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4th International Student Medical Congress in Košice

ISMCK 2012, Košice, Slovak Republic

Supplement

International Student Medical Congress Košice 2012

Editorial

4th International Student Medical Congress in Košice

IJMS

International Journal *of* Medical Students

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The *International Journal of Medical Students* (IJMS), is a peer-reviewed open-access Journal, created to share the scientific production and experiences of medical students worldwide.

Cover photo

Participants at the 4th International Student Medical Congress in Košice.

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4th International Student Medical Congress in Košice

Tamas Otvos,[1] Barbora Kuncova[1]

ISMCK website
www.ismck.com

Dear friends,

In 2012 we had a great opportunity to heartily welcome medical students, doctors and researchers from all over the world at the 4th International Student Medical Congress in Košice. ISMCK is an event that represents one of the best projects in Slovakia as well as in Czech Republic.

Medicine is not only a profession but a mission and passion as well. Thus, being involved in your passion and live your mission you have to improve your skills continuously. A scientific congress represents one of the best opportunities on how to move your thinking forward.

Preparation of a unique congress which will meet requirements of participants requires a lot of time and effort. It resulted in almost 130 invited presentations in scientific program from all parts of medicine, dentistry, pharmacology and public health. To give participants only the best quality, we provided interesting workshops such as Laparoscopic training and trainings on Effective reading and Poster design. We are glad to say that our participants enjoyed and highly appreciated the sessions and workshops.

The congress was organized by students and young doctors, therefore high quality of social program was guaranteed. Participants had an opportunity to get to know the city of Košice, the Slovak culture and traditions.

Figure 1. *Auditorium view at the 4th International Student Medical Congress in Košice.*

The committee was made of students of Medical faculty of P. J. Šafárik University in Košice, members of Association of medical students in Košice and young doctors from Edumed, n.o.

Pavol Jozef Šafárik University was established in 1959 as the second classical University in Slovakia. The current structure includes five faculties – Faculty of Medicine, Faculty of Science, Faculty of Law, Faculty of Arts and Faculty of Public Administration. The University provides higher education based on the newest scientific findings in a wide international context. The University frequently co-operates with academic institutions from all around the world.

Faculty of Medicine is the oldest faculty of P. J. Šafárik Universtity and provides 6-year General Medicine and 6-year Dentistry courses awarding the degree of Medical doctor ("MUDr.", the equivalent to the M.D. degree) or Dentistry doctor ("MDDr."). The faculty has rich tradition in research and offers a possibility of postgraduate study.

Association of medical students in Košice is a voluntary organization of students of general medicine at P. J. Šafárik University who are interested in developing cultural, social and scientific life. It wants to improve professional level of students and to help to enrich a personality of future doctors.

Edumed is a non-profit organisation established in October 2009. Five members of the organisation continuously support medical students, PhD students and young doctors aiming to increase a quality of students' life.

Please let us quote rector of P. J. Šafárik University in Košice, prof. L. Mirossay, from his speech about ISMCK 2012:

"From my perspective, this is its main mission, an opportunity to get to know each other, explore and learn, discuss and exchange ideas, solve problems of similar nature, and reveal that even in our being different, we are all alike, and that it is just at first glance that we are different."

Finally, we invite you to participate in 5th edition of ISMCK, which is taking place in Košice on 26-28 June 2013! We are looking forward to meeting you there!

See photos of ISMCK12 on the next page.

1. Pavol Jozef Šafárik University in Košice

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Figure 2. Photos of the *4th International Student Medical Congress in Košice.*

Abstracts of the 4th International Student Medical Congress in Kosice

PhD STUDENTS' WORK *Clinical Section*

01 THE ROLE OF THE NERVOUS SYSTEM IN REGULATION OF CANCER GROWTH: NEUROBIOLOGY OF EXPERIMENTALLY INDUCED FIBROSARCOMA

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Comenius University in Bratislava

Introduction: Despite the significant progress achieved in oncological research a recognition of mechanisms involved in tumor formation and metastasis is still incomplete. Recently research is focused also on the role of the nervous system in the regulation of tumor proliferation and metastasis formation. This investigation creates basis for neurobiology of cancer disease. Neurobiology of cancer diseases is based on the assumption that tumor growth and metastasis formation are accompanied not only by interactions between tumor and immune cells, but also by the transmission of signals between tumor tissue and the nervous system. Experimental and clinical studies have shown that the signals associated with tumor growth, are transmitted to the central nervous system. These signals may affect the activity of many brain areas. Consequently, the central nervous system can modulate tumor growth and metastasis formation. This assumption is supported by several facts: innervation of some types of cancer, the effect of neurotransmitters on the proliferation of cancer cells, activation of the nervous system in animals with tumors, effect of chemical sympathectomy on tumor growth, as well as the impact of stressors on the tumor growth. **Aim:** In our experiments we investigated various aspects of the interaction between tumor induced by application of BP6-TU2 fibrosarcoma cells and the central nervous system in rats. **Methods:** We found that tumor growth is accompanied by changes in the activity of selected brain structures and that tumor tissue is innervated. Moreover, destruction of sympathetic nerve endings has an inhibitory effect on tumor growth. **Results:** We found that the proliferation of BP6-TU2 cells in vitro is stimulated by the addition of the sympathetic neurotransmitter, norepinephrine. **Conclusion:** However, in order to utilize neurobiological research of cancer in oncology, it will be necessary to characterize the interactions between the central nervous system and other types of tumors.

02 THE INFLUENCE OF CPAP THERAPY ON C REACTIVE PROTEIN LEVELS AND PARAMETERS OF METABOLIC SYNDROME

Sova M, Hobzová M, Sovová E, Kolek V.
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Palacky University Olomouc

Introduction: Obstructive sleep apnea (OSA) can be associated with metabolic syndrome and cardiovascular disease (CVD). C-reactive protein (CRP) is a marker of inflammation and a risk factor for CVD. **Objectives:** The study objectivesed at finding whether continuous positive airway pressure (CPAP) treatment results in decreased serum CRP level and parameters of metabolic syndrome. **Material and Methods:** Eighty-one patients (70 males, a mean age of 53.9±10.3 years) were evaluated by polysomnography, diagnosed with OSA and indicated for CPAP treatment. Anthropometric, clinical and laboratory investigations were carried out and repeated after 1 year of CPAP treatment. The data were analyzed using the SPSS Statistics 15 software (SPSS Inc., Chicago, USA). **Results:** Patients had significantly decreased (without change in medication) CRP levels (6.08±7.74; 4.29±4.9; p=0.007), triacylglycerols (2.24±0.88; 2.13±1.32; p=0.01), diastolic blood pressure (82±11; 79±7; p= 0.006) and improved OSA parameters: AHI (53.9; 5.6; p<0.0001), mean nocturnal oxygen saturation (91 %; 94 %, p<0.0001), ODI (55; 8, p<0.0001), and percentage of sleep time with oxygen saturation below 90 % (28.2; 0; p<0.0001). BMI, waist, neck circumference, systolic blood pressure, total cholesterol, HDL cholesterol, LDL cholesterol, glucose and insulin did not change significantly. **Conclusion:** CPAP therapy of OSA patients has a positive effect on CRP levels, triacylglycerols and diastolic blood pressure and can contribute to fewer cardiovascular complications of OSA after CPAP therapy.

03 NEONATAL HYPOXIC-ISCHEMIC ENCEPHALOPATHY: CURRENT SITUATION IN TREATMENT AND MANAGEMENT

Plachá K, BaÇiak L, Juránek I
Comenius University

Introduction: Perinatal asphyxia is a serious health problem of neonatology which may result in neonatal hypoxic-ischemic encephalopathy (HIE). This is manifested by difficulty of respiration, depression of tone and reflexes, subnormal level of consciousness, and often by seizures. The outcome ranges from neonatal death, irreversible brain injury, cerebral palsy, mental retardation and learning disabilities in survived infants to normal survival. **Objectives:** Mechanisms of neonatal HIE are not fully understood, and hence treatment/management of newborns with perinatal asphyxia/HIE is difficult and often not satisfactory. **Material and Methods:** One of the prominent models of ischemic-hypoxic insult is the Rice-Vannucci model, using 7-day-old rats subjected to unilateral carotid artery occlusion and subsequently exposed to hypoxia. Magnetic resonance imaging (MRI) and spetroscopy (MRS) are excellent techniques that are sensitive enough to detect early alterations in the neurochemical profile of crucial brain structures. MRS can detect elevated cerebral lactate and a decline in high-energy phosphate content, reflecting primary and secondary energy failure. **Results:** Mechanisms of neonatal HIE are not fully understood, and hence treatment/management of newborns with perinatal asphyxia/HIE is difficult and often not satisfactory. Reduced supply of oxygen and other substrates to the brain results in a switch to anaerobic metabolism. Acute alterations occur predominantly due to the failure of primary energy metabolism, i.e. inhibition of oxidative phosphorylation due to lack of oxygen. The resulting inhibition of ATP-dependent processes, specifically the dysfunction of ATPases leads to a disruption of membrane potential, massive cation influx, development of cytotoxic edema and necrosis. Secondary failure, occurring within 6-12 hours after the primary insult, may last for several days and is typically characterized by excitotoxicity, cytosolic calcium overload, massive production of reactive oxygen/nitrogen species, inflammatory processes and apoptosis. **Conclusion:** The present paper objectivess to summarize important aspects of pathophysiology, diagnostic and therapeutic approaches leading to proper management of neonatal HIE.

04 PREVALENCE OF HYPOGLYCAEMIA IN HOSPITALIZED PATIENTS

Samos M, Galajda P, Stancík M, Mokáň M.
Comenius University

Introduction: Hypoglycaemia is a severe and life-threating condition. However, there are only limited information about the incidence of hypoglycaemia in hospitalized patients. **Objectives:** To determine the prevalence of hypoglycaemia, its most frequent causes and risk factors of its developement. **Methods:** A retrospective study in hospitalized patients at 1st clinic of internal medicine JFM CU, focusing on the periode 2007–2010. Hypoglycaemia was defined as blood glucose level ,3,0 mmol/l. Each case of hypoglycaemia from 17 872 hospitalizations in this period was identified. We studied the number of hypoglycaemic events, symptoms, presumable causes, presence and type of diabetes mellitus, it´s treatment, duration, metabolic compensation, insulin admission, chronic complications of diabetes and presence of other conditions predisposing hypoglycaemia. **Results:** Hypoglycaemia developed in 558 hospitalizations (3,12 %), totally 1092 hypoglycaemic events were found. 214 patients had repetitive hypoglycaemic events, 23 events were maximum found in one patient. In 108 cases hypoglycaemia occured in patients without

diabetes mellitus, 81 in patients with type 1 diabetes, 358 in type 2 diabetes and 11 in patients with other types of diabetes.84 % of diabetic patients were treated with insulin, 50,8 % of them had intensive insulin therapy. Insulin admission, intensive insulin therapy, tumors, nephropathy and hepatopathy were identified as the most frequent presumable causes of hypoglycaemia. **Conclusion:** We confirmed that hypoglycaemia is a frequent event in hospitalized patients with 3,12 % incidence. In diabetic patients hypoglycaemia was caused especially by antidiabetic agents, in nondiabetic other causes as tumors, renal or liver disease play major role. Our results points to the necessity of glucose control not only in patients with diabetes mellitus, but also in patients with other diseases affecting glucose and insulin metabolism.

05 DO MEDICAL STUDENTS LEAD HEALTHY LIFESTYLE-PHYSICAL ACTIVITY, DIET AND GOOD HABITS ON MEDICAL UNIVERSITY OF SILESIA

Milka D, Likus W, Jachacz-Lopata M, Dorzak B.
Medical University of Silesia

Introduction: Cardiovascular diseases, diabetes and obesity are major health problem of the 21st century. In Poland, this problem affects as much as nearly 20 % of the adult population. Proper eating habits and moderate exercise are the best way to reduce a risk of cardiovascular diseases. **Objectives:** The objectives of this study was to evaluated the awareness of healthy lifestyle of students beginning their studies at the first year of various medical faculties. **Methods:** The study was conducted using a survey on a group of Polish first year students (N = 239, 201 women, 38 men) aged 19-26 years (x = 19.82 ± 1.23) of various medical faculties at Medical University of Silesia in Katowice. Questions related to rational eating, subjective health assessment, the type of physical activity undertaken and the reasons for its inaction and awareness of the consequences of its absence. Assessed dietary habits, use of drugs and reducing diet. **Results:** Among the respondents, 74 % said they are eating 'more healthly', but as much as 5 % can't evaluate their diet. Significantly more often, the women declared that they eat 'more healthly' (p>0.0001). 33 % of students never eat first breakfast and 23 % of them snack between meals. An important problem is eating in fast food restaurants too often (11 %) and consumption of highly processed ready meals (10 %). Up to 50 % of students don't take any physical activity. Nearly 75 % of students are conscious of a necessity of regular physical activity and only 8 % believe that lack of exercise and a healthy diet have no effect on their health. **Conclusion:** Studies have shown that young people who have attended medical science in college, although in theory possessing higher awareness of the importance of undertaking regular physical activity and healthy eating, are not implementing their knowledge in the practice of everyday life.

06 DAY BY DAY ON HEALTHY WAY – WOMEN'S ACTIVITY IN MENOPAUSE

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Introduction: Menopause is a special period of time in woman's life, when a lot of systemic changes occurrs. Hormonal changes associated with menopause and aging have influence on the body composition and fat distribution in midlife woman's body. Women are affected by many physical symptoms, such as flushing, slightly decreasing the overall efficiency of the body and increasing risk of cardiovascular diseases and osteoporosis. Other difficulties concern the mood swings and depression. **Objectives:** The main purpose of the study was to collect information about women's habits concerning health and their attitude towards undertaking physical activity in pre-menopausal, menopausal and post-menopausal period. **Methods:** The study was conducted in Silesian fitness objects and during physical classes of University of Third Age. The research tool was a questionnaire of a survey, comprising questions about woman's health, her everyday activity and motivation and evaluation of her physical performance. Questionnaires were addressed to women aged over 40 years and the research group included 87 women aged from 41 to 68. Women were divided into four age groups: I. pre-menopausal (44>), II. early-menopausal and menopausal (45-54), III. late menopausal and postmenopausal (55-64) and IV. elderly (>65). **Results:** Women in all groups indicated the need of maintaining or improving health (80.64 %) as the most important cause of undertaking physical activity. 63.2 % noticed the increase in strength and endurance. The profits resulted from the regular physical effort are especially exposed in the time after menopause. In most active women define their health as good (66.3 %) and satisfactory (24.1 %) regardless on age. **Conclusion:** The regular physical activity cause the increase of motivation, raise the self-esteem and causes better perception of individual's health state. The menopausal health discomforts are reduced by regular exercising, because of its physical and psychological advantages.

07 RELATIONSHIP BETWEEN THE SEVERITY OF OBSTRUCTIVE SLEEP APNEA AND RESTING ENERGY EXPENDITURE

Brúsik M, Tisko R, Tkácová R, Joppa P.
Pavol Jozef Safarik University

Introduction: Obstructive sleep apnea (OSA) is characterised by repetitive episodes of partial or complete airway obstruction during the sleep. The most important indices of OSA severity are apneahypopnea index (AHI), oxygen desaturation index (ODI) and arousal index. Increases in resting energy expenditure (REE) were reported in patients with OSA, though possibly confounded by body composition and gender differences [1]. REE accounts for approximately 70 % of total daily energy expenditure [2], representing the major factor in energy balance. Several adipokines involved in regulation of energy metabolism were dysregulated in patients with OSA [3]. We hypothesized a relationship between OSA severity and REE, possibly mediated by adipokines. **Objectives:** We assessed REE adjusted for fat-free mass (FFM) in males evaluated for suspected OSA and hypothesized that REE/FFM ratio is related to indices of OSA severity and serum adipokines. **Methods:** 26 males (age 48.4±11.3 years) underwent overnight polysomnography. Body composition was assessed by tetrapolar bioimpedance method and REE was measured by indirect calorimetry. REE/FFM ratio was compared between 16 patients with severe OSA (AHI>30; mean AHI 60.8±20.1 events/hour) and 10 control subjects (AHI<15; mean AHI 10.7±4.4). Samples to determine serum levels of leptin, adiponectin, resistin, TNF-α, IL-6, IL-8 were collected. **Results:** Patients with severe OSA had increased REE/FFM compared to controls (30.4±3.1 versus 27.3±4.0 kcal/kg/24 h, p=0.033). In univariate analyses, REE/FFM was directly related to AHI (R=0.486, p=0.012), ODI (R=0.561, p=0.003) and arousal index (R=0.482, p=0.013). In multivariate analysis, only ODI remained an independent predictor of REE/FFM after adjustments for age, BMI, AHI and arousal index (p=0.027, R2=0.438). **Conclusion**: Resting metabolic rate was increased in patients with severe OSA and correlated with indices of OSA severity. The independent predictive value of ODI suggests a possible role for intermittent hypoxia in the regulation of energy metabolism in OSA.

08 EFFECTS OF CETP AND APOE POLYMORPHISMS ON LIPOPROTEIN LEVELS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

Tisko R, Slabá E, Dorková Z, Sopková Z.
P. J. Safarik University

Introduction: Cholesterol ester transfer protein (CETP) and apolipoprotein E (APOE) polymorphisms were related to serum lipids in association studies. Hypoxia inhibited clearance of triglyceride-rich lipoproteins in a mouse model of obstructive sleep apnea (OSA). **Objectives:** Since hypoxia might interfere with genetic background to affect lipid levels, we examined effects of interactions between CETP and APOE variants and hypoxia on serum lipids in patients with OSA. **Methods:** 634 adult subjects evaluated for suspected OSA underwent overnight polysomnography. The association of HDL-cholesterol (HDLC), triglycerides (TG) and LDLcholesterol (LDLC) with OSA-related hypoxia reflected by oxygen desaturation index (ODI) was examined and adjusted for relevant covariates. **Results:** Patients were 69.1 % male (age 51.1±11.2 years, apnoea-hypopnoea index 30.4±29.9). In univariate analyses, HDLC was related to the both ODI and CETP polymorphism (R=-0.196, p<0.001; R=0.123, p=0.002). In multivariate analysis only CETP genotype remained associated with HDLC (R2=0.185, p=0.002) and no interaction between CETP variant and ODI was observed. In contrast, TG were related to ODI and APOE polymorphism in the univariate analyses (R=0.284, p<0.001; R=0.100, p=0.013), and also after

adjustments (R2=0.382, p=0.046, p=0.002). Significant interaction between APOE genotype and ODI was observed with respect to TG levels (p=0.010 for the interaction term APOE*ODI). **Conclusion:** Our findings support the role of CETP and APOE polymorphisms in atherogenic dyslipidaemia in OSA patients, and suggest the presence of an interaction between hypoxia and APOE genotype to affect TG levels.

09 OBESITY AND METABOLIC SYNDROME IN THE GROUP OF UNIVERSITY STUDENTS

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Introduction: Obesity is a natural consequence of overnutrition and sedentary lifestyle. Obesity is basic part of the metabolic syndrome (MS). It is demonstrated in visceral obesity adversely influences insulin resistance. A higher amount of circulating free fatty acids in the blood has recently been suggested as the mechanism for the outbreak of insulin resistance. The circumference of the waist correlates with risk factors such as ischaemic heart disease, arterial hypertension and dislipoproteinaemia. Waist circumference measurement should be included in the routine examination of each patient. Lack of physical activity is another important factor for the outbreak of insulin resistance. Regular physical activity can significantly decrease insulin resistance, independently from the stage of adiposity. The special profile of fatty acids in the diet can influence the profile of fatty acids in muscle tissues. Insulin resistance is associated with higher contents of fatty acids. **Objectives:** To determine the risk of obesity and the MS in the population of young people and to compare this risk between male and female population. **Methods:** We approached 200 respondents aged 18-30 years, who filled out the questionnaire. We sample the biological material for the analysis of biochemical parameters (as triglycerides, HDL-c, LDL-c, total cholesterol, blood glucose) and measured the selected anthropometric measurements of inquired respondents. **Results:** We were looking for relationships between biochemical parameters and correlation antropometric measurements. We found out that students with manifestation of obesity had the value of glucose and lipid parameters higher as the other. **Conclusion:** Because of a sedentary way of life, food rich on saturated fats, fatty acids and purified sugar, complex treatment is needed to prevent the development of ischaemic heart disease in patients with abdominal obesity. A change of eating habits is crucial (balanced diet, preferably with lots of vegetable and fruit, and limited fat and sugar intake) together with regular physical activity.

10 VALUE OF SAGITTAL CURVES OF SPINE AND THE LUMBOPELVIC STABILIZATION COMPLEX IN CHILDREN AND ADOLESCENTS

Blicharska I, Rzany M.
Medical University of Silesia

Introduction: The process of formation of sagittal curves of spine takes place during progressively adopted vertical posture.Correct values of thoracic kyphosis and lumbar lordosis act as shock absorbers from axial load and protect the structures of the spine against overload.Increase or decrease of sagittal clinical angles influence the muscles,the position of pelvis and will cause incorrect body posture. **Objectives:** The objectives of this study was to evaluate the lumbopelvic stabilization in children and adolescents with diagnosed idiopathic scoliosis and training karate and also to assess influence of value of sagittal curves of spine on these stabilization. **Methods:** The study was performed in two groups of children and adolescents aged 7- 17 years (13,06±3,4). Group A was composed of 30 children with diagnosed idiopathic scoliosis-with primary Cobb angle 11-38°. They were hospitalized for 21 days in the Department of Medical Rehabilitation and rehabilitated with DoboMed.Cobb angle was measured on the actual x-ray.Group B-35 children who train karate in Club "Goliat" and haven't been diagnosed with scoliosis.The value of sagittal curves of spine of all subjects was measured by Plurimeter-V by Rippstein and lumbopelvic stabilization using Stabilizer Pressure Bio-Feedback. **Results:** The results showed that during deep muscles activation which stabilizes lumbar spine,occur additional actions of global muscles or flexion of spine initiated a movement in both groups (56 % group A, 42,8 %-B). In group A were 40 % of subjects with correct size of lumbar lordosis and 26 % with correct size of thoracic kyphosis (norm according to Dobosiewicz). In group composed of individuals training karate 42 % have incorrect value of lordosis (25,7 % descreased, 17,2 % increased). Statistically, significant correlation was noted between value of lumbar lordosis and values of stabilization in group A (R=0,39, p<0,042). **Conclusion:** Level of lumbopelvis stabilization depends on the size of lumbar lordosis in group with scoliosis. Decrease of thoracic kyphosis in children who train karate may be a result of antykyphosis exercises and strengthening of erector spine muscle which is often used during training.

11 THE RISK OF FALLS AND THE CONDITION OF THE LONGITUDINAL ARCH OF FOOT IN ELDERLY

Podhorecka M, Sielski G, Kociuga M.
Medicum Nicolaus Copernicus University

Introduction: Falls in older people is one of the major geriatric problems, because falls often lead to disability or death of the elderly. It is recognized that falls are not usually caused by one of the determinants, but are the result of their accumulation. Usually this is the link between internal and external factors. Elimination of determinants can have a positive impact on the repeatability of falls. **Objectives:** The aim of the study was assessment of longitudinal arch of the foot in standing position among people with recurrent falls, and to investigate the correlation between the risk of falls and the condition of longitudinal arch of the foot in the elderly. **Methods:** The study included 98 patients over 60 years (24 men and 74 women). Patients were asked for information concerning their health and lifestyle. Then patients were evaluated by Timed Up & Go Test, Tinetti Test and Berg Test. The next step was to measure the Clarke's angle, which assess condition of longitudinal arch of the foot by using the apparatus for computer evaluation of the feet. **Results:** Patients were divided into two groups. The first group consisted of persons without a fall in an interview. The second group consisted of people with recurrent falls in an interview. Average Clarke's angle in the group of recurrent falls was lower than in the other group and was 35 ± 12°, in the group without a fall was 42 ± 12° (p <0.05). It were also found statistically significant correlations between the Clarke's angle and Timed Up & Go Test (Pearson's correlation: 0.30491), Tinetti Test (0.37096) and the Berg Test (0.36265). **Conclusion:** 1. In elderly with recurrent falls occur reduction of longitudinal arch of the foot. 2. The reduced value of Clarke's angle is significantly correleted with increased risk of falls in the elderly.

PhD STUDENTS' WORK *Theoretical Section*

12 THE EFFECT OF SOFT DRINKS ON MECHANICAL PROPERTIES OF HUMAN TOOTH ENAMEL

Morozova J, Ctvrtlík R, Zapletalová Z, Ranc V.
Palacky University

Introduction: In the modern society we can observe significant increase of fruit juices and carbonated soft drinks consumption. They contain water, different additives as well as citric, phosphoric and carbonic acids. Frequent exposure of hard dental tissues to dietary acids can lead to irreversible erosive wear. **Objectives:** The aim of our in vitro study was to investigate the effect of soft drinks (Kofola, Coca-Cola), orange juice and yoghurt on microhardness and elastic modulus of human enamel. **Methods:** 40 enamel samples were prepared from intact freshly extracted human molars. At the beginning of the experiment microhardness and elastic modulus were measured by nanoindentation. Surface topography of enamel samples was studied by AFM. Received data were used as control. After that the samples were randomly divided into 4 groups. The 1-st group samples were immersed to soft drink Kofola, the 2-nd group samples – to Coca-Cola, the 3-rd group samples -to orange juice Hello, the 4-th group samples - to white yoghurt Klasik for 5 minutes. The pH and titratable acidity of every beverage and yoghurt were determined. After immersion the samples were rinsed and dried up. After that microhardness and elastic modulus were measured. Surface topografy was studied again. Received data were statistically worked up (paired Student's t-test) and compared with initial data. **Results:** The

most distinguished reduction of enamel microhardness was observed among samples exposed to Coca-Cola (43.6 ± 14.4 %) and orange juice (41.7 ± 3.4 %). The most distinguished decrease of elastic modulus was observed among samples immersed to orange juice (15.7± 4.7 %) and Kofola (14.9±9.0 %). The influence of yoghurt was insignificant ($p>0.05$). **Conclusion:** Our experiment prooved significant reduction of enamel mechanical properties after exposure to acidic beverages. Despite of acidic pH, yoghurt did not cause significant changes of enamel mechanical properties due to its mineral components.

13 THE EFFECT OF CHRONIC LIQUID NUTRITION INTAKE ON ORGANS DEVELOPMENT AND PHYSIOLOGICAL PARAMETERS IN RAT

Vrabcova M, Pallova L, Mravec B.
Comenius University

Introduction: Increased consumption of food and beverages rich in sugar and lipids represent key contributor for development of obesity in children and adult population. To investigate etiopathogenetic mechanisms responsible for obesity development, several experimental diet-induced obesity models are used. **Objectives:** The aim of our study was to investigate the effect of chronic liquid nutrition intake (Fresubin) on organs development in relationship to developmental stages of rats when liquid nutrition intake started. **Methods:** Rats from control group were fed by standard pellet food. In other groups, rats were fed by Fresubin immediately after weaning for 5 months or before reaching early adulthood (age 90 days) for 3 months. Moreover, the last group received liquid nutrition after reaching adulthood for 2 months. During the experiment repeated blood pressure measurements were performed by noninvasive tail-cuff method. After the end of experiment rats were sacrificed and selected tissues were removed. The samples of separated tissues were histologicaly analyzed by hematoxylin-eosin staining. **Results:** Rats fed by liquid nutrition showed increased food intake and body weight in comparison with control rats. In rats fed by Fresubin, significant increase of adipocytes diameter and increased blood pressure were found. Moreover, animals fed by liquid nutrition showed significant differences in muscle layer thickness of stomach than control rats. In aorta and small intestine no significant differences between experimental groups were found. **Conclusion:** Feeding of rats by liquid nutrition led to development of morphological and functional changes. These changes are consequences of increased energy intake as well as mechanical characteristics of liquid nutrition.

14 CARBON MONOXIDE STIMULATES AN EARLY ANTI-INFLAMMATORY RESPONSE IN RAT SEPTIC LIVER

Vanova K, Suk J, Petr T, Vanikova J, Lekic N, Vitek L, Muchova L.
Charles University

Introduction: In sepsis, normal hepatic functions can be altered by the development of cholestasis causing serious complications in the treatment. Carbon monoxide (CO), which is generated in mammals by heme oxygenase, is an important signalling mediator in anti-inflammatory and cytoprotective processes, and is involved in bile excretion. However, the role of CO in the pathogenesis of sepsis-induced cholestasis remains to be elucidated. **Objectives:** The aim of this study is to determine if exogenously-delivered CO can be distributed specifically to tissues and affect the inflammatory and cholestatic status of the liver. **Methods:** Adult female rats were divided into 4 groups: CON (controls, saline buffer, IP), LPS (lipopolysaccharide, 6 mg/kg, IP), COi (inhalation 250 ppm, 1h) and COi+LPS (inhalation 250 ppm, 1h, LPS 6 mg/kg, IP). HO activity and tissue CO were determined using gas chromatography, cytokine expression in the liver (TNF-alfa , IL-10, IL-6), and serum markers of liver injury were measured at 5 time-points from 0.5 – 12h after treatment. **Results:** Markers of liver injury (bilirubin, bile acids, ALT, AST) increased rapidly within 4h after LPS administration. Liver CO was significantly elevated after CO inhalation compared to CON (48.6±9.6 vs 7.2±1.0 pmol CO/mg fresh weight [FW], $p<0.01$), but returned to CON levels within 4h (9.9±2.8 vs 7.7±1.8 pmol CO/mg FW). Both HO activity and expression were significantly increased after 4h in LPS and COi+LPS groups ($p<0.05$). Expression of TNF-alfa was significantly reduced in COi+LPS 1h after treatment (3-fold compared to LPS, $p=0.01$). IL-10 expression significantly increased after CO pre-treatment at all time-points after LPS administration ($p<0.05$). **Conclusion:** We conclude that inhaled CO is unevenly distributed to all body tissues, but is eliminated within 4h. Moreover, CO stimulates an early anti-inflammatory response as demonstrated by the elevation of liver IL-10 mRNA and simultaneous TNF-alfa mRNA decrease in LPS-treated animals, but has no effect on serum cholestatic markers.

15 OPTIMIZATION OF METABOLIC ACTIVITY OF GASTROINTESTINAL TRACT BY NATURAL COMPOUNDS IN PREVENTION OF COLORECTAL CANCER

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Introduction: A much interest in nutritional sciences is in dietary modulation of the human gut, which is intensively populated by an array of bacterial species and develop important metabolic and immune functions. Dietary modifiers as prebiotics and phytochemicals are recognized by the numbers and types of microbes and have been reported to reduce colon cancer risk experimentally. **Objectives**: This study demonstrates beneficial aspects for consumption of prebiotics and plant extract by improving colonic ecology by decreasing fecal pH, increasing the relative proportions of lactobacilli and reducing proportion of coliforms, and increased concentration of butyrate in cecal digesta. **Methods:** Colon carcinogenesis was induced by N, N dimethylhydrazine (DMH) in a dose of 21mg/kg body weight s.c., five times at weekly intervals. Sprague Dawley rats (n=45) were divided into: control group without DMH; control group with injected DMH; group receiving inulin and injected DMH; group receiving Hyppocastani extractum siccum and injected DMH; group receiving inulin and Hyppocastani extractum siccum and injected DMH. Beneficial effect of natural compounds was determined by analysis of cecal parameters as pH, composition of microflora, activity of bacterial glycolytic enzymes and production of short-chain fatty acids (SCFA). **Results:** The counts of coliforms were decreased in group receiving inulin enriched with oligofructose ($p<0.01$), Hyppocastani extractum siccum ($p<0.001$) and combination of these supplements ($p<0.001$). The counts of lactobacilli were significantly increased in all experimental groups receiving natural compounds ($p<0.01$; $p<0.001$). Experimental groups receiving natural compound alone and in combination resulted in significant decrease in activity of Beta-glucuronidase ($p<0.01$; $p<0.001$). Administration of inulin and Hyppocastani extractum siccum separately significantly increased the concentration of SCFA compared to the control group with DMH. **Conclusion:** The achieved results indicate a beneficial effect of prebiotics and plant extract on the metabolic processes in the colon and they could exert a preventive effect on colon carcinogenesis induced by DMH.

16 COMPARISON OF ROMA SETTLEMENTS POPULATION WITH MAJOR POPULATION IN SLOVAKIA REGARDING CARDIOVASCULAR RISK PROFILE

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Introduction: Cardiovascular diseases (CVD) are primary cause of mortality world wide. Despite of deteriorating health of Roma particularly those living in Roma settlements information regarding non-communicable diseases such as CVD and their risk factors in Roma are limited. **Objectives:** The aim of this study was to explore prevalence of series of biological CVD risk factors in population living in separated and segregated Roma settlements compared to majority population and to explore the effect of Roma ethnicity on these health indicators. **Methods:** We used data from cross-sectional HepaMeta study conducted in 2011 in Slovakia. The final sample comprised of 452 Roma (mean age=34.7; 35.2 % men) and 403 (mean age=33.5; 45.9 % men) non-Roma respondents. The effect of ethnicity was analyzed using logistic regression and adjusted for age and stratified by gender. **Results:** We found that the prevalence of the CVD risk factors varied among Roma and non-Roma. Population living in Roma settlements have in comparison to major population higher chance for obesity, and among Roma women also for abdominal

obesity, higher chance to be a smokers, higher chance for low HDL cholesterol, but also normal total cholesterol and among Roma men also normal LDL cholesterol. We did not find differences by ethnicity regarding hypertriglyceridemia, hyperglycemia, and hypertension. **Conclusion:** Our study confirmed higher accumulation of biological CVD risk factors in Roma compared to the majority population. On the other hand, differences between Roma and majority population in our sample concerning younger age groups were not that dramatical in comparison to differences found in older age groups in other studies. Thus the intervention focusing on Roma should promote health literacy and healthier lifestyl among younger population.

17 FAST EFFICIENT AND ROBUST UHPLC DETERMINATION OF 4-DIMETHYLAMINOANTIPYRIN FROM DIFFERENT TYPES OF SUPPOSITORY VEHICLES

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Introduction: Magistral suppositories are important tools of the individual therapy especially in the paediatrics. Nowadays an instrumental assay method became necessary for the quality contol of dosage units. **Objectives:** The aim of this work was the development of a fast, effective UHPLC method for the assay of aminophenazone from magistral suppositories prepared using three different suppository bases. **Methods:** During the assay methanol from Merck (LiChrosolv) and Sigma-Aldrich (Chromasolv for HPLC) was used as organic modifier. Buffer solutions have been prepared using triple distilled water. The pH of the buffer solutions was set using Na-acetate anhydrate (Reanal) and acetic acid 96% (Molar Chemicals). 4-dimethylaminoantipyrin (AMFZ) (Sigma-Aldrich) was used as reference substance during our experiments. Each suppository contained 100.0 mg of AMFZ formulated in three different suppository bases that was used during the analysis. The bases were Adeps solidus, Adeps solidus compositus and Massa macrogoli. The measurements have been carried out on a Shimadzu Prominence UHPLC system equipped with a 20 µl sample loop. The separation was achieved on a Hypersil ODS column. The applied mobile phase was 60:40 v/v% mixture of methanol and 50 mM sodium acetate buffer pH=5.5 ± 0.05. The flow rate was 1.5 ml/min. The chromatograms were acquired at 253 nm wavelength for 5 minutes. Integration of the chromatograms was carried out by LCSolution software (Shimadzu Corp.). **Results: T**he developed chromatographic method has been fully validated according to current guidelines. Applying the sample preparation method developed by the authors AMFZ can be determined from the various lipo-hydrophilic types of suppository bases with 95-105 % recovery. **Conclusion:** On the basis of the data presented in this paper it can be stated that a fast efficient and robust sample preparation and UHPLC method has been successfully developed and fully validated for the routine uniformity of dosage units test of suppositories containing 4-dimethylaminoantipyrin.

18 RELIABILITY OF A QUALITY OF LIFE QUESTIONNAIRE IN DIABETIC PATIENTS - REPEATABILITY AND CONSISTENCY OF RESPONSES

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Introduction: The study of quality of life in disease requires the use of validated questionnaires. Their reliability largely depends on the repeatability and consistency of responses to standard questions. In adult diabetic patients the recommended tool is the Audit of Diabetes Dependent Quality of Life Questionnaire (ADDQoL). The lack of data on its reliability in Polish diabetic patients provided the background for the study. **Objectives:** Objective was to assess the repeatability of responses to ADDQoL, using a test-retest approach. **Methods:** The study group included 54 diabetic out-patients aged 62.3 ± 14.6 years (38 female and 18 male). Each patient was asked to complete the questionnaire on two occasions, at an interval of 1-2 weeks. Reproducibility of responses obtained on both occasions was assessed by calculating test-retest % agreement and using Cohen Kappa statistic (good agreement was defined if Kappa values exceeded 0.6). **Results:** The results of analyses (% agreement, weighted Cohen Kappa statistics and their 95 % CI) are shown in table below. For examined questions the level of agree ment was good or very good. Question and its ADDQoL code; Level of test-retest agreement [%]; Weighted Cohen Kappa statistic and its 95 % CI Leisure time activity (Q1b) 98 0.97 (0.92-1.00) Travelling (Q3b) 98 0.97 (0.93-1.00) Family life (Q6b) 83 0.75 (0.57-0.93) Appearance (Q10b) 85 0.77 (0.62-0.92) Feelings about the future (Q14b) 77 0.61 (0.42-0.81) Housing conditions (Q16b) 87 0.76 (0.59-0.93) Independence from other (Q17b) 76 0.69 (0.53-0.85) **Conclusion:** The findings suggest that the Polish version of ADDQoL has satisfactory repeatability for the examined questions regarding quality of life. However the complete evaluation requires analyses on more questions in a larger group of diabetic patients.

19 COMBINATION OF EXCESSIVE USE OF TESTOSTERONE AND PHYSICAL ACTIVITY IN RAT - BENEFICIAL OR DETRIMENTAL?

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Introduction: Clinical studies suggested beneficial effect of testosterone therapy on heart failure symptoms associated with increase of exercise capacity. Myosin is the primary regulator of muscle strength and contractility. Genes involved in its regulation were associated to cardiac failure as they control myosin content, and muscle performance. **Objectives:** We tested effects of testosterone, alone or in combination with physical activity, on cardiac function, exercise capacity and expression of genes regulating muscle myosin (Sox6, Myh6, Myh7, PurB) in cardiac and skeletal muscle. **Methods:** Testosterone (100 mg/kg) was administered once weekly in sedentary or physically active Wistar rats during eight weeks. Activity was provided by voluntary freewheel running. Systolic and diastolic blood pressures (sBP and dBP) were measured in a.carotis, left ventricular pressure (LVP), rate of contraction (dP/dtmax) and relaxation (dP/dtmin) were determined using left ventricular catheterization. The expressions of myosin regulating genes were analyzed using qRT-PCR in cardiac and skeletal muscle. **Results:** The combination of running with testosterone significantly increased dBP (+13 %). Ventricular mass to body weight ratio was significantly increased by 15 % in simple trained rats, and by 25 % in combined group, resp. (P less than 0.05 vs. sedentary controls). Training per se increased left ventricular function and application of testosterone accentuated this increase (LVP by 12 %, dP/dtmax by 31 % and dP/dtmin by 33 %, P less than 0.05 vs. sedentary controls). Independently, the expression of analyzed genes remained stable in cardiac tissue. Testosterone-treated rats ran significantly longer total distance compared to non-treated group (228 km vs. 81 km) but expression of Sox6, a negative modulator of Myh7 expression was downregulated similarly by 40 % (P less than 0.05 vs. sedentary controls) in skeletal muscles in both trained groups. **Conclusion:** Myosin regulating genes have no significant influence on testosterone-induced hyperdynamic cardiac function but regulation of Sox6 might be associated with adaptation of skeletal muscle on training.

20 TAU PATHOLOGY IN RAT BRAIN DOES'T INFLUENCE SYMPATHETIC NERVOUS SYSTEM AND HYPOTHALAMIC-PITUITARY-ADRENOCORTICAL AXIS IN RESPONSE TO ACUTE STRESS

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Introduction: Alzheimer`s disease (AD) is characterized by progressive neurodegeneration and loss of neurons in several brain areas. One of the factor that is implicated in AD neurodegeneration is stress. An acute neuroendocrine stress response is characterized by profound increase of plasma catecholamines and glucocorticoids levels. **Objectives:** The aim of this study was to determine whether responses of sympathetic nervous system and hypotalamo-pituitary-adrenocortical axis (HPA) to stressor are influenced by developed neurofibrilary pathology in central nervous system in transgenic rats, used for the study of AD etiopathogenesis. **Methods:** We used transgenic rat line (TG) expressing truncated human tau protein (SHR72) and rat SHR line (WT). Immobilization (IMO) for various intervals was used as a stressor. Before and during IMO (15, 30, 60 and 120 min of IMO) blood samples were collected used via cannula implanted into the jugular vein. Levels of catecholamines (norepinephrine

and epinephrine) and corticosterone in plasma were determined by ELISA and RIA kits. Gene expression of catecholamine synthetising enzyme - tyrosine hydroxylase (TH) in adrenal medulla was determined by RT-PCR. **Results:** Immobilization induced significant increase of plasma epinephrine, norepinephrine, and corticosterone level. However, there were no significant changes between WT and TG groups in this neuroendocrine stress response. TH mRNA expression in the andrenal medulla was significantly increased after immobilization, but no differences were seen between WT and TG groups. **Conclusion:** Our data indicate that responses of the sympathoadrenal system and hypotalamopituitary- adrenocortical axis to stressor are not significantly affected by AD pathology.

21 EFFECT OF HYPERHOMOCYSTEINEMIA ON TOTAL ANTIOXIDANT CAPACITY (TAC) AND ENZYME ACTIVITY AFTER INDUCED ISCHEMIA-REPERFUSION DAMAGE

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Introduction: Acute ischemic stroke is the third leading cause of death in industrialized countries and the most frequent cause of permanent disability in adults worldwide. Deficits include partial paralysis and problems with cognitivity functions. The reperfusion which is needed to restore normal brain function, paradoxically, causes ischemia-reperfusion (IR) injury associated with the formationof reactive oxygen (ROS) and nitrogen (RNS) species. These substances accelerate the lipid and protein oxidation and form malondialdehyd or 4-hydroxynonenal. Homocysteine contributes to the deterioration of damage. **Objectives:** To investigate the relationship between antioxidant enzyme activities and effect of hyperhomocysteinemia after induced IR damage. **Methods:** The homocystein was administrated subcutaneously for 2 weeks period to male Wistar rats (6 months of age). The first analyzed group was rats with a 15-minute lethal ischemia followed by reperfusion (1,3, and 24 hours). The second group was represented by healthy control rats. The mitochondria fraction from brain homogenates was analyzed using spectrophotometric methods and Western blotting to determine biochemical parameters. The total antioxidant capacity was determined by quantitative ELISA test. **Results: T**he activity of MnSOD was dependent on the length of reperfusion with the maximum achieved after 1hr of reperfusion. We observed the similar trend on the protein level using Western blotting**. Conclusion:** Our results indicate that the antioxidant enzyme activity of MnSOD is relate to TAC. The increase of the total activity has been observed in the IR periods with the maximum after 3 hrs of reperfusion. Long-lasting period of reperfusion (72 hrs) leads to decreasing of the activity.

22 EXPRESSION DYNAMICS OF SELECTED CALCIUM-HANDLING PROTEINS DURING INDUCTION AND DEVELOPMENT OF ISOPROTERENOL-INDUCED CARDIAC HYPERTROPHY

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Introduction: Heart failure is a pathological state associated with decreased contractility, which is closely related to abnormal calcium cycling in cardiac myocytes. Alterations in levels of calciumhandling proteins were observed in patients with heart failure and also in many animal models of cardiac hypertrophy. **Objectives:** Our aim was to measure mRNA expression of selected calcium-handling proteins in left ventricle during induction and development of isoproterenol-induced cardiac hypertrophy. **Methods:** 20-weeks old male Wistar rats were administered isoproterenol (ISO) (5 mg/kg, i.p.) in a single dose (n=70) and were sacrificed by CO2 asphyxiation after 0.5, 1, 2, 4, 8 or 24 h. In the second experiment (n=50), ISO was administered at a dose 5 mg/kg/day i.p. and rats were sacrificed after 1, 2, 4 or 8 days of treatment. Control groups received no treatment. mRNA levels of ryanodine receptor 2 (RYR2), sarcoplasmic/endoplasmic reticulum calcium ATPase (SERCA2a), voltage-gated L-type calcium channel alpha1C subunit (CACNA1C) and atrial natriuretic peptide (ANP) as marker of cardiac hypertrophy were analyzed by qRT-PCR using gene-specific primers. beta2-microglobulin was used as housekeeping gene. **Results:** Increased heart weight was observed already after 24 h after ISO administration ($p<0,05$), and heart weight progressively increased until the 8th day. The changes in left ventricular mass were accompanied by massive upregulation of ANP ($p<0,01$). During first 24 h after ISO administration expression of RYR2, SERCA2a and CACNA1C mRNA remained unchanged. On the second day of ISO treatment we observed downregulation of SERCA2a mRNA ($p<0,01$), which persisted until the end of the experiment. Expression of RYR2 was lowered on the 2nd ($p<0,05$) and 4th day ($p<0,05$) and expression of CACNA1C decreased significantly on the 4th day of ISO treatment. **Conclusion:** Observed changes in RYR2, SERCA2a and CACNA1C expression could contribute to abnormal calcium leaks and subsequently to the left ventricular dysfunction previously observed in this model.