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The potential role of phospholipids in the management of cognitive impairment and Alzheimer's disease

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Phospholipids are structurally and biologically important molecules, which form cellular membranes and are involved in the function of membrane proteins, receptors, enzymes and ion channels. The human brain is one of the richest organs in lipid content, most of which are phospholipids. The relation between different phospholipid brain content and cognitive performance has been evidenced by several preclinical and clinical studies. Furthermore, changes in brain phospholipid levels were shown to be associated with various pathogenic processes in the brain, eventually leading to neurodegenerative diseases. One of the prevalent neurodegenerative diseases is Alzheimer's disease (AD), which is characterized by extracellular Amyloid-beta plaques, intracellular neurofibrillary tangles, and a continuous loss of synapses and neurons. Membrane phospholipids are involved in the regulation of subcellular transport, activity, and metabolism of AD related proteins. As such, they were found to affect A β generation and aggregation, as well as the Tau hyperphosphorylation process. In turn, AD associated proteins were found to influence lipid metabolic pathways in the brain. Additionally, the APOE protein, which is associated with the Amyloid beta pathological pathway, mediates the transport of various brain lipid molecules. Interestingly, recently a phospholipid-based blood panel was suggested as biomarker for AD prediction in the pre-symptomatic stage. In view of the key roles of phospholipids and their changes in the human brain occurring during aging or at different stages of AD, phospholipids are an interesting target for development of novel safe and effective treatment strategies against cognitive decline.

Biography

Yael Richter has a PhD in Medicinal Chemistry from Bar-Ilan University. She serves as the VP R&D at VAYA Pharma, which is the pharmaceutical division of Enzymotec, an international biotech company. In her role, she oversees the pre-clinical and clinical research, regulation, and intellectual property affairs. She has years of experience in clinical development, as well as a strong background in regulatory affairs. Her main field of interest is the potential role of lipids in the management of CNS disorders, mainly early memory impairment and ADHD.

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