal fluid,” the researchers found.

In further studies of 132 paired serum and CSF samples, the detection of anti-CD320 antibodies in the blood predicted vitamin B12 deficiency in the brain without simultaneously indicating hematological disorders of vitamin B12 deficiency.

Conclusion of the study?
“The finding of CNS-specific transcobalamin antibodies could explain why neuropsychiatric symptoms such as gait instability or cognitive disorders can occur in some vitamin B12 deficiency patients independently of hematological vitamin B12 deficiency symptoms, for example without anemia. It is important for diagnostics that neuropsychiatric deficiency symptoms can also develop without a manifest vitamin B12 deficiency in the blood,” explained Prof. Karlheinz Reiners, neurologist and member of the scientific advisory board of the Gesellschaft für Biofaktoren e. V. (GfB).

And how were the patients in the study treated? A combination of immunosuppressants and high doses of oral vitamin B12 increased the vitamin B12 level in the cerebrospinal fluid and improved the clinical symptoms. According to Prof. Reiners, oral high-dose therapy of 1,000 µg vitamin B12 per day is also recommended to compensate for a vitamin B12 deficiency.

Further information on vitamin B12 can be found here.

Literature:

[1] Pluvinage JV et al.: Transcobalamin receptor antibodies in autoimmune vitamin B12 central deficiency. Sci Transl Med 2024 Jun 26; 16(753): eadl3758