ANTIOXIDANT AND ANTINFLAMMATORY EFFECT OF CYANIDIN-3-O-GLUCOSIDE FROM BLACKBERRY EXTRACT

1Serraino I., 2Rossi A., 3Paola Dugo, 1Rosanna Di Paola, 4Luigi Mondello, 1Tiziana Genovese, 4Domenica Morabito, 4Giovanni Dugo, 2Lidia Sautebin, 1Achille P. Caputi, 1Salvatore Cuzzocrea.

1Dept. of Pharmacology, University of Messina, Italy. 2Dept. of Pharmacology, University of Naples, Italy. 3Dept. of Pharmacology and Chemistry and 4Dept. of Biological and Organic Chemistry, University of Messina, Italy.

Anthocyanins are a group of naturally occurring phenolic compounds related with the colour of several plants, flowers and fruits. Cyanidin-3-O-glucoside represents 85% of the total anthocyanins content in blackberry extract. The aim was to investigate the antioxidant and anti-inflammatory properties of the blackberry extract and cyanidin-3-O-glucoside. The content of blackberry (Rubus species) juice was analyzed by HPLC/ESI/MS. We have evaluated antioxidant activity on the endothelial dysfunction in HUVEC cells and in vascular rings exposed to peroxynitrite pre-treated with blackberry extract (different dilutions containing 80ppm; 40ppm; 14.5ppm of cyanidin-3-O-glucoside) and cyanidin-3-O-glucoside (0.085 µM; 0.028µM; 0.0085µM). Blackberry juice and cyanidin-3-O-glucoside reduced the peroxynitrite-induced suppression of mitochondrial respiration, DNA damage and PARS activation in HUVEC cells. Blackberry juice and cyanidin-3-O-glucoside pre-treatment ameliorated endothelium-dependent relaxant responses to acetylcholine and a vascular contractility dysfunction in response to norepinephrine. Base on this results, we have studied the therapeutic efficacy of this anthocyanin (10, 30mg/kg) in an in vivo model of lung inflammation (carrageenan-induced pleurisy) in the rats. Carrageenan caused fluid accumulation in the pleural cavity containing a large number of polymorphonuclear leukocytes; lipid peroxidation; increased production of nitrite/nitrate and of prostaglandin E2. All parameters were increased (p<0.01 vs sham;n=10). Cyanidin-3-O-glucoside significantly attenuate in a dose dependent manner the neutrophils infiltration (PMNs count and myeloperoxidase activity) (1949±221.8 U/g vs 2962±177.3 of car group, p<0.01;n=10), lipid peroxidation (MDA levels) (40.73±3.03 µM vs 72.77±5.77 of car group, p<0.01;n=10); release of nitrate/nitrite (NOx) and prostaglandin production (PGE2). Anthocyanins from blackberry extract significantly reduced the degree of lung injury carrageenan-induced and staining for the intercellular adhesion molecule-1, nitrotyrosine and PARS. In conclusion we demonstrated that blackberry juice containing cyanidin-3-O-glucoside exerts a protective effect against endothelial dysfunction and vascular failure induced by peroxynitrite and exerts multiple protective effects in carrageenan-induced pleurisy.