Increasing Effect of Citrus natsudaidai on Brain-Derived Neurotrophic Factor.

Abstract

The increase in brain-derived neurotrophic factor (BDNF) in the brain is beneficial for the treatment of depression, Alzheimer's disease (AD), and Parkinson's disease (PD); BDNF can cross the blood-brain barrier. Therefore, foods that elevate BDNF concentration in peripheral tissues may increase BDNF in the brain and thereby induce preventive and therapeutic effects against depression, AD, and PD. In this study, we aimed to determine whether Citrus natsudaidai extracts can increase BDNF concentration using the human kidney adenocarcinoma cell line ACHN, which has BDNF-producing and -secreting abilities. As test samples, methanol extracts of C. natsudaidai peel and pulp, and their n-hexane, ethyl acetate, n-butanol, and water fractions were prepared. The BDNF concentrations in culture medium of ACHN cells were assayed after 24 h cultivation in the presence of test samples. Compared with that of control (non-treated) cells, the BDNF concentration increased in the culture medium of ACHN cells treated with the methanol extract of C. natsudaidai peel and its hexane, butanol, and water fractions, as well as the butanol and water fractions of the pulp extract. Quantitative reverse transcription-polymerase chain reaction analysis revealed that ACHN cells treated with the butanol fractions of the peel and pulp extracts showed elevated levels of BDNF mRNA compared with those of non-treated cells. C. natsudaidai may increase BDNF concentration by acting on peripheral tissues and could be a medication for the prevention and treatment of depression, AD, and PD.