

**Abstracts
of the
9th János Szentágothai
Interdisciplinary Conference
&
Student Competition**



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Program of the conference

9th János Szentágothai Memorial Conference and Student Competition

Venue:
University of Pécs (UP)
J. Szentágothai Research Centre
H-7634 Pécs, Ifjúság Street 20.

3rd May 2013, the 1st day

12:00-13:00	Arrival and registration
13:00-13:30	Opening ceremony Prof. József BÓDIS rector Dr. Zoltán MARUZSA Deputy State Secretary for Higher Education
13:30-14:15	Prof. Judit PONGRÁCZ - Invited Speaker, Medical Section
14:15-15:00	Dr. László MOLNÁR - Invited Speaker, Natural Science Section
15:00-15:15	Coffee break
15:15-16:00	Dr. Andrea SCHMIDT - Invited Speaker, Social Science Section
16:00-16:45	Dr. János FOJTIK - Invited Speaker, Marketing Section
16:45-17:00	Coffee break
17:00-18:30	Gábor PAULER PhD - IQclub Business Competition
19:00	Dinner



National Talent Point

4th May 2013, the 2nd day

08:00-08:30	Arrival and registration
08:30-09:30	Medical Section - Oral presentations
09:30-10:00	Medical Section - Posters
09:30-11:00	Natural Science Section - Oral presentations I.
11:00-11:30	Coffee break
11:30-13:00	Natural Science Section - Oral presentations II.
13:00-13:30	Natural Science - Posters
13:00-14:00	Conference lunch
14:00-16:00	Social Science Section - Oral presentations
16:00-16:15	Coffee break
16:15-17:15	Marketing Section - Oral presentations
17:30	Closing



National Talent Point

Oral presentations – timeframe

Medical Section	
Nazar Beley	8:30 - 8:45
Dr. Bálint Bencze	8:45 - 9:00
Aniko Vivien Fejes	9:00 - 9:15
Máté Kiss	9:15 - 9:30
Natural Science Section	
Abel András Bodó	9:30 - 9:45
Gyula Czégény	9:45 - 10:00
Kristóf Csepregi	10:00 - 10:15
Dániel Kánnár	10:15 - 10:30
Nándor Lambert	10:30 - 10:45
Anikó Mátai	10:45 - 11:00
Attila Molnár	11:30 - 11:45
P. Pomastowski	11:45 - 12:00
Annamária Sepsey	12:00 - 12:15
Sándor Szekeres	12:15 - 12:30
Csaba Szmolnik	12:30 - 12:45
Zsuzsanna Tóth	12:45 - 13:00
Social Science Section	
Dóra Czeferner	14:00 - 14:15
Andrei Damsa	14:15 - 14:30
Ibolya Keczer	14:30 - 14:45
Noémi Nagy	14:45 - 15:00
Réka Pusztai	15:00 - 15:15
Alexandra Soós	15:15 - 15:30
Bálint Tóth	15:30 - 15:45
Márta Várvizi	15:45 - 16:00
Marketing Section	
Beatrix Hideg	16:15 - 16:30
Zsolt Máté	16:30 - 16:45
Nóra Vaski	16:45 - 17:00

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Abstracts

MEDICAL SECTION

Life expectancy in patients operated on glioblastoma multiforme

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Glioblastoma multiforme (GM) is a tumor going from glioma cells and is considered as one of the most aggressive malignant cerebrum neoplasm. Statistically, 38% of all malignant tumors of the brain are GM. Incidence rate of the disease in Europe and North America is about 2-3 cases per 100000 per year. Average surviving rate after diagnosis is from 4,5 months to 1 year without treatment (Van Meir et al.). GM treatment is still an actual problem because of extremely high disability and mortality rate within this group of patients. Both survival and quality of life increasing of these patients are actual. The aim of our study was to evaluate the survival rate in patients after GM surgery after 3-6-9 months. We retrospectively analysed 16 patients who underwent surgical treatment of GM at the Uzhhorod Regional Center of Neurosurgery and Neurology in 2011-2012. At the time of the study we have investigated a direct survival index (DSI) in term of 3, 6 and 9 months after surgery. Thus, the 3rd month DSI was $75 \pm 1,29\%$, the 6th month DSI - $56,25 \pm 1,7\%$. The results of 6th and 9th month were equal. The average survival rate of patients who died on the moment of study was 6,3 months.

Natural mouthwash provides long term dental prevention

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Introduction: Mouthwashes used in daily dental prevention consist mainly of synthetic active agents increasing the chemical exposure of the body.

Aims: Our goal was to develop and analyze a new mouthwash based solely on natural medicinal herbs and volatile oils.

Materials and methods: Our mouthwash was prepared by 40% ethanol extraction of 6 well known medicinal plants completed with 3 different antimicrobial essential oils. Antimicrobial effects of the mouthwash were examined on oral pathogens *Staphylococcus aureus*, *Streptococcus sanguis*, *Escherichia coli*, *Lactobacillus plantarum* and fungi like *Candida albicans*, *C. Krusei*, *C. glabrata* and *C. parapsylosis*. We used disk diffusion and tube dilution methods. Direct bactericide effect was studied by fluorescence microscopy with propidium-iodide stain. Bioautography was performed on Merck F254 silica layer, using *Staphylococcus aureus* and the above mentioned bacteria and fungi. 5 µl, 10 µl, 15 µl of mouthwash with gentamicine and/or fluconazole controls were tested. Flavonoid spectrum of our mouthwash was analyzed by densitometry after separation on silica layer. The effect of mouthwash on the saliva proteins was examined by SDS-PAGE (Laemmli).

Results: The inhibition zone of the mouthwash was 8±1mm, by Corsodyl® 20±2mm, by ethanol 0mm, respectively (disk method). In tube assay the mouthwash showed a dose dependent effect with highest inhibition effect of 188.7 times slower multiplication rate compared to the control. In the propidium-iodide assay the 40% ethanol control contained 4%, while the mouthwash treated sample expressed 92% dead bacteria. In bioautography, the largest inhibition zone of our mouthwash was 9±1mm, the controls were 6±3 mm; in the tincture we could separate 12 different flavonoids and the salivary protein pattern was not changed after mouthwash exposure.

Conclusion: Our completely natural mouthwash prepare possesses significant antimicrobial effect, is rich in flavonoids and does not modify salivary proteins.

Investigating the role of PPAR γ during aging of the immune system

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Histologically, the epithelial structure of the thymus consists of cortical and medullary thymic epithelial cells (TECs), but during aging the stroma of this organ undergoes epithelial-mesenchymal transition (EMT) and adipoid involution. TECs are essential in thymocyte development and selection hence the senescence of this organ is associated with reduced thymopoiesis. It leads to viral infections, autoimmune- and cancerous diseases.

Peroxisome-proliferator activated receptors (PPARs) are a group of nuclear receptor proteins. A family member, PPAR γ , is expressed mainly in adipose tissue and it has a role in the regulation of glucose metabolism and fatty acid storage as a transcription factor.

One of the main aims of our research was to examine the effect of PPAR γ on thymus epithelium in different aged control mice and in PPAR γ KO mice. We studied the production of naive T-cells in the spleen too.

We can observe the ratio of medulla/cortex decreases with age in the thymus. The level of PPAR γ increases with age. This increase is more typical for cortical epithelial cells than medullary epithelial cells. In the case of PPAR γ KO mice the slides from hetero- and homozygotes resemble the young control. The level of TREC decreases with age in the spleen, in the case of PPAR γ KO mice this level is preserved.

In the process of adipoid involution the cortical epithelial cells may form the fat tissue, the number of medullary epithelial cells is decreased. PPAR γ is one of the main regulators of the adipoid involution in the thymus, with the “knock out” of this gene the young epithelial structure can be maintained.

‘Development of a short, functional, tissue specific FoxN1 promoter for studying thymic epithelial cell aging’

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T-cell development and selection is mediated by distinct populations of thymic epithelial cells. During senescence epithelial cells of the thymus follow a differentiation program towards adipocyte-lineage commitment, called adipose involution, which has an indubitable role regarding the inhibition of *denovo* T-cell selection. This impaired production results in weakened ability to mount efficient immune responses.

Thymic involution is strongly related to decreased secretion of Wnt4 regulating the expression of FoxN1, a key transcription factor responsible for the differentiation of thymic epithelial cells and the subsequent maintenance of thymic epithelial identity. Based on multiple alignment analyses of foxN1 gene from different species, a 300 basepair long conserved consensus sequence has been determined, which might have the ability to operate as a short, functional, tissue-specific promoter region.

In our study, we have isolated this 300 bp long sequence and inserted it into a lentiviral vector, which has been subsequently integrated into thymic epithelial cells. Currently, we are investigating the effect of various transgenes on thymic epithelial senescence proving the functionality and tissue-specificity of the promoter. Our further aim is the placement of tetracycline responsive elements into this construct followed by fate mapping experiments during physiological thymic epithelial senescence.

NATURAL SCIENCE SECTION

Human modeling

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A cliché: Whole is greater than the sum of its parts.

Consider the „whole” as a special composition of its „parts”. The more complex the composition is, the more complicated it is to recreate the whole from the parts. A possible question for all complex systems is whether it’s fruitful to separate the perceived subsystems, creating (possibly non-existent) interfaces between them – or should we try to keep the components together in their natural composition while trying to comprehend the whole?

A society has a complexity of second order, because the human being herself has her own very complex nature. However, these two levels of complexity are impossible to separate – because we could never understand anybody separated from her past and present social environment and identity. Society also could never exist without the individuals composing her.

Our aim is to find a method of understanding and modeling the human being and society without cutting them to pieces and patching them together again.

Responses of leaves to UV-B radiation – A multiple role of hydrogen peroxide

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High UV doses have been shown to provoke the production of various reactive oxygen species (ROS) in leaves either by enhancing existing metabolic pathways or by inducing new ones. It is assumed that similar biochemical events take place in response to lower doses and thus model experiments are relevant to studies of adaptive plant responses.

Here we report on possible roles of H₂O₂ in responses of tobacco leaves to UV-B radiation. Tobacco plants grown in chambers were treated with 308 nm UV-B radiation and we found that short (2-10 min) monochromatic irradiance was capable of limiting photosynthetic electron transport by 10-50%. A 4-min UV pre-treatment caused serious but mostly reversible changes in the ways how leaves partition visible light between photosynthesis and energy dissipation. Promptly after UV irradiation, an increased presence of H₂O₂ was observed using diamino-benzidine (DAB) staining. Complementing leaf experiments, our in vitro experiments showed that UV-B radiation was capable of generating •OH from H₂O₂ and the action spectra of this process was taken. Within the 280-400 nm spectral range, 295 nm radiation was the most effective for promoting the H₂O₂ → •OH reaction.

Leaves are known to produce H₂O₂ as part of their normal metabolism. Our results suggest a multiple role for H₂O₂ in leaf responses to UV-B, including: (i) UV-induced enhancement of H₂O₂ production, (ii) effects of H₂O₂ itself (iii) UV-B induced conversion of both ‘natural’ and ‘extra’ H₂O₂ to •OH.

Acknowledgement

Supported by grants from the Hungarian Scientific Research Fund (OTKA NN-85349) and Örebro University's Faculty for Business, Science and Technology.

Grapevine leaf phenolic compounds in various roles

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Grapevine is an important agricultural plant typically grown in sun exposed areas. Light, which is a driving force of photosynthesis and a signal for several metabolic pathways may also impose oxidative stress. Both high intensity ‘visible’ (photosynthetically active, 400-700 nm) and ultraviolet (UV, 285-400 nm) components of sunlight are capable of such damage. Phenolic compounds are important plant metabolites with two major roles in preventing cellular injury and thus promoting the acclimation of leaves to sunlight: (i) attenuating ultraviolet (UV) irradiation and (ii) neutralizing pro-oxidants, such as reactive oxygen species (ROS). Many compounds, especially flavonoids have both UV screening and antioxidant functions and their actual role is determined by their localizations, while others appear more specialized.

Our work started by an *in vitro* comparison of UV absorbing and antioxidant capacities of representatives of various phenolic groups, which also included a revision of photometric methods traditionally applied to identify compounds.

Results were applied in an international grapevine network project on Pinot Noir leaf samples collected from six different European locations.

References

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A model built up for theoretical study of the alkali metal ions' interaction with graphene clusters

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The fabrication of graphene-based nano devices has attracted wide interest in many areas of science and technology. A new method have been reported [1], how to generate a graphene-CeO₂-sapphire composite layers. Using electrochemical modifications this layer could serve as a device where the ion diffusion can be controlled by external electric field. Due to the unknown background processes theoretical investigations required. For the investigations, we performed quantum chemical calculations using the finite graphene cluster model with the frozen cluster approach.

The highly parameterized, empirical exchange-correlation functionals, M05-2X and M06-2X were used to study the alkali metal ion-graphene interactions, because they have been shown to describe noncovalent interactions better than density functionals which are currently in common use [2]. Using the experimentally available data and CCSD(T) binding energies as a benchmark, the performance of these functionals for the noncovalent cation- π interaction was described. The calculated adsorption properties (equilibrium distance, adsorption energy, charge transfer etc.) show significant dependency on the cluster size, therefore the selection of the proper size of cluster is inevitable to mimic the real properties of the graphene layer.

The impact of the applied perpendicular external electric field on the ion adsorption was also investigated. Results show the electric field shortens the equilibrium distances of the alkali metal ions, while the charge transfer from the surface has increased. At a species-dependent certain strength of the electric field the excess electrons cause negative charge on the alkali metal ion. This effect is promoting the removal of the ion from the surface. These results support the design of experimental studies of ion adsorption and diffusion on graphene surface under the effect of external electric field and will be applicable to design effective optoelectronic devices based on graphene layers.

This work was supported by the Hungarian research project No. TÁMOP-4.2.2.A-11/1/KONV-2012-0065. The calculations are performed using the Gaussian 09 Rev.C.01. program package on SGI UltraViolet 1000 supercomputer of the Hungarian National Infrastructure Development Program Office located in the University of Pécs.

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Determination of mass-transfer coefficients in Supercritical Fluid Chromatography and in Liquid Chromatography

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A number of equilibrium and kinetic macroscopic models are used to understand the chromatographic processes in liquid chromatography [1]. These models, however, cannot be used easily to characterize the mass-transfer in supercritical fluid chromatography (SFC), due to the variation in the physico-chemical properties of the mobile phase along the column.

The stochastic model of chromatography describes the separation process as a random migration, and randomly occurring adsorption-desorption of the molecules in the chromatographic column [2]. According to this model, the number of adsorption and desorption steps and the sojourn time that a molecule will spend on the stationary phase during the adsorption are random variables. By using the first and the second central moments of the chromatographic peaks, the mass-transfer coefficients can be calculated [3].

In this study the first and the second moments of alkyl-benzene peaks - measured on the same column in UHPLC and SFC systems - were used to explore the mass-transfer processes in case of the two chromatographic modes.

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The effect of β -aminobutyric acid treatment onto the spread of Grapevine leafroll-associated virus 1 (GLRAV-1) in the plant

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Recently, several research results proved that β -aminobutyric acid (BABA) can induce resistance against many kind of pathogens in plants. However we don't know much about its effect against viruses except the Tomato mosaic virus (TMV).

BABA can induce a special resistance in plants, which is closely related to the phenomenon called priming. The induced resistance is able to provide protection against several pathogens. This wide spectrum protection is based on the increased capacity of the basic defensive mechanisms. The research of the induced resistance focused on the direct effects of treatment onto the defensive mechanisms and the expression of the related genes. We decided to take advantage of this mechanism to protect grapevine from Grapevine leafroll-associated virus 1 (GLRAV-1).

The floem related closterovirus, the Grapevine leafroll-associated virus 1 (GLRAV-1) is frequent in Hungary. Infected grapevine shoots were treated with BABA solution. At the end of the treatment (8 weeks) some shoot showed symptoms, the majority was symptomless. After using RT-PCR, we found that the concentration of the virus gradually decreased in the younger parts of symptomless plants. At the same time, we examined how the expression of genes related to oxidative stress and defensive signal pathways (SA, JA/ET) changed.

Our results show that BABA treatment is efficient to protect grapevine suffer from GLRAV-1 infection. Further experiments are needed to specify the settings of the BABA treatment.

An attempt to extract, amplify, and sequence DNA from lower Cretaceous *Gallionella ferruginea* fossils

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The persistence of bacterial DNA in geological timescale is a contradictory issue which holds a high relevance in the understanding of biological evolution. The majority of modern molecular phylogenetics results are based on DNA samples from our geological present, however they try to answer the questions of eons. Therefore, long time preserved genetic information would be invaluable for not only building phylogenetic trees but phylogenetic networks, considering the horizontal gene transmission phenomenons. Naturally, it is highly unlikely to build even a small sequence throughput phylogenetic network of a wide range of taxa based only on fossil DNA, since they are rare relic to find. However, they give us the chance to understand the nature of the changing of genetic information through geological timespans.

There are many questions to answer before the proper utilization of preserved genetic information. Which ways and how long can it endure the different environmental effects? What is the chance of contamination? Where and how can it be extracted. High amount of lower Cretaceous *Gallionella ferruginea* fossils collected at the outskirts of Ófalu by a geologist research group from our university, led by Viktor Jáger. This is a still living iron-oxidizing chemolithotrophic bacterium with the ability to form well recognizable stalks “constructed from numerous helically wound, uniquely mineralized fibrils” (Ridgeway, Means, and Olson 1981). These stalks make the morphological identification easy even through millions of years. Our goal is to extract, amplify and sequence the DNA of this ancient organism with the excluding of contamination.

The old Two-Dimensional Electrophoresis technique in new lights of perspective

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In recent years, two-dimensional gel electrophoresis (2-DE) has become the most widely used tool in proteomic analysis, because of the high resolving power for biopolymer complex mixtures. In the classical analysis of 2-DE, the first dimension is isoelectric focusing (IEF). The second dimension of the sample - gel ionic detergent (SDS) - is performed by electrophoresis. Two-dimensional electrophoresis is found widely used in expression proteomics. The essence of the research is a comparative analysis of protein expression, exposed to environmental factors and proteins in physiological state undisturbed. Through a comparative analysis of changes in protein expression, it indicates a potential information about proteins that can be used in drug design and gives information about potential biomarkers. Strengthening the capacity of this method provides unique application of 2-DE. Furthermore, the technique of gel two-way electrophoresis is undergoing ascension, due to the possibility of coupling it with a number of analytical techniques: MALDI-TOF/MS, HPLC-ESI-MS, CE, Western Blotting - RT-PCR, Flow Field Flow Fractionation (FFFF) and with bioinformatics methods.

Introducing pore size distribution into the stochastic theory of size exclusion chromatography

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Chromatographic processes can be modeled at a molecular level using the characteristic function approach. This model is completely independent of the physical chemical mechanisms responsible for the retention; therefore it can be used for any chromatographic process such as adsorption, partition, ion-exchange or size exclusion chromatography.

The size exclusion process is pictured as the molecules of the same size enter the pores of the stationary phase n times, and spend in a pore time τ_s on average. After leaving, the molecules spend time τ_m on average in the mobile phase. Each molecule has an individual path in the column, but because of their same size and behavior, the average time the molecules spend in the column will be t_R and the chromatogram will be nearly a Gaussian curve.

The moments of the chromatographic peak can be derived from the characteristic function. However, the original model assumes that the pore sizes in the column are equal in each stationary phase particle.

In this work, we assume that the pore size in the stationary phase of chromatographic columns is governed by a lognormal distribution. This property was integrated into the molecular model of SEC and the moments were calculated for several kinds of pore shape.

Our results demonstrate that pore size distributions have strong influence on the retention properties of macromolecules. The novel model allows us to estimate the real pore size distribution of commonly used HPLC stationary phases.

The work was supported by the grants TÁMOP-4.2.1. B-10/2/KONV-2010-0002, TÁMOP-4.2.2.A-11/1/KONV-2012-0065, and OTKA K 106044.

Epidemiological and ecological study of small mammals and ticks in Gemenc

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Small mammals are important hosts for nymphs and larvae of ticks and play a central role in the maintenance of tick-borne pathogens. We collected small mammals in Gemenc from three areas with modified Sherman traps between 2009 and 2012. Captured animals were euthanized and tissue samples were preserved for morphological and molecular analyses.

Altogether 470 small mammals (*Apodemus flavicollis*, *Apodemus agrarius*, *Myodes glareolus*, *Microtus agrestis*, *Mus musculus*, *Micromys minutus* and *Sorex araneus*) were trapped. Ticks were also collected from the vegetation.

During the examination of spleen smears *Hepatozoon* parasites were observed in eight of the 36 bank voles (*M. glareolus*). For the identification of these protozoa, we amplified the whole 18S rDNA sequence. Amplicons proved to be very similar to *Hepatozoon* sp. detected in *M. glareolus* in Spain but also to other *Hepatozoon* sequences. We could not amplify *Hepatozoon* DNA from ticks removed from the small mammals and collected with flagging. Spleen samples from other small mammal species were found negative with both morphological and molecular methods. Based on gamont morphology and the specific host, the bank voles in our study can be considered to be infected with *Hepatozoon erhardovae*. We extracted DNA from the skin tissue samples and performed polymerase chain reaction using *Borrelia*-specific primers. Three *A. agrarius*, one female *A. flavicollis* and one fed *I. acuminatus* nymph was *Borrelia*-positive. All of these were identified as *Borrelia afzelii* with sequencing.

Investigation of the retention phenomena of Mefloquine enantiomers with High Pressure Liquid Chromatography: effect of the eluent composition

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A cinchona alkaloid-based zwitterionic chiral stationary phase (ZWIX) was applied for enantiomer separation of rac-erythro-mefloquine. A Chiralpak Zwix(+) analytical column was used for the separation. The overloaded peak profiles have confirmed that there is significant difference between the adsorption-desorption phenomena of the two mefloquine enantiomers. Whereas the 11R, 12S enantiomer shows a strong retention and a common Bi-Langmuir behavior, the 11S, 12R enantiomer has a weak retention near to the column void time. The weak retention phenomenon is most probably caused by the repulsive interactions between the analyte and the CSP (chiral stationary phase). These repulsive effects, which are mostly polar and hydrogen-bonding interactions, can be modified by changing the eluent composition. The purpose of the present work is to vary the methanol-acetonitrile-water composition and the buffer ratio of the applied eluent. The first results show that it is necessary to use a small amount of buffer. On the other hand, increasing the level of the aqueous phase in a buffered organic eluent, decreases the selectivity (α), although better peak shapes can be obtained.

Systems biological perspective in toxicogenomics: transcriptome analysis on different *in vitro* liver models

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The new „omic” technologies provide large amount of data to analyse and understand enormous complexity of the biological systems, however data conversion into biological meaning is challenging. To overcome these difficulties, a new scientific perspective called systems biology was established, that focuses on complex interactions in [biological systems](#).

In our study two high-throughput technology, gene-chip and digital transcriptome profiling (SAGE-seq) was used to investigate and identify key components of the effect of a unique structured macrolide antibiotic. Different scaffold-free two- and three dimensional *in vitro* liver models (mono- and co-cultured hepatoma and human fibroblast cells) were created to gain into the host response due to the antibiotic treatment.

Although macrolides are well studied in some respects, the relationship between the molecular structure and their activity is not well established; therefore the presented systems biological data could serve as a guide to improve the biological understanding of the mechanisms related to the promising antibiotics.

SOCIAL SCIENCE SECTION

Content Analysis of Two Feminist Journals in the Austro-Hungarian Monarchy

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The first decade of the 20th century is considered to be the period, when the members of the weaker gender woke up into consciousness. The years preceding the First World War are denoted as the flowering period of the mass media as well. The primary aim of the determined and resolute female activists was to fight against the well-known slogan of the *three Ks* – “Kinder, Kirche, Küche” (children, church, kitchen). They shared their opinions, views and beliefs on the political emancipation of the female gender in periodicals which had been published by certain women’s associations.

Besides outlining the structure of the feminist periodical press of the Austro-Hungarian Monarchy, I will compare and contrast two characteristic female journals, published in Vienna and Budapest between 1907 and 1913. From the Hungarian side, I will analyse the official organ of the Hungarian Feminists’ Association and the National Association of Hungarian Female Clerks (*The Woman and the Society*), while from the Austrian perspective, I will study the periodical published by the General Austrian Women’s Association (*Neues Frauenleben*). At first, I will survey the general features of the two periodicals. After that, I will introduce the authors of the articles who published their articles in these journals. Besides their genders, nationalities and occupations, I will explore their activities as members of different Hungarian and non-Hungarian female associations. I will also touch upon the most important subject matters which had been discussed in the papers. In addition to this, I will reveal the social composition of the readership of the two periodicals.

Gamification - How to create FUN?

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Why do we love to play? Why are videogames so engaging for both the young, and the older generations? How can we create a game-like environment and experience in a non-gaming context such as the educational system. How can we produce all the motivational benefits what games have - without any digital background?

These are the questions in the core of Gamification, a new methodological concept of transforming a non-gaming environment into a motivational and fun-producing context by using game thinking, game design and game elements. The aim of the presentation is to familiarize the audience with the main principles of this technique, using a psychological approach to understand such things as game dynamics and game mechanics. By reflecting to the current educational system we recommend a new approach which can provide the "players" (aka. students and teachers) with a fun-generating, new and exciting experience.

Scrapbooking as a 'life archiving' method

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*'Scrapbooks and albums share their origins with traditions of collecting, display, and exhibition and the development of print and book styles.'*¹(Susan Tucker)

Scrapbooking is a method for preserving personal memories, (re)creating family history, documenting everyday life or spending free time in an artistic way. Scrapbooks can be defined as decorated photo albums which include the stories behind the photos and express the personal feelings of their makers. Furthermore, the hobby is very popular for the strong social network it provides.

Even though the history of the today called scrapbooks started in the early 19th century, it gained a big popularity also in the 'Digital Age'. The reasons for scrapbooking then still hold today.

According to the research I've made between the Hungarian 'scraper' community, I will focus on different aspects of this hobby that will lead us to consider its importance in our modern society. I will present the conclusions I made based on semi-structured interviews and the replies of an online survey.

¹Tucker, Susan et al., *The Scrapbook in American Life*, Temple University Press, 2006. 4.p.

The hidden map – A brief history of language minorities and linguistic legislation in France

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Aspirations towards reflecting an image of France where only one language – namely, French – is being spoken, have a long history. Well before the concept of one nation–one language became widespread in the 19th century, French monarchs had used linguistic standardization as a means of building a unified realm and a single French identity. In this respect, the histories of linguistic (national, autochthonous, historical) minorities share a great deal of similarities in France, Spain and the United Kingdom. However, while in the latter two states autochthonous minorities managed to gain a greater or lesser degree of territorial autonomy including the competence to legislate on linguistic rights, autochthonous minorities in France – with the only exception of Corsica – have no such power. Regional/minority languages have been allowed to be taught in schools since only 1951, and they have been recognized by the Constitution since only 2008. Also, France belongs to those few states which still not have signed or ratified either the European Charter for Regional or Minority Languages, or the Framework Convention for the Protection of National Minorities. Indeed, national minorities do not exist under French law, and national census data do not contain any information about the speakers of minority languages.

In my presentation I propose to dispel the myth of a monolingual France, by introducing the history and the present situation of regional/minority languages spoken in the country. I also offer a brief overview of the linguistic legislation in France affecting the fate of minority languages and their speakers.

Cognitive complexity and coping mechanism

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The purpose of our study is to provide an empirical investigation to find out whether there is interdependence between the complexity of a person's cognitive structure and some dimensions of their coping skills.

According to Crockett's approach, one's cognitive structure can be considered more complex, if their construct system is more differentiated (they are using a greater number of cognitive constructs), more articulated (refined, consisting more abstract elements) and better integrated (organized and interconnected).² Cognitive complexity is associated with a wide range of interpersonal skills such as communication skills (see Bureson and Caplan, 1996), social perspective taking (Hale and Delia, 1976), predictive behavior (Bieri, 1955), etc. It implies a more developed – and therefore more detailed – perception in most social situations.

Based on Lazarus' cognitive appraisal theory of stress, the appraisal of the psychological stress is relying on the person's own representations of the world, i.e. how they construe the world and the stressor (Lazarus, 1966). The term 'appraisal' in this sense is really close to the notion of construing. That means that the perception of a threatening (or an irrelevant) situation, as well as the ways one can react on that, depend on how one understands or construes the situation.

We can expect that a cognitively more complex person is going to develop a more complete representation of a situation, especially in interpersonal field, and to consider more aspects of the situation which enables them to apply their constructs more flexible, to think of more options or to reevaluate their own preconceptions of the situations which potentially results in a more effective coping behavior.

² Crockett's (1965) approach is based on Kelly's (1955) personal construct psychology on the one hand and Werner's (1957) Orthogenetic Principle of Development on the other hand.

On The Spot – The new role of the reporter in Hungary

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The presentation will address the question of how the role of the reporter is changing in the 21. century. On The Spot is the title of a new Hungarian documentary series, through which I would like to introduce the new role of the reporter and the spread of the digital journalism.

The series introduces in Hungary a new, before unknown, unique genre, which forecasts the changes in the documentaries in the new century. It is not only a documentary series, the films incorporate the digital journalism. On The Spot represents a new genre because in the series there are only 2 young journalists with 2 small cameras, they work alone and they spend much more time on the field than any other reporters. The series is a mix of the video-journalism, the report and the documentary, in the terms of investigative journalism and enterprise journalism.

The literature and the opinions about the definition of the documentary and the report are widespread, but all theories highlight the importance of the filmmaker, his or her interfere into the actions.

During my one year long research I have examined many theories, I have talked to media experts and I watched 30 films of On The Spot. The aim of the research was to identify the main characters of the 21. century's reporter and the differences between the traditional journalism and the digital journalism. The talk will give examples of the changes in the genre and in the journalism from the Hungarian documentary series.

Cognitive Bias through the Media: Cognitive Linguistics and Controlled Constructions of Social Meanings

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The presentation offers answers to the question why we prefer certain newspaper articles over others. My analysis is based on the tenetsof Cognitive Linguistics: there is *an intricate relationship between acquired linguistic meanings and constructed social meanings*. It is claimed that the basis for understanding language and linguistic behavior is *conceptualization*.

After a brief introduction to conceptualization in general and conceptual structures (manifest in semantic and lexical frames) in particular –I will discuss how *lexical frames of a given keyword in a text* (a word with a high frame priming capacity) play a role in the *on-line, dynamic construction of meaning and conceptual structures*.

A major claim of the analysis is that texts with a higher inventory of keywords will be perceived as messages suggesting clear, focused and transparent (albeit directed and thus controlled) meanings unlike those lacking these textual prompts), I will give an account of the *results of a initial research* conducted on four newspaper articles from different English daily papers published (retrieved) on the same day, pertaining to the same topic. I will show that the newspapers differ in the *construal* of the objectively given news items.

The research was carried out by means of distributing a short questionnaire among English majorsof the same age-group and similar linguistic competence, who were requested to read the four articles, rate them in order of their preference, and try to justify their decisions by a few coherent sentences. The participants had no prior training in semantics or news analysis. I summarized the results the conclusions of which are discussed in the current presentation.

The applicability of mathematics as a philosophical problem

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While classic approaches to the applicability problem of mathematics are more or less homogenous, later discussions – including contemporary discussion – raised various new questions, though having retained the original issue. Given that, we cannot characterize it as a single problem, but as a diversified branch of problems. Mark Steiner distinguished a metaphysical, a semantical and a descriptive problem in this branch. The metaphysical problem is the same as the one raised by Plato, namely, the problem of the relevance of mathematical truths to the empirical world. The semantical problem rises when questioning the validity of the inferences containing mixed mathematical statements, and the descriptive problem when questioning the applicability of the language of mathematics in describing physical theories and making predictions. According to Mark Steiner, Gottlob Frege offered a definitive solution for both the metaphysical and the semantical problems, thus superseding all further discussion of the subject. I do not agree with Steiner's claim, but in this presentation I would rather emphasize the merits of Frege's logicist solution.

MARKETING SECTION

The online consumer reviews – Does our opinion matter?

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Internet, as a global phenomenon brought significant changes in consumer behaviour, pulling the marketing towards inevitable changes. When we browse our favourite sites, read our e-mails or listen to some music on the web or comment on a blog post, we become unconsciously part of the online marketing mechanism. The World Wide Web – besides being the virtual place of commerce - is an important two-way communication channel as well, that links millions of customers to businesses. This connection offers many new ways for both parties to interact and benefit from each other's actions, however online reviews are undeniably one of the most important tools in this process. The spawn of online ratings started in the last decade, with a result of taking a more complex and diversified role in the life of marketers and consumers. The aim of this presentation is to give an overall view about the topic through examining both the online and off-line influences of the reviews from a marketing point of view.

The marketing of the two superpowers. The Soviet-American exchange exhibitions in 1959

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After the Sputnik-shock and Nikita S. Khrushchev's Berlin ultimatum there were two important events in the relationship between the United States of America and the Soviet Union. The first one was the Lacy-Zaroubin Agreement, where the delegates of the two superpowers accepted a more active cultural and scientific exchange. This enabled them to organize an exhibition in each other's cultural capitals.

The Soviet Union opened its exhibition in New York at the Coliseum. For the organizers the three most important things were the model of the Sputnik and the Lenin atomic icebreaker and the „usual-kitchen”. The one million American visitors had very different opinions about the exhibition, especially the journalists. From the articles of the American newspapers we can read a mostly negative opinion, specially at the Hungarian immigration's journals. In their point of view the whole exhibition was a lie.

The American National Exhibition in Moscow was different. The organizers wanted to show the daily life of America, so there was coke, color-television, fast food, cars etc. Three million people visited the event, but the Soviet officers made anti-propagandistic steps. From the American and Hungarian newspapers we know, that the visitors wanted to see how they made the products, this shows the different thinking of the two nation's citizens.

In the presentation I will show the atmosphere of the exhibitions and the most popular show-pieces, what the superpowers wanted to show about themselves and visitors and journalists' opinions.

The Importance of Being Indie – A Case Study About Alex Day

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Nowadays the spread of the internet has changed the consuming habits to the core. That is even more obvious when it comes to our attitudes towards media and entertainment. Nowadays it seems natural that wherever we are, we can instantly access our favorite films, books, TV-series or music. What kind of changes has this phenomenon brought to the contributors' side in terms of music? How has it restructured the music industry, the opportunities to sell, the attitudes of the artists? My case study about Alex Day, an up and coming innovatory musician of Youtube and of DFTBA Records attempts to show the new ways artists can seek to keep up with the challenges of this new online-driven era and use the tools the internet provides them to build their careers.

POSTER SECTION

Distribution of connexin36 in the retina of various vertebrate species

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Gap junctions form cell-to-cell contacts by linking identical (homotypic) or different (heterotypic) connexin (Cx) subunits. The combinations of Cx subunits determine junctional conductances and modulatory processes, thus they ultimately determine the function each particular gap junction plays in the retinal circuitry. Similar to other brain areas, many retinal gap junctions are formed by Cx36. In this study we examined the distribution pattern of Cx36 immunolabeled (IL) plaques in retinas of various vertebrates including the human, the rat, the guinea pig and the chicken to assay changes in the roles gap junction may play in vision as a function of evolutionary distance. We found that all four vertebrate retinas display Cx36 IL staining in both plexiform layers. While Cx36 in the OPL likely forms gap junctions between cones in all four species, Cx36 is differently distributed in the IPL. In the chick retina Cx36 IL plaques are homogeneously distributed in the IPL, whereas the three mammalian retinas displayed an inhomogeneous Cx36 distribution. For these latter retinas the innermost IPL sublayer displayed the largest Cx36 plaques and this sublayer showed also the highest Cx36 density. Interestingly, the human and the guinea pig retinas also often displayed Cx36 plaques with somatic locations of calretinin expressing (likely AII) amacrine cells. In addition, the human retina was unique in that it also displayed another Cx36 dense IPL stratum close to the INL/IPL border, likely relating to the lobular appendages of AII amacrine cells. The above data clearly shows that the Cx36 distribution, and likely the role it plays, differs in various vertebrate species and this observed variance is in a clear correlation with the evolutionary distances of the examined species.

Application of resorcinarenes on Liquid Chromatography

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Cavitands are cavity-shaped cyclic oligomers and they can create host-guest interactions with various analytes. Host-guest interaction represents the affinity of macrocyclic molecules to form reversible complexes with neutral as well as charged molecules.

Cavitands (e.g.: calixarenes, resorcinarenes, cyclodextrins and their derivatives) may have three types of uses in liquid chromatography. Stationary phases can be synthesized by covalently bonding resorcinarenes on silica particles. Many resorcinarene-bonded silica phases are prepared for the separation of aromatic positional isomers [1, 2], enantiomers of chiral compounds [1] and polycyclic aromatic hydrocarbons [2]. Furthermore, resorcinarene derivatives can be applied as mobile phase additives [3]. Cavitands are also employed as dynamic coatings on RPLC stationary phase for the separation of aromatic positional isomers and nucleobases [4].

We investigated chromatographic behavior and possibilities of the use of resorcinarene derivatives in high performance liquid chromatography.

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Game damage research in Bükkhát forest reserve

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Effects of game species on forests and its significance is a strongly debated issue in. Their study is important because game population in Hungary has been increased significantly over the past 50 years.

Forest reserves are protected from any kind of human intervention, aiming that processes of natural forest dynamic can prevail undisturbed in the long run and so they can be observed and studied. Our research was carried out in Bükkhát Forest Reserve in SouthWest Hungary (Drava plain), consisting of oak-ash-elm gallery forests and hornbeam-pedunculate oak forests communities. We studied the species composition and game damage of shrub layer in the core area, using the official protocol of the forest reserve research.

62% of the 2134 individuals in the shrub layer were damaged by game. Damage rate is 71% in first height category (50-150 cm), 47% in second height category (above 150 cm) is 47%. The shrub layer is dominated by *Acer campestre* and *Cornus sanguinea*. The game damage rate is also the highest for these two species (72% and 67%). Other three species has also high game damage rate is: *Fraxinus angustifolia* (69 %), *Carpinus betulus* (58%), *Ulmus minor* (57%). The canopy layer is dominated by *Quercus robur*, and the shrub layer is dominated *Acer campestre*, *Carpinus betulus* and shrubs (e.g. *Cornus sanguinea*), but proportion of *Quercus robur* is very low. This state indicates the unsustainability of the present forest type. Besides game damage it may be due to different factors: e.g., climate and resulting growing site change (drying out), lack of forestry management and selection, mildew fungus, *Rubus* overgrowth; which all hinder regeneration of native dominant species, first of all that of *Quercus robur*.

Screening Coronaviruses in bat fecal samples from Hungary

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Bats are efficient reservoirs of zoonotic viruses, such as lyssaviruses, henipaviruses, various versions of ebola and coronaviruses. The best-known human coronavirus with public health importance causing epidemic in 2003 is the SARS (Several acute respiratory syndrome) – coronavirus, which has a proven zoonotic origin. During replication, coronaviruses have an exceptionally high mutation rate, so they can be considered a potential zoonotic threat. Coronavirus occurs in all mammals, ranging from poultry to dogs all the way to the bats. There is a broad range of coronaviruses isolated from various animal groups, e.g. birds, rodents, dogs and many other mammals. Recent studies have shown that bats are the hosts of several types of coronaviruses. The bats represent 20% of all mammal species, can fly long distances during seasonal migrations (800 miles), and have a wide range of habitats (caves, spiers, cracks, holes in trees, buildings) where they can easily contact with humans. In our study, in 2012, fecal samples were collected in two counties of Hungary from over 77 live bats. The 77 feces samples were tested by RT-PCR using degenerated universal coronavirus primers to detect a broad range of coronaviruses. Preliminary investigations did not reveal the presence of coronaviruses in the collected samples.

Changes in expression levels of Wnt signalling molecules in cigarette smoke- induced experimental model systems

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Wnt proteins are known for their roles in inflammation and tumor development. The group of the non-canonical Wnt molecules has been identified to trigger carcinogenesis and inflammation in the lung. Previous studies have proven increased levels of the non-canonical Wnt5a and Wnt11 signalling molecules in a human non-small cell lung cancer cells.

In our in vivo experiments, mice were exposed to cigarette smoke for 1-2 and 3 months. The expression levels of Wnt5a and Wnt11 were measured at mRNA level using quantitative RT-PCR method and protein levels were detected by immunofluorescence of mouse lung tissue. In the in vitro model system, human lung carcinoma cell lines were exposed to cigarette smoke. After 1, 3 and 7 days, qRT-PCR was performed.

In the in vivo model we found an increase of the expression levels of Wnt5a and Wnt11 molecules that correlated with the time of exposure to cigarette smoke and we also detected the epithelial localization of these Wnt proteins in the mouse lung tissues. In the in vitro model system, different cell lines responded diversely to cigarette smoke indicating a more complex regulation of gene expression.

As a result we can say that exposure to cigarette smoke increases expression of Wnt5a and Wnt11 at both mRNA and protein levels in our models. As cancer is triggered by cigarette smoke, novel model systems are required to understand the molecular processes and to test pharmaceutical drugs.

Examination of the expression of Ca²⁺ binding proteins after kanamycin treatment in the inner ear of wild type, heterozygote and PACAP-deficient mice

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Pituitary adenylate cyclase activating polypeptide (PACAP) is a multifunctional neuropeptide with well known neuroprotective and neurotrophic effects. Recently, we have shown that PACAP protects cochlear cells against oxidative stress-induced apoptosis *in vitro*, but there are no data about its effects in ototoxic insults *in vivo*.

In this study we examined the effect of a single dose of ototoxic kanamycin treatment (1g/kg) on Ca²⁺ binding protein expression in hair cells of wild type, heterozygote and PACAP-deficient mice. We treated 5-day-old mice with kanamycin and 2 days later we examined the Ca²⁺ binding protein (parvalbumin, calretinin) expression of the hair cells with immunohistochemistry. Control animals received physiological saline.

We found that the hair cells of control PACAP-deficient mice showed more pronounced parvalbumin and calretinin immunopositivity compared to control wild-type mice. Elevated level of Ca²⁺ binding proteins was detected in experimental ototoxic models, hence the increased immunoreactivity of Ca²⁺ binding proteins in the absence of PACAP provide evidence for its important protective role in hair cells. Kanamycin induced a significant elevation in Ca²⁺ binding protein expression in hair cells of wild-type and heterozygote mice, but the baseline higher expression in PACAP-deficient mice did not change after the treatment. Further investigations are necessary to examine the role of endogenous and exogenous PACAP in ototoxic insults.

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Cholecystokinin effects on energy balance depend on age and body composition

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During aging, two major trends appear in the regulation of body weight and body composition: aging obesity is followed later by anorexia. Complex age- and body composition-related alterations in the regulation of energy homeostasis may be assumed in the background. Cholecystokinin (CCK), a catabolic peptide of the brain-gut axis, has long been known to induce satiety by activating peripheral CCK type-1 receptors. Changes in the responsiveness to CCK possibly contribute to age-related alterations in energy balance.

Our aim was to analyze age- and body composition-related alterations in the anorexigenic responsiveness to peripheral CCK in rats.

Male Wistar rats aged 2-, 4-, 6 - or 12- 18-, 24 months (juvenile, young adult, early or late middle-aged, aging, old, respectively) were injected by CCK intraperitoneally (5 µg) to test anorexigenic effects of CCK on 3-h re-feeding following 48-h fasting. Twelve-month-old calorie-restricted (40% reduction, CR) and 6- or 12-month-old high-fat diet-induced obese (60% fat calories, HF) groups were also established. Food intake was recorded in automated FeedScale system (Columbus). Statistical analyses: one-way ANOVA.

Anorexic effects of peripherally administered CCK showed well-defined age-related shifts. CCK suppressed re-feeding in young adult, early middle-aged and old animals. CCK-resistance of late middle-aged rats was prevented by life-long calorie-restriction. Conversely, in HF6 rats the CCK-induced suppression of re-feeding was diminished already. HF12, on the other hand, showed CCK-sensitivity similar to that of NF18.

In conclusion, age-related changes in the responsiveness to CCK may contribute to the explanation of middle-aged obesity and that of aging anorexia. CCK-responsiveness is also influenced by body composition: CR delays, HF promotes age-related regulatory alterations. (OTKA PD84241, SROP-4.2.1/B-10/2/KONV-2010-0002, 34039/KA-OTKA/13-02)

Auditory and visual differences in time perception: the presence of auditory dominance at suprasecond time-intervals

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Background: Time is a fundamental factor in our everyday life, and the human nervous-system is affected by various time-specific cues in every second. We are able to process these time-specific cues in the auditory, visual, and even by the tactile sensory modalities. The central nervous system is, however, always greatly challenged to integrate the time relevant information provided by the different modalities. In the current study we aimed to investigate the integration process between the visual and auditory time-specific information.

Methods: Two experiments were dedicated to *bimodal* time perception applying a duration bisection task. Participants ($N_{\text{exp1}}=9$; $N_{\text{exp2}}=19$) were asked to decide whether the duration of a test stimulus was longer or shorter than that of a previous reference stimulus. Three stimulus conditions were tested: visual, auditory, and bimodal (visual-auditory). Auditory stimuli were presented at 4 different frequencies: 250, 500, 750, and 1000Hz.

Results and Conclusions: The results clearly suggest an auditory dominance in time perception: Visual-auditory stimuli were perceived significantly longer as compared to single visual stimuli. On the other hand, the auditory dominance does not necessarily mean a more accurate time perception in the auditory domain: A significant overestimation of the intervals was found for visual-auditory stimuli but not for visual stimuli. Finally, the results also indicate a frequency independent time perception in the auditory domain.

A generic RT-nested-PCR assay for the screening of mosquito-borne viruses

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There are numerous groups of mosquito transmitted viruses that can cause illness in humans, such as Flavivirus and Orthobunyavirus. In the central european region there are three main human pathogen viruses from these families that are transmitted by mosquitoes, West Nile virus, Tahyna virus and Usutu virus. The early detection of these viruses by screening the mosquito populations is crucial for the prevention of local epidemics. In our study we successfully optimized a generic RT-nested-PCR assay for the detection of Tahyna and Usutu viruses from incorporated mosquito pools which contained nucleic acid from 150 mosquitoes individually. After the RT-PCR amplification we got false negative results in some cases. We designed a new primer pair for the primary amplicon and with a nested-PCR amplification we could detect positivity in all of the previously false negative pools. Our method for screening mosquito pools on a large scale is sensitive enough to gain presence/absence data about Tahyna and Usutu viruses. In our study we successfully optimized a generic RT-nested-PCR assay for the long-term surveillance of arboviral activity in our region.

The historical aspects of a basement outcrop at Mohácsi island

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At the northern part of Mohácsi island there is Vári-field, inhabited since the prehistoric times. A local basement outcrop is the only occurrence of limestone at the island and the whole South Hungarian lowland too. Not surprising that this outcrop was an important source of building materials from centuries. Nowadays the outcrop is nearly totally extracted, and the *related* historical ruins were taken irreversible damage by the miners. This place has been a geological terra incognita for a long time, and the historical background is dim.

The walls of the formal stronghold, what was mined down with the cliff, belong to the medieval castellum of Sembech with high probability, but on other hand the roman origin also has a chance. Roman presence proven by artefact collections, and there is symmetric object visualized by an orthophoto, the size and orientation suspect that is a outline of a roman made structure. Different maps from the 18-19th century confirm the location of the Sembech castellum predicted by Kőhegyi and written sources at the outcrop. Maps, engineering plans, other river regulation documents from the last few centuries clarified the questions about flowing direction, bed attributes and runoff of the river section at Szekcső and Baracska. These maps also suspect the location of some east-west trading route on this land. The archaeological aerial photos located the fort. The spatial orientation of the wall fragment is determined by geophysical measurements. Geographical and practical considerations predict the route-river crossing point near to the outcrop at Vári-field. These facts create a presumption to localize a fort established for the protection of a Danube crossing trading route.

Floristic homogenization of roadsides and railway tracks in the case of Pécs

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Nowadays, more and more international articles deal with the problem of floristic richness, floristic homogenization of roadsides and/or railway tracks, and the distribution pattern of plant species richness between urban and rural landscapes. According to the Flora Mapping Database of Pécs and the related literature, surveying the selected sections of the railway tracks and roadsides of the city and its narrower surroundings, we tried to answer the following questions:

1. How rich are the sections of the surveyed railway tracks and roadsides from the floristic point of view?
2. How frequent are the rare, the red list and the protected species within the flora of the investigated tracks and verges?
3. Can we demonstrate the taxonomic homogenization along the investigated linear landscape elements, and if so, does it correlate with the pattern of the urban-rural gradient, as well as the direction of traffic?

These problems above were investigated at larger ($\sim 10^3 \text{ m}^2$) and at smaller scales (4 m^2) as well. We pointed out the relative richness of the flora of tracks and verges both in national and international relations. There were more rare, red list and protected species along the roadsides than in the flora of the surveyed tracks. We detect relative environmental filtering effect of railway tracks in larger scale and in the case of roadsides at larger and at smaller scales as well. In larger scale the rate of distance decay were lower in the case of verges than it was expected. We can not support VON DER LIPPE & KOWARIK's expectations at the selected scale in the case of Pécs, since the effect of taxonomic homogenization was not stronger along the outbound lanes than along the lanes leading into the city.

Molecular pattern of aging lungs

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The continuous increase of elderly population will put an enormous pressure on social and medical care in the near future. Therefore expanding the healthy lifespan or decreasing the occurrence of the age related diseases are the biggest challenges for developed countries.

While the aging of other organs such as thymus are studied widely, the molecular background of lung senescence is hardly known. In the aging lung the lung capacity decreasing and the formation of the new alveoli slow down even in the absence of diseases.

Recent studies suggest the role of Wnt signaling during aging. It was already proven that the Wnt proteins have role in different fibrotic and inflammatory diseases. Such as the Chronic Obstructive Pulmonary Disease (COPD), and Idiopathic Pulmonary Fibrosis (IPF)

In our studies 1 month and 24 months Balb/C mice lungs were compared first with Computed Tomographic technique. On the recordings is clearly seen the enlargement of the alveoli, and it was also proven in microscopic sections with Hematoxylin-Eosin staining.

To investigate the molecular pattern of the lung, first epithelial and non-epithelial cells were separated by EpCAM1 positivity and gene expression analyses were performed. Because during aging the level of chronic inflammatory cytokines also increasing, they were also investigated beside the different Wnt molecules. The gene expression results were confirmed with immunfluorescent staining as well.

Our studies have shown that Wnt4 molecule is increased in both epithelial and non-epithelial type of cells, but Wnt5a and Wnt11 are increased in non-epithelial cells.

We concluded that Wnt molecules may have stimulating effect in chronic inflammation by promotion the production of different inflammatory cytokins. Further studies are on their way.

The role of endogenous PACAP in the kidney during ischaemia-reperfusion

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Introduction: Several diseases, certain surgical interventions and kidney transplantation are accompanied by ischaemia-reperfusion-induced kidney injury. We have previously described the presence of PACAP (pituitary adenylate-cyclase activating polypeptide) in the kidney and demonstrated its changes following renal ischaemia-reperfusion. The aim of the present study is to investigate whether endogenous PACAP influences the extent of ischaemia-reperfusion-induced injury in the kidney.

Methods: PACAP knockout (homozygous and heterozygous) and wild-type mice underwent 45 or 60 minutes of renal ischemia followed by a two-week reperfusion. Kidneys were processed for histological analysis. Sections stained with PAS-haematoxylin were graded for histological parameters (dilatation of the Bowman's capsule, tubular dilatation, thyreoidisation-like changes, lymphocyte and macrophage infiltration, damage of the glycocalyx layer) on a three-degree scale. In other sets of experiments, tissue cytokine expression and the level of the endogenous antioxidant superoxide dismutase (SOD) were also determined in wild-type and homozygous knockout mice after 60 minutes ischemia and 24 hours reperfusion.

Results: No significant difference was observed in postoperative mortality between the investigated groups. PACAP knockout mice showed more severe histological outcome compared to wild-type mice, with significantly higher histological scores for most of the tested parameters. Cytokine profile of the kidney was markedly altered in homozygous PACAP knockout mice and the level of SOD was significantly reduced in these mice after ischemia-reperfusion.

Conclusion: Both the partial and the total lack of PACAP results in increased susceptibility to renal ischaemia-reperfusion, the developed injuries are more severe, suggesting that endogenous PACAP has a protective effect in the kidney.

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Development of an in vitro 3D lung tissue model containing activated T-cells to study chronic obstructive pulmonary disease (COPD)

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Chronic obstructive pulmonary disease (COPD) is predicted to become the third causes of death globally by 2030. The disease is characterized by a chronic inflammatory process predominantly in the small airways and lung parenchyma with T cell recruitment and remodelling of the extracellular matrix (ECM). Whereas T helper type 2 (Th2) cells are important for the progression of fibrosis, IFN- γ -producing Th1 cells have the opposite effect by inducing collagen degradation. Currently there are no any drug therapies, which can prevent the development of disease or decrease mortality. Three-dimensional (3-D) cell cultures are widely used in biomedical research because cells in 3-D cultures more closely emulate the in vivo microenvironment regarding to cellular interactions, cellular morphology and secreted compounds.

The aim of our experiment was to develop and establish stable 3-D lung tissue spheroid models that adequately and reproducibly mimic COPD disease system.

Using various cell lines including human alveolar basal epithelial adenocarcinoma cell line A549, F11 human fibroblasts and stimulated T-cell Jurkat P116 cell lines, the spheroids were established. The multicellular spheroids were generated using plate centrifuge pelleting technique. T lymphocytes stimulation was carried out with ionomycin+PMA treatment and evaluated by flow cytometric analysis of CD25 expression. Histology of the spheroids were established by cutting frozen sections followed by hematoxylin and eosin staining. Sections were also stained for the nucleus using DAPI staining and recombinant Jurkat cells expressing DS-Red were visualized in a fluorescent microscope.

The effects of opportunistic predation behaviour of the red fox (*Vulpes vulpes*) on small mammal trapping success

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Two hypotheses were tested in the analysis of the effects of red fox on small mammal trapping and demography. According to the first null-hypothesis, the majority of traps predated by foxes included no trapped animals. We assumed that if prey availability is balanced, predators choose traps with an animal inside. Based on the statistical test for correlation between frequency values of active trap numbers (A) and the sum of active and predated traps in the rest of the plots (A+P), the alternative hypothesis was accepted: there were captured animals in most of the traps predated by foxes.

Our second hypothesis assumes that trap-predation of foxes has no effect on small mammal demography, which was investigated by analysing capture parameters of the yellow-necked mouse (*Apodemus flavicollis*) and the bank vole (*Myodes glareolus*), in relation to predation effects. Three out of the 4 trapping parameters had significant negative correlation with predation effect. We evaluated the effectiveness of capture-recapture and the demographic pattern of the two species, based on the recapture rate. All three parameters showed significant negative correlation with the trap-predation. Foxes had the greatest impact on recapture rates, decreasing capture-recapture efficiency.

Landscape-level analysis of small mammal fauna based on barn owl (*Tyto alba*) pellets collected in different landforms of Fertő-Hanság and Drava riverside

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Composition of small mammal assemblages has been analyzed in two lowland regions (Drava riverside, Győr basin) and has been evaluated on three different spatial scales based on barn owl pellets collected between 2006 and 2009.

Distribution of the relative abundance of small mammal taxa has been evaluated as well as the correlation of frequency sequences on a mezzo- and micro regional scale. Assumed differences of niche parameters have been calculated on a local scale, regarding to the breeding pares. Null hypothesis of the first question assumed the homogeneity of species' distributions. In case of the second and third question, the lack of differences have been assumed in frequency sequences well as in niche parameters.

Based on the summarized species list of the mezzo regions, there has been inhomogeneity proven only by the two *Sorex* species, which occurred with a higher relative frequency value on the area of Győr basin. In case of considering detailed data of the local breeding pares (Mann-Whitney-U-test), there has been a significant difference in relative abundance by eight small mammal species.

Variance analysis by the micro-scale analyzes confirmed that refinement of the spatial scale can increase the number of significant differences in the distribution of frequency values. Spearman rank correlation had been used for evaluating frequency sequences of the species at both spatial scales. Calculations have shown that the fauna picture of small mammals of the compared landscapes is basically the same.

Statistical analysis of the niche parameters showed that the width of barn owl's niche did not differ between the two lowland regions, however, the niche overlap within the two mezzo-regions was higher than between them. Results of the niche overlapping analyses have rejected the third null hypothesis.