Effects of Citrus unshiu Intake on Serum Brain-Derived Neurotrophic Factor Levels and Mood States: A Pilot Randomized Controlled Trial.

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Abstract

Brain-derived neurotrophic factor (BDNF) is a critical mood regulator; increasing BDNF levels may help improve mood states. We conducted a pilot randomized controlled trial to investigate the effects of *Citrus unshiu* intake on serum BDNF levels and mood states. Healthy participants were assigned to an intake group [n=13; two *C. unshiu* fruits daily (106.9±37.2 g each)] or a non-intake group (n=13). Serum BDNF levels and mood states were assessed at Weeks 0, 4, and 8. In the primary analysis, a linear mixed-effects model revealed no significant group-by-time interaction contrast for serum BDNF levels, and no significant between-group differences were observed at any time point. Serum BDNF levels declined in the non-intake group over time, whereas an increase occurred from Week 4 to Week 8 in the intake group. In exploratory and unadjusted analyses, we examined within-group changes in serum BDNF levels. In the intake group, the change from Week 4 to Week 8 (median: +0.636 ng/mL) was significantly greater than that from Week 0 to Week 4 (median: −2.453 ng/mL). Based on the Profile of Mood States 2nd Edition results, between-group comparisons of change scores showed significant improvements in Depression-Dejection and Vigor-Activity scores in the intake group compared with the non-intake group. Within-group analyses demonstrated decreases in Depression-Dejection and Total Mood Disturbance and an increase in Vigor-Activity following *C. unshiu* intake. The findings of our preliminary study suggest that *C. unshiu* intake may be associated with attenuating the decline in serum BDNF levels and inducing modest favorable changes in certain mood domains.