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1. AUTOLOGOUS VESSEL BYPASS VERSUS ARTIFICIAL GRAFT BYPASS

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ABSTRACT

In the last years, arterial obstructive diseases are treated by using vascular grafts. Unfortunately, this method is limited by the lack of the autologous tissues necessary for the revascularization procedures. In this particular case, synthetic grafts are recommended, but their performances are reduced compared to the natural ones. An artificial graft should resist to thrombosis, inflammation and neointimal proliferation and should present metabolic and biochemical functions similar to those of blood vessels, which contain a luminal monolayer promoting healing. The lack of functional endothelial cells on the luminal surface of the stent induces a high thrombogenicity and also promotes intimal proliferation. These deficiencies could be removed by using grafts coated with an endothelial monolayer. Even though autologous endothelial cells are better tolerated than allogeneic and xenogenic ones, they do not constitute a source of normal endothelial cells, because of the endothelial dysfunction which accompanies arterial obstructive diseases. The purpose of our article is to review the literature data regarding a stent with properties closer to those of a blood vessel, better compatibility with the patient, and an adequate time interval for isolation, culture and seeding of endothelial cells on the graft inner surface.

2. IN VITRO HUMAN ADULT MESENCHYMAL STEM CELLS DIFFERENTIATION TOWARD CHONDROGENIC LINEAGE

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ABSTRACT

Aim: The purpose of our study was to investigate MSCs potential to differentiate into chondrocytes, under the influence of culture medium. **Material and methods:** Bone marrow derived MSC were obtained from patients submitted to femoral replacement, by drilling the femoral bone, after the informed written consent was signed, in accordance with rules of the Ethics Committee of “Victor Babes” University of Medicine and Pharmacy Timisoara. The cells were differentiated using two different supplements in culture medium (TGF beta and BMP 2) and two culture techniques (cellular suspension culture and microaggregates technique). After differentiation, RNA was extracted and the cells were assessed by PCR technique. We aimed to identify molecular markers specific for chondrocytic lineage, so that we assessed presence of aggrecan, collagen X and II. **Results:** Our experiments indicated that mesenchymal stem cells which are placed in chondrocytic medium have an increased tendency to progressively differentiate towards the chondrogenic lineage. The MSCs cultured in presence of TGF beta showed an increased ability to develop towards chondrocytic cells, compared to culture conditions using BMP2. Molecular biology analysis performed in the 21 day of differentiation on cells differentiated using microaggregates technique, revealed a strong expression of characteristic markers for cartilaginous tissue, such as: aggrecan, collagen X, and collagen II. **Conclusion:** Although the supplements added in culture medium seem to support MSCs differentiation, there are still factors which are not known which are involved in MSCs differentiation towards the chondrocytic lineage.

Key words: mesenchymal stem cells, chondrocyte, culture medium, molecular markers, PCR

3. AUDITORY HAIR CELL TYPE SENSITIVITY TOWARDS OTOTOXIC ACTION OF NEOMYCIN

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ABSTRACT

Objectives:The main objective was to detect on experimental way in what measure neomycin determines apoptotic hair cell death in the organ of Corti at 6 hours after their contact with the antibiotic. We also wanted to determine the sensitivity gradient between the different hair cell types in the organ of Corti. Another objective was to evaluate the order of cytoplasmatic caspase 3, 8 and 9 activation.

Material and methods: The study took place in Tuebingen Hearing Research Center. Cochleas harvested from 7 days old mice were incubated for 6 hours in rotatory bioreactors in the presence or absence of neomycin and were afterwards treated with fluorochrominhibitors for caspase 3, 8 and 9.

Results: After 6 hours of cochlear *in vitro* cultivation in the presence of neomycin, the average cell number which expresses caspase 3, 8 and 9 is significantly higher in cochleae treated with neomycin compared to the control group. First affected are outer hair cells in the first row followed by inner hair cells and then by outer hair cells II and III. After 6 hours of neomycin treatment, first affected is the basal segment followed by the middle one, and then, by the apical segment. The apoptotic process is initiated by caspase 8 activation followed by caspase 9 activation and finally by caspase 3.

Conclusions: In auditory hair cell apoptosis due to neomycin participates caspase 8 which activates first, followed by caspase 9 activation and finally by caspase 3 activation.

Key words: apoptosis, hair cell death, caspase, organ of Corti

4. LONGTERM EXPOSURE TO CIGARETTE SMOKE INDUCES ASSOCIATION OF PULMONARY AND VASCULAR INFLAMMATION WITH ENDOTHELIAL DYSFUNCTION AT THE LEVEL OF GUINEA PIGS' THORACIC AORTA

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ABSTRACT

The purpose of our study was evaluation of functional and inflammatory modifications on guinea pigs' thoracic aorta, after chronic exposure of guinea pigs to cigarette smoke. We took 20 guinea pigs into our study and they were divided into a control group (n = 5) and 3 other groups exposed to cigarette smoke for 4 weeks (n = 5), 8 weeks (n = 5), and 8 weeks (n = 5), respectively. When the cigarette smoke exposure period finished, the animals were sacrificed and both thoracic aorta rings were harvested for further vascular reactivity study in organ bath, as well as fragments of thoracic aorta and lungs for morphopathologic examination using hematoxylin-eosin staining.

Long term exposure of guinea pigs to cigarette smoke had induced initially pulmonary inflammatory changes, followed after a “window” of approximately 8 weeks by inflammatory changes at the level of thoracic aorta vascular wall, small pulmonary arteries, and arteries comprised by vasa vasorum. Endothelial dysfunction, revealed by a decrease of endothelial-dependent vasodilator response to 5' adenosine, had a statistic significance compared to control at the end of cigarette smoke exposure period: $EC_{50}\text{-Log[M]} = 5.35 \pm 0.87$ vs. 7.37 ± 0.23 , $p < 0.001$; $EC_{\max}(\%) = 56.85 \pm 14.56$ vs. 92.50 ± 13.23 , $p < 0.001$. Endothelial-independent vasodilator response to sodium nitroprusside did not show any changes.

As conclusion, long term exposure of guinea pigs to cigarette smoke induced a series of inflammatory processes, which had a precocious beginning as pulmonary inflammation, then presented a further amplification as vascular inflammation and finally associated pulmonary emphysema with endothelial dysfunction, at the end of cigarette smoke exposure period.

Key words: cigarette smoke, pulmonary inflammation, vascular inflammation, endothelial dysfunction

5. PARTICULAR FACTORS MODIFYING THE CHARACTERISTICS OF PHYSIOLOGICAL TREMOR

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ABSTRACT

Changes of locomotors segment inertial properties in young persons contributes to the increase of vibration amplitude, expressed by a 3.4-fold increase of the oscillations' spectral energy (POWER), due to a 1.8-fold increase of their maximal energy (P_{MAX}), respectively a 2.1-fold increase of their average energy (PAVER). An increase by 2.9 Hz of the mean frequency (MPF) of oscillations occurred concurrently with the amplitude increase. The frequency of maximal energy (F_{MAX}) increased by 4.1 Hz.

Of the total amount of oscillations of the finger distal phalanges, 64% in young persons, and 57% in old subjects, respectively, are concentrated in the frequency range of 7-13 Hz, which is determined by the

activity of the spinal alpha-gamma loop. The density of oscillations recorded in this interval in young persons is 8.9 times lower compared to the level recorded in an old age group. The oscillation density increases with age over the entire considered frequency range (0-50 Hz), but the most significant are the changes in the frequency interval 0-7 Hz, wherein the oscillation density in old subjects is 18.6 times higher than in the young age group.

The increase of the vibration amplitude in old persons, expressed by a 2-fold increase of the spectral energy (POWER) and by 1.5-fold increase of the maximal energy of oscillations (PMAX) occurs concurrently with a diminution of their average frequency by 4.3 Hz., which results from a 3-fold increase of the proportion of oscillation with a frequency below 7 Hz.

The pulsatile wave may interfere with the main parameters of the physiological tremor; however its influence is not determinative.

Key words: physiological tremor, oscillations, frequency, spectral energy

6. OSTEOCALCIN AND ESTRADIOL - MARKERS OF BONE CELLS IN POSTMENOPAUSAL OSTEOPOROSIS

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ABSTRACT

Introduction: The Estradiol (E2) and Osteocalcin (OC) play an important role in the regulation of bone turnover, stimulating the bone formation by the osteoblasts. **Objectives:** The aim of this study was the determine serum levels of Estradiol and Osteocalcin are elevated in postmenopausal women with osteoporosis. **Material and Method:** The study was made on two cohorts of patients with postmenopausal osteoporosis (depending of estrogenic deprivation) comparing them with the control group (menopausal women without osteoporosis). Serum levels of the markers were measured by ELISA technique and evaluation Bone Mineral Density (BMD) were analysed using DEXA methods assessment T scores (sT spines). **Results and discussions:** Cohort 1 (under 15yr of the estrogenic deprivation): OC serum levels were 20.12 ± 0.87 ng/ml, E2 serum levels were 28.32 ± 1.78 pg/ml, and sT spines were 3.63 ± 0.65 . Cohort 2 (over 15yr of the estrogenic deprivation): OC serum levels were 15.12 ± 1.55 ng/ml, E2 serum levels were 19.66 ± 1.23 pg/ml, and sT spines were -3.71 ± 0.36 DS. Control group: OC serum levels were 16.22 ± 1.62 ng/ml, E2 serum levels were 43.07 ± 4.04 pg/ml, and sT spines were -1.78 ± 0.11 . **Conclusions:** The serum levels increased of osteocalcin demonstrates osteoblasts activation, and the decrease serum levels of osteocalcin demonstrates osteoblasts apoptosis stimulation, associated with estrogen deficiency in a postmenopausal women, witch will increase significantly bone turnover; producing a decrease of bone formation and increasing bone resorting, and the imbalance favoring the osteoporosis appearance.

Key words: osteoporosis, osteocalcin, bone remodeling

7. THE EFFECTS OF MIXTURES OF ORGANIC SOLVENTS ON PSYCHO-PHYSIOLOGICAL FUNCTIONING IN SMALL DOSAGE OCCUPATIONAL EXPOSURE

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ABSTRACT

The effects of various organic solvents on the psychological and neurological functioning of the subjects exposed to them has been largely documented, however little interest has been shown in determining whether exposure to a very small dosage of organic solvents in a mixture, taken individually, can cause psychological degradation in the common workplace.

In the following study we measured short time memory, attention, cognitive inhibition and cognitive interference in 183 subjects, over the course of 4 years, who had been exposed to a small dosage mixture of organic solvents in their workplace.

The results confirm our hypothesis, namely that even a small dosage occupational exposure can cause various alterations in the subjects psychological functioning, determining degradation significantly larger than the normal aging effect, over all the 4 investigated factors, after at most 4 years of exposure, cognitive interference being the most sensitive to degradation, and attention the most resistant to these effects.

These results emphasize the necessity of better protection against exposure to mixtures to organic solvents; otherwise, the psychological degradation they determine may lead to various workplace accidents, and will certainly lead to lower productivity.

Key words: mixtures of organic solvents, psychological functions, shoes factory

8. A REPORT FROM THE 6TH ROMANIAN SYMPOSIUM ON MAGNESIUM

With international participation

Contributed by Dr. Manole Cojocaru MD, PhD, member of Director Committee of the RSMR, member of Scientific Committee of the Symposium

Magnesium is the second most abundant intracellular cation after potassium taking part in all important life processes. Progresses in magnesium research are opening a wide field for therapeutic use of this cation. Health care delivery is no longer a simple process of examining the patients and writing a prescription. It is very important to recognize that laboratory data form the basis for Evidence-Based Medicine (EBM) and that magnesium research can help to prepare proper guidelines for diagnosis and directives for treatment. Magnesium research is a dynamically field, and understanding mechanisms of magnesium misbalances, involvement into the pathology of many processes have shaped the existence of some magnesium dependent regulatory cellular mechanisms. One of the best opportunities for international communication is provided by scientific congresses and symposia. To achieve further progress, a new impetus in magnesium research is needed.

The 6th Romanian Magnesium Symposium was held at the Technical University "Gh Asachi" Aula (Main Hall) in beautiful city Iassy from September 27-28, 2007. Iassy, one of the most beautiful cities from Romania must be seen. This symposium was dedicate special attention to the progress achieved in the last year as well as to the methodology and practical issues of the development of magnesium research.

The focus of symposium was on an excellent scientific program, this year organized by Prof. dr. Mihai Nechifor from Iassy, President of Symposium and prof dr. Paul J. Porr from Cluj-Napoca, president of the Romanian Society for Magnesium research who delivered the salutary addresses. Welcome party sponsored by Antibiotics enterprise from Iassy followed the opening ceremony

More than 100 people from around the world had the opportunity to review an interesting program. Diverse topics such as magnesium in water and soil, magnesium in plants, physiological involvement of magnesium, magnesium in pathology, magnesium mechanisms of action at cellular level, magnesium involvement in CNS, magnesium in microorganisms, magnesium in immunity, magnesium in therapy, pharmacology and toxicology of magnesium components, magnesium sources, magnesium in veterinary medicine were discussed with great interest.

There were 4 sessions with plenary lectures, 3 sessions with free communications and also a session for poster presentations and 2 workshops (Worwag Pharma, Sanofi Synthelabo).

The new developments on magnesium research were presented by prestigious scientific personalities: Magnesium in the food chain of plants, animals and man (M. Anke, Jena Germany), Magnesium in acute

brain injury (R. Vink, Adelaide, Australia), Magnesium involvement in bipolar disorders (M. Nechifor, Iassy, Romania), Mineral waters as good source of magnesium – polish mineral waters from the south Poland (M. Schlegel–Zawadzka, Krakow, Poland), Magnesium content in the diets used for nutrition of patients staying in the military institute of aviation medicine hospital in Warsaw (A. Klos, Warsaw, Poland), Magnesium deficiency detected at several elderly persons (L. M. Deac, Cluj-Napoca, Romania), Possible implications of magnesium deficiency in the pathogenesis of irritable bowel syndrome – basis of a new therapeutical strategy? (P. J. Porr, Cluj–Napoca, Romania), explosive magnesium efflux and H₂O₂ induced apoptosis in red blood cells (J. M. Lou–Bonafonte, Zaragoza, Spain), Assessment of nutritional norms for magnesium fulfillment by food rations used for polish soldiers' alimentation within the space of last 30 years (J. Bertrandt, Warsaw, Poland), Magnesium, lead and delta-aminolevulinic acid dehydratase activity in vitro (R. Naginiene, Kaunas, Lithuania), Magnesium metabolism in insulin resistance, cardiometabolic syndrome and type 2 diabetes (M. Barbagallo, Palermo, Italy), Input of new advances in biology to better understanding of magnesium needs (A. Mazur, St. Genès Champanelle, France), Variations in magnesium distribution and cardiovascular disorders (I. S. Djujic, Belgrade, Serbia), Serum magnesium in patients with acute ischemic stroke (M. Cojocaru, Bucharest, Romania), Effects of magnesium sulphate on immobilization – induced gastric ulcerations in rat (V. I. Sandor, Cluj–Napoca, Romania), Magnesium and cardiac arrhythmias (C. Zeana, Bucharest, Romania), Synthesis of magnesium complexes with biological molecules and their crystal structures (T. Theophanides (Athens, Greece), Stress and immune system in athletes (M. Laires (Cruz Quebrada, Portugal), In vitro antioxidant activities of magnesium compounds (A. Szentmihalyi, Budapest, Hungary), Neuroprotective properties of 6-hydroxy-flavanone in two murine models of epilepsy: magnesium deficiency-dependent audiogenic seizure and pentylenetetrazole tests (P. Maurois (Paris, France), Magnesium effect on the interaction of statin molecules with an immobilized phosphatidylcholine monolayer (A. Berthelot, Besançon, France).

The participants had the opportunity to visit the beautiful city of Iassy and its surrounding. The organizers had prepared an excursion programme for the participants and the accompanying persons. The tour included the astonishing area Neamt Monastery. Surrounded by old forests, at the foot of the mountains, rises the oldest monastery in Moldavia-Neamt Monastery founded in the 14th century. Neamt Monastery has witnessed many historical events of the nation. Jewel of 15th century architecture, the monastery was built by Stefan the Great.

In conclusion, this symposium provided a forum for the meaningful exchange of ideas dealing with magnesium research. The 6th Romanian Magnesium Symposium was a successful symposium, where the participants joined efforts to continuing to improve the development of magnesium research. Discussion of timely topics by renowned scientists assures that this symposium was informative and interesting. Newly-acquired information about magnesium will be useful to practicing physicians who can apply this knowledge in a clinical setting. The personal discussions are sometimes even more important and there is no substitute for them. This symposium offered an outstanding scientific program regarding the clinical and basic studies on magnesium. On behalf of the Scientific Committee I take this opportunity to specially acknowledge the organizers for the success of the Symposium, and also for the contributions of the delegates.