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Biglycan protects cardiomyocytes against simulated ischemia/ reoxygenation injury via an NO-dependent mechanism

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Although biglycan, a proteoglycan component of extracellular matrix, has been suspected to contribute to the development of atherosclerosis, overexpression of biglycan has been shown to induce cardioprotective genes including nitric oxide (NO) synthases in the heart of a transgenic mouse model.

The aim of the present study was to test whether biglycan is cardioprotective against hypoxia/reoxygenation injury in cardiomyocytes and if an NO-dependent mechanism is involved in the cytoprotection.

Therefore, primary cardiomyocytes were prepared from newborn Wistar rats and kept in growing medium (90% DMEM, 10% fetal calf serum) under normoxic conditions (37°C, 5% CO_2). Two days old cultures were treated with 1, 3, 10, 30 and 100 nM biglycan. In separate experiments, biglycan (30 nM) was combined with the NO synthase inhibitor L-nitro-arginin-methyl-ester (L-NAME, 100 μM). After a 20-hour pretreatment, media of the cultures were replaced with a "hypoxic" solution and plates were kept in a hypoxic chamber (gased with 95% N_2 and 5% CO_2 at 37°C) for 150 minutes, which was followed by 120 minutes of reoxygenation. All treatments were continued throughout hypoxia and reoxygenation. Finally, viability tests were done in all groups with Trypane blue staining. In order to check the effect of biglycan on NO synthase (NOS) expression, in separate experiments, normoxic cells were treated with 30 nM biglycan for 20 hours and then mRNA and total protein were isolated.

After simulated ischemia and reoxygenation, 41.8±1.0% of the cells died in control cultures. Biglycan significantly decreased cell death at 3, 10, 30 and 100 nM concentrations. Protection was the strongest at 30 nM (17.3±2.4%). Biglycan enhanced expression of mRNA of endothelial NOS, but not inducible NOS. Endothelial NOS expression at protein level was also significantly elevated after biglycan treatment. The L-NAME abolished the cytoprotective effect of biglycan (36.3±1.6%).

The proteoglycan biglycan exerts a cytoprotective effect against hypoxia/reoxygenation injury via at least in part an NO-dependent mechanism.

Antioxidant characterization of perspective apricot hybrids

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Health-promoting effects of fruits are at least partially attributed to the antioxidant compounds accumulating in fruit flesh. Apricot fruit contains three major types of antioxidant compounds: water-soluble ascorbic acid (vitamin C), lipid-soluble carotenoids and polyphenolics encompassing both hydro- and lipophilic components. To survey the potential health-effects of apricot it is important to know about the variations in quantity of the antioxidant compounds present in fruit. Studies on parents and their progeny may help to shed light on the inheritance of fruit antioxidant properties and to clarify if the increase in fruit antioxidant capacity may be possible in a carefully designed breeding program.

The measurements were carried out on the apricot cultivars maintained in the germplasm collection of the Department of Genetics and Plant Breeding, CUB and 18 hybrids obtained from a breeding program of the Department of Genetics and Plant Breeding, CUB. The following parameters were studied in apricot fresh fruits: colour values (lightness factor, hue angle and chroma colour); ferric reducing ability (FRAP); DPPH-radical scavenging activity; total radical scavenging capacity measured with chemiluminescence methods; as well as total phenol (TPC) and vitamin C contents measured with spectrophotometer and HPLC-DAD, respectively.

The FRAP and TPC assays revealed 22- and 21-fold differences, respectively, between the lowest and the highest values, indicating a great diversity in the antioxidant power of apricot fresh fruits. A perspective hybrid produced outstanding values in all of the antioxidant assays, exceeding 2.5-times the same parameters determined for the best commercial cultivar. The