

## CURRENT TOPICS IN NUTRACEUTICAL RESEARCH

Volume 9

Number 3

August 2011

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71-76 SCHOOL PERFORMANCE IS ASSOCIATED WITH DIETARY IRON AND ZINC INTAKE IN ADOLESCENT GIRLS

Roberto Aquilani, Luisa Maggi, Umberto Parisi, Giuseppina Ghioni, Marina Zucchella, Teresio Nardi, Pierangelo Lombardi, Cristina Covini, Manuela Verri, Annalisa Barbieri, Luca D'Agostino and Federica Boschi

**ABSTRACT:** *The purpose of this investigation was to determine whether dietary iron (Fe) and Zinc (Zn) intake is associated with school performance in adolescent girls. Forty-eight girls (14.6±0.7 yrs) were enrolled. Eight students were excluded because they had anemia or sideropenia (low serum ferritin). The remaining 40 students were asked to keep a 7-day alimentary diary at home at 4 months after starting school. Nutrient intake, assessed by an analysis of the diaries, was then related to performance in two school subjects: mathematics (written: WM; oral: OM) and written Italian (WI). Among nutrients, Fe positively and significantly correlated with both WM and OM ( $p<0.01$ ), WI ( $p<0.02$ ). Zinc intake was positively linked to WM ( $p<0.03$ ) and OM ( $p<0.04$ ). Iron resulted higher significantly in students with satisfactory matter scores ( $\geq 6$ ) than in students with unsatisfactory performance ( $<6$ ) ( $p<0.003$ ); zinc intakes tended to be higher in students with satisfactory matter scores ( $\geq 6$ ) than in students with unsatisfactory performance ( $<6$ ) ( $p=0.1$ ). School performance in adolescent girls is associated with iron intake and, to a lesser extent, zinc intake.*

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77-82 MODERATE INTAKE OF CAFFEINE HAS NO EFFECT ON BONE HEALTH IN GROWING MALE RATS

Mi-Ja Choi

**ABSTRACT:** *High dosage of caffeine has been suggested to deteriorate bone metabolism. Despite a general consensus on detrimental effects of high dose caffeine consumption on bone health in adulthood, there is little data, if any, on the role of low dose caffeine consumption. The objective of this study was to determine whether moderate caffeine supplementation is related to bone mineral density and markers of bone formation and bone resorption in growing rats. Twenty 8-week old male SD rats (240±5 g) were randomly divided into two groups (control- and caffeine-group) and treatment lasted for 6 weeks. The results of this study show that moderate intake (25 mg/Kg) of caffeine by rats increases urinary calcium loss but does not affect any of the markers (BMC and BMD) associated with detrimental effects on bone quality. In conclusion, the current animal data has led us to conclude that it is unlikely that moderate consumption of caffeine by young individuals may be harmful to bone health.*

**83-98**                    **POTENTIAL APPLICATIONS OF ANTIOXIDANT COMPOUNDS  
DERIVED FROM ALGAE**  
Wan-Loy Chu

**ABSTRACT:** *Algae produce a variety of antioxidant compounds ranging from  $\beta$ -carotene, astaxanthin, fucoxanthin, phycocyanin to sulfated polysaccharides. The commercial microalgae Spirulina, Chlorella, Dunaliella and Haematococcus, currently consumed as nutritional supplements, are rich in antioxidant compounds. For instance, astaxanthin from the green alga Haematococcus is known to be a very powerful antioxidant while the hypersaline alga Dunaliella salina is being mass-cultured for the commercial production of natural  $\beta$ -carotene. The health benefits of antioxidant compounds such as sulfated polysaccharides and fucoxanthin from seaweeds (macroalgae) have also received much interest. Algae have great potential for nutraceuticals and functional food ingredients as studies have shown that antioxidants from algae may have preventive effects against diseases such as diabetes, atherosclerosis and cancers. However, the therapeutic potential of antioxidant compounds from algae is yet to be fully explored. In addition, the antioxidant extracts and compounds from algae may have applications in prolonging the shelf life of food products by retarding oxidation and peroxidation processes, as well as a functional ingredient in the food industry. In this review, the potential applications of antioxidant compounds from the four commercial microalgae Spirulina, Chlorella, Haematococcus and Dunaliella, as well as those from seaweeds are highlighted.*

**99-104**                    **ANTIOXIDANT AND NEUROPROTECTIVE EFFECTS OF JP05,  
A POLYHERBAL MEDICINE, ON HYDROGEN PEROXIDE-  
INDUCED OXIDATIVE INJURY IN NEURO-2A  
NEUROBLASTOMA CELLS**  
Ramalingam Mahesh, Hyo Won Jung, Young-Ho Kim and Yong-Ki Park

**ABSTRACT:** *Herbal medicines with antioxidant properties are believed to have potential therapeutic effect against oxidative stress in neurodegenerative diseases. In this study, we evaluated the antioxidant and neuroprotective effects of JP05, a polyherbal medicine, on  $H_2O_2$ -induced oxidative injury in Neuro-2a (N2a) cells. The cells were treated with or without JP05, and then stimulated with 500  $\mu M$   $H_2O_2$ . Cell viability was determined by MTT assay, and the releases of NO and LDH and intracellular ROS were measured. The levels of MDA and PCO, the activities of SOD, CAT and GPx, and contents of GSH and GSSG were assayed with respect to expressions of iNOS, nNOS, Bax and Bcl-2 via the NF $\kappa$ B and MAPK pathways. JP05 potently inhibited the  $O_2^{\cdot-}$ ,  $H_2O_2$ ,  $OH^{\cdot}$ ,  $NO^{\cdot}$  and possessed metal chelating properties. JP05 improved cell survival, decreased the levels of NO, LDH and intracellular ROS, modulated antioxidants by suppressing the expression of iNOS, nNOS and Bax, and increased Bcl-2 expression by modulating the NF- $\kappa$ B and MAPK pathways. Our results indicate that JP05 protects neuronal cells against  $H_2O_2$ -induced oxidative injury by preventing cell apoptotic cascades and modulating NF- $\kappa$ B and MAPK pathways, suggesting that JP05 has therapeutic potential for the treatment of neurodegenerative diseases.*

**105-110** **IN VITRO PROTECTIVE EFFECTS OF OLIVE POMACE POLAR LIPIDS TOWARDS PLATELET ACTIVATING FACTOR METABOLISM IN HUMAN RENAL CELLS**

AB Tsoupras, E Fragopoulou, C Iatrou and CA Demopoulos

**ABSTRACT:** *Platelet-Activating-Factor (PAF) is a potent inflammatory mediator implicated in several pathological situations including atherosclerosis, cardiovascular and renal diseases. Mediterranean Diet contains foods that exhibit protective effects against these pathologies. We have previously described that micro-constituents existing in polar-lipids of olive oil and olive-pomace, with anti-inflammatory effects towards PAF-activity, exhibit also in vivo anti-atherosclerotic activities. In this study we have further examined the in vitro effects of Olive-Pomace-Polar-Lipids (OPPL) towards PAF-metabolism in renal cells. We have evaluated the specific activities of PAF-basic biosynthetic enzymes, PAF-Cholinephosphotransferase (PAF-CPT) and Lyso-PAF-Acetyltransferase (Lyso-PAF-AT), and that of PAF-Acetylhydrolase (PAF-AH) of PAF-degradation in mesangial cells cultured for 24h in the presence of OPPL or not (Control). We have found for the first time that the presence of OPPL in cultured mesangial cells resulted in significant decrease of  $31.01 \pm 11.32\%$  ( $p=0.022$ ) of PAF-CPT and activation of  $25.83 \pm 12.04\%$  ( $p=0.043$ ) of PAF-AH in these cells. On the other hand, Lyso-PAF-AT remained relative stable after this incubation. The OPPL seem to beneficially induce a reset of PAF-metabolism in renal cells towards the direction of lessening PAF-activity and its sub-sequent pro-inflammatory manifestations, by a simultaneously PAF-biosynthesis reduction and a PAF-degradation increase. However, more tests are needed to fully evaluate the effects of micro-constituents of the Mediterranean Diet towards PAF-metabolism.*

**111-118** **FUNGAL IMMUNOMODULATORY PROTEIN FROM FLAMMULINA VELUTIPES INDUCES CYTOKINE GENE EXPRESSION IN MOUSE SPLEEN CELLS**

Qizhang Li, Lei Huang, Xuefei Wang, Xinsheng Li, Sanqiao Wu and Xuanwei Zhou

**ABSTRACT:** *FIP-fve, a fungal immunomodulatory protein isolated from Flammulina velutipes, is a member of fungal immunomodulatory protein family. In order to enhance the yield of FIP-fve expressed in Prokaryotes, a novel expression system and analysis method was developed in this study. FIP-fve gene was firstly cloned from the genomic DNA of F. velutipes, and then expressed by a new expression cassette vector pQE-30. Further, the recombinant FIP-fve was purified from the supernatant of the pellets by Nickel-affinity chromatography (Ni-NTA) column after sonicated, and identified by SDS-PAGE and MALDI-MS. The bioactivity of the protein was determined by induction of cytokine gene expression in mouse spleen cells. The results show that the yield of recombinant protein was 36.7% of total bacteria proteins and 7.4% of the total soluble fraction. The result of analyzing by MALDI-MS demonstrated that the recombinant protein contain 114 amino acids according with the protein existing in the natural F. velutipes. The purified recombinant protein could increase*

*the expression of interleukin (IL)-2, IL-4, interferon (IFN)- $\gamma$ , tumor necrosis factor (TNF)- $\alpha$ , lymphotoxin (LT) and IL-2 receptor (IL-2R). The research will provide a useful reference for further research, development and utilizations of FIPs.*