



SL-001

Scientific

Paradoxical effects of nutritional antioxidants

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Abstract: Antioxidants are crucial in counteracting oxidative processes occurring in the body. Reactive molecules, mostly containing oxygen or nitrogen and known as free radicals, are constantly generated in the course of many physiological pathways and play important roles in cell signalling and the immune response. The harmful effects of these endogenous agents and those of exogenous origin are generally controlled by various antioxidative defence systems in the organism. However, under certain circumstances an overproduction of reactive molecules with additional exposure to exogenous free radicals can lead to oxidative stress. Oxidative stress has been identified as a contributor to many chronic noncommunicable diseases such as diabetes mellitus, rheumatoid arthritis, cardiovascular diseases or cancer.

Many antioxidants are supplied by the diet in the form of vitamins. Thus, vitamin E (tocopherols and tocotrienols) and carotenoids protect the lipophilic milieu and vitamin C (ascorbic acid) the hydrophilic compartments. They are complemented by other redox systems acting as scavengers of free radicals, namely ubiquinones and secondary polyphenolic plant components, as well as enzymatic antioxidants that rely on trace elements (Fe, Se, Zn, Mn, Cu) as co-factors. Adequate supply of antioxidant vitamins and other dietary factors has the potential to prevent oxidative stress and the diseases associated with it. However, high doses of isolated nutritional antioxidants often failed to show the expected beneficial effects (e.g. tocopherol on cardiovascular events). On the contrary, they even increased the risk of disease and were associated with harmful side effects. A prominent example is the higher lung cancer rate observed in smokers supplemented with β -carotene. In line with this, epidemiological evidence of positive effects observed in vitro is mostly controversial with no firm clinical support.

The reason for this is that antioxidants through their reaction with radicals become themselves radicals with prooxidant properties. They are generally recovered by other redox systems cooperating in an intricate network in the body that can, however, be unbalanced by high dose supplementation of single components. Considering the complex involvement of redox reactions in cell signalling and immune responses, disruptions of the physiological equilibrium have decisive metabolic and health consequences.

This underscores the importance of a varied diet as the source of natural antioxidants. Little or unprocessed fruit and vegetables, nuts and seeds and whole grains contain a variety of antioxidants that by interacting with each other help in maintaining the antioxidative balance.

Keywords: antioxidants, vitamins, polyphenols, oxidative stress, noncommunicable diseases

SL-002

Scientific

Middle Eastern and Mediterranean diet: Similarities and differences

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Abstract: Mediterranean diet has been introduced as a healthy dietary pattern for heart. Adherence to this dietary pattern has been linked to reduced risk of cardiovascular disease and stroke. However, little is known and has been published about Middle Eastern dietary pattern. This review was conducted to compare Mediterranean with Middle Eastern dietary pattern. The content of macro- and micro-nutrients of these two dietary patterns are different. Carbohydrates constitute approximately 55 to 60 percent of energy intake in both diets. However, the main source of carbohydrates in Mediterranean diet is whole grains, fruits and vegetables; while the main carbohydrate content in Middle Eastern countries is refined grain with high glycemic index and glycemic load. The most important difference between two diets is the amount and types of dietary fat. In Middle Eastern dietary pattern, less than 30% of energy intake comes from fat; whereas the Mediterranean diet is a high fat eating pattern (35-40% of energy intake). In addition, the major sources of fat in the Mediterranean diet are olive oil and nuts. The amount of saturated fatty acids (SFA) and trans fatty acids (TFA) in this dietary pattern are low. In contrast, hydrogenated vegetable oils, dairy products, and animal products make up the large proportion of fat intake in Middle Eastern dietary pattern. It is worth noting that SFA and TFA content of this diet is much higher than international standards. Although the protein content of the Mediterranean diet is slightly lower than Middle East dietary pattern; high consumption of fish along with a small amount of animal products, red meat and especially processed meats intake, are considered prominent features of Mediterranean dietary pattern. On the other hand, Middle Eastern population consume large amounts of red and processed meats. Overall, the differences in both amount and sources of carbohydrate, fat and protein in the mentioned diets, has made the Middle Eastern diet as an increasing risk factor for chronic diseases, while Mediterranean diet decreases the risk. Main characteristics of these dietary patterns including differences in amount and type of dairy products, significant variations in the amount of micronutrients intake such as fiber, several vitamins, minerals and flavonoids, are discussed in the present review. Given the cultural similarities between the Middle East and the Mediterranean populations, it seems that by making little changes in food pattern of Middle Eastern can decrease differences between two diets and introduce Middle Eastern dietary pattern as a healthy eating pattern in the world.

SL-003

Scientific

Nutrition and age-induced changes in immune and inflammatory response: implications for immune related diseases

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Abstract: Increasing evidence indicates that aging is associated with dysregulated immune and inflammatory responses, which may contribute to many age-related diseases and conditions including osteoporosis, infection, diabetes, cancer, cardiovascular diseases

and Alzheimer's. The immune system is made up of different cell types that defend the host against invading pathogens through a series of complex interactions. These interactions, under normal conditions, are well-coordinated so that a temporary upregulation in inflammatory responses needed to eliminate pathogens is subsequently diminished and controlled. With aging, however, the normal "checks and balances" of the immune response become impaired creating a chronic inflammatory state (hyperactivity of parts of the immune system involved in the innate immune response) on the one hand, and hypoactivity of cell-mediated immunity, especially T cells, on the other. This dichotomy presents a challenge in developing effective interventions to prevent/treat age-related changes of the immune response. Recent evidence, however, suggests that both the hyper- and hypo-activity of immune response connected with aging might be governed by some of the same molecular/biochemical anomalies that might be responsive to nutritional intervention. The opportunities and challenges in developing nutritional interventions that could reduce inflammation and improve host defense against infection will be discussed through specific examples. Supported by: USDA agreement #, 58-1950-0-014

SL-004 **Scientific**
Fructose: A Highly Lipogenic Nutrient Implicated in the Epidemic of Insulin Resistance, Obesity and Type 2 Diabetes

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Abstract: Fructose consumption has increased dramatically in the last 40 years and its role in the pathogenesis of the metabolic syndrome has been implicated by many studies. It is most often encountered in the diet as sucrose (glucose and fructose) or high-fructose corn syrup (55% fructose). At high levels, dietary exposure to fructose triggers a series of metabolic changes originating in the liver, leading to hepatic steatosis, hypertriglyceridemia, insulin resistance and decreased leptin sensitivity. Fructose has been identified to alter biological pathways in other tissues including the central nervous system, adipose tissue and the gastrointestinal system. Unlike glucose, consumption of fructose produces smaller increases in the circulating satiety hormone glucagon-like peptide 1 (GLP-1), and does not attenuate levels of the appetite suppressing hormone ghrelin. In the brain, fructose contributes to increased food consumption by activating appetite and reward pathways and stimulating hypothalamic AMPK activity, a nutrient-sensitive regulator of food intake. Recent studies investigating the neurophysiological factors linking fructose consumption and weight gain in humans have demonstrated differential activation of brain regions that govern appetite, motivation and reward processing. Compared to fructose, glucose ingestion produces a greater reduction of hypothalamic neuronal activity and increases functional connectivity between the hypothalamus and other reward regions of the brain, indicating these two sugars regulate feeding behavior through distinct neural circuits. This review outlines current findings in fructose-feeding studies in both human and animal models and

focuses on the central effects on the CNS that may lead to increased appetite and food intake.

SL-005 **Scientific**
Nutrition in critical care - new substrates and mediators

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Abstract: Pharmaconutrition presents a new tool in the treatment of malnutrition and catabolism in critical patients. There is a particularly important role for organ-specific nutrition in protection of the gut barrier during chemotherapy, sepsis and trauma. Gut permeability increased progressively and significantly from 0.0132 (1st day) to 0.027 (28th day) $p < 0.001$ after initiation of cytotoxic drug therapy. A crucial role is played in the protection of gastrointestinal tract mucosa by pharmaconutrients such as glutamine and anti-inflammatory lipid mediators (polyunsaturated fatty acids – PUFA n-3) in the small intestine, and products of dietary fibre fermentation – short chain fatty acids (SCFA) – in the colon. The role and optimal selection of soluble fermentable fibre is still an important issue. The main problem is the quantitative measurement of dietary fibre fermentation and the intensity of SCFA production. For this purpose a novel method for measurement of dietary fibre fermentation based on methane determination in breath has been developed and introduced into practical clinical use.

Pharmacological effect of aminoacids
Amino acids – a list of the most frequently used pharmaconutrients in critical patients is presented in Table 1.

Table 1: Specific pharmacological effect of amino acids

Substrate	Effect
Arginine	-Stimulation of immunity -Formation of NO -thymotropic effect, antineoplastic effect
Glutamine	-maintenance of intestinal barrier (toxins, starving, radiation) -substrate for cell division (mucosa, bone marrow)
VLI + arginine	-support and synthesis of proteins in muscle and anabolism -of host

(Takeshita, M., Metab Nutr, 1987)

Glutamine is undoubtedly one of the most frequently used pharmaconutrients due to its favourable effect in immunity modulation and it's securing of positive nitrogen balance, and is the nutrient which has been demonstrated to ensure the integrity of the intestinal mucosa and thus the functionality of the intestinal barrier.

Arginine is a nonessential amino acid, which, however, under stress load, is not synthesized in sufficient amount to the endogenous metabolic pool, and which therefore must be supplemented as a



potentially essential nutrient.

Leucine is a hydrophobic neutral branched amino acid which is necessary for the synthesis of proteins. At the same time, leucine is an important source of energy, in particular for muscles. Oxidation of leucine, as in other branched amino acids requires thiamine, riboflavin, pyridoxine, niacin, biotin, pantothenate, ubiquinone, magnesium, and iron. An important property of leucine is its capacity to provide energy even under critical condition, when glucose intolerance has developed and glucose is oxidized with difficulty. It is also capable of replacing fatty acids as a source of energy, if under critical condition and hypoxia oxidation of fatty acids is blocked. Leucine is also a precursor in cholesterol synthesis, thus playing an important role in the regeneration and reparation of tissues. Depletion of leucine in the muscles decreases the production of cholesterol, which is necessary for the building of the membranes of muscle cells. For this reason and by means of this mechanism leucine very markedly influences the intensity of sarcopenia. Leucine gives rise to an important metabolite beta-hydroxy-beta-methylbutyrate (HMB), a marked regulator in the anabolism of muscle tissue. Although hydroxymethylbutyrate does not have such a marked effect on the synthesis of proteins in muscle and on the suppression of sarcopenia as does leucine, this metabolite is indispensable for the immune functions and for the regeneration of damaged cells in all tissues of the human organism, including those damaged by toxic compounds and required for maintenance of the structural and functional ability of the muscle tissue.

Polyene omega-3 and omega-6 fatty acids are indispensable fatty acids, which are not produced in the human body. In addition, many types of diet contains a low amount

of omega-3 fatty acids, so that the ratio omega-6 PUFA/omega-3 PUFA is usually increased above the optimal value. The human organism obtains the majority of the required amount

of omega-3 fatty acids from fish and from alpha-linolenic acid, contained

in some plants. Contemporary clinical studies demonstrate that

an increased supply of omega-3 fatty acids is capable of stabilizing body weight in patients suffering from tumour cachexia.

Especially favourable effects have been observed with the use of n-3 PUFA after extensive abdominal surgery, where there appears decreased occurrence of infectious complications.

SL-006 **Scientific**
Developing leadership competencies among food and nutrition professionals in Iran and the region: 2008-2014 and beyond

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Leadership is taking responsibility to improve self and others in order to achieve sustainable and desired

change. Regardless of working at cellular, individual, community or global levels, the ultimate envisioned change in nutrition science and practice is improving food and nutrition security (i.e., provision of physical, economic, cultural and biological access to safe and adequate food for every person to have an active and healthy life—adopted from The World Bank 96). Capacity building in leadership, therefore, starts with encouraging personal responsibilities. This encouragement can be fulfilled through training, coaching and mentoring. However, most degree curricular Food and Nutrition programs around the globe overlook this part of capacity building among students and alumni. Technical expertise is the main goals of current programs, which cannot adequately support personal and professional success. To bridge this gulf, a number of best practices in developing leadership competencies around the world have been introduced. European Nutrition Leadership Platform (ENLP) is the first systematic endeavor started in early 1990s to integrate leadership capabilities into technical competencies of nutrition professionals in Europe. The idea was then expanded to other regions. Given the value global experience and through further needs assessment and research (participatory observation, key informant interviews, questionnaire survey), we have tailor-made and facilitated leadership programs for Iranian food and nutrition professionals (Iranian Food and Nutrition Leadership Program – IFNLP) since 2008. The program was successfully expanded to the region through the Middle-East Nutrition Leadership Program – MENLP (since 2012). Other initiatives such as ‘one vision, one voice’ events, leadership trainings for members of Iranian Nutrition Society (NGO), and leadership development in PhD students in a number of leading PhD Nutrition Programs in Iran and so on complemented the first idea. Advocacy has mainly done through biannual national nutrition congresses since 2008. Research on more local and regional customization, as well as evaluation and program sustainability continues. Transition from research to development is the task forward for program establishment.

Keywords: leadership competencies, leadership capabilities, skill development, food and nutrition, science, professionals, IFNLP, MENLP

SL-007 **Scientific**
Dietary intakes, changes in lipid parameters and the risk of hyper-triglyceridemia: a prospective approach in Tehran Lipid and Glucose Study

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Background and aim: Lifestyle factors, especially dietary intakes play an important role in metabolism of lipids and lipoproteins. In this study, we assessed the association between the some dietary factors and 3-year changes of serum triglycerides, HDL-C and the atherogenic index of plasma among Iranian adults.

Methods: This longitudinal study was conducted on 1938 subjects, aged 19-70 years, who participated in the Tehran Lipid and Glucose Study. Demographic, anthropometric and biochemical measurements including serum triglycerides (TG) and HDL-C, were assessed at baseline (2006-2008) and after a 3-year follow-up

(2009-2011). Atherogenic index of plasma (AIP) was considered as Log [TG] to HDL-C. Dietary data were collected by using a 168-food item, validated semi-quantitative food frequency questionnaire at baseline. The associations of dietary factors with 3-year changes of TG, HDL-C and AIP were evaluated using linear regression models with adjustment for age, gender, body mass index, smoking, physical activity and energy intakes.

Results: Mean age of the participants at baseline was 41.0±13.0 year. Mean TG and HDL-C at baseline was 143±86 and 42.2±10.0 mg/dl, respectively. There was a significant association between dietary energy density and HDL-C and AIP changes ($P<0.05$). Energy intake from carbohydrate and total fat were also significantly related to TG changes ($P<0.05$). Three-year change of serum TG was inversely related energy intake from phytochemical rich foods, whole grains, and legumes ($P<0.05$). Higher intakes compared to lower ones of dietary fiber and phytochemical-rich foods had similar impact on decreased risk of hyper-triglyceridemia (OR=0.58, 95% CI=0.34-1.00). Higher- compared to lower-dietary sodium to potassium ratios (Na/K ratio) increased the risk of hyper-triglyceridemia by 63% (OR=0.1.63, 95% CI= 0.34-1.00).

Conclusion: These findings showed that more dense diets, higher intake of fast food and fat could have undesirable effects on lipid and lipoprotein levels; in contrast, higher intakes of fiber, and phytochemical rich foods especially whole grain and legumes could have protective effects against undesirable changes in lipid and lipid profiles.

SL-008 Scientific Potential Health Promoting Activities of Dietary Bioactive Compounds

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Several bioactive components of foods such as resveratrol, curcumin, quercetin, catechins and avenanthramides have been discovered to promote health through activation and modulation of molecular nutrient sensing complex signaling pathways composed of mTOR (mammalian target of rapamycin), NAD(+) dependent deacetylases (sirtuins) and AMPK (AMP activated kinase). These molecular sensing complexes have been determined to be metabolic sensors to govern age-related degenerative diseases and senescence. These bioactive compound complexes exert their effects not only through their antioxidant properties but also by altering signaling pathways involved in aging and age-associated diseases.

We have discovered that oats, in addition to having the capacity to reduce blood cholesterol, contain unique bioactive compounds called avenanthramides (Avns), which have anti-inflammatory and antioxidant properties. Avns modulate endothelial cell function through suppression of proinflammatory cytokines, interleukin (IL)-1, IL-6, IL8, MCP-1, and several adhesion molecules including ICAM-1, VCAM-1 and E-selectin. These bioactive compounds of oats suppress SMC proliferation and increase endothelial cells and SMC production of NO, a vasodilatory compound. For many years, colloidal oat baths have been known to

soothe and relieve poison ivy skin reactions through their antihistamine activities most likely due to presence of Avns with their anti-inflammatory properties. Curcumin, a natural polyphenol present in turmeric spice, is another natural bioactive compound, which has been suggested to have several biological activities including anti-cancer, anti-inflammatory and anti-angiogenic activities. Curcumin, in addition to suppressing tumor growth, may also modulate adiposity, body weight gain, inflammation, and atherosclerosis. We examined the effect of curcumin on angiogenesis, pre-adipocyte growth, lipid accumulation in adipocytes and macrophages, differentiation, apoptosis, and gene expression involved in lipid and energy metabolism in cell culture systems as well as on body weight gain and adiposity in C57/BL mice and LDLr^{-/-} mice fed high fat diets supplemented with 500-1,500 mg curcumin/kg diet for 12-16 wks. Curcumin, in a dose-dependent manner, suppressed adipocyte differentiation and caused apoptosis. It also inhibited adipokine-induced angiogenesis of HUVEC and accumulation of lipids in adipocytes and macrophages. Supplementing the high fat diet of mice with curcumin did not affect food intake, but it did reduce body weight gain, hepatosteatosis, adiposity, and microvessel density in adipose tissue, which coincided with reduced expression of VEGF and its receptor VEGFR-2. Curcumin increased AMPK phosphorylation, reduced GPAT-1, and increased CPT-1 expression, which lead to increased oxidation and decreased fatty acid esterification. The in vivo effect of curcumin on the expression of these enzymes was also confirmed by RT-PCR. In addition, dietary curcumin significantly lowered blood cholesterol, TG, FFA, glucose, and insulin levels as well as the expression of PPAR- α and C/EBP- α , two key transcription factors involved in adipogenesis and lipogenesis. Furthermore, curcumin, through suppression of aP2 expression, inhibited accumulation of lipids in adipocytes and THP-1 macrophages. In addition, curcumin reduced the expression of aP2 and CD36 in peritoneal macrophages collected from the mice fed a high fat diet supplemented with a medium dose (1,000 mg/kg diet) of curcumin. At this dose, curcumin also reduced the development of fatty streaks in descending aorta and attenuated accumulation of lipid laden lesions in aortic root of LDLr^{-/-} mice. Further, curcumin reduced liver fibrosis, which resulted from a high fat diet. In contrast, a higher dose of curcumin (1,500 mg/kg diet) had adverse effects in several measured parameters. Our findings suggest that curcumin's ability to suppress angiogenesis in adipose tissue, upregulate lipid metabolism, and reduce lipid accumulation in adipocytes as well as macrophages may contribute to lower body fat and body weight gain and to a reduction of obesity-associated inflammation and atherosclerosis. Funded by a National Institute of Food and Agriculture (NIFA) grant #2010-65200-20395 and USDA agreement #58-1950-0-014.

SL-009 Scientific Issues in Dietary Assessment for Research on Diet and Health

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Abstract: As the nutrition transition progresses rapidly throughout the world toward increasing obesity,



diabetes and chronic disease, research to understand all aspects of diet and health is increasingly important. However, despite impressive progress in biological measures, including genetics, metabolomics, and other biomarkers, the field of dietary assessment has lagged behind. At the present time the two main ways that dietary data are collected are by 24-hour recall and food frequency questionnaire. The first provides important detail for populations, but is severely limited in relation to other individual variables due to intra-person day-to-day variability. Food frequency questionnaires, on the other hand, measure usual intake, but are designed to represent the average population, thereby limiting the ability to measure inter-person variability; and they are valid only for the population for which they were developed. As populations become more diverse, it is apparent that food frequency questionnaires do not measure all subsets with the same precision, adding bias to results. These limitations have led to a proliferation of unique questionnaires that cannot be reliably combined as we try to understand health disparities across populations, or as we move toward more global data analyses with combined data sets. Neither recalls nor food frequencies capture usual nutrient intake at the individual level sufficiently for accurate categorization. This well known limitation in our ability to characterize dietary phenotype is the limiting factor in otherwise exciting developments in understanding metabolic outcomes. As a field, nutritional epidemiology has been criticized for lack of reproducibility of results across studies. At least part of this is due to studies using different types and different qualities of dietary methodology. A new method, using technology to obtain dietary histories from individuals, using technology and skip patterns to obtain the same detail seen in 24 hour recalls for the previous day, but for usual longer term intake, is proposed to advance the field by standardizing data collection methods across populations while, at the same time, obtaining detailed usual intake at the individual level.

SL-010 **Scientific**
Managing biases of dietary data collection and potential research implications in Iran

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Abstract: Self-reported measures of dietary intake are subject to collection biases that may obscure the relationship of diet and disease. This presentation will address strategies to decrease error during collection of dietary data and statistical approaches to deal with measurement issues once the data have been collected. Examples from the Women's Health Initiative (WHI) Dietary Modification Trial and the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) will be used.

Approaches used during the collection of dietary intake data include home visits to assess actual portion sizes of foods consumed, early detection of random and systematic error, and technology-based tools to capture dietary intake. Discussion of WHI and HCHS/SOL ancillary studies will illustrate appropriate use of calibration and biomarkers. Biomarkers of interest include both recovery (doubly labeled water, urinary nitrogen), and other urinary biomarkers such as sodium, potassium and total sugars. Discussion of blood con-

centration biomarkers such as folate, tocopherols and carotenoids and novel biomarkers such as carbon and nitrogen isotope ratios from blood and hair will supplement this review.

The discussion of statistical methods will include the development of regression calibration equations that use both biomarkers and self-report measures and hazard ratios (ratio of incidence rates) based on Cox regression for assessing diet-disease associations with biomarkers. This review will conclude with approaches to apply in nutrition research in the context of Iran and areas for future research.

SL-011 **Scientific**
Controversies in Obesity Treatment

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The markedly high prevalence of obesity contributes to the increased incidence of chronic diseases, such as diabetes, hypertension, sleep apnea, and heart disease. Because of high prevalence of obesity in almost all countries, it has been the focus of many researches throughout the world during the last decades. Along with increasing researches, new concepts and controversies have been emerged. The existing controversies on this topic are so deep that some researches argue on absolutely philosophical questions, such as "Is obesity a disease?" or "Is it corrects to treat obesity?" These questions are based on a few theories and real data that explain obesity as a biological adaptation and also the final results of weight loss programs.

Many people attempt to lose weight by diet therapy, physical activity and lifestyle modifications. Importantly, weight loss strategies in the long term are ineffective and may have unintended consequences including decreasing energy expenditure, complicated appetite control, eating disorders, reducing self-esteem, increasing the plasma and tissue levels of persistent organic pollutants that promote metabolic complications, and consequently higher risk of repeated cycles of weight loss and weight regain.

In this review, major paradoxes and controversies on obesity including classic obesity paradox; pre-obesity; fat but fit theory; and healthy obesity are explained. In addition, the relevant strategies like "Health at Every Size" that emphasize on promotion of global health behaviors rather than weight loss programs are explained.

Keywords: Obesity, overweight, obesity paradox, fat but fit.

SL-012 **Scientific**
National Food and Nutrition Surveillance Program: What Has Been Done and What Will Have To Be Done

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Abstract: According to the definition by World Health Organization, "a food and nutrition surveillance system is a mechanism to transfer food and nutrition data into action through formulation, modification and ap-

plication of the food and nutrition policy of a country." National Nutrition and Food Surveillance Program (NNFSP), as one of the highest priorities of both Ministry of Health (MOH) and NNFTRI, has been implemented since 2013 with supports of UNICEF. To start the program, six provinces were enrolled including Fars, Khoozestan, Lorestan, West Azarbaijan, Semnan and South Khorasan. Considering a very limited budget, the entry points for the first year were selected based on the immediate needs of MOH. They included: (a) "study of the seasonal variations of vitamin D status in different latitudes and climatic regions of Iran" and (b) "assessment of sugar, total fat and trans fat intake in the Iranian households". Data coming from the first project would be used for national vitamin D fortification program being implemented hopefully from fall, 2015, while sugar and fat intake data would demonstrate some of the crucial nutritional indicators of non-communicable disease risk. It is planned to enroll two more provinces (including Tehran and Mazandaran or Guilan) and to perform dietary, anthropometric as well as biochemical assessments for children and adults residing in both urban and rural areas for the next year. NNFSP will follow the 4 year plan of action objectives including consolidation of the most important indicators of nutritional status of the community. In this article, a very recent data from NNFSP and the next four year road map will be presented.

Keywords: Surveillance; Nutrition; Assessment

SL-013

Scientific

Polyphenols and Blood Glucose control, mechanisms of its effect.

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Introduction: The global pandemic of insulin resistance, metabolic syndrome and type 2 diabetes mellitus places an incalculable burden on health care systems. Polyphenols such as Flavonoids, Phenolic acid and stilbens(resveratol) are a large and heterogeneous group of Phytochemicals in plant-based foods, such as Tea, Soy, Coffee, Cinnamon, Gingerol, Cocoa, Cereal grains, Fruits and Berries. Growing evidence indicates that various dietary polyphenols may influence blood glucose at many levels.

In animal models and a limited number of human studies carried out so far, polyphenols and foods or beverages rich in polyphenols have decreased postprandial and fasting hyperglycemia, and improved acute insulin secretion and insulin sensitivity. The possible mechanisms include glucose absorption in the intestine, inhibition of carbohydrate digestion, stimulation of insulin secretion from the pancreatic β -cells, modulation of glucose release from the liver, activation of insulin receptors and glucose uptake in the insulin-sensitive tissues, and modulation of intracellular signaling pathways and gene expression.

The positive effects of polyphenols on glucose homeostasis observed in a large number of in vitro, animal models and some human trials study are supported by epidemiological evidence on polyphenol-rich diets.

Conclusion: to confirm the implications of polyphenol consumption for prevention of insulin resistance, metabolic syndrome and eventually type 2 diabetes, more human trials with well-defined diets, controlled study

designs and investigation of molecular pathways involved in glucose homeostasis are needed. However, a limitation in clinical studies is the heterogeneous bio-availability and rapid metabolism of polyphenols.

SL-014

Scientific

The importance of methodology and cutoff points in assessment of vitamin D status: from clinical practice to epidemiological studies

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Abstract: Nowadays, evidence is accumulating that vitamin D deficiency/insufficiency plays the role in the development of several non-bone diseases including malignancies, cardiovascular disease, and diabetes, in addition to bone diseases, so the assessment of circulating 25-hydroxyvitamin D (25OHD) is one of the most popular tests ordered by clinicians.

It is not surprising; many studies have been designed to define the optimal circulating concentration of 25-hydroxyvitamin D (25OHD) as well as determination of the daily vitamin D dose requirement for reducing the risk of vitamin D deficiency related diseases.

There are several methodologies used to measure 25OHD in laboratories including immunoassays, competitive vitamin D protein binding assays (CPBA), high performance liquid chromatography (HPLC) and liquid chromatography tandem mass spectrometry (LC-MS/MS). These methods are diverse and often yielding markedly differing results. High variability in 25(OH)D measurements due to lack agreement between methods often confounds proper assessment of vitamin D status. For this reason, assay standardization is indispensable and the optimal 25OHD levels should be determined based on the standardized method.

This review highlights the importance of methodology and cutoff points in assessment of vitamin D status in researches and clinical practices.

SL-015

Scientific

Impact of body composition during weight change on resting energy expenditure and homeostasis model assessment index in overweight nonsmoking adults (Oral Presentation)

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Background: Weight change affects resting energy expenditure (REE) and metabolic risk factors. The impact of changes in individual body components on metabolism is unclear.

Objective: We investigated changes in detailed body composition to assess their impacts on REE and insulin resistance.

Methods: 83 healthy subjects (BMI range: 20.2-46.8 kg/m², 50 % obese) were investigated at two occasions with weight changes between -11.2 kg to +6.5 kg (fol-



low-up periods between 23.5- 43.5 months). Detailed body composition was measured by using the 4-component model and whole-body magnetic resonance imaging. REE, plasma thyroid hormone concentrations and insulin resistance were measured by using standard methods.

Results: Weight loss was associated with decreases in FM (fat mass) and FFM (fat-free mass) by 72.0 and 28.0%, respectively. 87.9% of weight gain was due to FM. With weight loss, the sizes of skeletal muscle, kidneys, heart and all fat depots decreased. With weight gain, skeletal muscle, liver, kidney masses and several adipose tissue depots increased except for visceral adipose tissue (VAT). After adjustments for FM and FFM, REE decreased with weight loss (by 0.22 MJ/d), and increased with weight gain (by 0.11 MJ/d). In a multiple stepwise regression analysis, changes in skeletal muscle, plasma T3 and kidney masses explained 34.9%, 5.3% and 4.5% of the variance in changes in REE. Reduction in subcutaneous adipose tissue (SAT) rather than VAT was associated with the improvement of insulin sensitivity with weight loss. Weight gain had no effect on insulin resistance.

Conclusion: Beyond a 2-compartment model, detailed changes in organ and tissue masses further add to explain changes in REE and insulin resistance.

Keywords: body composition, weight change; regional body composition, organ mass, muscle mass, resting energy expenditure (REE), insulin resistance

SL-016 **Scientific**
Effects of Olive Oil and Grape Seed Oil on Lipid Profile and Blood Pressure in Hyperlipidemic Patients

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Background: Hyperlipidemia is a clear risk factor of coronary artery disease. Regarding importance of nutritional factors in management of hyperlipidemia, this study was designed to compare the effects of olive oil and grape seed oil on serum lipids and blood pressure in hyperlipidemic patients referred to obesity center of Shahid Sadoughi University of Medical Sciences in 2013.

Methods: In this parallel clinical trial, 60 hyperlipidemic patients who met inclusion criteria were recruited. After obtaining informed consent, subjects were randomly assigned to consume 20cc olive oil (OO) or grape seed oil (GSO) and the control group had no oil daily over a six week period, accompanied Step I diet. Height and weight measurements were taken by Seca scale. Blood pressure was measured using a standard mercury sphygmomanometer (Alpk2, japan). Total cholesterol, high-density lipoprotein [HDL] cholesterol, triacylglycerol [TG] and fasting blood sugar [FBS] were measured at baseline and after 6 weeks by enzymatic methods (PARS AZMON-Iran). LDL cholesterol levels were calculated by the Friedewald formula.

Data was analyzed with t-test in SPSS 16.0 and $p < 0.05$ was considered significant.

Results: It was found in the present study that difference of systolic blood pressure after olive oil (-11 ± 11.4) reduced significantly compared with grape oil (5.4 ± 30) ($P=0.03$). Changes in systolic blood pressure between olive and control had significant differences

($-11 \pm 11.4, -0.3 \pm 15.7$ respectively) ($P=0.03$). Moreover TG had significant differences between olive oil and control ($-46.6 \pm 149.5, 45.8 \pm 122.4$ respectively) ($P=0.03$). compared to the grape seed oil and control, TG had significant differences ($-71.6 \pm 97.1, 45.8 \pm 122.4$ respectively) ($P=0.002$).

Conclusion: Our findings showed, however, the effects of olive oil and grape seed oil were better than control group but the effects of olive oil in comparison with grape seed oil suggest the substitution of dietary lipids with olive oil.

Keywords: hyperlipidemia, olive oil, grape seed oil, lipid profile, blood pressure

SL-017 **Scientific**
The hypoglycemic effect of Juglans regia leaves aqueous extract in diabetic patients: A first human trial

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Background: *Juglans regia* L. (*J. regia*) is one of the medicinal plants traditionally used for treatment of diabetes in Iranian medicine. The effect of this plant has already been investigated on animal models; however, this is the first study conducted on human subjects. The aim of this study is to investigate the hypoglycemic effect of *J. regia* leaves aqueous extract in type 2 diabetes patients.

Methods: Fifty eight Iranian male and female patients with type 2 diabetes were enrolled. The patients were randomly allocated into two groups. One group ($n=30$) received *J. regia* leaves extract while the other group ($n=28$) received placebo. Fasting blood samples were collected at the beginning of the study and after two months for determination of HbA1c and blood glucose level as a main outcome and insulin, SGOT, SGPT, and ALP level as secondary outcome.

Results: Our analysis showed that serum fasting HbA1C and blood glucose levels were significantly decreased and the insulin level was increased in patients in the *J. regia* arm.

Conclusions: The results indicate that *J. regia* aqueous extract favorably affects blood levels of glucose, insulin and HbA1C in type 2 diabetic patients.

Keywords: *J. regia*; Insulin; Diabetes mellitus; Glucose; Liver enzymes

SL-018 **Scientific**
Understanding of the old Metabolic Disorders: The stimulating action of insulin-mediated disorder caused by saturated fatty acids with Micro RANA Mediation

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Abstract: Effect of a high intake saturated fatty acids on the secretion pathway and / or sensitivity to insulin is revealed well. Micro RANA, the non-coding ribonucleic acid nucleotides in length is equal to 25-18 nu-

cleotides that are evolutionarily conserved and as a source of activation or inactivation of genes, play an important role in stimulation of insulin.

However, their role in the relationship between obesity and insulin resistance in the liver is largely unknown. Studies have revealed that their role in the relationship between obesity and insulin resistance in the liver is largely unknown. It is a fact that saturated fatty acids and high fat diet, cause the liver cells for Expression of miR-195. As well as a direct target of miR-195 for insulin receptors are aimed too. Ectopic expression of miR-195 leads to the suppression of insulin receptors and impaired insulin stimulation of glycogen synthesis in cells Hep- G2. These findings suggest that saturated fatty acids cause dysregulation of miR-195, resulting in impaired insulin sensitivity in the liver. As a fantastic idea, more or less like a dream, with application of artificial micro RNA with application of specific nucleotide sequences, may cause the reduction in expression of mRNA and its produced metabolic product. In general, this review article that used results of the performed researches about the effects of Mico RNA and modification in insulin secretion indicates that the miRNA interference pathway introduction to fundamental research and technological applications are the key to the future treatment of metabolic disorders by the expression or silencing the involved genes.

Keywords: micro RNA, insulin resistance and saturated fatty acids.

SL-019

Scientific

The association between birth weight and cardiovascular risk factors and mental problems among Iranian school-aged children: the CASPIAN-III Study

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Background: High and low birth weights are both risk factors for adulthood diseases. The aim of this study was to investigate the association between birth weight and cardiovascular risk factors as well as psychiatric problems among Iranian school aged children.

Methods: This national multi-center study of school-aged children entitled CASPIAN III was conducted among 5528 students in the age range of 10-18 years. Biochemical indices and anthropometric measurements were collected. Mental health was assessed by questionnaire. To investigate the association between birth weight categories and cardiovascular disease risk factors and mental problems, multivariate logistic regression was used.

Results: high birth weight adolescents were at higher risk for high diastolic blood pressure (Ptrend<0.05) and low levels of HDL cholesterol (Ptrend<0.05) and lower risk for general obesity (Ptrend<0.05) compared to low birth weight category. High birth weight did not have significant association with mental problems (Ptrend>0.05) when compared to low birth weight adolescents. The results of regression analysis which considered normal birth weight as reference group showed that low birth weight students had declined risk for overweight, obesity (P<0.01) and higher dias-

tolic blood pressure (P<0.05) but they were at more risk for lower levels of HDL-C (P<0.01). Furthermore, a U-shaped relation was detected between birth weight categories and mental problems and sleep disorders (P<0.05). The risk of confusion was higher among low birth weight group (P<0.05).

Conclusion: Findings from this population-based study revealed a positive relation between birth weight categories and cardiovascular disease risk factors, but not with mental problems in the following years of life.

Keywords: Birth weight, cardiovascular risk, mental health

SL-020

Scientific

Validity and Reproducibility of Iranian Food Frequency Questionnaire

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Background: The assessment of dietary intake in epidemiological studies is often by means of validated food frequency questionnaires because of ease of administration and low burden on the subject.

Method: Study Participants were chosen from five major cities of Iran and 156 subjects, aged 20-69 years old, from both gender were recruited for the study. For validation study, dietary intake was assessed by a semi-quantitative FFQ, which consisted of 160 Iranian food items. Participants were asked to complete two FFQs (at the first and fourth month of the study) and 3- day food records every month. Two blood and 24-h urine samples were collected at fifth and sixth months for comparison serum and urine concentrations of biomarkers with nutrient intakes estimated by the FFQ.

Results: Forty nine persons (32.1 percent) of the subjects were men and 104 persons (67.9 percent) were women

The highest correlation coefficient in all FFQs was for fiber (r=0.677; p<0.001) and the lowest one was for fat (r=0.331; p=0.001).

The highest correlation coefficient was for potassium
Conclusion: The results showed reasonable validity just for carbohydrate intake evaluation and good reproducibility of the FFQ over a 6- month period.

Keywords: Food Frequency Questionnaire. Nutritional assessment. 24hourrecall.validation.Reproducibility

SL-021

Scientific

Riboflavin in the lowering of high blood pressure: a novel gene-nutrient interaction

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Abstract: Hypertension, defined as a systolic/diastolic blood pressure of 140/90 mmHg or greater, is estimated to carry a 3-fold increased risk of developing cardiovascular disease (CVD). Evidence from genome-wide association studies has identified an association between blood pressure and the gene encoding the folate-metabolising enzyme, methylenetetrahydrofolate reductase (MTHFR). Recent meta-analyses of



observational studies show an increased risk of hypertension in people homozygous for the 677C→T polymorphism in MTHFR. Riboflavin in the form of FAD acts as a cofactor for MTHFR and the variant enzyme is known from molecular studies to become inactive as a result of having an increased propensity to dissociate from FAD. We have shown that CVD patients with the relevant MTHFR 677TT genotype (compared to CC or CT genotypes) have significantly higher blood pressure, and that blood pressure was highly responsive to riboflavin intervention, specifically in the TT genotype group. Further investigations confirmed this gene-nutrient interaction in hypertensive patients (with and without overt CVD), and showed that the blood pressure lowering effect of riboflavin in the TT genotype group was independent of the number and type of antihypertensive drugs taken. Although the precise mechanism linking this polymorphism to hypertension remains to be established, it would appear that the biological perturbation which leads to higher blood pressure in individuals with the MTHFR 677TT genotype is modifiable by correcting the variant MTHFR enzyme through enhancing riboflavin status. Thus riboflavin, targeted specifically at this genetically at-risk group, may offer a personalised non-drug approach to managing hypertension.

SL-022 **Scientific**
The role of vitamins in the prevention of DNA damage

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Abstract: DNA damage resulting from the constant exposure to endogenous and environmental aggressors such as reactive molecules, UV light or harmful chemical agents, is a major cause of potentially detrimental mutations, cell death, and cancer.

Oxidative changes to DNA can indeed lead to base misincorporations and transitions. Besides repair mechanisms, the prevention of oxidative stress plays a crucial role in the maintenance of DNA integrity. Vitamin E and vitamin C, the most important lipid- and water-soluble dietary antioxidants, respectively, are involved in this process. Accordingly, inverse correlations between the status of α -tocopherol and ascorbic acid and markers of DNA damage have been observed and supplementation with these micronutrients was protective in some studies.

On the other hand, antioxidant vitamins are turned into reactive molecules themselves upon interacting with radicals and although they are usually more stable, they can act as prooxidants if they are not appropriately regenerated by other antioxidants. This requires a balance of the various redox systems in the body that may be disrupted if a single agent is supplied excessively thus promoting DNA damage rather than preventing it. This has been observed in the form of oxidative damage to nucleic acids resulting in the generation of 8-oxo-deoxyguanosine after high doses of vitamin C. As this vitamin is widely used as an over-the-counter supplement and often added to foods as a fortificant or an antioxidant in addition to a generally adequate dietary vitamin C supply, the resulting high intake might be of concern.

The synthesis of nucleic acids requires 1-carbon units that are provided by folate and vitamin B12, making

these vitamins essential for DNA maintenance and repair as well. They also purvey methyl groups for epigenetic regulation mechanisms involved in the detection and repair of DNA damage. Thus, histone methylation determines the accessibility of the DNA to repair enzymes. In addition, the activity of repair enzymes themselves is regulated through methylation.

A vitamin having received much attention recently is vitamin D that is also involved in the protection of DNA from oxidative damage and its repair as well as the elimination of mutated cells. Possible mechanisms involve the regulation of repair enzymes, the cell cycle and apoptosis by calcitriol.

Vitamins play important and diverse roles in the maintenance of DNA stability. However, the many actors have to be well orchestrated. Supply of vitamins in the right combination is therefore a requisite for optimal DNA protection.

Keywords: DNA damage, DNA repair, vitamins, antioxidants, prooxidants

SL-023 **Scientific**
Social inequity in nutrition related diseases in I.R. Iran
Mohsen Maddah

Abstract: Social determinants of health are mostly responsible for health inequities-the unfair and avoidable differences within and between countries. From the early 1990 social determinants of health were considered the main concern of countries since effective interventions require community oriented approach. While the gap between socioeconomic and political factors should be filled through research there is less data on social determinants of health in Iran. Non-communicable diseases (NCDs) are increasingly affecting developing countries with about 80% of NCD related death occurring in low and middle income countries. In Iran, the prevalence of NCD is remarkably high and recent studies showed that 78% of Iranian men and 80% of women presented at least one NCD risk factor. Neither the Comprehensive Study on House Food Consumption Pattern and Nutrition Study in Iran nor National Study on NCDs in Iran considered social factors in data analysis in their report. Social inequity in health should be of particular interest when those inequities are attributable to determinants that fall within the capacity of people and societies to moderate. Commitment to health equity requires understanding the differences in lifestyle and risk factors distribution among different socioeconomic groups. This lecture summarizes the available published data on association between social factors and nutrition related diseases in Iran.

SL-024 **Scientific**
Dietary Approaches to stop hypertension (DASH) eating pattern: Beyond the hypertension

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Abstract: Dietary Approaches to Stop Hypertension (DASH) eating pattern, a diet rich in fruits, vegetables, whole grains and low-fat dairy with a reduced content of sodium, saturated and total fat is introduced as an

appropriate diet for hypertension. This eating pattern was basically designed to normalize blood pressure in patients with hypertension, and a large body of data could confirm its beneficial effects on blood pressure level. However, we are going to discuss regarding the other aspects of this diet in the present paper. Some studies have proposed other useful effects of this dietary approach than lowering blood pressure, such like reducing insulin resistance, controlling the fasting blood sugar and lipid profiles which proposing it as a good dietary pattern to prevent CVDs. There are some evidence regarding the effect of DASH-style diet on CVDs or its major subclasses like coronary heart disease (CHD), stroke and Heart failure (HF) -in prospective cohorts. A meta analysis also showed the effects of this pattern on the indices of the glycemic control. Epidemiologic data linking adherence to DASH diet and metabolic abnormalities showed that adherence to the DASH eating plan was inversely associated with the odds of MetS and most of its features. Adherence to the DASH diet was inversely related to central obesity in observational studies in Iran. Beyond the beneficial effects of this pattern on metabolic risk factors, DASH is also suitable for gestational diabetes mellitus and even can have a role in the growth of the fetus and may affect pregnancy outcomes. So, we can really emphasize that this kind of diet is suitable for whole life span. Even evidence on the effects of this type of diet on obese children also confirmed the beneficial effects of DASH. Consumption of the DASH eating pattern for 6 weeks could reduce circulating levels of hs-CRP among adolescents with MetS. Based on the existing evidence we can conclude that DASH eating pattern is a good dietary pattern for both controlling the metabolic risk factor and being healthy.

SL-025

Scientific

Epigenetics and nutrition in cellular community

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Abstract: Methylation pattern on DNA is the most addressed epigenetic event and heritable chemical signatures printed on certain sequence of constant polynucleotides, which could be promisingly modified profoundly by some effective environmental factors. Many chronic disorders, e.g., different sorts of malignancies, are partly defined in the molecular conjecture of anomalies in DNA methylation and subsequent genomic variations. One-carbon metabolism related micronutrients provide S-adenosyl methionine (SAM) to global methylation reactions is mainly led to substantial studies to quest the veil of nutrition on epigenetics. Dose and duration of exposures to these dietary factors seem important determinants of abnormal methylation changes. Recently, the dynamic of methylation event of certain DNA sequences is intriguingly suggested farther complexity. In this line, it is additionally assumed that cell clonality in the pathogenesis of disorders carries distinct methylation density and region-specific hypermethylation while compared to normal cells. This epigenomic phenomenon is also indicated to be in vast diversity between cells distributed within an initiative lesion or even to be more complex in advance stages. On the first view, the bioavailability of nutrients and their cellular per capita

remain largely obscure. Recent advancements and our observations suggested that disease-associated DNA methylation might be a region-specific case depends on certain dietary factors. In overall, it will be appealing to understand how far dietary factors could take part in epigenetic changes attributed to fundamental genomic variations ultimately predispose for multiple chronic diseases.

Keywords: Epigenetics; Diet; Methylation; One-carbon

SL-026

Scientific

Epigenetic Approaches to Control Obesity

Atoosa Saeidpour

Abstract: Overweight and obesity result from the interactions among environmental factors, genetic predisposition and the individual behavior. There are some documents, implying interindividual differences in predisposition to obesity depend on epigenetic factors. Epigenetics pursue heritable changes which do not involve alteration in DNA sequence. All recognized epigenetic marks (including DNA methylation, covalent histone modifications, chromatin folding, micro-RNA (miRNA) expression and polycomb group complexes) are influenced by environmental exposures, including nutrients, tobacco, alcohol, physical activity, hyperglycemia, inflammation, hypoxia and oxidative stress which play important roles in the etiology of obesity. In this review, we focus on knowing the epigenetic biomarkers in body weight regulation, recognition of epigenetic markers which are more prone to modification by dietary alterations; identification of bioactive factors making a change in epigenome, real importance evaluation of obesity-related factors in epigenetic regulation and determination of a given period of life which yields best results

SL-027

Scientific

Molecular function of vitamin A and D on the immune system

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Abstract: Some of the fat-soluble vitamins and their active metabolites can regulate the immune system via their specific nuclear receptors. Retinoic acid (RA) induces the differentiation of myeloid cells to macrophages, neutrophils and dendritic cells (DCs), therefore can enhance the immunity through increase the production and activity of phagocytes. Vitamin A also helps to differentiation of lymphoid cells to effectors T cells, B cells and regulatory T cells (Tregs). RA induces the B cells to produce and secrete more IgA and is very important in mucosal immunity. RA enhances FoxP3 gene expression and inhibits the Th17 polarization which helps to maintenance of tolerance and prevention of autoimmune diseases.

Similar to vitamin A, vitamin D also regulates both innate and adaptive immunity. Vitamin D deficiency impairs immune function and causes predispose to infectious diseases like tuberculosis. However vitamin D can also inhibit the over activity of immune system and prevent autoimmune diseases including type 1 diabetes mellitus and multiple sclerosis.