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Prevention of cognitive impairment by B-Vitamins and omega-3-fatty acids - state of knowledge

Deficiency of folic acid and/or vitamin B12 is sensitively reflected by an increase of plasma homocysteine (Hcy). For both events are pathomechanisms known leading to typical Alzheimer-like alterations in brain. Moderately elevated plasma Hcy is a strong risk factor for Alzheimer disease and vascular dementia.

Among long chain polyunsaturated omega-3-fatty acids in particular the docosahexaenoic acid (DHA) is the main fatty acid in gray matter and thought to be of great importance to structure and function of brain. An inverse correlation between dietary intake of DHA and occurrence of cognitive decline is well known.

Moreover, there is a direct connection between the both above mentioned mechanisms as hyperhomocysteinemia leads via hypomethylation to diminished synthesis of phosphatidylcholine from DHA-rich phosphatidylethanolamine in brain. From numerous placebo-controlled intervention studies with the three B-vitamins (B6, B12, folate) those were selected which meet decisive criteria: primary preventive approach, increased Hcy starting level, study duration of at least two years, adequate vitamin dosage, proven decline in cognitive parameters in placebo group. Significant results of these studies in favor of the vitamins: reduction of the brain atrophy rate, significantly better values for dementia status, MMSE (mini mental state evaluation) and learning test.

There is a direct positive influence of plasma omega-3-fatty acid level on the effect of B-vitamins.

Biography:

Born February 8 at 1939 in Berlin, Germany, married, 3 children

1958-64 Medical Study at Jena-University

1964-76 Scientific Assistant at Jena-University, PhD, postdoctoral lecturing qualification

1976-93 Director of the Institute of Pathobiochemistry at Erfurt-Medical Academy

1984 chair of Pathobiochemistry

1993-99 Director of Centre of Vascular Biology and Medicine at Jena-University

1999-2004 Director of the Institute of Pathobiochemistry at Jena-University, then emeritus

200 publications in periodica, 30 monographs, 6 textbooks (among: „Homocystein-assoziierte Erkrankungen – Prävention und Therapie“, UNI-MED Verlag AG Bremen-London-Boston 2008)