

# Brain-Derived Neurotrophic Factor Up-Regulation by the Methanol Extract of Foxtail Millet in Human Peripheral Cells

## Abstract

Brain-derived neurotrophic factor (BDNF) plays important roles in synaptic plasticity and neuronal differentiation. The neurotrophic hypothesis of depression, which suggests that reduced BDNF in the hippocampus underlies depression, has attracted increasing attention. Stress, a major cause of depression, leads to decreased BDNF levels, and administration of BDNF into the hippocampus shows an antidepressant effect. BDNF is synthesized in peripheral tissues as well as in the brain. Since BDNF crosses the blood-brain barrier, intake of food ingredients that elevate BDNF in peripheral tissues may be useful for the prevention and treatment of depression. However, no screening method for BDNF up-regulators in peripheral tissues has been reported. In this study, we revealed that ACHN human kidney adenocarcinoma cells secreted BDNF. In addition, we demonstrated that the methanol extract of foxtail millet up-regulated BDNF levels in ACHN cells. Our results indicate that ACHN cells could be useful in the screening for peripheral-BDNF up-regulators, and that foxtail millet may have the potential to elevate BDNF levels in peripheral tissues.