THE MODULATORY EFFECT OF FLAVONOID GLYCOSIDES ON ANGIOTENSIN II STIMULATED PC 12 CELLS

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More and more information indicates a modulatory effect of redox state on intracellular signaling processes. Factors capable of affecting redox balance are flavonoid glycosides, present in many food products. They show numerous beneficial properties (for example, use in prophylaxis of atherosclerosis and prevention of neoplastic diseases). Flavonoid glycosides obtained from Mentha piperita – luteolin-7-O-glucoside and eriodictiol-7-O-glucoside – show antioxidative and anti-inflammatory properties.

The aim of this study was to investigate the influence of luteolin-7-O-glucoside and eriodictiol-7-O-glucoside on the cellular redox balance and on angiotensin II (Ang II) induced signal transduction.

The experiments were conducted on the PC12 (pheochromocytoma) cell line, where the Ang II AT₂ receptor is present. This line bears protein tyrosine phosphatase activity. It was used to investigate the mutual relationship between the free radical scavenging system and the alteration in the protein phosphorylation pattern triggered by AT₂ receptor stimulation.

PC12 cells were preincubated with 0.05 mM luteolin-7-O-glucoside or 0.05 mM eriodictiol-7-O-glucoside, and then incubated with Ang II (10⁻⁷ M) for 0.5, 2 and 5 minutes. Subsequently, superoxide dismutase (SOD) activity was measured and the tyrosine phosphorylation pattern was visualized with antiphosphotyrosine antibodies (Western blotting).

Both Ang II and the flavonoid glycosides showed a costimulatory impact on SOD activity; the greatest increase in SOD activity was observed after 0.5 min of Ang II induction in the presence of luteolin-7-O-glucoside.

After Ang II stimulation, changes in the phosphorylation pattern could be observed. However, in the presence of the flavonoid glycosides, one band of phosphorylated protein in the range of 70-80 kD did not appear.

Therefore, it may be suggested that the flavonoid glycosides affect the Ang II stimulated signaling pathway based on protein phosphorylation possibly by interfering with the cellular redox state.