Effects of bioactive compounds from blackcurrant on the pathogenic pathways relevant for Alzheimer's disease: Results from the "BrainHealthFood" project

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Introduction: Recent epidemiological and experimental data suggest that fruit and vegetable juices containing various phenolic compounds can reduce the risk of Alzheimer's disease (AD). Blackcurrant is a good candidate to study which fruit polyphenols provide the strongest neuroprotection in AD, since its phenolic profile is unique among soft fruits. Detailed molecular studies related to the observed neuroprotective effects may reveal novel avenues to understand and design therapeutic approaches for AD.
Aims: Our aim was to determine the effects of fractions and bioactive compounds from blackcurrant on neuroprotection in the cellular models of AD.
Methods: We used cultured human neuroblastoma (SH-SY5Y) cells over-expressing APP and primary neuronal cultures from transgenic AD mice to study the effects of anthocyanin enriched fractions from blackcurrant and bioactive compounds, myricetin and quercetin, on APP processing (APP holoprotein, APP C99 and C83, sAPP and Aβ) and cell survival under normal growth conditions as well as apoptosis and ER-stress. Furthermore, antioxidant properties of bioactive compounds and fractions were analyzed.
Results: In the normal growth conditions, quercetin treatments reduced APP maturation, which suggests altered trafficking of APP in the secretory pathway. In addition, anthocyanin-enriched blackcurrant extracts increased the levels of APP C83. However, anthocyanin enriched fraction did not have neuroprotective effects during apoptosis. As expected, all analyzed compounds and fractions encompassed antioxidative properties.
Conclusion: Based on the observed results, fractions and bioactive compounds from blackcurrant may affect APP trafficking and processing.