Additional Clues for a Protective Role of Vitamin D in Neurodegenerative Diseases: 1,25-Dihydroxyvitamin D3 Triggers an Anti-Inflammatory Response in Brain Pericyte.

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BACKGROUND: Epidemiological and experimental studies suggest that 1,25-dihydroxyvitamin D3 (1,25D) plays a neuroprotective role in neurodegenerative diseases including Alzheimer's disease. Most of the experimental data regarding the genes regulated by this hormone in brain cells have been obtained with neuron and glial cells. Pericytes play a critical role in brain function that encompasses their classical function in blood-brain barrier control and maintenance. However, the gene response of brain pericyte to 1,25D remains to be investigated.

FINDINGS: Analyses of the transcriptomic response of human brain pericytes to 1,25D demonstrate that human brain pericytes in culture respond to 1,25D by regulating genes involved in the control of neuroinflammation. In addition, pericytes respond to the pro-inflammatory cytokines tumor necrosis factor-α and Interferon-γ by inducing the expression of the CYP27B1 gene which is involved in 1,25D synthesis.

CONCLUSIONS: Taken together, these results suggest that neuroinflammation could trigger the synthesis of 1,25D by brain pericytes, which in turn respond to the hormone by a global anti-inflammatory response. These findings identify brain pericyte as a novel 1,25D-responsive cell type and provide additional evidence for the potential value of vitamin D in the prevention or therapy of Alzheimer's disease and other neurodegenerative/neuropsychiatric diseases associated with an inflammatory component.

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