Vitamin D binding protein-derived macrophage activating factor stimulates proliferation and signalling in a human neuronal cell line

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Vitamin D (vitD), vitD binding protein-derived macrophage activating factor (DBP-MAF), and vitD receptor (VDR) are essential for adult neurogenesis [1], and this effect could be responsible for the recently reported effects of DBP-MAF on autism spectrum disorders (ASD) [2]. In order to test this hypothesis, we challenged a human neuronal cell line (SH-SY5Y, IZSLER) with DBP-MAF (Immuno Biotech), and we studied cAMP formation (cAMP EIA kit, Abnova), cell proliferation (MTT assay, Sigma Aldrich), apoptosis (human caspase 3 act, Invitrogen) and cell morphology. SH-SY5Y cells represent a validated in vitro model of human neurons in neurodegenerative diseases [3]. DBP-MAF induced rapid (15 min) formation of cAMP in a dose-dependent manner (0.4-40 ng/ml) as well as increase in cell proliferation at 24-48 and 72 h. Cell morphology was consistent with neurogenesis and an increase in the number of cells with high synthetic activity was observed. No apoptosis following DBP-MAF treatment was observed. Our results open the way to exploit these newly described effects to treat neurodegenerative disorders from Parkinson’s and Alzheimer’s diseases to Myalgic Encephalomyelitis and ASD.

References

Key words
Vitamin D, macrophages, vitamin D receptor, vitamin D binding protein-derived macrophage activating factor, human neurons, autism spectrum disorders.