

Biochemical effects of flavonoids from Georgian grapes “Saperavi” in biological systems

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Flavonoids are naturally occurring polyphenolic compounds that are present in a variety of fruits, vegetables, tea, and wine, and are the most abundant antioxidants in the human diet. Evidence suggests that these phytochemicals might have an impact on brain pathology and aging; however, neither their mechanisms of action nor their cell targets are completely known.

Georgia is considered to be one of the oldest homelands of viticulture in the world. It is proved that wine-making in Georgia has been practiced since the 5th millennium BC. The presence of a large number of aboriginal sorts of grape (more than 525) also proves that Georgia is the cradle of initial inter-mutation of wild cultivated grapes. Nowadays ongoing research activity mainly includes collection, conservation, and description of local sorts by means of modern scientific methods. But neurobiological studies of active ingredients from local grapes never have been performed. In this regard to evaluate potential of flavonoids of Georgian endemic grape species is under our intense interest.

In our experiments we investigated the influence of active fraction of flavonoids extracted from Georgian grapes “Saperavi” by using modified method of Zaprometov on age-related memory disturbance in laboratory rats. Extracted active fraction of flavonoids from “Saperavi” were identification using TLC method and it was revealed that extracted probe is multicomponent phenol fraction which contains flavonoidal glikozides as well aglicones, spots were characterized by R_f-values and color under UV light before (UV) and after spraying with gas of anhydrous ammonia. The wavelength absorbance at 280 and 360 nm was also used to estimate total phenolic content, flavonoids and anthocyanins, respectively. Also *in vitro* and *in vivo* systems, we compared antioxidative effects of active fraction of flavonoids with well-known phenolic antioxidants.

The main tasks of experiments were to determination of effects of extracted flavonoids on development of oxidative stress in biological models (brain tissue). We studied quantitative changes of malondialdehyde, which is the one of the final product of lipid peroxidation, in the brain of adult (36 week old) and young (8week old) rats. In biochemical experiments it was revealed that the flavonoid extract effectively prevented age-related increase of quantity of malondialdehyde in the brain of adult rats. Treatment of adult rats during 5 day with flavonoids from “Saperavi” (25 mg/kg), attenuates age-related lipid peroxidation disturbance in brain.

Our experiments are first effort to purify the flavonoids from Georgian grapes, to characterize their biochemical specificity and to investigate theirs role in brain plastic processes. Obtained data will enable to find the new flavonoids that mimic some or all of the properties of neurotrophic factors and may be effective for treatment and prevention of chronic and acute diseases of the CNS, as well as age-related lipid peroxidation disturbance in brain.

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