

P1: Lipids & Fatty Acids I

P1-01

DULATION OF TRIACYLGLYCEROL BY CONJUGATED LINOLEIC ACID (CLA) AND FAT LEVELS IN PROTEIN REPLETION

Andreoli, María F.; Illesca, Paola G.; Bernal, Claudio A.
Universidad Nacional del Litoral, Santa Fe, Santa Fe, ARG

OBJECTIVES: To investigate CLA effects at two dietary fat levels on modulation of plasma and tisular triacylglycerol (TG) levels during protein repletion (PR).

MATERIALS & METHODS: Rats maintained with a protein depletion diet (PD, 5% casein; 15 days) were fed with a PR diet (20% casein, 30 days), supplemented or not with CLA, at normal or high dietary fat levels (NF: 7% or HF: 20%).

RESULTS: PD leads to hypotriacylglyceridaemia, liver steatosis and gastrocnemius TG depletion. PR at NF levels or HF levels with CLA normalized most of lipids parameters. Lipid normalization was associated to a restoration of hepatic TG output (TGO) observed in all groups except HF lacking CLA. In PR diets adipose tissue and muscle LPL activities were not changed by either dietary fat levels and/or CLA supplementation.

CONCLUSION: CLA and dietary fat levels modulated lipid alterations induced by PD. However, CLA supplementation normalized hepatic TG accumulation independently of dietary fat levels, and the mechanism involved could be related to hepatic TGO.

P1-02

EFFECT OF CONJUGATED LINOLEIC ACID (CLA) ON ADIPOSITY IN MICE FED WITH DIFFERENT SOURCE OF DIETARY FAT

Sain, Juliana; Scalerandi, María V.; González, Marcela A.; Fariña, Ana C.; Bernal, Claudio A.
Universidad Nacional del Litoral, Santa Fe, Santa Fe, ARG

OBJECTIVES : To determine the effects of CLA supplemented diets containing different ratios of n-3/n-6/n-9 unsaturated fatty acids (UFA) on adiposity in mice.

MATERIALS & METHODS : Male CF1 mice (22 g) were fed (30 days) with a standard diets differing in dietary n-3/n-6/n-9 UFA ratios: Canola (CO: 10.9/19.0/63.2), Corn (MO: 0.9/53.3/31.3) or Olive (OO: 0.8/9.7/76.3) Oil containing or not CLA. Body composition, carcass energy retention, energy efficiency and tisular TG content were determined.

RESULTS : CLA reduced food energy efficiency (-23 to -34%), fat energy retention (-48 to -62%), fat carcass content (-52 to -62%) and epididymal adipose tissue (-71 to -80%) independently of UFA ratios. CLA lead to hepatic steatosis and gastrocnemius TG depletion. However, these effects were higher in OO+CLA diets than CO+CLA and MO+CLA.

CONCLUSION: CLA supplemented diets containing different ratios of n-3, n-6 and n-9 UFA produces lipodystrophy and changes in body composition. Some of these alterations were attenuated when higher dietary polyunsaturated fatty acids were presented.

P1-03

ASSESSING PPAR ACTIVATORS' PERFORMANCE IN SELECTED MEDICINAL PLANTS AND SINGLE CHEMICAL COMPOUNDS

Bhuiyan, Muhammad Javidul Haque; Hoang, Minh Hien; Chung, Hyuck-Jin; Lee, Dong-Ho; Lee, Sung-Joon
Korea University, Seoul, KOR

RATIONALE & OBJECTIVES: Peroxisome proliferated activated receptors (PPARs) play an important role in the pathogenesis of type II diabetes and obesity by regulating carbohydrate and lipid metabolism in higher organisms. Previously screened out two plant extracts from 389-medicinal plant extract library and five single chemical compounds identified from previous studies were taken into account for assessing the PPAR activation performance.

MATERIALS & METHODS: Plant samples like *Eucommia ulmoides* (EU) and *Actinidia arguta* (AA) were prepared into three concentrations like 0.4, 2 and 10mg/ml while the five single compounds were made into five concentrations like from 0.05 to 1mM. PPAR agonist activity was measured by receptor gene assay. CHO (Chinese Hamsters Ovary) cells were co-transfected with DR-1 containing PPRE3-TK Luc vector, β -galactosidase vectors and either with PPAR- α , PPAR- γ or PPAR- δ vectors to evaluate the respective agonist performance. Fenofibrate (100 μ M) troglitazone (10 μ M) and GW-610742 (100 μ M) were used as positive control for PPAR- α , PPAR- γ and PPAR- δ , respectively.

RESULTS & FINDINGS: From the data we concluded that single compounds showed higher performance than plant extracts even as 4-7 times greater extent compare to respective positive controls.

CONCLUSION: Single compounds showed higher PPAR activation and could be used for therapeutic approach of diabetes and obesity.

P1-04

EFFECTS OF EICOSAPENTAENOIC ACID (EPA) AND DOCOSAHEXAENOIC ACID (DHA) DIETS ON BEHAVIOR DURING LACTATION AND NEONATAL PERIOD IN RATS

Huang, Shih-Yi (Taipei Medical University, Taipei, TWN)
Yi-Ting Lin, Ming-Jer Shieh, Shih-Yi Huang
School of Nutrition and Health Sciences, Taipei Medical University, Taipei, TWN

RATIONALE & OBJECTIVES: Depression is an important disease in the 21st century, especially in women. Perinatal depression is the major health issue for many women. Pregnancy and delivery process might give a lots physical stress to them. In this study aimed to assess the effects of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) diets on behavior during lactation and neonatal period in rats. Also assess that EPA or DHA which have more improvement in physical stress.

MATERIALS & METHODS: Sprague-Dawley mother rats were subjected to a diet rich in soy oil, EPA-rich oil or DHA-rich oil during lactation period. After lactation period, mother rats and some male rat pups were tested in the forced swim test (FST) and determined the lipid composition in plasma, erythrocyte and selected areas brain. Other male rat pups were subjected to a diet as same as mother rats for 4 weeks. Behavior performance on the FST and the fatty acid profile selected tissues were determined.

RESULTS & FINDINGS: The results of the forced swimming test showed that the EPA group had a significantly shorter immobile time than other two groups. And the male rat pups had the similar results both in ab lactation and after diet intervention. And the immobile time is negative correlation with the fatty

acid profile in plasma C20:5 and prefrontal cortex C22:5. The EPA-rich diet might be impairing the depression-like behavior under the physical stress, but not DHA-rich diet. In the results of the fatty acid profile, the prefrontal cortex C22:5 is positive correlation with struggle times and the plasma C20:5 is positive correlation with swim times. In the EPA group, C20:5 and C22:5 are significant changed in blood or prefrontal cortex. The EPA-rich diet might be improving the antidepressant-like behaviors under the physical stress. According to these data, it seems imply the various molecular roles of EPA and DHA under pregnancy stress.

CONCLUSION: These observations demonstrate that EPA-rich diet, but not DHA-rich diet, could impair the immobile times and improve the struggle and swim times under physical stress during pregnancy and lactation in mother rats. A similar effect presented in male rat pups both in ab lactation and after diet intervention.

P1-05

THE EFFECT OF PETITE VERT ON LIPID METABOLISM OF MICE FED OBESITIC DIET

Nishida, Hiroshi¹; Kuriyama, Yuka¹; Masuda, Hidemi²; Sato, Shinji¹; Mineo, Shigeru³; Ohtsuka, Akira⁴; Konishi, Tetsuya¹
¹Niigata University of Pharmacy and Applied Life Sciences, Niigata, JPN; ²Masuda Seed Corporation, Iwata-city, Shizuoka-pref, JPN; ³Bourbon Corporation, Kashiwazaki-city, Niigata-pref, JPN; ⁴Kagoshima University, Kagoshima, JPN

OBJECTIVES: Petit vert (PV) is a hybrid of Brussels sprout and Kale, and was born in Japan in 1991. The health beneficial roles of PV are attracting much attention because of its high vitamins, minerals and fiber contents compared to other vegetables.

MATERIALS&METHODS: We examined anti-obesitic effect of PV on mice (8-week-old ICR) fed high fat/glucose/cholesterol diet (Western diet; W). Mice were divided into 4 groups: Control (standard diet), PV (standard diet including 5% PV), W and W + 5% PV (n=6). After 4 weeks of feeding, mice was sacrificed and subjected to biochemical assays.

RESULTS& CONCLUSIONS: PV prevented the increasing weight of fat and liver tissues addition to blood triglyceride (TG) levels. Notably, PV significantly inhibited Fatty acid synthase (FAS) but Carnitine palmitoyl transferase (CPT). The effect of PV on TG was also demonstrated in diabetic model mice. These data indicate that PV has a potential to prevent the accumulation of body fat through the modulation of lipid metabolisms.

P1-06

REDUCTION OF THE FATTY ACID UPTAKE BY WHITE AND BLACK SOYBEAN EXTRACTS IN CHO CELLS

Jeun, Jungae; Cho, Hee-Jun; Hong, Sung-jin; Jun, Hee-jin; Lee, Sung-Joon
Korea University, Seoul, KOR

RATIONALE & OBJECTIVES: High levels of plasma free fatty acids (FFAs) and glucose are associated with several metabolic diseases such as diabetes and obesity thus reducing cellular uptake of FFAs from small intestine may help preventing the development of obesity. We investigated the inhibitory effects of soybean extracts on the FFA uptake and glucose uptake in vitro.

MATERIALS & METHODS: Hexane extracts from white and black soybeans were prepared. Soybean were grounded in electric grinder and extracted with hexane for 3 times. The extracted solution were filtered and then evaporated. Cell viability was measured using the MTT assay. The relative amounts of fatty acid uptake were measured by fluorescent-activated cell sorter and the glucose uptake was analyzed by using 3 H-2-deoxyglucose.

RESULTS & FINDINGS: The yield of hexane extracts of white and black soybean were 10.1% and 8.3%, respectively. White and black soybean extracts were effective and inhibited 30 % and 23% of fatty acid uptake, respectively. And hexane extracts of white soybean was down regulated the uptake of glucose by 13 %.

CONCLUSION: These suggest that the hexane extracts of white soybean may can be good candidate material to prevent the obesity by reducing the uptake of fatty acid and glucose.

P1-07

EFFECTS OF HIGH-FAT DIET ON FREE RADICAL AND LIPID METABOLISM-RELATED GENE EXPRESSION IN MICE

Shi, Yonghui

Institution of Food nutrition, Wuxi Jiangsu, CHN

The investigation was to evaluate the effects of high-fat diet and/or with supplemented lipoic acid (LA) on the oxidative stress of digestive system, blood lipid and coherent gene expression of mice. In trail1.40 Kunming mice were administered with 0.2ml saline, lard, lard+0.05%LA and lard+0.1%LA after food intake respectively. Blood free radical (FR) was determined at 0 h, 0.5h, 1.0 h, 1.5 h, 2.0h after administration. The results show that blood FR increased significantly in mice introgastriuced with lard compared with control and HF+0.1%LA. In trail 2, another 40 m ice were fed with basal diet, high-fat diet(HF 20%fat), HF + 0.05% LA and HF+ 0.1%LA for 6 weeks. FR in mice fed with HF was significantly increased in blood, liver, pancreas, stomach, duodenum, jejunum and ileum compared with controls total anti-oxidation capacity (T-AOC), GSHpx,SOD,CAT decreased, while MDA increased significantly in serum and liver compared with the controls and HF+0.1%LA. High-fat diet decreased serum activities of LPL,HL and HDL-C while serum TG, TC, and LDL-C increased significantly compared with controls and HF+LA. Hepatic expression of Carnitine palmitoyltransferase-1a(Cpt1a) was down-regulated and apolipoprotein E(ApoE) was up-re gulated significantly in HF group compared with controls. Addition of 0.1%LA could modulate hepatic expression of Cpt1a and ApoE. Conclusion: High-fat diet induced oxidative stress in digestive system and disturbed the blood lipid metabolism of mice. The optimum dose of LA could eliminate FR, improved anti-oxidative capacity, adjust the blood lipid metabolism and the expression of Cpt1a and ApoE in liver of mice fed with high-fat diet.

P1-08

EFFECT OF SOMATOSTATIN MRNA EXPRESSION ON LIPID-METABOLISM OF MICE FED HFD

Shi, Yonghui¹; Wu Li²; Ruili Yang²; Caina Yin²; Jin Sun²; Guo-Wei Le^{2,3}; Yong-Hui Shi^{2,3}, *

¹Jiangnan Univ., Wuxi Jiangsu, USA; ² State Key Laboratory Of Food Science And Technology, Jiangnanuniversity, Wuxi, Jiangsu, China; ³ School of Food Science and Technology, Jiangnan University, Wuxi, Jiangsu, CHN

The reason of upset of lipid and glycometabolism induced by Long-term high fat diet (HFD) feeding was not clear. It was investigated that the effect of HFD and antioxidant lipoic acid (LA) on the secretion and expression of SS, lipid metabolism and glycometabolism.

MATERIALS & METHODS: Mice were fed a control diet, high fat diets (21.45% fat, w/w) and HFD plus 0.1% LA for 1, 3 or 6 weeks respectively. At 1st week, there was not significant difference in blood ROS, glucose, and serum MDA and lipid (P>0.05), but the levels of SS in plasma, pancreas and intestine was significant increased (P<0.05) in the group fed with HFD than the control group. No change of SS mRNA expression in intestine was observed in mice fed HFD. After 3 and 6 weeks, the SS level was significant decreased (p<0.05) and the levels of ROS and homeostasis model assessment (HOMA) index,

accompanied by a depressed antioxidant enzyme activity, was increased significantly ($p < 0.05$) in the group fed the HFD than control group. The expression of SS and carnitine palmitoyl transferase-1 (CPT-1) were significantly down-regulated ($P < 0.05$), but apolipoprotein E (ApoE) up-regulated ($P < 0.05$) in intestinal and liver at 6th week. Treatment with LA brought about a significant improvement of SS mRNA expression and redox homeostasis of HFD-fed mice for 6 weeks.

These results suggested that SS can modulate ROS level by controlling redox, then, oxidative stress induced by HFD brought about damage to SS secretion system, which in turn aggravated redox imbalance and metabolic dysfunction.

P1-09

EFFECTS OF N-3 LONG CHAIN-PUFA IN HYPERCHOLESTEROLEMIC CHILDREN

Giovannini, Marcello; Decarlis, Silvia; Scarlino, Serena; Ferrante, Francesca; Capra, Maria Elena; Bonza, Matteo; Salvatici, Elisabetta
University of Milan, Milan, ITA

BACKGROUND: Dietary n-3 fatty acids (FA), including both eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) can reduce cardiovascular risk in adults.

METHODS : In a double blind placebo-controlled trial, 36 children, 3-13 yr of age, 19 M and 17 F, affected by primary hypercholesterolemia, were put on Step-I Diet and randomized to three groups providing 500 mg/day of DHA, or EPA+DHA mixture (41% and 45%, respectively), or wheat germ oil as placebo. They underwent at baseline and after 4-months anthropometrics, blood lipid profile [TC, HDL-C, TG levels (enzymatic method), LDL-C [calculated], EPA and DHA plasma levels (high resolution capillary gas-chromatography).

RESULTS: 31 children completed the study (11, DHA; 10, DHA+EPA; 10, germ oil). At baseline, groups were not different as far as age, anthropometrics and blood lipid profile. Compared to the other two groups the DHA group showed the major increase of HDL-C (+39.8%, $P = .003$) and DHA levels in circulating phospholipids and cholesterol esters after 4 months.

CONCLUSIONS: DHA supplementation in dietary treated dyslipidemic children may raise HDL-C while increasing DHA levels in circulating lipid subfractions.

P1-10

SCREENING OF THE LIVER X RECEPTOR ACTIVATOR FROM KOREAN TRADITIONAL MEDICINAL PLANT AND SEAWEEDS

Hoang, Hien M.; Muhammad, Javidul H.; Lee, Joon S.; Lee, Ho D.
Korea University, Seoul, KOR

RATIONALE & OBJECTIVE: As a member of nuclear receptor family, liver X receptor (LXR) play important role in pathogenesis of atherosclerosis and diabetes by regulating cholesterol, fatty acid, and glucose homeostasis. In order to find potent natural LXR agonists, eighteen methanol extracts from Korean traditional medicinal plants and forty eight methanol extracts from Seaweed were screened out for LXRs activation.

MATERIALS AND METHODS: Samples were prepared into three concentrations as 10mg/ml, 2mg/ml and 0.4mg/ml in DMSO. CHO (Chinese hamsters ovary) cells were co-transfected with LXRE-Luc and β -galactosidase vectors and then were treated with three concentrations of each extract, DMSO (control) and 10 μ M of 20(S) – and 22(R)-hydrocholesterol (positive controls). The data were compared with control and positive controls.

RESULTS AND FINDINGS: among 66 extracts, 2 plant and 8 seaweed extracts showed potent LXR activator activities. Activations were 3 to 6 times higher comparing with controls. Two plant and 8 seaweed extracts were further evaluated for agonist's performance involving co-transfection of LXRE with

LXR a or LXR b or RXR.

CONCLUSION: our results suggest that 4 extracts may have potent LXR activators that could be use for the therapeutic approach of atherosclerosis and diabetes.

P1-11

OXIDIZED FRYING OIL INDUCES OXIDATIVE STRESS IN MOUSE COLON AND EXACERBATES DSS-INDUCED COLITIS

Huang, Hui-Ling¹; Zhang, Lian-Yun¹; Hung, Chia-Chin¹; Su, Su-Hui¹; Shaw, Huey-Mei¹; Shaw, Ning-Sing²
¹Chia-Nan University of Pharmacy Science, Tainan, TWN;
²National Taiwan University, Taipei, TWN

Environmental factors such as dietary oil play a significant role in the pathogenesis of inflammatory bowel diseases (IBD). The purpose of this study was to investigate the effect of dietary oxidized frying oil (OFO) on IBD progress using a mice model of dextran sulfate sodium (DSS)-induced colitis. C57BL/6 mice were divided into 2 groups : OFO-fed and fresh oil-fed control group. After 2 months feeding, a half mice of each group were exposed to 2% DSS (w/v) in drinking water for 5 days and killed at day 40. Clinical symptoms were recorded daily during acute and chronic colitis. Our results showed that OFO-fed mice had severe clinical manifestation, marked significantly by weight loss, diarrhea score, visible fecal blood and increasing disease activity index (DAI) from day 2. Based on results of two-way ANOVA, serum hepatoglobin and spleen weight were significantly increased, whereas hemoglobin and serum albumin and colon length were all decreased by DSS treatment ($p < 0.05$). OFO-fed mice had lower alpha-tocopherol in serum and colon as well as an increase in colonic TBARS ($p < 0.05$). In summary, dietary OFO leads to increased susceptibility to DSS-induced colitis. This detrimental effect on DAI may be associated with an increase in colonic oxidative stress.

P2: Protein & Amino-acids I

P2-01

BOTH BRANCHED-CHAIN AMINO ACIDS AND INSULIN ARE REQUIRED FOR STIMULATION OF TRANSLATIONAL CONTROL IN RAT PRIMARY HEPATOCYTE CULTURE

Chotechuang, Nattida¹; Azzout-Marniche, Dalila¹; Chaumontet, Catherine¹; Gausserès, Nicolas²; Tomé, Daniel¹; Gaudichon, Claire¹
¹AgroParisTech, INRA, Paris, FRA; ²Danone Vitapole R.D., PALAISEAU CEDEX, FRA

This study addressed the question of amino acid (AA) sensing in hepatocytes. We aimed to investigate whether changes in the phosphorylation state of mammalian target of rapamycin (P-mTOR), adenosine monophosphate-activated protein kinase (P-AMPK) and general control non-depressible 2 kinase (P-GCN2) transduction pathways are involved in nutrient signaling in primary hepatocyte culture. Western blot analyses were performed on protein extracts. The activation of translation required both high AA levels (at least for branched-chained AAs) and insulin, as indicated by the increase of phosphorylation of 4E-BP1 (P-4E-BP1) and S6 (P-S6) ($P < 0.01$). This was associated with an increase in P-mTOR and a reduction of P-AMPK and P-GCN2 ($P < 0.01$). Surprisingly, no change in P-4E-BP1 was observed by Rapamycin whereas P-4EBP-1 was dramatically decreased by AIRCAR. We also observed that eIF2 phosphorylation profile was affected by AICAR. This suggests that in response to AA and insulin, 4E-BP1 may not be the direct downstream target of mTOR. Moreover, AMPK modified phosphorylation of eIF2, suggesting that AMPK may be involved in the control of translation.

P2-02

EFFECT OF DEHYDROISOANDROSTERONE ON TRYPTOPHAN METABOLISM AND QUINOLINIC ACID PRODUCTION IN RATS

Egashira, Yukari¹; Sanada, Hiroo¹; Okamura, Minako²
¹Chiba University, Matsudo-City Chiba, JPN; ²Chiba University, JPN

OBJECTIVES: Hepatic 2-amino-3-carboxymuconate-6-semialdehyde decarboxylase (ACMSD) [EC4.1.1.45] plays a key role in regulating NAD biosynthesis from tryptophan. ACMSD is also an important enzyme regulating the generation of quinolinate. Quinolinate is a potent endogenous excitotoxin of neuronal cells. ACMSD activity is greatly affected by many factors such as dietary protein, fat, hormones and disease.

In humans, dehydroisoandrosterone (DHEA) is the dominant steroid hormone and precursor of all sex steroids. DHEA supplements are sometimes used as muscle-building or performance-enhancing drugs by athletes.

In this experiment, we investigated alterations of ACMSD activity and mRNA expression in rats by feeding diets which contain dehydroisoandrosterone (DHEA).

METHODS: Male Sprague-Dawley rats were fed a diet containing DHEA for 7d, and ACMSD activity and mRNA and important tryptophan metabolites were determined.

RESULTS: DHEA suppressed liver ACMSD activity and mRNA expression, but did not affect kidney ACMSD activity much. Serum kynurenine and quinolinate levels were increased by feeding DHEA.

CONCLUSION: The transcription level of hepatic ACMSD is modulated by DHEA. DHEA also affects the production of quinolinic acid in serum by suppressing the ACMSD activity.

P2-03

THE FAVOURABLE EFFECT OF GLUTAMINE ON PROTEIN BALANCE IS ASSOCIATED WITH DECREASED CATABOLISM OF BRANCHED-CHAIN AMINO ACIDS – EXPERIMENTAL STUDY UNDER IN VIVO AND IN VITRO CONDITIONS

Holecek, Milan; Kovarik, Miroslav; Safranek, Roman; Sispera, Ludek
Charles University, Hradec Kralove, USA

RATIONALE: We studied the relations between glutamine administration and branched-chain amino acid (BCAA; valine, isoleucine and leucine) metabolism in experimental sepsis.

METHODS: At in vivo study, glutamine or saline solution were infused to endotoxemic or intact rats. At in vitro study, m. soleus and m. extensor digitorum longus were incubated in medium containing 0, 500 or 2,000 μ mol glutamine/L. The parameters of protein and BCAA metabolism were estimated using labeled leucine and according to the rates of tyrosine and 3-methylhistidine release. Statistical comparisons were performed using ANOVA.

RESULTS: Infusion of glutamine induced a decrease in plasma BCAA levels, in leucine oxidation and an improvement of protein balance. Supplementation of incubation media with glutamine in concentration of 2,000 μ mol/l decreased leucine oxidation by isolated muscles.

CONCLUSION: The favorable effect of glutamine on protein balance is related, at least in part, to its direct effects on BCAA metabolism.

Supported by RP MSM 0021620820.

P2-04

EFFECTS OF RICE PROTEIN AND RICE BRAN PROTEIN ON THE GENE EXPRESSION OF SMALL INTESTINE OF ADULT RATS

Horiguchi, Yuki¹; Ohno, Chieko¹; Kubota, Masatoshi¹; Kumagai, Takehisa²; Watanabe, Toshiyuki²; Hashimoto, Hiroyuki³; Watanabe, Reiko⁴; Fujimura, Shinobu¹ (Niigata University, Niigata, JPN); Kadowaki, Motoni¹

¹Niigata University, Niigata, JPN; ²Kamada Seika Corporation, Niigata, JPN; ³Tsuno Food Industrial Corporation, Wakayama, JPN; ⁴University of Niigata Prefecture, Niigata, JPN

RATIONALE & OBJECTIVES: Rice protein (RP) and rice bran protein (RBP) are edible plant protein sources. In Japan, RP occupies the third following meat and fish protein as a daily protein source. Rice bran is a non-utilized byproduct produced over a million ton annually. Thus new functions of RP and RBP are investigated as candidates for functional foods for adults.

MATERIALS & METHODS: Novel functions of RP and RBP were searched in the small intestine (SI) by DNA microarray. Male Wistar rats (20 weeks) were fed a casein (C), soy protein (SP), RP or RBP diet for 3 weeks. A duodenal portion of the SI after over-night fasting was obtained and analyzed using Gene Chip \square Rat Genome 230 2.0 Arrays (Affymetrix).

RESULTS: Out of 31,042 genes, 351, 2355, 413 genes were up-regulated, and 347, 2105, 351 genes down-regulated in SP, RP, RBP, respectively, compared with C significantly. RP especially affected the genes related to transport, antioxidation and mineral metabolism, GI hormones related to food intake. RBP showed a similar tendency to RP.

CONCLUSION: Plant proteins, especially rice-related proteins, raise absorptive functions in the SI compared to animal protein.

P2-05

THE ROLE OF HISTIDINE ON WOUND HEALING

Ichikawa, Hiroshi¹; Wakahara, Ayako¹; Takagi, Tomohisa²; Minamiyama, Yukiko²; Adachi, Satoko²; Uchiyama, Kazuhiko²; Naito, Yuji²; Yoshikawa, Toshikazu²

¹Doshisha University, Kyotanabe City, JPN; ²Kyoto Prefectural University of Medicine, Kyoto City, JPN

AIM: It is well known that the delayed wound healing and the gastrointestinal mucosal injury were common complications in chronic kidney disease (CKD) patients. It has been reported that the histidine deficiency contribute to an impaired nutritional state in patients with CKD. The aim of this study was to investigate the functional role of histidine on wound healing using cultured rat intestinal epithelial cells (RIE).

MATERIAL & METHODS: A round artificial wound was induced in the center of confluent RIE monolayers. The closure of round wounds were evaluated in all the amino acid addition culture media (Full culture medium), an amino acid additive-free culture medium (Zero culture medium), and histidine lack culture media. MTT assay was used for the measurement of cellular proliferation. The expression of HSP70, Caspase-3, TGF-beta, and PCNA in RIE cultured with various media were estimated by western blotting.

RESULTS: In the histidine lack culture medium and the Zero culture medium, the restitution speed of RIE showed delay remarkably. In MTT assay, the cell proliferation after 24 hr incubation in the histidine lack culture medium was significantly decreased compared with in the Full culture medium. In the histidine lack culture medium and the Zero culture medium, the expression of HSP70 and Cleaved Caspase-3 were increased compared with in the Full culture medium. Furthermore the expression of TGF-beta, and PCNA were decreased in the histidine lack culture medium and the Zero culture medium.

CONCLUSION: It was suggested that the induction of heat shock protein, the induction of apoptosis, and the reduction of growth factor were involved in the mechanisms of delayed wound healing by lack of histidine.

P2-06

LOWERED PLASMA BRANCHED-CHAIN AMINO ACID CONCENTRATIONS IMPAIRS GLUCOSE TOLERANCE IN RATS

Kadota, Yoshihiro¹; Bajotto, Gustavo²; Shimomura, Yoshiharu²
¹Nagoya Institution of Technology, Nagoya, JPN; ²Nagoya University Graduate School of Bioagricultural Sciences, Nagoya, JPN

Recent studies have suggested that branched-chain amino acid (BCAA) administration stimulates glucose uptake into muscles and whole body glucose oxidation. In the present study, we investigated the effect of lowered plasma BCAA concentrations on glucose tolerance in rats. Clofibrate, a drug for lowering blood triglyceride concentration, was used to decrease plasma BCAA levels, because this drug promotes the BCAA oxidation by activation of branched-chain alpha-ketoacid dehydrogenase complex, the rate-limiting enzyme of BCAA catabolism. Male Sprague-Dawley rats (8 weeks of age) were divided into 2 treatment groups: vehicle and clofibrate (0.2 g/kg BW) treatments 3 h before an intraperitoneal glucose tolerance test (IPGTT). Each group of rats was subdivided into saline and BCAA (0.45 g/kg BW, Val:Leu:Ile = 1:2:1) administration 1 h before IPGTT. Results of IPGTT showed that clofibrate treatment impaired glucose tolerance and that BCAA administration in this group of rats recovered glucose tolerance to the level in the control rats, suggesting that plasma BCAAs play an important role in keeping normal glucose tolerance.

P2-07

ANTIHYPERLIPIDEMIC EFFECT OF SESAME (SESAMUM INDICUM L) PROTEIN ISOLATE IN RATS FED A NORMAL AND HIGH CHOLESTEROL DIET

Ghosh, Santinath; Biswas, Arundhati; Dhar, Pubali
University of Calcutta, Kolkata, West Bengal, IND

RATIONALE AND OBJECTIVE: Sesame is one of the important oil seed crops cultivated in India. The oil meal is a rich source of protein and can be utilized to produce protein isolate of excellent quality due to presence of balanced amino acid composition. For efficient utilization of this important material in various food formulations, the main objective is to know whether there is any antihyperlipidemic effect of sesame protein isolate in rat model.

MATERIAL AND METHODS: The dietary influence of sesame protein isolate (SPI, protein content 91.5%), produced from dehulled, defatted sesame meal on blood and tissue lipid profile and lipid peroxidation has been assessed in normal and hypercholesterolemic rats. To evaluate their hypocholesterolemic and antioxidative activity in vivo, we fed 18% SPI with or without 2% cholesterol in comparison with casein to male albino rats of Charles Foster strain for 28 days. We determined plasma total protein, total cholesterol (TC), HDL-cholesterol, LDL-cholesterol, triacylglycerol (TAG) as well as susceptibility of plasma and erythrocyte membrane lipid to oxidation ex vivo. Liver tissue lipid, cholesterol, phospholipids and lipid peroxidations were also determined.

RESULTS AND FINDINGS: The total cholesterol, LDL-cholesterol and TAG levels were significantly reduced in the SPI and SPI containing cholesterol group (SPI-C) than the corresponding control casein groups (CAS and CAS-C). HDL-cholesterol level was also increased in SPI (41%) and SPI-C group (38%) than the corresponding control CAS and CAS-C groups. There was 49% and 64% lowering of plasma lipid peroxidation as well as 36% and 56% lowering of LOS in the two experimental groups (SPI and SPI-C) than the corresponding control (CAS and CAS-C) groups. There was significant lowering of erythrocyte membrane lipid peroxidation (68% and 63% lowering in SPI and SPI-C) and liver lipid peroxidation (61% and 76% lowering in the two experimental groups (SPI and SPI-C) than the corresponding control CAS and CAS-C groups.

CONCLUSION: Therefore, our results indicate that SPI decreases cholesterol concentration in plasma, increases HDL-cholesterol and also decreases plasma and erythrocyte membrane lipid peroxidation with or without cholesterol fed diet in rats. SPI can be utilized in various food formulation as hypocholesterolemic component.

P3: Energy

P3-01

ENERGY INTAKE FROM BEVERAGES BY AUSTRIAN ADULTS

Fröhler, Melanie; Elmadfa, Ibrahim
University of Vienna, Vienna, AUT

RATIONALE & OBJECTIVES: The purpose of this study was to determine the energy intake from beverages by Austrian adults.

MATERIAL & METHODS: The representative cross-sectional study ÖSES.aqa07 examined the data of 459 adults (w: n=271, m: n=188) aged 18-65 years using questionnaire and 1-day-drinking-record. The consumed beverages were divided in groups and evaluated concerning drinking quantity and energy content. The evaluation took place using an Access tool to the German food database, BLS version 2.3.

RESULTS & FINDINGS: The mean total energy intake from beverages was 338±328 kcal/d (176 ±244 kcal/d without milk and alcohol consumption). The energy intake from soft drinks (cola, lemonade, ice-tea) and juices was 118±205 kcal/d. This study found significant differences for correlation between energy intake from beverages and sex, age group and BMI. The consumption of soft drinks by overweight persons were significantly (p<0,05) higher than by normal weight persons, there was no association by obese Austrians. The obese (BMI>30) drank twice as much alcohol as normal weight people.

CONCLUSION: Energy intake from beverages should be reduced in Austria, especially by people with weight problems.

P3-02

EFFECT OF PHOSPHORUS MANIPULATED HIGH FRUCTOSE SOLUTION ON SUBJECTIVE SATIETY AND FOOD INTAKE OF ADULTS

Obeid, Omar A.; Dimachkie, Sara; Hlais, Sani
American University of Beirut, Beirut, LBN

OBJECTIVE: The effect of phosphorus (P) manipulation of a high fructose solution on average appetite (AA) and subsequent energy intake (EI) was investigated.

METHOD: Four preloads were offered in a blind randomized order to 20 overweight subjects (10 males and 10 females). The preloads were composed of fructose (40g) plus glucose (10g) (200 kcal/250ml) with no added P (HF-0P), 50mg (HF-50P), 250mg (HF-250P) or 500mg (HF-500P) of added P. Subjective AA was measured from baseline till 75 min and at 80 min an ad libitum lunch (pizza) plus water were offered.

RESULTS: Analysis of data, according to gender and P content of preload, showed no difference for AA and post load water intake. EI (expressed in Kcal) was 1012.1±407.0, 969.5±512.8, 780.8±386.9 and 675.7±403.7 for the HF-FP, HF-50P, HF-250P and HF-500P respectively, and this was significantly different according to gender and P content of preload. An inverse relation was observed between EI and P content of the preload, while no gender difference was observed in the amount of EI reduction.

CONCLUSION: Increasing P content of the preload was associated with a reduction in EI at a subsequent meal. This indicates that P plays a role in satiety regulation

P3-03

A COMPARATIVE STUDY ON DIFFERENCES OF FOOD ENERGY CONVERSION SYSTEMS

Yang, Yuexin; Guo, Jun; Yang, Xiao-li; Yang, Jing-ming
Institute of Nutrition and Food Safety, Chinese Center for Diseases Control and Prevention, Beijing, CHN

OBJECTIVES: To evaluate the bias or accuracy of 5 different food energy conversion systems on prediction of energy values with designed Chinese Diets.

METHODS: 6 diets were designed: a low fiber diet (rice and animal foods); a typical Chinese normal diet (rice, vegetables and animal foods); wheat and oat dietary fiber (DF) product with two doses were added to the basic diet respectively. Duplicate food sample, whole feces and urine of each volunteer were collected and the combustible energy, energy contributing components and DF were determined. Daily intake energy of each diet were calculated by 4 metabolizable energy (ME) food energy conversion systems (MEAtw, MEEuro, MELiv and MEMod) and net metabolizable energy (NME) system, and the bias of each system were estimated on the base of determined metabolizable energy (ME det).

RESULTS: Totally the relative and absolute difference of energy value between each energy systems and ME det were significantly different ($P < 0.5$): MEAtw overestimated the metabolizable energy of the diets about 4 %, MEEuro lower estimated 3.4 %, and MELiv and MEMod lower estimated the daily intake ME from diets 1 % and 0.22% respectively. The relative difference of NME value is about 6 % lower than ME det. The relative and absolute differences of energy value between each energy system and ME det of each diet group were significantly different ($P < 0.05$), the differences of energy values of high cereal DF group were significantly higher than other groups ($P < 0.05$).

CONCLUSIONS: Different energy conversion systems may produce differences on energy value, MEMod have the best correlation and consistency among the systems. DF was related with the differences of energy value of each system.

P3-04

IS MEDGEM HAND-HELD INDIRECT CALORIMETER VALID FOR RESTING METABOLIC RATE MEASUREMENT IN ATHLETIC AND NON-ATHLETIC ADOLESCENTS?

Kim, Jae-Hee; Park, Ji-Sun; Park, Mi-Yeon; Lee, Jeong-Sook; Kim, Eun-Kyung
Kangnung National University, Gangwon-do, KOR

OBJECTIVE: The aim of this study was to verify the accuracy of a new hand-held metabolic rate measuring device (MedGem) in athletic and non-athletic adolescents.

METHODS: Thirty male soccer players (mean age 16.7 ± 1.0 years) and 30 non-athletic male high school students (mean age 16.0 ± 0.0 years) in Gangneung, South Korea were included. Weight/height and body fat (BIA, Inbody720) were measured, and muscle mass (Heymsfield's formula) was calculated. The resting metabolic rate (RMR) of the subjects was measured using conventional ventilated hood (VH; TrueOne2400, USA) and hand-held (HH; MedGem, USA) indirect calorimeters.

RESULTS: Athletic group showed the significantly lower body fat ($11.1 \pm 2.2\%$) and higher muscle mass ($35.0 \pm 3.4\%$) comparing with those ($14.8 \pm 8.8\%$ and $31.1 \pm 2.6\%$) of non-athletic group. In athletic group, there was no significant difference (mean difference from Bland Altman test -28.9 kcal/day) in RMR measured by the two methods (1647.6 ± 111.3 kcal/day vs. 1618.7 ± 244.6 kcal/day for VH and HH, respectively). But in non-athletic group RMR (1481.9 ± 112.9 kcal/day) measured by HH was significantly higher than RMR (1391.0 ± 84.4 kcal/day) measured by VH.

CONCLUSION: These findings indicate that the hand-held indirect calorimeter may provide an accurate measure for athletic adolescents. Further validity research is needed in

subjects who differ in body composition.

P4: Micronutrients I

P4-01

PLASMA ZINC LEVELS IN INFANTS AGED LESS THAN 6 MONTHS IN A URBAN LOW INCOME COMMUNITY IN DELHI, INDIA

Chandola, Temsunaro R.; Taneja, Sunita; Mazumder, Sarmila; Kumar, Tivendra; Bhandari, Nita
Society for Applied Studies, Delhi, IND

OBJECTIVES : Occurrence of zinc deficiency in children 6 months to 3 years of age is common in developing countries. The beneficial impact of routine supplementation on diarrhea and pneumonia is well documented. Few data are available for infants aged less than 6 months. The prevalence of zinc deficiency in the first 6 months of life in low-middle income population is described.

METHODS : The data were obtained from baseline specimens of infants aged less than 6 months enrolled in a double blind placebo controlled trial.

RESULTS : Overall, in infants aged less than 6 months, mean (SD) plasma zinc levels were 63.5 (12.0); the proportion < 60 $\mu\text{g/dL}$ were 40% and < 55 $\mu\text{g/dL}$ were 25%. Mean (SD) levels in infants aged 30 to 60 days were 59.7 (11.9), 61 to 90 days were 65.5 (9.4), 91 to 120 days were 67.0 (10.7), 121 to 150 days were 66.8 (12.4) and 151 to 180 days were 67.3 (11.6).

CONCLUSIONS : Zinc status is impaired in children less than 6 months despite high rates of breastfeeding in this setting. The importance of the benefits of zinc intake in this age group by supplementation or other means need to be assessed and warrant further investigation.

P4-02

TOTAL AND BIOACCESSIBLE LEVELS OF IODINE IN JAPANESE SEA MUSTARD SEAWEEDS

Fukushima, Michiko³; Michiko Fukushima¹, Amares Chatt²
¹Ishinomaki Senshu University; ²Dalhousie University, SLOWPOKE-2; ³Ishinomaki Senshu University, Ishinomaki, Miyagi, JPN

Several edible seaweeds including sea mustards play an important role of main source for iodine in Japanese diets. Sea mustards start growing in ocean during December to January, and reach maturity in March to April. Sea mustards at different growing stages were collected from Onagawa Bay in Ishinomaki, Miyagi Prefecture, Japan, and iodine levels in them were measured by instrumental neutron activation analysis (INAA). Samples were first washed with tap water followed by distilled water and freeze-dried. The dried samples were pulverized. About 0.3-0.5 g of the powdered samples were sealed in polyethylene vials and irradiated at the Dalhousie University SLOWPOKE-2 Reactor facility in Canada or at Kyoto University Reactor in Osaka, Japan. Iodine levels were determined using the 443-keV gamma-ray of its radionuclide ^{128}I with a half-life of 25 min. Total amount of iodine in sea mustards varied from about 40 to 5500 μg depending on their growing stage. The concentrations of iodine were in the range of 90 – 270 $\mu\text{g/g}$, dry weight. In addition, water-soluble or bioaccessible levels of iodine in several species of seaweeds were estimated by in vitro enzymolysis and INAA.

P4-03

IODINE NUTRITIONAL STATUS OF PRIMARY SCHOOL CHILDREN IN THE RURAL EASTERN CAPE PROVINCE OF SOUTH AFRICA

George, Grace¹; George G² & Mswelanto L²

¹Walter Sisulu University, PMB X¹, UNITRA, Mthatha, ZAF;

²Department of Medical Biochemistry, Faculty of Health Sciences, Walter Sisulu University, Mthatha, Eastern Cape Province, South Africa.

RATIONALE & OBJECTIVES: Voluntary iodization of table salt was introduced in South Africa in 1954. But iodized salt became widely available to the general population only after it was made mandatory in 1995. Compulsory Iodization of table salt at 40-60ppm has been reported to have improved the iodine nutritional status in several areas which were previously iodine deficient. The objective of the present study was to determine the iodine nutritional status of primary school children from a rural, low socio-economic background in the Eastern Cape Province of the country for which there is paucity of data.

MATERIALS & METHODS: A cross sectional descriptive study (n=207, age 7-11years) was carried out in two primary schools in the rural setting. Measurements included anthropometry (Height & Weight), urinary iodine (Sandell-Kolthoff reaction) as well as iodine content of house hold salt (Iodometric titration).

RESULTS & FINDINGS: Urinary iodine excretion ranged from 22 - 628.7 ug/l, with a median value of 336.6ug/l. About 7% of the children showed urinary iodine values below 100ug/l, indicating severe to moderate deficiency. In 7.3% of the study population urinary iodine was 100 -199ug/l, indicating adequacy while 11.5% it was more than adequate (200-299ug/l). 69.7% of the study population showed urinary iodine levels in excess (>300ug/l).

Iodine content of salt used by households in the area varied between 20-38ppm 21% of the participants showed stunted growth, 2% over weight and 1% obese.

CONCLUSION: Results obtained in the study calls for a more detailed investigation in the community as both deficiency and excess in iodine can cause severe health risks. Severe to moderate iodine deficiency observed in 7% of children in the study population need to be addressed and corrected in order to prevent the possible iodine deficiency diseases. The finding of endemic urinary iodine excess in 69.7% of the population studied must be viewed with caution and need to be further investigated since it increases the risks to thyroid disease with no additional benefits.

P4-04

FACTORS AFFECTING NUTRITIONAL STATUS OF PRE-SCHOOL CHILDREN 2-5 YEARS IN OBUKPA A RURAL COMMUNITY IN NIGERIA

Oly-Alawuba, Nkiru M.

University of Nigeria, Nsukka, Enugu, NGA

Factors influencing the nutritional status of 200 pre-school children aged 2-5 years were determined. The subjects were randomly selected from Ejuona-Obukpa in Nsukka Local Government Area of Enugu State. Data on the general characteristics, food habits, access to health services by the pre-school children, and the socio-economic status, caring capacities and nutrition knowledge of their parents were obtained with questionnaire. The nutritional status of the children was obtained by taking height and weight measurements using standard anthropometric methods. The frequencies and percentages of the coded variables were analyzed using the SPSS package. The Z-scores for their weight-for-age, height-for-age and weight-for-height were determined and compared with NCHS reference standards. The study revealed that 67% of the pre-school children were normal, 9% of the children were both wasted and stunted and 24% were overweight. Income and nutrition knowledge of the parents were the factors that most

affected the nutritional status of the pre-school children. Factors like caring capacity, food habits and healthy environment affected their nutritional status to a lesser extent.

P4-05

EFFECT OF THE ADDITION OF UNSATURATED FATTY ACIDS AND VARIOUS CAROTENOIDS AS SUBSTRATE ON THE ACTIVITY OF RECOMBINANT B-CARTENE DIOXYGENASE AND B-CAROTENE DIOXYGENASE FROM RAT INTESTINE

Hosotani, Keisuke⁴ Keisuke Hosotani¹, Masahiro Kitagawa², Ryoichi Yamaji³, Yoshihisa Nakano³;

¹ Faculty of Education, Wakayama University, Wakayama;

²Nutrition of Otemae College, Osaka ³Department of Applied Biological Chemistry, Osaka Prefecture University, Osaka, Japan; ⁴Wakayama University, Wakayama City, JPN

We examined the effect of kind and concentration of unsaturated fatty acid on the activity of β -carotene dioxygenase (CDO) from rat intestinal mucous and clarified the mechanism underlying the action of unsaturated fatty acids on mucous CDO and recombinant CDO. When the substrate were β -carotene, the activity of mucous CDO was higher with the addition of 1mM of oleic acid or linoleic acid than with 0 mM of either acid. When the substrate was β -cryptoxanthin, the activity of mucous CDO was higher with addition of 0.5 ~ 2 mM of oleic acid than with 0 mM of acid. However, the activity of recombinant CDO was lower with the addition of 0.5 ~ 2mM of all three fatty acids than with 0mM of acid. This decrease in the activity of recombinant CDO differed from that of mucous CDO. When the substrate was β -carotene, the activity of a mixture that included recombinant CDO and mucous CDO was lower than the sum of individual activity (recombinant CDO plus mucous CDO). Based on the findings obtained with addition of fatty acid a mixture of recombinant CDO and mucous CDO, it was thought that the components of mucous induce changes in CDO activity.

P4-06

PLASMA ASCORBATE AND MALONYLDIALDEHYDE AFTER INGESTION OF FERROUS SULFATE

Hutchinson, Carol¹; Collard, Keith²; Brugggraber, Sylvaine¹; Pereira, Dora¹; Powell, Jonathan¹

¹MRC Human Nutrition Research, Cambridge, GBR; ²The University of Plymouth, Plymouth, USA

RATIONALE: Iron is a potential catalyst for the formation of reactive oxygen and nitrogen species. These reactive species can initiate oxidative damage to plasma lipids and proteins, if antioxidant defenses become overwhelmed.

HYPOTHESIS: We hypothesize that there will be an increase in plasma malonyldialdehyde (MDA) and a deterioration in plasma ascorbate, following ingestion of 65mg iron as ferrous sulfate, compared with placebo.

METHODS: Twenty one healthy adults, 14 iron replete (IR) and 7 iron deficient (ID), ingested 65mg iron as ferrous sulfate (FeSO₄) with a meal on one occasion. On a different occasion volunteers took a placebo tablet with an identical meal. Blood was taken immediately before the meal, then 3 and 7 hours afterwards for the determination of serum iron, transferrin saturation, plasma ascorbate and MDA Results There was no change in plasma ascorbate in either sub-group. Plasma MDA increased in the IR group following FeSO₄ (P<0.05), however, there was no change in plasma MDA in the ID subgroup, which was limited by sample size.

CONCLUSION: These findings suggest that plasma MDA may be raised after oral ferrous sulfate, although confirmation of these findings in a larger sample size is necessary.

P4-07

PREDICTING RELATIVE CONCENTRATIONS OF BIOAVAILABLE IRON AND ZINC USING IN VITRO APPROACHES

Argiri, Konstantina; Kapna, Afroditi; Theofanidi, Eleni; Staikidou, Chrysoula; Georgiou, Costantinos; Komaitis, Michael; Kapsokefalou, Maria
Agricultural University of Athens, Athens, GRC

There is an unequivocal need for predicting the bioavailability of dietary iron and zinc. Consequently in vitro methods have been developed for the prediction of iron and zinc bioavailability from foods and supplements. A new setup, that involves 6-well plates and a ring insert that holds the dialysis membrane, was proposed for the application of the iron dialyzability method with the objective to increase efficiency and to allow testing small-volume samples. This setup was further tested for its potential application for the measurement of zinc bioavailability. A series of solutions and recipes that have been employed in studies on iron or zinc absorption published in the literature were digested in vitro. Dialyzability was measured and correlated with published values on absorption. Zinc or iron dialyzability measured with the proposed setup correlated well with zinc or iron absorption published in the literature. These results suggest that the new setup can be employed in future applications for the prediction of zinc or iron bioavailability.

P4-08

RELATIONSHIP BETWEEN SELENIUM AND ANEMIA AND OTHER ESSENTIAL TRACE ELEMENTS IN VIETNAM

Nguyen, Nhien Van¹; Nguyen, Khan Cong²; Nguyen, Ninh Xuan¹; Le, Tuyen Danh¹; Yabutani, Tomoki³; Wieringa, Frank T.⁴; Nakaya, Yutaka⁵

¹National Institute of Nutrition, Hanoi, VNM; ²Vietnam Food Administration, Hanoi, VNM; ³Graduate School of Science and Technology of Engineering, The University of Tokushima, Tokushima, JPN; ⁴IRD, Hanoi, VNM; ⁵The University of Tokushima, Tokushima, JPN

RATIONALE & OBJECTIVES: To determine the relationship between selenium and other trace elements and to investigate the prevalence of micronutrient deficiencies in rural Vietnam.

MATERIALS & METHODS: Data from 4 cross-sectional studies (*) conducted between 2003-2004 with in total 908 subjects, including preschool children, primary schoolchildren, adolescent girls, and adults in rural Vietnam (1-4). Hemoglobin (Hb) and micronutrient status indicators were measured.

RESULTS: Concentrations of calcium, zinc, magnesium, Hb, and vitamin A were significantly increased with higher quartiles of selenium concentrations ($P < 0.001$), whereas the level of lead was significantly decreased ($P < 0.0001$). The prevalence of anemia, deficiencies of calcium (< 84 mg/L), selenium, zinc, magnesium, copper, and vitamin A were 39.1%, 10.7%, 45.4%, 60.7%, 38.3%, 4.8%, and 9.0%, respectively. Selenium deficiency (OR 1.73, 95% CI 1.17-2.57, $P = 0.006$) and low serum vitamin A (OR 2.00, 95% CI 1.38-2.88, $P < 0.001$) were strongly, independently associated with anemia in multivariate models adjusted for age, gender, and undernutrition, but deficiencies in zinc, copper, and magnesium were not associated with anemia.

CONCLUSION: The results show a strong relationship between selenium deficiency and vitamin A deficiency with anemia. More research is required to gain insight into the potential role of selenium in the prevention and control of anemia

* 1-4: Nutrition 2009;25:6-10, J Nutr Sci Vitaminol (Tokyo) 2008;54:454-9, Asia Pac J Clin Nutr 2008;17:48-55, Biol Trace Elem Res 2006;111:1-9.

P4-09

PRENATAL IRON SUPPLEMENTATION IN RURAL VIETNAM

Aikawa, Ritsuko¹; Jimba, Masamine²; Nguen, Khan C.³; Binns, Colin W.⁴
¹JICA, Addis Ababa, ETH; ²University of Tokyo, Tokyo, JPN; ³National Institute of Nutrition, Hanoi, VNM; ⁴Curtin University, WA, AUS

OBJECTIVE: To assess the potential impact of a national iron supplementation programme in rural Vietnam.

METHODS: The study included questionnaires, focus group discussions of pregnant women and key informant interviews, together with measurements of hemoglobin (Hb) and a stool examination for soil-transmitted helminths.

RESULTS: Iron supplementation significantly increased Hb concentration among participants in the second and third trimesters by 0.4 and 0.7 g/dl, respectively ($P = 0.017$ and $P < 0.001$). The risk of anemia (Hb < 10.0 g/dl) was increased significantly by hookworm infestation ($P = 0.041$) and in summer season ($P = 0.001$) and was decreased significantly by taking iron tablets ($P = 0.041$).

CONCLUSIONS: The results of this study show that an iron supplementation programme is beneficial as a part of a comprehensive anemia program for pregnant women in these communities. These results will be useful for developing improved iron-deficiency anemia control programs for pregnant women.

P4-10

EVALUATION OF TYPE OF OILS ON CAROTENOID AND VITAMIN E (VE) BIOAVAILABILITY USING IN VITRO DIGESTION/CACO-2 CELL MODEL

Chitchumroonchokchai, Chureeporn¹; Kamonpatana, Kom¹; Feruzzi, Mario²; Harrison, Earl¹; Failla, Mark¹

¹The Ohio State University, Columbus, Ohio, USA; ²Purdue University, West Lafayette, IN, USA

Dietary lipid enhances carotenoid and VE bioavailability, but the effect of type of lipids on absorption of these compounds is limited. We have investigated the effects of commercial lipids on their bioavailability using the in vitro digestion/Caco-2 cell model. Meals consisted of a mixed vegetable salad containing test lipid. Micellarization and cellular uptake of β -carotene (β C), but not xanthophylls or VE, during digestion was increased by lipids rich in unsaturated fatty acids (FA): soybean oil $>$ olive $>$ canola $>$ butter. Caco-2 cells were pre-incubated with micellar mixtures of FA mimicking the types and ratio of saturated to unsaturated FA present in butter, olive and soybean oil before addition of β C, LUT, VE and mixtures of test FA. Uptake and transepithelial transport of both carotenoids, but not VE, were greater in cells pre-treated with mixtures enriched in unsaturated compared to saturated FA. These results suggest that oils rich in unsaturated FA promote β C bioavailability (Supported by USDA NRI and OARDC).

P4-11

MICRONUTRIENT STATUS OF PRIMARY SCHOOL CHILDREN IN LAGOS NIGERIA

Akeredolu, Ifeoma A.¹; Oguntona, Babatunde E.²; Okafor, Chinwe J.³; Ifeoma Akeredolu I, Phd.; Tunde Oguntona⁴, Phd.; Chinwe Okafor⁵, Msc,

¹Yaba College Of Technology, Yaba, Lagos, Nga; ²Olabisi Onabanjo University, Ogun, NGA

³Federal Polytechnic, Ogun, NGA; ⁴Ogun State University, Ayetoro; ⁵Federal Polytechnic Ilaro

Micronutrient malnutrition affects the health and survival of more than 2 billion people worldwide and school-age children are at an increased risk. Data is scarce on the micronutrient status of primary school children in Nigeria; therefore this

study assessed the micronutrient (iron, zinc and copper) status of primary school-attending children (5-13years). 200 subjects were randomly selected using a stratified 2 – stage sampling technique. Data was collected using dietary intake (24 hr dietary recall protocol) blood samples, and a questionnaire. The data were analyzed using descriptive and inferential statistics. The results revealed that 49.0% of the subjects were males while 51% were females. Among ages 5-8years., the main dietary intake for iron was 10.66 ± 12.44 mg/d (106% of DRI), for zinc, 7.30 ± 7.39 mg/d (92% of DRI) and for copper, 1.55 ± 1.31 mg/d (390% of DRI). For ages 9 -13yrs, the mean intake of micronutrients showed that iron was 11.03 ± 12.72 mg/d (138% of DRI), zinc was 8.44 ± 7.7 mg/d (105% of DRI) and copper was 3.75 ± 15.17 mg/d (536% of DRI). Dietary intakes did not provide right amounts of micronutrients to meet body requirements.

P4-12 SYNERGISTIC EFFECTS OF VITAMIN A AND EXTREMELY LOW FREQUENCY ELECTROMAGNETIC FIELD (50HZ) ON LIMB BUD DEVELOPMENT OF BALB/C MOUSE

Baharara J, Parivar K, Ashraf AR, Madadi M, Shariati MR
Javad Baharara, Mashhad, IRN

INTRODUCTION: Vitamin A is involved in vertebrate morphogenesis, growth, cellular differentiation, and tissue homeostasis. Vitamin A and its metabolites, are essential for adequate embryo development. electromagnetic fields (EMFs) have been used effectively to treat some diseases such as certain musculoskeletal and chondrogenic disorders. To investigate the effects of EMFs on limb bud development in vivo. Animal models have been used to investigate several questions related to the teratogenic effects of Vitamin A and electromagnetic fields such as dose and temporal and spatial correlation.

MATERIALS AND METHODS: Balb/C mice from the colony of the Central Animal House of Razi, were used. The Virgin females were mated and tested for the presence of a vaginal plug, which represented day zero of pregnancy. After mating, the pregnant dams were divided at random into 3 groups of 5 animals included: control, experimental which exposed EMFs (50 Hz / 100 gauss, for 12 h during three day) and received a single intraperitoneal injection of Vitamin A with 15000IU/Kg 10/5th gestational day, sham exposed with no EMFs delivered and received Vitamin A. The animals were killed on the 15/5th day of gestation and submitted to cesarian section. The Fetuses obtained was examined externally with a analyzed under a stereoscopic microscope and photographed and All samples were fixed in 10% formalin, embedded in paraffin, serially sectioned (7 μ) and stained with Hematoxylin and Eosin. Limb bud measurements were performed using a scaled graticule. Data were analyzed statistically by T-test and Mann-Whitney tests, with the level of significance set at $p > 0.05$.

RESULTS: In the experimental model using Balb/C mice, Morphological and histological examinations showed significant changes occurred in limb buds as compared with sham exposed and control. In both fore and hind limb buds decrease in proximo-distal (P-D) and antero-posterior (A-P) axes were significant ($p < 0/05$). Chondrocyte counts, revealed significant deferment development in as compared with sham exposed and control ($p < 0/05$).

CONCLUSION : Synergistic effects of vitamin A and extremely low frequency electromagnetic field (50Hz) has deferment chondrogenesis on limb bud of Balb/C mouse. EMFs (50 Hz/100 G) and received a single intraperitoneal injection of Vitamin A, under the conditions applied, has deferment effects on the limb bud development.

P4-13 RETINOL AND ASCORBIC ACID STATUS OF PATIENTS WITH BREAST CANCER AT THE UNIVERSITY COLLEGE HOSPITAL, IBADAN, NIGERIA

Fadupin, Grace T.; Atinmo, Tola T.
University of Ibadan, Ibadan, Oyo state, NGA

This study evaluated the retinol and ascorbic acid status of 30 newly diagnosed female adult patients with breast cancer (experimental group) and 30 apparently healthy female adults (control group). The frequency of dietary intake of pro-vitamin A, vitamins A and C was assessed. High Pressure Liquid Chromatography (HPLC) and UV spectrophotometer were used to determine the serum retinol and ascorbate of the subjects respectively. Pro-vitamins A, vitamins A and C sources in the diet of the subjects were red palm oil, liver, egg, milk, fruits and vegetables. The mean serum retinol level of the experimental and the control groups were 14.43 ± 7.1 μ g/dl and 21.04 ± 7.2 μ g/dl respectively. The mean serum ascorbate level of the experimental and the control groups were 0.2 ± 0.16 mg/L and 0.5 ± 0.18 mg/L respectively. Despite the fact that intake of both experimental and control groups were similar, the serum values of the antioxidants were lower in the patients with breast cancer. This may suggest increase intake of antioxidants in the management of patients with breast cancer.

P4-14 ASSESSMENT OF ZINC STATUS OF OBESE ADOLESCENTS

Freire, Simone C.¹; Fisberg, Mauro²; Cozzolino, Silvia F.³
¹Simone Freire, São Paulo, BRA; ²Mauro Fisberg, São Paulo, BRA; ³Silvia Cozzolino, São Paulo, BRA

RATIONALE & OBJECTIVES: Assess zinc distribution in the body of 15 obese adolescents, before and after a nutritional orientation program to reduce body fat (BF).

MATERIALS & METHODS: 15 female adolescents, with ages ranging from 14 to 18 years and $\%bf > 35$ were evaluated. The zinc nutritional status as well as other zinc-dependent parameters such as superoxide dismutase (sod) and insulin was assessed by means of biochemical analyses in plasma and erythrocytes, saliva and urine, all of them collected before and after 04 months of dietetic intervention. A double-beam x - ray absorptiometry was used to verify body fat % at the beginning and at the end of the study and mineral consumption was assessed in three individual food questionnaires throughout the study.

RESULTS & FINDINGS: After diet orientation, 53%, of the group presented a decrease in body weight and 78% presented a decrease in bf %. There was a trend in decreasing bf % with an increase in plasma zinc and erythrocytes parameters. The remaining biochemical parameters, zinc in saliva sedimentation, sod and insulin, presented a significant decrease ($p < 0.05$) after the dietetic orientation. There was no difference in zinc consumption throughout the study.

CONCLUSION: there is zinc redistribution during the weight loss process, emphasized by the increase in plasma zinc and erythrocytes levels and by the decrease in sod activity, regardless of food consumption.

P4-15 VITAMIN C PHARMACOKINETICS IN RABBITS: EVIDENCE FOR A RECOMMENDATION OF VITAMIN C INTAKE

Donati, Gaudensia; Donati G & Kinabo JL
Sokoine University of Agriculture, Department of Food
Science and Technology, Morogoro, TZA

The study on vitamin C pharmacokinetics was carried out to determine the level of supplementation of vitamin C that can

have optimal health benefits and promote resistance against diseases and boost the immunity.

Twenty-four healthy New Zealand White male rabbits received basal diets and a single dose of vitamin C supplement at the rate of 30, 60 and 100mg per day. Steady-state plasma vitamin C concentrations were determined using the Iodometry titration method.

Vitamin C concentration displayed a sigmoid kinetics. Bioavailability was almost complete (98%) for 30mg and 60mg (97%) doses but not (87%) for the 100mg dose. The plasma half-life was 99 minutes for the 30mg and 234 minutes for 100 mg dose.

The current RDA of 60mg per day should be increased to 240mg daily. This amount can be obtained from fruits, vegetables and supplementation. In situations where fruits and vegetables are not readily available the regime for vitamin C supplementation should be approximately 80mg given at 8 hourly.

P5: Bioactive Ingredients in Foods

P5-01

EFFECT OF ADENOSINE ADMINISTRATION ON IMPROVING METABOLIC SYNDROME-RELATED PARAMETERS IN STROKE-PRONE SPONTANEOUSLY HYPERTENSIVE RATS

Ardiansyah, Ardiansyah⁴; Shirakawa, Hitoshi⁴; Koseki, Takuya⁵; Shiono, Yoshihito⁵; Murayama, Tetsuya⁵; Komai, Michio⁴; Ardiansyah^{1,3}, Hitoshi Shirakawa¹, Takuya Koseki², Yoshihito Shiono², Tetsuya Murayama², Michio Komai¹

¹ Lab. Nutr. Grad. Sch. Agr. Sci., Tohoku Univ.; ²Fac. Agr., Yamagata Univ.; ³ ¹⁻¹ Tsutsumidori-Amamiyamachi, Aobaku, Sendai, Japan; ⁴Tohoku University, Sendai-Miyagi, JPN; ⁵Yamagata University, Tsuruoka-Yamagata, JPN

Despite the well-documented that adenosine has health-related physiological activities in animal and human studies, but the detailed mechanisms remain unknown. Thus, the purpose of the present study was to identify the effect of adenosine administration on metabolic syndrome-related parameters in stroke-prone spontaneously hypertensive rats (SHRSP) after high fat diet intake. Rats aged 6-weeks-old was divided into control and adenosine groups were administered water or water with adenosine, respectively, for 8 week. The rats had free access to high fat diet. Hypertension, plasma lipid, nitric oxide, insulin, 8-OHdG, and glucose levels were significantly improved in the adenosine group. The mRNA expression levels of genes involved in lipid and anti-oxidative activity were significantly altered in the adenosine group. Further, a denosine increased plasma adiponectin level and accompanied by the alleviation of hepatic mRNA level of AdipoR2. In conclusion, adenosine administration is effective to improve metabolic syndrome-related parameters.

P5-02

ABSORPTION AND METABOLISM OF BIOACTIVE MOLECULES AFTER ACUTE INGESTION OF STRAWBERRIES

Azzini, Elena¹; Napolitano, Aurora²; Fogliano, Vincenzo²; Raguzzini, Anna¹; Toti, Elisabetta¹; Rossi, Laura¹; Maiani, Giuseppe¹

¹National Institute for Research on Food and Nutrition, Rome, ITA; ²University of Naples Federico II, Naples, ITA

Several studies have shown that the bioactive molecules present in fruits and vegetables could play an important role in human physiology.

The objectives of this research were to evaluate in fresh and stored strawberries: the effect of domestic storage on the content of bioactive molecules; the bioavailability of antioxidant compounds and their metabolism; the effect of acute ingestion

on plasma levels of vitamin C, carotenoids and polyphenols. On 13 healthy volunteers, blood and urine were sampled before and after acute ingestion of fresh and stored strawberries, 300 g respectively. After consuming fresh strawberries, plasma levels of α -carotene increased significantly ($P < 0.05$), while they did not increase after ingestion of stored strawberries. Consumption of fresh and stored strawberries resulted in a significant increase of vitamin C with a maximum at 2h ($P < 0.05$). No plasma anthocyanin levels were found. Plasma levels of protocatechuic acid, 4-hydroxybenzoic acid and coumaric acid were detected higher after consuming fresh than stored strawberries. The peak of urinary excretion of pelargonidin-3-O-glucuronide and pelargonidin 3-O-glucoside was found at 2 h.

Our results show that storage seems to influence the content of bioactive molecules and their bioavailability and contribute to elucidate the absorption, metabolism and excretion of pelargonidin.

This research was supported by the EU. TRUEFOOD "Traditional United Europe Food" is an Integrated Project financed by the European Commission under the 6th Framework Programme for RTD (Contract n. FOOD-CT-2006-016264).

P5-03

ANTI-INFLAMMATORY ACTIONS OF XANTHONES FROM MANGOSTEEN IN HUMAN MACROPHAGES AND ADIPOCYTES

Bumrungpert, Akkarach¹; Chuang, Chia-Chi²; Overman, Angel²; Martinez, Kristina²; West, Tiffany²; Hopkins, Robin²; Kennedy, Arion²; McIntosh, Michael²

¹Mahidol University, Bangkok, THA; ²University of North Carolina at Greensboro, Greensboro, NC, USA

Obesity-associated inflammation is characterized by an increase in the number of macrophages in adipose tissue and production of inflammatory cytokines, leading to the development of insulin resistance. The xanthones, α - and γ - mangostin (MG), are major bioactive compounds found in mangosteen reported to have anti-inflammatory properties. Thus, we examined the efficacy of MG to prevent lipopolysaccharide (LPS)-mediated inflammation in differentiated U937 human macrophages and cross-talk with primary cultures of newly differentiated human adipocytes. α - and γ - MG attenuated LPS-induced inflammatory cytokine expression in dose-dependent manner in macrophages. α - and γ - MG also attenuated LPS-activated mitogen activated protein kinase (MAPK)s, nuclear factor-kappa B (NF- κ B), and activator protein (AP)-1. Furthermore, the ability of macrophage conditioned media (CM) to cause inflammation and insulin resistance in cultures of human adipocytes was attenuated by pretreating macrophages with γ -MG. Taken together, these data demonstrate that MG attenuates LPS-mediated inflammation and insulin resistance, possibly by preventing the activation of MAPKs, NF- κ B, and AP-1, which are central to inflammatory cytokine production.

P5-04

CHRYSANTHEMUM MORIFOLIUM RAMAT EXTRACTS REDUCE OXLDL-INDUCED ICAM-1 EXPRESSION IN HUMAN UMBILICAL VEIN ENDOTHELIAL CELLS

Chen, Haw-Wen¹; Lei, Yen-Ping²; Hsieh, Yun-Sheng²; Lii, Chong-Kuei¹

¹China Medical University, Taichung, TWN; ²Chung Shan Medical University, Taichung, TWN

The flower of *Chrysanthemum morifolium* Ramat. (CM) has been widely used as a healthy beverage and medicine in China for hundreds of years. In the present study, we investigated the effect of CM on the oxLDL-induced ICAM-1 expression in human umbilical vein endothelial cells (HUVEC). HUVEC were treated with 100, 250, or 1000 μ g/ml of hot water extract of CM (HCM), or 25, 100, or 250 μ g/ml of ethanol extract of

CM (ECM), or 20 or 50 μ M apigenin and luteolin, which are the major flavonoids of CM for 16 h before challenge the cells with oxLDL for another 24 h. oxLDL significantly increased the surface expression of ICAM-1 in HUVEC, and HCM, ECM, apigenin, and luteolin inhibited the induction effect of oxLDL. Similar results were found for total cellular ICAM-1 expression. ECM, apigenin, and luteolin significantly inhibited oxLDL-induced total expression of ICAM-1. In addition, HCM, ECM, apigenin, and luteolin significantly inhibited the adhesion of HL-60 cells to HUVEC. The ROS scavenging capability of HCM, ECM, apigenin, and luteolin was in a dose-dependent manner. HCM (250 and 1000 μ g/ml), ECM (100 and 250 μ g/ml), apigenin and luteolin significantly scavenged the ROS produced by oxLDL. Taken together, these results suggest that CM is a cardiovascular-protective plant candidate, and apigenin and luteolin are the bioactive components in CM for its anti-CVD effect.

P5-05
EFFECTS OF ISOTHIOCYANATES ON ACTIVATED MACROPHAGE-INDUCED ANGIOGENESIS IN CULTURED CELLS

Wang, Mei-Lin; Chen, Yue-Hwa
Taipei Medical University, Taipei, TWN

We have previously indicated that cruciferous vegetable derived isothiocyanates, BITC (benzyl isothiocyanate) and PEITC (phenylethyl isothiocyanate), not only possess anti-inflammatory activities in lipopolysaccharide (LPS)-stimulated macrophages, but also inhibit phorbol-12-myristate-13-acetate-induced tube formation in endothelial cells. Because activated macrophage is closely associated with angiogenesis in the process of cancer development, this study was aimed at studying the effects of BITC and PEITC on activated macrophage-induced angiogenesis in cultured cells. After RAW 264.7 macrophages were stimulated with LPS for 24 h, the condition medium (CM) was collected and used for cultivating EA hy926 endothelial cells in the presence of BITC and PEITC, and tube formation, nitric oxide (NO), vascular endothelial growth factor (VEGF), and matrix metalloproteinase (MMP) were examined. The results showed that CM activated tube formation, increased NO and VEGF production, as well as enhanced MMP activity in endothelial cells. However, BITC and PEITC inhibited CM-induced tube formation, NO production and MMP activity, but further enhanced CM induced VEGF secretion. In conclusion, BITC and PEITC inhibited activated macrophage-induced tube formation which is an in vitro marker of angiogenesis, and such effect was associated with decreased NO production and MMP activity, as well as increased VEGF secretion in endothelial cells.

P5-06
INDOLE-3-CARBINOL INHIBITS HEPATIC STEATOSIS AND MODULATES EXPRESSIONS OF HEPATIC LIPID METABOLISM RELATED GENES IN MICE FED WITH HIGH FAT DIET

Chang, Hsiao-Pei; Lee, Yuan-Hsia; CHEN, YUE-HWA
Taipei Medical University, Taipei, TWN

OBJECTIVE: This study was aimed at investigating the effects of indole-3-carbinol (I3C), a bioactive component in cruciferous vegetable, on serum triglyceride and cholesterol, hepatic triglyceride accumulation, and hepatic mRNA expressions of lipid metabolism related genes in high fat diet-induced obese mice.

METHODS: C57BL/6 mice were randomly divided into three groups, control (C), high fat (HF), and HF diet + 5 mg I3C/kg intraperitoneally (HFI). After 12 wks of feeding, serum and fecal triglyceride and cholesterol were analyzed, hepatic fat contents were determined, and hepatic expressions of sterol regulatory element binding protein -1 (SREBP-1), acetyl CoA

carboxylase (ACC), and peroxisome proliferators-activated receptor α (PPAR α) mRNA were examined.

RESULTS: I3C reduced high fat diet-induced hepatic steatosis, lowered serum and hepatic triglyceride levels, and decreased SREBP-1 and ACC, but increased PPAR α mRNA expressions in liver. However, no significant difference was observed in serum and fecal cholesterol levels between HFI and HF groups.
CONCLUSIONS: I3C suppressed high fat diet-induced hepatic steatosis, lowered serum and hepatic triglyceride levels, and such effects were correlated with modulated gene expressions of lipid metabolism related genes in liver.

P5-07
ASTAXANTHIN: NEUROPROTECTIVE MECHANISM IN TRAUMATIC BRAIN INJURY IN RATS

Chin, Hung Jung; Chen, Han-Jung
E-da Hospital, Kaohsiung County, TWN

Astaxanthin, a carotenoid without vitamin A activity, has shown anti-oxidant activities. Traumatic brain injury (TBI) usually result in inflammatory effect and delay the prognosis time. This study was investigate whether astaxanthin has an inflammatory-lowering effect in rats suffer from TBI. Eight-week-old Sprague Dawley (SD) rats were used for animal feeding trial. One week before performing the TBI operation in rats, feed contain different concentrations of astaxanthin will be feed to these rats. During the post-operation period, production and expression of interleukine-6 (IL-6), IL-1 β , tumor necrosis factor- α (TNF- α), prostaglandin E2 (PGE2), nuclear factor- κ B (NF- κ B), nitric oxide (NO), and inducible NO synthase (iNOS) in brain or serum of rats, neurological performance and neuronal survival will analyze to investigate the mechanism of neuroprotective effects of astaxanthin in rats.

Preliminary data showed that rats fed with 40 mg/kg B.W. astaxanthin have lower serum IL-6 and TNF- α concentration than the control after the TBI operation. The serum IL-6 and TNF- α concentration were decreased from 1.3 and 0.41 ng/mL to 0.97 and 0.25 ng/mL, respectively, suggested an anti-inflammation effect of astaxanthin.

P5-08
EFFECT OF (EISENIA BICYCLIS) - DERIVED PRODUCTS ON CARBOHYDRATE AND LIPID METABOLISM IN STREPTOZOTOCIN-INDUCED DIABETIC MOUSE

Cho, Sung-Hee; Park, So-Young; Choi, Sang-Won
Catholic University of Daegu, Gyeongbuk, KOR

To investigate the use of sea oak (*Eisenia bicyclis*; EB) as a functional food material improving blood glucose and lipid profile, EB was included in the AIN-93 diet and fed to streptozotocin-induced diabetic mice weighing 34.0 \pm 0.7 g for four weeks. Dietary EB materials were water (W) and viscozyme-treated (N) extracts and EB pill containing EB and other seaweed powders at the level of 5% and EB derived fucoidan (F) at the level of 1%. Blood glucose increase was lowered by EBW and EBP in 2 weeks and by all EB materials in 4 weeks when serum insulin level increased most in EBN group compared with control DM group. Serum and liver levels of total cholesterol was lower but serum HDL-cholesterol higher in all EB groups. Serum and liver levels of lipid peroxide measured as TBARS were lower while liver glycogen contents were higher in all EB groups. Some of these effects were more pronounced either in EBN and EB pill groups. It is concluded that viscozyme-treated extract of EB can be utilized as a functional component for improving blood glucose, lipid profile and peroxidation status in diabetic subjects and the formulation of EB pill is regarded as appropriate for the preparation of a functional food.

(Supported by the RIC Program of MOCIE, Korea).

P5-09

THE CONCENTRATION OF OLEOCANTHAL IN OLIVE OIL WASTE

Cicerale, Sara¹; Conlan, Xavier²; Barnett, Neil²; Keast, Russell¹
¹Deakin University, Melbourne, Victoria, AUS; ²Deakin University, Geelong, Victoria, AUS

RATIONALE & OBJECTIVES: Oleocanthal is a natural non-steroidal anti-inflammatory phenolic compound present in extra virgin olive oil (EVOO). It has been proposed that the biological activity of oleocanthal is partially responsible for the beneficial health effects of the Mediterranean diet. However, during the processing of olive oil, a large portion of phenolics are lost in the waste portion. Due to oleocanthal's healthful properties, its concentration in waste makes this usually disposed product a potentially valuable commodity to the nutrition/functional food industry. In this study we determined the concentration of oleocanthal in olive oil waste and compared this to its concentration in EVOO.

MATERIALS & METHODS: The concentration of oleocanthal in freshly pressed EVOO from Barnea olives and its subsequent waste was analyzed at three time points (i.e. early, middle and late harvest) during the processing period for this cultivar. Oleocanthal concentrations were quantified using high performance liquid chromatography (HPLC).

RESULTS & FINDINGS: At the time points, early and middle harvest, the concentration of oleocanthal in waste was comparable with that in the oil (128.25 ± 14.67 mg/kg and 123.24 ± 6.48 mg/kg, 112.15 ± 1.51 mg/kg and 114.20 ± 19.9 mg/kg respectively). However at late harvest, there was a decline in the concentration of oleocanthal in the waste compared to the oil (62.35 ± 7.97 mg/kg and 152.22 ± 10.54 mg/kg respectively).

CONCLUSION: Olive oil waste, particularly from early and middle harvest olives is potentially a valuable commodity to the nutrition/functional food industry.

P5-10

LACTOFERRIN DIFFERENTLY MODULATE IMMUNOLOGICAL REGULATORS AND EFFECTORS IN PEYER'S PATCHES AND SPLEEN IN MICE

Fan, Cuibai¹; Davila, Anne-Marie¹; Xia, Shenghua¹; Martin-Rouas, Christine²; Blachier, François³; Tomé, Daniel¹
¹AgroParisTech, Paris, FRA; ²SB Alliance, Viroflay, FRA; ³INRA, Paris, FRA

OBJECTIVE: The aim of the study was to analyze the influence of oral bovine lactoferrin on fecal counts of Lactobacillus and Bifidobacterium flora, on fecal and serum immunoglobulin isotypes and on spleen and Peyer's patches cell phenotypes. BALB/c mice (n=20) were fed during 6 weeks a basal diet supplemented or not with 1% (w:w) lactoferrin. Fecal samples were collected for Lactobacillus and Bifidobacterium flora and immunoglobulin isotype concentrations analysis. Blood samples were collected to determine immunoglobulin isotype concentrations. Phagocytosis, natural killer (NK) activities and T-lymphocytes phenotypes from spleen and Peyer's patches (PP) were determined by flow cytometry.

RESULTS: fecal Lactobacilli and Bifidobacteria concentrations were not affected by the presence of lactoferrin. The presence of lactoferrin in the diet: (1) induced a higher level of fecal IgG whereas fecal IgA and IgM and serum Igs were not modified, (2) improved phagocytosis in spleen neutrophils by increasing their activity (on E.coli) whereas the number and activity of monocytes was not affected, (3) had no effect on NK activity, (4) did not modified spleen T cell subpopulations, (5) induced a reduced levels of CD3+, CD8+ and CD3+CD4+ in Peyer's Patches cell subpopulations.

CONCLUSION: oral lactoferrin does not affect Lactobacillus and Bifidobacterium flora but modified several immunological markers. These modifications are different in spleen and Peyer's Patches. Lactoferrin improves innate immunity in spleen and acquired immunity in Peyer's Patches, respectively.

P5-11

USEFULNESS OF VEGETABLE OIL WITH ADDED HYDROXYTYROSOL TO REDUCE CVD RISK

Díaz Prieto, Ligia Esperanza; Nova Rebato, Esther; Gómez Martínez, Sonia; Romeo, Javier; Marcos, Ascensión CSIC, Madrid, ESP

BACKGROUND AND AIM: Epidemiological data have shown significant protective effects of hydroxytyrosol (HT) against cancer and CVD. Aim: Assessment of sunflower oil (SO) with added HT consumption (45–50 mg/d, Oleoactive from Koipesol, SOS Group SA, Madrid, Spain) on LDL-cholesterol and endothelial adhesion molecules in healthy adults.

METHODS: 22 healthy subjects (both sexes, aged 20–45y) were recruited, submitted to a randomized cross-over design and divided into two groups consuming SO+HT and SO-HT in 3 week-periods with a 2-week wash-out period in between both interventions. According to the cross-over design, each group followed an opposite order of both treatment periods. Serum LDL-cholesterol levels and endothelial adhesion molecules (ICAM-1 and VCAM-1) were analyzed at four points: at 0, 3, 5 and 8 weeks.

RESULTS: In both groups, LDL cholesterol levels showed a tendency to increase during SO-HT diet compared to SO+HT diet. SO+HT diet reduced VCAM-1 levels compared to baseline.

CONCLUSION: The diet rich in hydroxytyrosol promoted a slight improvement in lipid profile which might be useful for CV risk prevention.

P5-12

EFFECT OF DASIDZEIN ON SERUM GLUCOSE, LIPID, AND LIPOPROTEIN PROFILE AND PAROXONASE ACTIVITY IN DIABETIC RATS

Mohammad Zadeh Honarvar, Neyaz; Eftekhari, Mohammad Hassan; Owjje, Ali Akbar; Rajaeifard, Abdol Reza Shiraz University of Medical Sciences, Shiraz - Fars, IRN

RATIONALE & OBJECTIVES: Controversy exists about the ability of soy isoflavones to modulate biochemical risk markers in diabetic patients.

The objective of this research was to assess whether the consumption of daidzein, the most important isoflavone in soybean, would result in improved lipoprotein profile, serum glucose and paroxonase activity in diabetic rats.

MATERIALS & METHODS: 36 male Sprague-Dawley rats were divided into nondiabetic control group, streptozotocin induced diabetic group without supplementation and diabetic group supplemented with 600mg/kg daidzein. Diabetes was induced by a single injection of STZ (60 mg/kg BW) freshly dissolved in 0.05mol/L citrate buffer into the vein of the tail. Diabetes was confirmed by measuring the fasting blood glucose concentration 72-h post injection. The Rats with glucose level above 250mg/dL were considered to be diabetic. Daidzein were supplemented to the diet and used for 3 weeks.

RESULTS & FINDINGS: The supplementation of daidzein had no effect on fasting glucose level but a significant reduction in TG, cholesterol, LDL level was observed in the group treated with daidzein in comparison to the diabetic control group. HDL was increased in supplemented group. Serum paroxonase activity was decreased in diabetic control group. Daidzein had no effect on activity of this enzyme but comparison of paroxonase activity at the initial and end of study had assigned of positive effect of daidzein supplementation on prevention of enzyme activity reduction.

CONCLUSION: These results suggest that daidzein, as one of the soy isoflavones can ameliorate hyperlipidemia in diabetic rats, but has no significant effect on blood glucose levels, and can therefore be useful in correction of hyperlipidemia in diabetic patients.

P5-13

GALACTOMANNANS FROM COCONUT LOWERS SERUM TOTAL AND LDL-CHOLESTEROL IN HYPERCHOLESTEROLAEMIC GUINEA PIGS

Gooneratne, Jaanaki¹; Samarasinghe, K.²; Vidanarachchi, Janak²

¹Industrial Technology Institute, Colombo, Western Province, LKA; ²University of Peradeniya, Peradeniya, Central Province, LKA

Many prebiotic plant oligosaccharides have shown various health benefits in animal models. Current study evaluated the effect of a galactomannan extracted from coconut kernel on the lipid profile of hypercholesterolemic laboratory guinea pigs (*Cavia porcellus*).

Galactomannans (CGM) were extracted from defatted, sugar-removed coconut kernels in 0.05 M Na₂CO₃ and 0.05M KOH sequentially, by stirring for 12 h at 4 °C, extracts adjusted to pH 5.0 and precipitated using ethyl alcohol (1:4) in an ice bath. Both extracts contained over 90% galactomannans (1:5 ratio of galactose:mannose) as determined by GC techniques.

Eight weeks old male guinea pigs (n=18), randomly assigned to nine cages were fed with broiler starter feed (adaptation period) for one week, followed by a cholesterol enriched diet for 2 weeks. The hypercholesterolemic guinea pigs were randomly assigned to three treatments: basal diet (BD); BD+ 1000 ppm CGM; and BD+ 2000 ppm CGM; and fed ad libitum for 3 weeks. Serum lipid profiles were analyzed. Results showed BD supplemented with CGM at 1000 and 2000 ppm, significantly (p<0.05) lowered total cholesterol levels from 241.5±47.23 mg /dL to 155.1± 30.91 mg /dL and 170.9±3.66 mg /dL, lowered LDL-cholesterol levels from 123.7±14.62 mg /dL to 108.2±27.26 mg /dL and 105.5±8.03 mg /dL and increased HDL-cholesterol levels from 16.3±2.16 mg /dL to 45.2±3.80 mg /dL and 40.3± 4.01 mg /dL, respectively, lowering the LDL/HDL ratio from 7.16 (BD) to 2.4 and 2.7 for test diets. Coconut galactomannans showed beneficial effects on the lipid profile of hypercholesterolemic laboratory guinea pigs.

P5-14

GLYCEMIC INDEX ASSESSMENT OF BREAD MADE WITH FRUCTOOLIGOSACCHARIDE AND B-GLUCAN LY, Sun Y.¹; Sun Mi Jeon, Sun Yung LY²

¹Chungnam National University, Daejeon, KOR; ²Department of Food and Nutrition, Chungnam National University, Daejeon, KOR

RATIONALE & OBJECTIVES: The objective of this study is to make bread with low glycemic index (GI) for those who need blood sugar control.

MATERIALS & METHODS: Two test breads were made: one with β-glucan and another with fructooligosaccharide. Specifically, using the basic recipe for white bread, the first test bread replaced 10% of the flour with an insoluble β-glucan produced from the agrobacterium spp R259 KCTC 10197BP, the second test bread replaced 100% of the sugar with fructooligosaccharide. Acceptability and GI for the breads were measured. For GI assessments of the breads, nine adults were selected and their blood glucose curve was tracked for two hours after eating the bread, which contained 50g of available carbohydrates. The GI was calculated based on the glucose or AUC (Area Under Curve) of white bread.

RESULTS & FINDINGS: The sensory evaluation found that the three breads showed no significant differences in color, flavor, taste, texture, and overall acceptability. Though the difference was not statistically significant, the GI of the fructooligosaccharide bread was relatively low. The GIs computed, using the white bread as a standard, were 77.89±41.77 and 98.65±26.10 for fructooligosaccharide bread and β-glucan bread, respectively.

CONCLUSION: This suggests that the fructooligosaccharide bread has lower GI than white bread, and could be used for

people who need blood sugar control. The insoluble β-glucan bread, however, requires further study, since its GI difference with white bread was not significant.

Sun Yung Ly, Department of Food and Nutrition, College of Human Ecology, Chungnam National University, 220 Gung-dong, Yuseong-gu, Daejeon 305-764, Korea

P5-15

VOLATILE AROMA CONSTITUENTS OF HERB OIL FROM ECLIPTA PROSTRATA L

Chang, Kyung Mi¹; Kim, Gun Hee²

¹Kmchang, Seoul, KOR; ²Ghkim, Seoul, KOR

RATIONALE & OBJECTIVES: The plant essential oil from aromatic plants has been known since antiquity to possess biological properties because they included tremendous enriched with terpenoids which exert inhibitory action against micro organisms by disrupting their membranes. The volatile aroma components of *Eclipta prostrata* L. were separated and tentatively identified.

MATERIALS & METHODS: The volatile flavor components from *Eclipta prostrata* L. were isolated using a Clevenger-type apparatus by hydro distillation extraction method, and analyzed by gas chromatography-mass spectrometry (GC/MS).

RESULTS & FINDINGS: It contained 35 hydrocarbons (56.20%) with sesquiterpene predominating, 10 alcohols (2.40%), 8 ketones (3.83%), 9 aldehydes (1.86%), 2 oxides (6.03%), 2 esters (0.13%), and 2 miscellaneous components (0.65%).

CONCLUSION: α -Humulene, 6,9-heptadecadiene, (E) -β- farnesene, and α -phellandrene were the predominantly abundant aroma components in *Eclipta prostrata* L.

P5-16

EFFECT OF SUPPLEMENTED HIGH FRUCTOSE DIETS WITH TWO LEVELS FROM SOME SPICES ON NORMAL ALBINO RATS

Abd El-Megeid Ali, Ashraf A.¹; Hasanain, Manal A.²; Naga, Mona E.²; Abd El-Hamid, Mohamed Y.²

¹Faculty of Home Economics Helwan University, Cairo – Egypt., Cairo, EGY; ²Home Economic Dept. Faculty of Specific Education, Minufiya University., Cairo, EGY

The present work was conducted to study the influence of supplemented high fructose diets (HFD) with (some spices) on albino rats. Two main experimental groups were established. Group 1 used as a negative control group fed on basal diet. The other group was fed with fructose-enriched diet for 15 days, then this group was divided into eleven subgroup. Ten subgroups were treated with HFD containing 2.5% and 5% spices and its combination for 30 days, while Subgroup(11) fed on HFD only (as a control positive group). Feeding rats on HFD (positive control) led to defect in lipid fractions, dysfunction in kidney and increased the level of serum glucose, compared to the negative control group. On the other hand, treating rats with HFD containing 2.5% and 5% (spices and its combination) improved the mean values of these parameters, especially with high levels of spices.

P5-17

POLYAMINES: DIETARY INTAKE, DATABASE PROGRESS AND FOOD CONTRIBUTION TO THE TOTAL DAILY INTAKE

Ali, Mohamed A; Yngve, Agneta
Karolinska Institutet, Huddinge, USA

Knowing the levels of bioactive amines particularly polyamines (putrescine, spermidine and spermine) in foods is becoming a growing concern due to the association of dietary polyamines to health and disease. Also due to the lack of information on

polyamine in foods, especially in Sweden, a database for food polyamines covering around 250 foods was shaped using different literatures and Dietist XP Software linked to the database. 7-day food records were collected from adolescent groups in order to estimate polyamines daily intake.

Of the foods from the database, fruits and cheeses were the highest sources of putrescine, while vegetables and meat products were reported to be rich in spermidine and spermine respectively. The mean intake of polyamine was 317 $\mu\text{mol/day}$, which was within the range that was reported in some European countries and higher than the Japanese and American estimations. There was a statistically significant positive correlation between polyamines intake and body weight ($P < 0.002$, $r = 0.37$).

Fruits contributed to approximately half of the total intake of polyamines while the other food groups shared the remainder percentage almost equally.

Development of such database makes it possible to estimate polyamines intake and gives more opportunities to correlate polyamine to health and nutrition.

P5-18

GREEN TEA: THE NEW ERA OF ANTIOXIDANTS AND FREE RADICAL SCAVENGERS, MUSLIM ALI, ABRAR ALANSARY, FATIMA BOU-ABBAS, MARTHA THOMSON, AND KHALED K. AL-QATTAN DEPARTMENT OF BIOLOGICAL SCIENCES, FACULTY OF SCIENCE, KUWAIT UNIVERSITY, P.O. BOX 5969, 13060-SAFAT, KUWAIT

Ali, Muslim

Kuwait University, Kuwait, KWT

It is well established that risk of cardiovascular disease due to atherosclerosis increases with increasing concentration of total cholesterol and increased level of triglycerides in the plasma. Green tea catechins have a variety of pharmacologic effects, i.e., antioxidative, antimutagenic, anticarcinogenic, anti-inflammatory, antimicrobial, and hypolipidemic effects. We have investigated the effects of green tea extract on the total antioxidant, protein, enzymes, and lipid levels of normal and 2% cholesterol-fed diet in rats. The rats were divided into four groups; control diet group drinking water (group 1), control diet group drinking green tea (group 2), 2% cholesterol diet group drinking water (group 3) and 2% cholesterol diet group drinking green tea (group 4). The rats were sacrificed after six weeks and blood was collected by cardiac puncture. The serum was prepared by centrifugation and stored at -80°C for biochemical analyses. Our experimental data showed a significant increase in the amount of serum total antioxidant levels in the rats drinking green tea compared to rats drinking water. These differences were observed in both groups of rats which were on normal and 2% cholesterol diet. Data in our experiment shows that there was no significant change in serum glucose levels. Serum cholesterol and triglyceride levels were significantly decreased in rats drinking green tea. Green tea was shown to decrease the levels of glutamic pyruvic transaminase (GPT) in the liver. Low antioxidant and high cholesterol levels in rats on 2% cholesterol diet explains the fact that consumption of green tea may be beneficial in the prevention of atherosclerosis.

P5-19

ROLE OF PROBIOTIC AND NOVEL NUTRACEUTICALS IN IMPROVING MICROFLORA, BIOCHEMICAL AND CYTOGENETIC PARAMETERS IN ADJUVANT ARTHRITIS

Al-Okbi, Sahar Y.⁴; Sahar Y. Al-Okbi¹, Doha A. Mohamed¹ Souria M. Donya² and Azzat B. Abd El Khalek³

¹Food Sciences and Nutrition Department; ²Cytogenetic Department; ³Dairy Department, National Research Centre, Cairo, EGY; ⁴National Research Centre, Cairo, EGY

Plants foods are rich in biologically active constituents that may have beneficial effects towards different diseases. So the aim of the current research is finding out plant food components, nutraceuticals that may have bioactivity towards chronic inflammation. The research dealt with plant foods fractions that are rich in phenolic compounds, carotenoids and tocopherols since these compounds possess a lot of health benefits include anti oxidant and anti-inflammatory effect. The current research dealt with preparation of bioactive fractions from selected plant foods which are rich in the aforementioned compounds. In addition, preparation of three mixtures of the previously prepared fractions have been carried out. The anti-inflammatory activity of the different mixtures as well as probiotic bacteria (*Bifidobacteria bifidum*) have been evaluated in chronic inflammation model in rats (adjuvant arthritis). The mechanism of action and safety of the three mixtures and the probiotic have been studied through determination of inflammatory and oxidative stress biomarkers, colonic bacteria profile and specific cytogenetic parameters.

In conclusion, the studied three mixtures showed to possess anti-inflammatory activity in chronic inflammations models in rats and they as well as the administered probiotic improved the biomarkers of inflammation and oxidative stress with variable degrees. The administered mixtures as well as the probiotic produced significant increase in colonic *Bifidobacteria bifidum* that may reflect its involvement in the anti-inflammatory mechanism. It has been also observed that adjuvant arthritis produced genotoxicity and DNA fragmentation that have been managed significantly by administration of different mixtures but not probiotic.

P5-20

STRAWBERRY CONSUMPTION AND ANTIOXIDANT STATUS IN HUMAN SUBJECTS

Tulipani, Sara¹; Romandini, Stefania¹; Busco, Franco²; Mezzetti, Bruno¹; Battino, Maurizio¹

¹Università Politecnica delle Marche, Ancona, ITA; ²Torrette-Umberto I Regional Hospital, Ancona, ITA

BACKGROUNDS: Most of the native substances present in the berry matrix express high antioxidant properties and many studies conducted in vitro indicate that berry phenolics have a wide range of biological properties ranging from antioxidant to anticancer, anti-inflammatory and cell regulatory effects. However, the even enthusiastic data obtained in vitro cannot be directly translated to biological activities borne out in vivo, and the lack of understanding of the effective potentialities of berry antioxidants and their mechanisms of action is mainly due to the still scarcity of in vivo studies. Few groups have until now investigated the impact of strawberry consumption on human health, by verifying the biological properties of the strawberry phytochemicals once ingested, metabolized and distributed in tissue and, in particular, the potential effects on biomarkers of oxidative stress and inflammation in animal models and human subjects.

MATERIALS & METHODS: After a fine characterization of the antioxidant, micronutrient and phytochemical composition of strawberries from plants with different genetic background, we carried on sequential feeding studies based on acute and prolonged consumption of strawberries in addition to the usual diet of the human subjects. The work included the evaluation

of potential quantitative variations in the hydro- and lipophilic serum antioxidants and in the plasma Total Antioxidant Capacity (TAC). We also assessed the putative improvement in the cellular mechanisms of protection against spontaneous and induced oxidative damage, measured in normal erythrocytes and lymphocytes isolated from human subjects, before and after the period of strawberry intake.

RESULTS & DISCUSSION: The plasma TAC and the serum ascorbate contents significantly increased during both the studies. Surprisingly, the serum urate levels were unchanged, confirming that the improvement in the plasma antioxidant status after strawberries consumption was related to the absorption of dietary antioxidants, with the main relevant contribution of vitamin C, rather than to the increase of endogenous metabolic urate. However, the *in vivo* contribution of the strawberry phytochemicals to the increased plasma antioxidant properties failed to be ascertained, and no traces of phenolic derivatives were observed in fasted serum collected during the prolonged strawberry consumption, indicating that there is no evidence for long bioavailable circulating phenolic metabolites after several hours from the last intake of the fruits.

P5-21 IN VITRO ANTIOXIDANT ACTIVITY OF AMARANTHUS LIVIDUS L.

Can, Ayse; Ozsoy, Nurten; Yilmaz, Tugba; Kurt, Ozlem; Yanardag, Refiye
Istanbul University, Istanbul, TUR

Amaranthus lividus L. (= *A. blitum*) locally known as “dari mancari” is one of the most popular leafy vegetable consumed in West Black Sea Region of Turkey. The present study demonstrated that the water, methanol and ethyl acetate extracts from *A. lividus* contained naturally occurring antioxidant components, including total phenols, β -carotene, α -tocopherol, and ascorbic acid. The extracts exhibited an inhibitory capacity against FeCl₃/ascorbic acid induced phosphatidylcholine liposome oxidation, reduced lipid peroxidation in the β -carotene-linoleic acid system, scavenged stable ABTS •⁺, DPPH •, superoxide anion, hydroxyl, NO • radicals, and hydrogen peroxide, acted as reductants and formed chelating complex with transition metals. *Amaranthus lividus* vegetable (stems with leaves and flowers) seems to be good source of natural antioxidants.

P5-22 IN VITRO ANTIOXIDANT POTENTIAL AND PHYTOCHEMICAL CONSTITUENTS OF THREE CAMEROONIAN MEDICINAL PLANTS USED TO MANAGE PARASITIC DISEASES

Yondo, Jeannette¹; Fomekong, Gilles Inès D.²; Kontangui, Marie-Claire¹; Wabo, Josué P.¹; Tankoua, Olivia F.¹; Kulate, Jules-Roger¹; Mpoame, Blaise M.¹

¹University of Dschang, West, CMR; ²University of Yaounde I, Centre, CMR

RATIONALE & OBJECTIVES: The present study investigates the fundamental scientific bases for the use of these plants by defining and quantifying the amount of crude phytochemical constituents present in these plants.

MATERIALS & METHODS: Aqueous and methanol-methylene chloride extracts of *Schumaniophyton magnificum*, *Rauvolfia vomitoria* and *Pseudospondias microcarpa* were screened for phytochemical constituents. The antioxidant potential of these plants were also evaluated using three different methods: FRAP (Ferric reducing antioxidant power), DPPH (1,1-Diphenyl-2- Picrilhydrazyl) and Folin (Folin-Ciocalteu reagent).

RESULTS & FINDINGS: Tests for saponines, phenols, Tanins, Terpenoids, flavonoids, cardiac glycosides and coumarines were positive in both methanol-methylene chloride and aqueous

extracts, while anthraquinones and anthocyanins were absent in *Schumaniophyton magnificum*. The aqueous and methanol-methylene chloride extracts of *Pseudospondias microcarpa* had the highest antioxidant activity ($P < 0.05$) follow by *Rauvolfia vomitoria* and *Schumaniophyton magnificum*. The presence of the above bioactive compounds could justify the use of these plants by traditional practitioners to treat parasitic diseases.

CONCLUSION: Generally, *Pseudospondias microcarpa* have presented the better antioxidant potential and polyphenolic content, while the presence of several bioactive compounds was found in *Schumaniophyton magnificum*.

P5-23 METABOLOMIC CHANGES IN URINE INDUCED BY ORAL ADMINISTRATION OF QUERCETIN IN RATS

Guo, Changjiang; An, Daizhi; Zhang, Qi; Wei, Jingyu; Yang, Jijun; Yan, Xianzhong
Institute of Hygiene and Environmental Medicine, Tianjin, CHN

RATIONALE & OBJECTIVE: Quercetin, one of representative flavonols, has been studied extensively. However, the actions of quercetin *in vivo* are not well understood. We investigated the overall metabolic changes in the urine after oral quercetin administration in rats and provide useful information on the actions of quercetin *in vivo*.

MATERIALS & METHODS: Rats were orally administered a single dose of quercetin aglycone (40 mg/kg body weight). Urine samples were collected before and after treatment and subjected to 1H NMR based metabolomic analysis and HPLC-MS.

RESULTS & FINDINGS: Significant changes in urine metabolite profiles were observed after quercetin administration. Relative increases in the concentrations of creatinine, glutamine, and trimethylamine N-oxide, and reductions in the concentrations of lactate, 2-oxoglutarate, citrate, and succinate were observed. The level of acetate decreased in the 0–24 h period after treatment and recovered thereafter. HPLC-MS analysis identified quercetin, methyl quercetin, quercetin sulfate, quercetin monoglucuronide, and methyl quercetin monoglucuronide in the urine after quercetin administration.

CONCLUSION: We conclude that quercetin acts as more than an antioxidant *in vivo* and plays a significant role in metabolic processes. The active forms of quercetin present in the biofluids must be investigated further.

P5-24 EFFECTS OF PARSLEY (PETROSELINUM CRISPUM) AND ITS FLAVONOL CONSTITUENTS, KAEMPFEROL AND QUERCETIN, VERSUS ALLOPURINOL ON SERUM URIC ACID LEVELS, BIOMARKERS OF OXIDATIVE STRESS AND LIVER XANTHINE OXIDOREDUCTASE ACTIVITY IN OXONATE- INDUCED HYPERURICEMIC RATS

Haidari, Fatemeh¹; Mohammad Shahi, Majid¹; Keshavarz, Seid Ali²; Rashidi, Mohammad Reza³

¹Faculty member, Ahvaz & Khuzestan, IRN; ²Faculty member, Tehran & Tehran, IRN; ³Faculty member, Tabriz & Azarbaijan Sharghi, IRN

RATIONALE & OBJECTIVES: The aim of this study was to investigate the effects of parsley, quercetin and kaempferol versus allopurinol on serum uric acid levels, liver xanthine oxidoreductase activity and two non-invasive biomarkers of oxidative stress in normal and oxonate-induced hyperuricemic rats.

MATERIALS & METHODS: A total of 60 male Wistar rats (body weights: 180-200g) were randomly divided into ten equal groups (n=6); including 5 normal and 5 hyperuricemic groups. Parsley (5g/kg) and quercetin, kaempferol and allopurinol (5mg/kg) were orally administered to the corresponding groups

for 14 days.

RESULTS & FINDINGS: Parsley, quercetin and kaempferol significantly reduced the serum uric acid levels of hyperuricemic rats in a time-dependent manner. All treatments significantly inhibited liver xanthine oxidoreductase activity handled also to a significant increase in total antioxidant capacity and decrease in malondialdehyde concentration in hyperuricemic rats. Although the hypouricemic effect of allopurinol was much higher than that of parsley and its flavonol constituents, it could not significantly change oxidative stress biomarkers.

CONCLUSION: These features of parsley and its flavonols make them as a possible alternative for allopurinol, or at least in combination therapy to minimize the side effects of allopurinol to treat hyperuricemia and oxidative stress diseases.

P5-25

EFFECTS OF CHERRY INTAKE ON SERUM URIC ACID LEVELS, BIOMARKERS OF OXIDATIVE STRESS AND HEPATIC XANTHINE OXIDASE/DEHYDROGENASE ACTIVITY IN HYPERURICEMIC RATS

Haidari, Fatemeh¹; Mohammad-Shahi, Majid¹; Keshavarz, Seid-Ali²; Rashidi, Mohammad-Reza³

¹Faculty member, Ahvaz & Khuzestan, IRN; ²Faculty member, Tehran & Tehran, IRN; ³Faculty member, Tabriz & Azerbaijan Sharghi, IRN

RATIONALE & OBJECTIVES: The aim of this study was to investigate the effect of cherry intake on serum uric acid levels, biomarkers of oxidative stress and hepatic xanthine oxidase/dehydrogenase activity in hyperuricemic rats.

MATERIALS & METHODS: A total of 36 male Wistar rats (body weights: 180-200g) were randomly divided into six equal groups. These groups were normal; normal+cherry (5g/kg); normal+allopurinol (5mg/kg); hyperuricemic; hyperuricemic+cherry (5g/kg); hyperuricemic+allopurinol (5mg/kg). Every group received its treatment orally once a day for 14 days. Allopurinol was used as positive control and experimentally hyperuricemia in rats was induced by intraperitoneal injection of potassium oxonate (250 mg/kg).

RESULTS & FINDINGS: Oral administration of cherry significantly reduced the serum uric acid levels of hyperuricemic rats in a time-dependent manner. Cherry significantly inhibited liver xanthine oxidase/dehydrogenase activity handled also to a significant increase in total antioxidant capacity and decrease in malondialdehyde concentration in rats. Although the hypouricemic effect of allopurinol was much higher than that of cherry, allopurinol could not significantly change oxidative stress biomarkers.

CONCLUSION: These features of cherry, as a polyphenols-rich food, make it an attractive candidate for the prophylactic treatment of hyperuricemia, particularly if it is to be taken on a long-term basis.

P6: Nutrient Requirements & Metabolism: Others I

P6-01

EFFECT'S OF BAKER'S YEAST DERIVED BETA-GLUCAN ON DEFECTION IN FEMALE STUDENTS

Hanai, Miho; Inoue, Seira; Inaoka, Aya; Kurosawa, Akiyo Ibaraki Christian University, Hitachi, Ibaraki, JPN

OBJECTIVE: It has already been reported that baker's yeast-derived beta-glucan (BBG) prevented and reduced the incidence of allergic reactions. This study evaluated the effects of BBG on defecation frequency and fecal properties in female students.

METHODS: Sixty healthy female students (age: 19.4 +/- 1.0) were divided into two groups for a single crossover study, and were given BBG (500m/day) or alpha cornstarch as a placebo. The experimental duration was 7 weeks, divided into 5 periods

consisting of no-administration periods (I, III, V : one week each) and administration periods (II, IV : two weeks each). Throughout the study, subjects answered a questionnaire about daily defecation. For statistical analysis, subjects were divided into three groups by the results of frequency of defecation in the I period: group 1, 1 time or more /day; group 2, 0.5-1 times/day; group 3, under 0.5 times/day.

RESULTS: 1) There was no effect of BBG on frequency or amount of stool in any group. 2) The form of stool significantly improved by BBG in group 3. 3) BBG ingestion caused stool color to change from bright to dark in group 3 (p<0.12).

CONCLUSIONS: These results suggest that BBG improved defecation properties in subjects who tend to be constipated.

P6-02

SOY PRODUCTS CONSUMPTION AMONG POST MENOPAUSAL MALAY WOMEN

Hasnah Haron ¹, Amin Ismail², Suzana Shahar¹, Loh Su Peng² and Azrina Azlan²

¹ Department of Nutrition and Dietetics, Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia; ² Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra, MYS

Estimation of the isoflavone intake of the locals is important in order to study the protective effects of isoflavone against the risk of chronic diseases. This study was carried out to estimate isoflavone intake and determine the type of soy products preferred by 125 post menopausal Malay women. Subjects were asked on frequency of soy products intake and portion size normally consumed for the past 3 months. Average total isoflavone intake for the subjects was 25 ± 15 mg, ranging from 0-61 mg. Most subjects (23%) preferred tempeh and the least preferred was egg tofu (4%). Highest frequency intake for most soy products was once a week except for soft tofu and fujook were once a month while egg tofu was twice a month. About 90% of the subjects were tempeh eater and 67% of them preferred fried tempeh. Most post menopausal Malay women in this study consumed tempeh for at least once a week.

P6-03

NEW PHYSIOLOGICAL FUNCTIONS OF EDIBLE MUSHROOMS IN JAPAN

Horie, Yoshimitsu¹; Horie, Kazuyo²

¹Eishoku University, Okazaki, Aichi Prefecture, JPN;

²University of Hamamatsu, Okazaki-shi, Aichi Prefecture, JPN

OBJECTIVES AND METHODS: Attention was paid on finding physiological functions of three edible mushrooms, Shiitake, Maitake, Eryngi, eaten widely in Japan and their dietary fiber fractions (DF). In the present study, the effects of the mushrooms and their DFs on both food intakes and 'endogenous' levels of plasma cholesterols were investigated using an model that rats were fasted for two days followed by repletion diets for three days. The diets contained each mushroom powder or its DF but no cholesterol. Shiitake's DF fraction only was further fractionated into acid and neutral detergent fibers (ADF and NDF). As for food intake of Shiitake, its mechanism was examined by the assay of blood glucose and frees fatty acids.

RESULTS: The food intakes were significantly decreased (P<0.05) all in the rats given diets containing the mushroom powders and their DFs including Shiitake's ADF+NDF and ADF or NDF. The reduced food intake by Shiitake was due to significantly elevated blood glucose and decreased free fatty acids (P<0.05). On the other hand, plasma endogenous total- and HDL-cholesterols were drastically decreased (P<0.01) only in rats given the diet containing the Shiitake powder and its ether extracts. For lowering blood cholesterols levels, an eritadenine containing mushroom only is effective, but that any other mushroom powders and all the DFs including Shiitake's

ADF and NDF were not effective.

CONCLUSION: We clearly demonstrated here that edible mushrooms and their DFs are likely to be effective for dieting, but that no mushrooms except Shiitake mushroom and any dietary fibers of mushrooms seem effective for blood cholesterol reduction.

P6-04

BLOOD LIPID PEROXIDATION AND ANTIOXIDANT ENZYMES AND VITAMINS IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS AND NEPHROTIC SYNDROME: A PRELIMINARY STUDY

Saowanee Kajanachumpol¹, Sakulrat Srirojana², Phienvit Tantibhedhyangkul²

¹Research Center, Faculty of Medicine, Ramathibodi Hospital, Mahidol University ; ²Department of Pediatrics, Faculty of Medicine, Ramathibodi Hospital, Mahidol University, THA

Products of plasma lipid peroxidations (malondialdehyde, MDA, and conjugated diene, CD) and activities of RBC antioxidant enzymes (superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) and catalase) and plasma vitamins E and C were studied in 19 patients with systemic lupus erythematosus (SLE) with nephritis, aged 11-17 years, 10 patients with nephrotic syndrome(NS), aged 8-17 years and 48 healthy controls, aged 14 years. The results showed that in the patients the concentrations of plasma MDA and CD increased significantly in compared with controls, while the activities of antioxidant enzymes and concentrations of vitamins did not change, except the SOD activity which increased slightly in SLE patients. Serum cholesterol and triglyceride concentrations increased markedly in the patients. It is concluded that the increase in lipid peroxidation in association with hyperlipidemia in patients with SLE and NS may predispose to the development of atherosclerosis.

P6-05

DIETARY SOY ISOFLAVONE DAIDZEIN LOWERS FOOD INTAKE, BODY WEIGHT AND BODY FAT IN OVARIECTOMIZED AND NON-OVARIECTOMIZED FEMALE RATS

Kishida, Taro; Mizushige, Takafumi; Osada-Ohtsu, Yohhei; Ishikawa, Shimpei; Nagamoto Manabu; Ebihara, Kiyoshi University, Matsuyama, Ehime, JPN

RATIONALE & OBJECTIVES: Estrogens down-regulate eating behavior and soy isoflavones are known to be estrogenic agents.

MATERIALS & METHODS: We examined the effect of dietary administration of the soy isoflavones daidzein and genistein on food intake, body weight gain and body fat in male, female and ovariectomized rats.

RESULTS & FINDINGS: Dietary daidzein, but not genistein decreased food intake, body weight and body fat in ovariectomized and non-ovariectomized female rats. Serum equal level of rats fed daidzein was much higher than serum daidzein level of same rats. Estradiol administration decreased these parameters in male and in ovariectomized rats. Dietary isoflavone did not affect uterine or didymus weight in spite of the observation that estradiol administration improved uterine atrophy in ovariectomized rats and decreased didymus weight in male rats.

CONCLUSION: It appears that daidzein specifically decreases food intake in females. However, this may not be a simple estrogenic effect because the effect of daidzein on food intake and reproductive organs differed from that of estrogen.

P6-06

THE EFFECT OF BREAKFAST AND SNACKS ON MORNINGNESS-EVENINGNESS AND MENTAL HEALTH OF YOUNG CHILDREN

Takeuchi, Hitomi¹; Kurotani, Mamiko²; Harada, Tetsuo¹; Nakade, Miyo²

¹Kochi University, Kochi, JPN; ²Aichi Gakusen University, Aichi, JPN

OBJECTIVES: The aim of this study was to clarify how consumption of breakfast and snacks affects morningness-eveningness and mental health of young children.

METHODS: In May, 2007, self-assessment questionnaires were administered to 779 children (ages 0-6) and their parents or guardians. Questionnaires included the Torsval and Akerstedt Morningness-eveningness Questionnaire (1980), a version of the morningness-eveningness questionnaire for young children and lifestyle-related questions on aspects such as eating habits and mental health.

RESULTS: Morning-typed children had healthier sleep. Children who frequently ate a well-balanced breakfast were more morning-typed and less often angry (P=0.047). Children who often consumed sweet foods or drinks were more evening-typed (foods: P<0.001; drinks: P=0.02). Children who were not picky eaters were more morning-typed, while picky eaters were more evening-typed (P=0.001).

CONCLUSIONS: Increased eveningness of parents' lifestyles may cause their children to become more night oriented. Increased eveningness of entire families may disrupt eating habits and lead to an increase in consumption of sweet foods and drinks and a decline in mental health. Reduction of eveningness may help improve eating habits, including snacking, and mental and physical health of children.

P6-07

SERUM ANTIOXIDANT VITAMINS C, A, E, OTHER ANTIOXIDANTS Se, Cu, Zn AND LIPD PROFILES IN BUDDHIST MONKS

Duangkamol Viroonudomphol¹, Talabporn Harnroongroj², Anchlee Mahaisiriyodom³

¹National Institute Metrology, Klong Luang, Pathumthani, THA; ²Department of Tropical Nutrition and Food Science, Faculty of Tropical Medicine, Mahidol University, THA;

³Department of Pathology, Priest Hospital, Bangkok, THA

Serum vitamins C, A, E, other antioxidants (se, cu, zn) and lipid profiles of 120 Buddhist monks, 40 healthy, 80 chronic diseased compared with 90 males in a control group. Subjects were Thai volunteers who attended the outpatient department, priest hospital, Bangkok, for a physical check-up from July to October 2004. There was no age difference between 2 groups. All serum vitamins c, a, e, were significantly lower in the Buddhist monks than controls. Similar results were found in serum se and hdl-c. However, higher serum ceruloplasmin, cu, zn, total cholesterol, ldlc and ldl-c/hdl-c ratio were shown in the Buddhist monks than controls. A positive correlation was found between age, vitamin a and e. A negative correlation was found between cholesterol, ldlc, hdl-c and vitamin e/ cholesterol ratio. Ceruloplasmin was found to correlate positive with copper concentration. A positive correlation was found between serum se, cu and zn in both Buddhist monk and control groups. The results suggest more research that should be conducted into the health and nutritional problems of both healthy and diseased subjects concerning vitamins and oxidative stress.