
MED PECS

# MEDICAL CONFERENCE FOR PHD STUDENTS AND EXPERTS OF CLINICAL SCIENCES

## Book of Abstracts

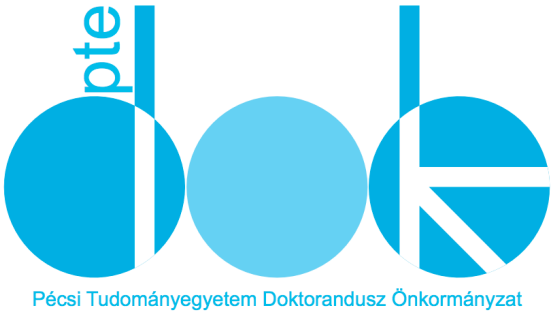
# Medical Conference for PhD Students and Experts of Clinical Sciences

# 9th of November 2019

# Book of Abstracts


**2019**

**Pécs**

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*Presidential Welcome Speech*

**Dear Doctoral Students, Doctoral Candidates and Young Researchers**,

I warmly welcome you on the pages of the MedPECS 2019 Conference's Book of Abstracts.

This event will be organized third time in the field of medical, health and pharmaceutical sciences. Our main objective has not changed during these years, which is to create a platform for doctoral students, doctoral candidates and young researchers in order to share their professional results witch each other. Exchanging ideas is essential for a healthy scientific mindset, being aware of other professionals' opinions could lead to better results consequently this event can support the development of scientific careers.

These days medical, health and pharmaceutical sciences and the related industry is developing quickly therefore being aware of newest research methods, scientific results and innovative ideas are essential and this knowledge plays a significant role. Even though you can sense the pressure of the academic field you have freedom also in terms of doctoral training. You can work in your chosen field of science, research topics you are interested in, carry out innovations and new ideas. During this period, you can step on a colourful and interesting path. This path means not only a never-ending challenge but continuous renewal furthermore a diverse and an inspiring career too.

On behalf of my colleagues and myself, I wish you a successful conference and a prosperous scientific career.

Best regards,

Bence Závodi
*president*
*University of Pécs*
*Doctoral Student Association*

# PROGRAM

| | | |
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| 9:00- | **Registration** | AULA |
| 10:00-11:30 | **Sessions of oral presentations I.** | A101, A102, A103 |
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| | **Csaba Szántay, PhD, DSc, Habil.**<br>*„How to be a successful scientist - the human aspects of scientific thinking”* | |
| 15:00-15:15 | **Raffle**<br>*supported by the Medicina Book Store* | B002 |
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# CHAIRS

| | | |
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| PUBLIC HEALTH MEDICINE | **Andrea Dr. Horváth-Sarródi**<br>*assistant lecturer at the Department of Public Health Medicine, University of Pécs, Medical School* | A101 |
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| PHARMACOLOGY AND PHARMACEUTICAL SCIENCES | **Györgyi Dr. Horváth**<br>*associate professor, deputy head of the Department of Pharmacognosy, University of Pécs, Faculty of Pharmacy* | A102 |
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# Public Health Medicine

## Eating behaviours of students in the University of Warwick

**Lu Zhang**[1], **Carlos Serra Traynor**[2]

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**Introduction**: Obesity is still a worldwide problem[1], especially in youth, which can affect health in adulthood[2]. The UK, as one of the top countries in the world for obesity prevalence[3], has an increasing number of the population attending university[4], while the healthy eating environment of universities is still full of challenges[5].

**Aim**: This study aimed to explore the University of Warwick students' eating behaviours based on the Three-Factor Eating Questionnaire (TFEQ-R18), which may be used in health strategies of the university.

**Methods**: Logistic regression was used to screen the influencing factors of the food source and linear regression was used in the exploration of eating behavior.

**Results:** 120 Warwick students were involved in this study, 61.2% of them were male and 38.8% were female. More than half of the participants spend 3-5 days at the university weekly. But almost 50% of the students chose ready-to-eat food. The mean (SD) of sum score of TFEQ-R18 was 43.9 (7.2) and the means (SD) of the sum of uncontrolled eating, cognitive restraint, and emotional eating was 21.5 (4.9), 16.1 (3.9), and 6.3 (2.1), respectively.

**Conclusions:** Female and Master or PhD students were trend to cook at home. Male showed higher sum scores in unhealthy eating behavior. It is hard for male students and the students who lived off-campus but within Cannon park to control their eating. While, financial struggle person and students who need to help to lost weight, had a stronger desire to control their diet before eating.

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*Keywords: Students, The University of Warwick, Food frequency, Three-Factor Eating Questionnaire-18 items*

## Evaluating the impact of the HIV/AIDS prevention programmes in Nigeria from 1991 to 2019

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**Background**: The Global trend of HIV/AIDS epidemic over the years and the mortality rates have been overwhelming. It has claimed the over 70 million people since the emergence of this virus. The strategies mapped out throughout history to curb out the virus have been positive, through the active working policy programmes enacted by International Organizations. Nigeria has been affected so badly with this disease in the middle 90's. Being the second in the world with the highest number of people living with HIV, is a matter of concern. The Impact of HIV/AIDS policy programmes in Nigeria 's evaluation is the basics for these studies. Programmes, Policies and Projects have been set to tackle the menace. Over the years, the prevalence of the virus shows a significant decreased number of the viral disease, whereas, new infections in Nigeria continue to persist among vulnerable populations and groups setting the country with one of the highest number of people living with HIV/ AIDS. With decreased prevalence of 2.9% as at 2014, it is still having one of the highest numbers of new infections globally due to its large population.(UNAIDS 2017 ESTIMATES). Policies have been developed to curb out the epidemic since the first epidemic, however, it was not effective until the late 90s.

**Method**: The method used is a narrative review of programm evaluation reports. Data were collected from the Sentinel Surveillance Survey System from 1990-2019, related articles published with reviewed research from databases (PubMed) and relevant documents published on websites of International Organization, Nigerian Federal Ministry of Health and relevant publication covering Nigeria HIV/AIDS related issue were explored, analysed, interpreted and evaluated based on the findings.

**Results and conclusion**: Nigerian have developed working policy and programmes, the National Policy on HIV/AIDS, National Agency for the Control of AIDS, NACA aimed at eradication of the virus since the first epidemic however, is just but a mere tool without a place of function. The impact is evident on the population, however, despite this progress there is still more to be done. Various research work published indicate lapses of the programme and variation in prevalence in some parts of the country.Nigeria's policy and programme vision to eliminate HIV/AIDS is dream come through, with effective working policy. To this day the prevalence has been reduced to 1.4% as at March 2019 based on the recent update from 2.8% in 2017 and an estimated 1.9 million from 2.8 million living with HIV/AIDS respectively and more than half of this population still have no supress viral load. (UNAIDS, 2019) An achievement above target indeed! Moreover, there is a different between achievement and impact to which more is yet to be accomplished.

*Acknowledgements:* Dr.Attila Sárváry, MD.PhD., HOD Departent of Nursing Science,Faculty of Health Sciences, University of Debrecen.

*References:*

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*Keywords: Nigeria, HIV/AIDS, evaluation, prvention, programmes, Impact.*

## Expectant Women's Perspective and Experience of Prenatal Fear of Childbirth in Kenya: A Qualitative Study.

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**Background**: Limited qualitative studies are available on the expectant women's perspective and experience of prenatal fear of childbirth.

**Aim**: Exploring prenatal fear of childbirth, perspectives and experience of Kenyan expectant women.

**Methods**: Semi- structured interview with primipara and multipara women with severe prenatal fear of childbirth were conducted. Thematic analysis was used in each of the two groups. Findings were reexamined in concurrence with a third source which was intensive literature review. Final key elements were determined by the presence of the element in at least two of the three sources of data collected.

**Results:** Primipara (n=18) identified 12 themes while multipara (n=18) identified 8 themes. The study finally generated 10 themes namely: fear of childbearing process, fear of pain, fear of losing control during labour, fear of a caesarian section, fear of inability to make decisions during labour, fear of lack of social support, fear of the body's ability to give birth, fear of harm during childbirth, fears relating to quality of care and fear of unknown. There was no relationship between prenatal fear of childbirth and caesarean section as mode of birth.

**Conclusions:** To reduce fear of childbirth, emphasis should be put in addressing all the mentioned fears.

*Keywords: Prenatal fear of childbirth, pregnancy related anxiety, qualitative study, Kenya*

## Breast cancer screening discourse in social media: a systematic review of the literature

**Bence Döbrössy**[1]

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**Background**: Unsatisfactory participation rate at population based organised breast cancer screening is a long standing and much researched problem.
We hypothesised that social media, with 3.2 billion users in 2019 [1], is an important site of breast cancer related discourse, potentially influencing many women in their screening decisions.
Understanding lay breast cancer screening related beliefs and sentiments expressed on such sites as Facebook, Twitter, YouTube and determining whether these platforms might be used as channels by professionals to reach under-screened women, may have public health significance.

**Objectives**: By systematically reviewing original research studies on breast cancer related social media discourse, we had two aims: first, to assess what we could learn about the breast cancer screening related beliefs, attitudes and literacy of potential participants that might explain sub-optimal attendance rates, and second, to find out whether social media can be used by screening organisers as a channel of patient education.

**Methods**: This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). After searching PubMed, ScienceDirect, Web of Science, Springer and Ebsco, 17 studies were found that met our criteria.
A systematic narrative framework was used to synthesize the data. Owing to the high degree of heterogeneity in social media channels, outcomes and measurement included in this study, a meta-analytic approach was not appropriate.

**Results:** Results indicate that the volume of breast cancer related social media discourse is considerable. One study found 1.7 million breast cancer related interactions posted by 1.1 million women on Facebook in a one-month period [2]. Breast cancer related tweets were potentially seen by 3,028,451,603 users in a single breast cancer awareness month [3] Overall, breast cancer screening sentiment ranges from neutral to positive but the controversy surrounding the harms and benefits of mammography is well mirrored in the content of social media discourse.

**Conclusions:** Dedicated breast screening websites operated by screening organisers would ensure much needed quality controlled information and also provide space for reliable question and answer forums, the sharing of personal experience and the provision of peer and professional support. Due to the large volume of breast cancer related social media discourse, social media is a feasible channel to be used by screening organisers to increase breast cancer screening uptake as it has the potential to reach screening age women.

*References:*

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*Keywords: social media, breast cancer screening, mammography, health beliefs*

## Examination of the effectiveness of the Safe Falls-Safe Schools preventional program in elementary school

**Kerner Ágnes**[1], **Ács Pongrác**[2] , **Oscar Del Castillo**[3] , **Derkács Evelin**[2] , **Boncz Imre**[4] , **Derdák Mercedes**[5] , **Morvay-Sey Kata**[2]

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**Purpose**: Falls are the second leading cause of accidental or unintentional injury deaths worldwide. 37.3 million falls that are severe enough to require medical attention occur each year. Each year an estimated 646 000 individuals die from falls globally of which over 80% are in low- and middle-income countries. Adults older than 65 years of age suffer the greatest number of fatal falls (WHO, 2018; Peden et al.2002). Falling related injuries indicate a huge burden on the health care expenses.The aim of this study is to show that the implementation of the „Safe Fall-Safe Schools" programme involved in physical education classes can help to reduce the negative effects of unintentional backward falls in the adolescent population. In a 6-week motor development program (Safe Fall-Safe School) children learn how to protect themselves in case of falling. We would like to exam the efficiency of precentional-research program, which already is working in Spain and Italy [1].

**Methods**: Our sample in this study is N=154 attending in an elementary school in Pécs (Hungary). Data was collected on an observation scale which records five basic elements during a backward fall: position of the neck, the hands, the trunk, the hips, and the knees, applying descriptive, correlational, and contrast statistics. For the statistical analysis was used the McNemar's test.

**Results:** In case of the sample fter the teaching program we found significant difference on the determinated position of the bodyparts (neck p<0,000, trunk p<0,000, knees p<0,000, hips p<0,000, hands p<0,000).The data indicates that learning safe and protected ways of falling backward is possible through the implementation of the Safe Fall programme.

**Conclusions:** The results show that the „Safe Fall-Safe Schools" 6 week program involved in PE lessons is able to develop the motor responses of children, which can reduce the risk of falling injuries.

*Acknowledgements:* The research was carried out with the support of the Human Resource Development Operational Program, EFOP-3.6.2-16-2017-00003: „Creating a Research Network for Recreational and Health Cooperation".

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*[2] Peden M, McGee K, Krug E (Eds), Injury: A leading cause of the global burden of disease, WHO, Genova,2002*

*Keywords: Safe fall-Safe Schools, injuries, backward fall, health care expenses*

## Determinants of Primary nonadherence to prescribed medications and associated factors among adults in Hungary 2012-2015

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**Introduction**: Primary nonadherence to prescribed medications occurs when patients do not fill/dispense the new prescriptions written by their healthcare providers [1]. It has been described as a global epidemic and is considered as the cornerstone in management, control, and prevention of loss of the desired therapeutic outcome, disease progression, and complications [2]. In Hungary, primary nonadherence has not been investigated before.

**Aim**: To assess the primary nonadherence to medications prescribed by general practitioners (GPs) and to determine its associated factors among adults in Hungary for the period of 2012-2015.

**Methods**: Data on all general medical practices (GMPs) were obtained from the National Health Insurance Fund. The ratio of the number of dispensed medications to the number of prescriptions written by GP for adults was used to determine medication adherence aggregated for GMPs. Effect of GMP characteristics (list size, GP vacancy, patients' education, settlement type (urban/rural), and geographical location of the center) on primary adherence standardized for patients' age, sex, and exemption certificate was investigated through multiple linear regression modeling.

**Results:** A total of 281,315,386 prescriptions were dispensed out of 438,614,000 written by GPs. Overall, 64.1% of the prescriptions were filled. There was a negative association between standardized adherence and urban settlement type, a higher level of education, and vacancy of the GMPs. The larger GMP size proved to be a risk factor, and there was significant geographical inequality among counties.

**Conclusions:** About one-third of the written prescriptions were not dispensed. There is great variability across GMPs that can be explained by structural characteristics of GMPs, socio-economic status of patients, and quality of cooperation between patients and GPs. The use of dispensed-to-prescribed medication ratio in routine monitoring of primary health care effectively supports the necessary interventions.

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*Keywords: Primary nonadherence, dispensing, prescribed medications, Primary health care.*

# Clinical Medical Sciences

## Assessment of Oxidative Stress Markers in Patients with Acute Coronary Syndrome: Potential to Modify Risk Stratification and Treatment

**Ied Al Sadoon**[1], **István Wittmann Prof. Dr.**[2], **Szilárd Kun MD PhD**[2], **Mercedes Ahman**[1], **Attila Konyi MD PhD**[3], **Zs.Verzár MD PhD**[1]

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**Introduction**: Oxygen molecular reduction can generate reactive oxygen species (ROS) or free radicals through oxidative stress [1]. Under oxidative stress conditions, when levels of free radicals are elevated, hydroxyl radicals can oxidize the benzyl ring of amino acid phenylalanine, which then produces various abnormal tyrosine isomers (meta-tyrosine, ortho-tyrosine and para-tyrosine), with differences depending on the location of the hydroxyl group on the benzyl side chain, which are non-essential amino acids used by cells for protein synthesis [2].

**Aim**: Evaluate the oxidative stress to determine the correlation between the parameters of the oxidative stress markers and the extent of the myocardial damage regarding ST-segment elevation myocardial infarction patients (STEMI), and Non-ST-segment elevation myocardial infarction patients (NSTEMI) before and after a lesion.

**Methods**: Forty-four patients participated in the study; 23 had presented with STEMI while 21 had presented with NSTEMI. Arterial blood samples were taken once from the aortic root and the second after the lesion in the coronary artery during the percutaneous coronary intervention (PCI) being performed, and the serum Phe and p-, m- and o-Tyr levels were determined using the rp HPLC-method.

**Results:** Regarding the STEMI patients, the phenylalanine serum levels were significantly higher after the lesions compared to at the aortic roots (P = 0.002). While the serum p-Tyr/Phe ratio and m-Tyr/Phe ratio were lower after the lesions than at the aortic roots (P= 0.024) (P=0.018), respectively. Concerning the NSTEMI patients, there were no significant changes noted regarding the higher levels of the serum Phe and serum m-Tyr or the lower levels of the serum p-Tyr and serum o-Tyr after the lesions compared to at the aortic roots.

**Conclusions:** Our data suggest that the abnormal levels of the Phe and tyrosine isomer serums could, in fact, represent mediators of the effects of the oxidative stress.

*References:*

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*Keywords: Oxidative stress, Acute coronary syndrome, Risk stratification*

## Risk of adverse events in patients with low-on clopidogrel platelet reactivity after percutaneous coronary intervention: Systematic review and meta-analysis

**Alexandra Bálint MD**[1], **Lilla Hanák**[2] , **Péter Hegyi MD Dsc**[2] , **Zsolt Szakács MD**[2] , **Szimonetta Eitmann**[2] , **András Garami**[2] , **Margit Solymár**[2] , **Katalin Márta**[2] , **Zoltán Rumbus MD**[2] , **András Komócsi MD DSc**[1]

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**Objectives**: The purpose of this study was to systematically evaluate the significance of low platelet reactivity (LPR) on adverse cardiovascular events among patients receiving coronary stent implantation

**Background**: Clinical evidence has been controversial regarding the influence of LPR and ischemic and bleeding outcomes.

**Methods**: Medline, EMBASE and Cochrane Library databases were searched up to May 2019 for relevant studies. The primary outcome of interest was bleeding risk including major and minor bleeding events. Secondary outcomes included the incidence of all-cause mortality, repeated revascularization, nonfatal myocardial infarction and stent thrombosis. Study-level outcomes were evaluated in random effect models with DerSimonian-Laird estimation. (PROSPERO registration number: CRD42019136393)

**Results:** Eighteen studies with 7619 patients were included in this meta-analysis. Pooled analysis showed that LPR was diagnosed in 28 % (95% CI: 20% - 37%) of cases, and was associated with an increased bleeding risk (relative risk [RR] 2.75, 95% CI: 1.98-3.83, $p < 0.001$) Patients with LPR also had a lower risk of non-fatal MI (RR=0.63, 95% CI: 0.42- 0.95, p=0.028). No significant difference was found regarding all-cause mortality (RR=1.46, 95% CI: 0.82-2.58, p=0.20).

**Conclusions:** Our analysis supports that LPR is associated with important clinical outcomes of patients underwent coronary stent implantation. Possible benefit of this marker in risk stratification, or potential of improvement of risk prediction if combining with other factors in prediction models requires further studies.

*Acknowledgements:* The authors report no conflict of interest. This study was supported by an Economic Development and Innovation Operative Program Grant (GINOP 2.3.2-15-2016-00048) and an Institutional Developments for Enhancing Intelligent Specialization Grant (EFOP-3.6.2-16-2017-0006) of the National Research Development and Innovation Office.

*Keywords: low platelet reactivity, major adverse cardiac events, acute coronary syndrome, percutan coronary intervention, bleeding risk*

## Role of common CASR variants in chronic pancreatitis

**Amanda Takáts**[1], **Gergő Berke**[1] , **Andrea Szentesi**[1,2] , **Gyula Farkas Jr**[3] , **Ferenc Izbéki**[4] , **Bálint Erőss**[1] , **László Czakó**[2] , **Áron Vincze**[5] , **Péter Hegyi**[1,2,6,7] , **Miklós Sahin-Tóth**[8] , **Eszter Hegyi**[1]

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**Background**: The calcium sensing receptor (CASR) plays an essential role in maintaining mineral ion homeostasis and is also expressed in human pancreatic acinar and ductal cells. Over the past years, the possible involvement of common CASR variants in chronic pancreatitis (CP) has emerged, however, their role in the pathogenesis of CP remains controversial due to the lack of large case-control studies.

**Aim**: To analyze the clinically frequent CASR variants in an ethnically homogenous group of Hungarian CP patients and healthy controls.

**Methods**: 257 CP patients (cases) and 183 controls with no pancreatic disease from the Hungarian National Pancreas Registry were enrolled. As the most common CASR variants are located in exon 7, we PCR amplified and sequenced this exon with its flanking intronic regions.

**Results:** We identified three common exon 7 variants in our cohort: c.2956G>T (p.A986S), c.2968A>G (p.R990G) and c.3031C>G (p.Q1011E). No significant differences were found in allele frequencies of these variants in cases compared to the control group: p.A986S (19.26% vs 18.58%, OR=1.05, p=0.8), p.R990G (7.8% vs 6.3%, OR=1.26, p=0.4) and p.Q1011E (3.7% vs 4.1%, OR=0.9, p=0.8). However, genotype distribution analysis revealed, that the p.A986S variant in homozygous state was overrepresented in patients relative to controls (3.5% vs 1.1%, OR=3.3, p=0.13). Although this difference was not statistically significant, there is a clear trend which warrants extension of the studies to a larger cohort in the future.

**Conclusions:** The homozygous c.2956G>T (p.A986S) variant is overrepresented in the Hungarian cohort of chronic pancreatitis patients relative to the control group. Our results strengthen the previous findings in a French cohort [1] and support the possible pathogenic role of the homozygous p.A986S variant in chronic pancreatitis.

*References:*

*[1] Masson E, Chen JM. Overrepresentation of Rare CASR Coding Variants in a Sample of Young French Patients with Idiopathic Chronic Pancreatitis. Pancreas 44:996-8 (2015).*

*Keywords: pancreas genetics, pancreatitis, calcium sensing receptor*

## Melatonin, as a potential anti-inflammatory mediator in sepsis

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**Introduction**: Timely diagnosis and effective therapy of sepsis is still one of the most challenging medical conditions in intensive care. The incidence of sepsis is increasing worldwide but a modestly decreasing tendency in mortality rates is also observable [1]. Melatonin – the major hormone of the pineal gland synthetized from the amino acid tryptophan – plays an important part in regulating the circadian rhythm, but it may also have an anti-inflammatory effect by interacting with the immune system while being a potent antioxidant as well. Selective serotonin reuptake inhibitors (SSRIs) require weeks to achieve their antidepressant effects, however, they may also acutely elevate melatonin levels in the circulation, possibly resulting in decreasing inflammatory mediator levels in sepsis. This could be an indirect effect of SSRI medications (iv. Citalopram) in patients with sepsis.

**Methods**: Blood and urine samples were taken from 21 septic patients without SSRI treatment and 9 septic patients with SSRI treatment (UP CC Department of Anesthesiology and Intensive Therapy). Previous studies have shown that urine 6-sulfatoxymelatonin (6-SMT) concentrations show good correlation with the total level of melatonin in the circulation [2]. Urine 6-SMT levels (ng/ml) were measured using a ELISA method based on the competitive principle (IBL International GmbH). A Friedmann and Mann Whitney U test were used in the 22th version of the SPSS program for statistical analysis.

**Results:** We found a statistically significant increase in urine 6-SMT levels between the septic patient groups without and with SSRI treatment on the second (3,99 vs. 14,21 ng/ml, $p<0,05$) and third (3,55 vs. 8,39 ng/ml, $p<0,05$) night of follow up. However, we did not observe a statistically significant difference between the two mentioned patient groups regarding the decreasing tendency of currently used sepsis biomarkers, namely C-reactive protein (CRP) and Procalcitonin (PCT) during follow up.

**Conclusions:** A sensitive and precise ELISA method is already available for measuring urine 6-SMT levels, which may prove that SSRI treatment – resulting in elevated serum/urine melatonin concentrations – could have beneficial effects regarding the successful treatment of sepsis.

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*Keywords: sepsis, anti-inflammatory mediator, melatonin, ELISA*

## Fecal Transplants - Results with Capsules

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**Introduction**: When the number of *Clostridium difficile* infections (CDI) started to rapidly increase, metronidazol and vancomycin were the two best options for the treatment. Due to the fact that CDI is a result of antibiotic use, giving more antibiotics seems to be controversial. The efficacy of fidaxomicin proves that we can still be able to stand the fight against antibiotic resistance, but the cost of these new drugs directs us towards better infection control and alternative treatment options.

One of these alternative options is fecal transplant. Its effectiveness is similar to fidaxomicin, but the difference between their prices – and therefore their accessibility – may make it a more suitable choice. There are many questions regarding its safety, but the biggest challenge is still the prejudice and the inconvenience it caueses.

**Aims**: Due to the relative low case number and the labour-intensive procedure, the production of the preparates can be difficult to organize. Most of the protocols mention fecal transplant applied in form of a solution. We found however, that using lyophilized stool filled into capsules makes the entire process much more flexible and less inconvenient to the patients. In our study, we aimed to elucidate the possibilities of lyophilization in fecal transplants.

**Methods**: The prepatation of the fecal filtrates is carried out according to the regular protocols. After the new, additional step, we fill the lyophilized stool into „00" size hard gelatin capsules, then store it on -20°C until administration. In the past 2 years, we treated 20 CDI patients in Pécs, at the Department of Infectology.

**Results:** We found that our overall success rate was similar to the regular fecal transplant procedures and to the former results seen in a patient group of more than 100 patients.

**Conclusions:** Fecal transplant with capsules – although it requires additional labour compared to the regular procedure – is a promising improvement in the treatment of CDI.

*Keywords: Fecal transplant, Clostridium difficile colitis*

## Measurement of body surface acquired His electrocardiogram among patients undergoing valvular surgery

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**Introduction**: Due to the proximity of annular and conductive systems of the heart, frequency of dysrhythmias requiring permanent pacemaker implantation might be 3-12% according to certain previous studies. High volume registries reveal a 0,8-6% risk for all open cardiac procedures involving valve procedures as the most prominent additional risk factor (OR: 4,9-8,9). Goal of our current study was a prospective, observational study built upon noninvasive electrophysiological investigation with special consideration of His signals acquired via body surface acquired ECGs of patients undergoing surgical valve procedures at the Heart Institute of the University of Pécs.

**Methods**: Measurements were performed by a surface acquired ECG device and an accordingly developed analyzing software developed by Lóránd Kellényi and verified by our previous investigations.
Current measurements were performed in the 2017 calendar year at the Department of Cardiac Surgery of Heart Institute of the University of Pécs. Each patient undergoing valve procedure had been included, unless exclusion criteria were present. Measurements were performed on the day before surgery and on the sixth post-operative day ($\pm$2 days), when AH and HV times were recorded with filter settings based on our previously published validation process. Alterations of conduction were described as difference of prae- and postoperative data, statistically processed via paired T-sample test.

**Results**: Among the 74 patients involved 45 cases yielded evaluable prae-and postoperative records as well, other cases were obstructed by atrial fibrillation, pacemaker rhythm or technical issues. Neither AH nor HV times proved to be significantly altered (AH: 129,04 vs 129,20 ms, p=0,97, HV: 39,96 ms vs 40,07 ms, p=0,96).

*Keywords: Quality by Design, risk-based formulation, risk assessment, resveratrol-containing liposome, nasal administration*

# Biomedical Sciences

## Nanotube formation between the immune cells in hetero-culture condition

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**Introduction**: Membrane nanotubes (NTs) are long, non-adherent actin-based cytoplasmic extensions facilitate the intercellular transfer of different materials between the connected cells located in a fair distance of each other [1]. This mechanism of transport can involve nutrients, signaling molecules, RNAs and proteins, ions, autophagosomes, pro- and anti-apoptotic factors, membrane components and even cellular organelles in a uni- or bidirectional manner [2]. Membrane nanotubes could be abused by different pathogens as a route for spreading among their host cells. In this case, the pathogens use the nanotube as a physical route to translocate from one side (the infected cell) to the cell (most likely normal target cell) on the other side of the tube [3].

**Aim**: In our study, we focus on the formation of nanotubes between particular immune cell types (IP12-7 T cells and 2PK3 B cells) in both hetero (cells of different types) and homo-culture conditions.

**Methods**: Following the labeling of IP12-7 murine hybridoma T cells with 1,1'-Dioctadecyl-3,3,3',3'-Tetramethylindocarbocyanine Perchlorate (DiI) dye, and 2PK3 murine lymphoma B cells with Alexa488-Cholera Toxin-B, both cell types were co-incubated in fibronectin pre-coated petri dish for approximately 3 hours. The cells then visualized with Zeiss LSM 710 confocal laser scanning microscope at 63x magnification under live condition (37°C, 5% CO2) in order to investigate the formation rate of the nanotubes in between.

**Results and discussion**: Analyzing the images revealed that cells form hetero-NTs with a higher rate than homo-NTs. B cells showed more capability of forming NTs than T cells referring to their nature as potent APCs. Nanotubes showed a homogeneous pattern in thickness but a great diversity was presented in case of their length and thus, the length depends highly on the position of the cells in regard to each other.

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*Keywords: Membrane nanotubes, tunneling nanotubes, nanotubes, immune cells, B cells, T cells, cell communication*

## Phagocytic function of peripheral monocytes and neutrophil granulocytes in ovarian cancer

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**Introduction**: Ovarian cancer is the second most common gynecologic malignancy [1], and according to studies that can have a significant effect on the functioning of various immune cells [2].

**Objective**: The aim of this study was to investigate the effect of tumor removal on the phagocytic function of peripheral monocytes and neutrophils in advanced stage epithelial ovarian cancer (EOC).

**Methods**: We investigated peripheral blood samples from patients with advanced stage (IIIC) EOC (n=17) and with benign gynecological tumor (n=16) collected before and seven days following tumor removal surgery and from 14 healthy women. Separated monocytes and neutrophils were incubated with opsonized FITC-labeled Zymosan-A particles as the target of the phagocytosis. By using fluorescence microscope, we counted the number of particles phagocytosed by the cells and calculated the phagocytic index (PI). Statistical analysis of the data was performed by using paired samples t-test and one-way ANOVA; $p<0.05$ was considered significant.

**Results:** Peripheral monocytes and granulocytes isolated from preoperative blood samples of EOC patients had significantly lower PI values than the corresponding cells from the healthy control group. The phagocytic function of monocytes and granulocytes isolated from postoperative samples of EOC patients was significantly increased compared to preoperative values and reached the PIs of control cells in both cell types. There were no significant differences between pre- and postoperative PI values of the cells from patients with benign gynecological tumor.

**Conclusions:** The increase in phagocytic index following tumor removal surgery suggests that the tumor and/or its microenvironment may produce factors that can depress the phagocytic function of monocytes and neutrophils, and after tumor removal the production of these factors is reduced or eliminated.

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*Keywords: Ovarian cancer, monocyte, neutrophil granulocyte, phagocytosis*

## Identification of a novel annelid $\beta$-catenin homologue and its induction in adult *Eisenia andrei* earthworms

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**Introduction**: Wnt/$\beta$-catenin signaling is a highly conserved morphogenic pathway throughout the evolution. $\beta$-catenin ($\beta$-cat) plays crucial role in cell proliferation, differentiation, apoptosis, stem cell renewal and immune cell functions.

**Aim**: We intended to isolate and characterize the potential homologue of $\beta$-cat in *Eisenia andrei* earthworms.

**Methods**: Based on the available annelid $\beta$-cat sequences conventional RT-PCR was executed to identify a $\beta$-cat candidate in *E. andrei*. Gained PCR products were sequenced and analyzed applyingbioinformatic tools. Then, qPCR reactions were performed to measure $\beta$-cat mRNA in tissues, following *in vitro, in vivo* pathogen (Gram-positive / -negative bacteria, zymosan) and *in vitro* LiClstimuli in a time-dependent manner.

**Results:** We identified a partial mRNA sequence of $\beta$-cat in *E. andrei* (Ea-$\beta$-cat). This partial cDNA consisted of 518 bp in the coding region. Deduced amino acid sequence comprised of 172 amino acids that fit to the first armadillo repeat. Phylogenetic analyses showed strong similarities among *Lophotrochozoan$\beta$-catenins*. *Ea-$\beta$-cat* evidenced ubiquitous, but variable expression in different *Eisenia* tissues: high (metanephridia), moderate (ventral nerve cord, ovary) or low (vesicular seminalis, coelomocytes). *In vitro* and *in vivo* pathogen exposure demonstrated elevated mRNA level at 24 h and 48 h. In addition, *in vitro* 24 h LiCl treatment provoked off a significantly increased *$\beta$-cat* mRNA compared to the controls.

**Conclusions:** Wnt-signaling is highly conserved in a variety of organisms, but earthworms provided relatively limited information in this extent. We identified the partial coding sequence of *Ea-$\beta$-cat* mRNA from *E. andrei* earthworms. Kinetic analysis of *Ea-$\beta$-catexpression* upon pathogen exposure is in progress. Based on our preliminary results *Ea-$\beta$-cat* plays indispensable role in the immune functions of earthworms.

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*Keywords: earthworms, $\beta$-catenin, pathogen exposure, gene expression, innateimmunity*

## The effect of olaparib and oxaliplatin on breast cancer cell lines

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**Introduction**: The nuclear PARP enzyme found in all nucleated cells are a family of enzymes involved mainly in DNA repair. There are some PARP inhibitors on the market of which olaparib is the most widely used. It was approved for ovarian and metastatical breast cancer and many clinical trials are running, in developmental stage to use olaparib in other types of cancer and other diseases in mono and combination therapy with various drugs. Oxaliplatin is a third generation platinum compound which was approved for the therapy of colon cancer. Many clinical trials are using oxaliplatin in combination with other agents in liver and pancreatic cancer.
Breast cancer is one of the most commonly occuring cancer. In 2018 there were over 2 million new cases. In the many types of breast cancer triple negative breast cancer is aggressive and have poor prognosis.

**Aims**: Our goal was not only to test the platinum compound oxaliplatin and olaparib on breast cancer cell lines, but to investigate whether these two agents have synergistic effect.

**Materials and Methods**: MDA-MB-231 and MCF-7 cell lines were treated with different concentrations of oxaliplatin and olaparib. MTT assay was performed to assess the viability of the cell lines after the treatment. Early and late apoptosis was investigated as an effect of the treatment. Propidium iodide stain was used to assess cell cycle state. Colony formation assay was performed to analyze the altered clonogenic potential of the cells.

**Results and Conclusion**: Although olaparib didn't enhance the cytotoxic effect of oxaliplatin in 48 and 72 h treatments, based on the results of colony formation and apoptosis detection, it might have a synergistic effect in combination with the platinum compound in long-term therapy.

*Keywords: breast cancer, olaparib, oxaliplatin, PARP*

## Effects of PACAP fragments (PACAP3-38 and PACAP5-38) in ischaemic retinopathy

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**Introduction**: Intravitreal PACAP38 and 27 are neuroprotective in different retinal injuries, including ischemia induced by bilateral common carotid artery occlusion (BCCAO). We proved that PACAP passes through ocular barriers and so, retinoprotection can be achieved also by eye drops. PACAP is degraded by dipeptidyl-peptidase IV to PACAP3–38 or 5–38, which have antagonistic properties. Therefore, it was of interest to examine whether topical application of these fragments worsens ischemic retinal injury that could interfere with future therapeutic applications.

**Methods**: Right eyes were treated with PACAP3-38 or 5-38 eye drops. Retinas were processed for morphometric and biochemical analysis.

**Results:** BCCAO resulted in severely reduced thickness in retinal layers, while histological and molecular examinations did not show any, either ameliorating or aggravating, effect of PACAP3-38 and -5-38.

**Conclusions:** Our results show that the degradation after topical application of PACAP38 or 27 does not lead to destructive fragments that could interfere with the retinoprotective treatment.

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## Molecular biological changes in the background of Olaparib treatment on HeLa cells

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**Introduction**: Olaparib is an inhibitor of poly(ADP-ribose)polymerase (PARP) and also is an FDA-approved drug in cancer treatment. The PARP enzyme family is involved in several cellular processes, including programmed cell death and DNA damage repair affecting the function of cancerous cells. During our investigations we examined the possible radiosensitizing effect of Olaparib on cervical cancer cells. Radiotherapy is applied in cancer treatment; therefore it affects millions of people every year. In the present work we investigated known elements of pro- and antiapoptotic pathways after Olaparib treatment and irradiation and the combination of them.

**Methods**: First, we investigated the viability of cells after 2Gy irradiation and Olaparib treatments, and the combined effects of them in different concentrations (10uM, 8uM, 7,5uM, 4uM, 2uM, 1uM, and 500nM) on MTT tests after 24, 48, and 72h. After, we applied „Human Phospho-Kinase Antibody Array Kit" to detect the expression of several pro-and antiapoptotic factors (elements of Akt, JNK, GSK, RSK).

**Results:** We detected that the viability of cell lines decreased significantly ($p<0.05$) after 10uM, 8uM Olaparib treatments on MTT tests. We detected the most efficient changes after 72h treatment, therefore later we applied this pretreatment time. The irradiation effected decreased ($p<0.05$) cell viability as well. The expression of Akt1/2/3 significantly decreased after irradiation, 72h Olaparib treatment and the after the combined treatment (irradiation after 72h Olaparib pretreatment). Similarly, the expression of c-JUN, JNK1/2/3, RSK, and GSK decreased after 2Gy irradiation, PARP inhibitor and the combination of them. These results were affirmed by Western blot results.

**Conclusions:** Olaparib treatment decreased the expression of JNK1/2/3, Akt1/2/3, RSK, and GSK, these factors are targets of different approved oncological treatment protocols. Based on our results Olaparib ameliorated the effectiveness of irradiation on cervix carcinoma cell lines.

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*Keywords: Olaparib, PARP inhibitor, cervix carcinoma, radiosensitizing agent, JNK1/2/3, Akt1/2/3*

# Health Science and Health Economics

## Effect of Knee-Ankle-Foot Orthosis (KAFO) on Knee Kinematics and Kinetics in an Individual with Knee Varus Alignment

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**Background**: Knee valgus braces are used to reduce knee load and varus deformities in individuals with medial compartment osteoarthritis (OA)[1, 2].

**Aim**: the purpose of this study was to determine whether the kinematics and kinetics of the knee are improved when wearing a knee-ankle-foot orthosis (KAFO) compared with knee valgus braces while walking and stair climbing.

**Materials and methods**: One male individual (with 10° of knee varus) was assessed with a control shoe, custom, and off-the-shelf (OTS) Unloader knee valgus braces, and a custom-made KAFO in situ during walking and stair climbing.

**Results:** The KAFO significantly reduced the knee varus angle compared with the shoe and both knee valgus braces during walking and stair climbing, as well as the first peak of the external knee adduction moment (EKAM) during walking and the knee adduction angular impulse (KAAI) during ascending compared with the shoe. No significant differences were noted between the custom and OTS knee valgus braces in any measures.

**Conclusions:** Knee-ankle-foot orthoses (KAFO) may be recommended for individuals with high knee varus angles than knee valgus braces.

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*Keywords: Knee, OA, Orthoses, Gait, EKAM, Biomechanics, Walking, Stairs*

## Effects on hip and knee osteoarthritis with complex therapy

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**Objectives**: The aim of our research was to examine the efficiency of the complex therapy what we used. We hypothesized that with the complex therapy we can reduce pain in the hip and knee joints; we can increase the range of motion and because of this the patients quality of life can be better.

**Methods**: The patients of the research group (n=100) had a 3 week long complex therapy which contains physical therapy and balneotherapy as well. At the beginning and at the end of the 3 weeks we examined the patients with our self-developed questionnaire which contains the patients Visual Analogue Scale (VAS), Functional Independence Measure (FIM scale), Barthel Index scores and the Range of Motion (ROM) of the hip and knee joints. Together with this we filled the Short Form (36) Health Survey (SF-36) questionnaire as well to know more about their quality of life. For the normality test we used the Kolgomorov-Smirnov test and the Shapiro-Wilk test. Besides that we used the Paired Samples T-Test, Correlation and Wilcoxon test. In every case we determined the significance value in $P \leq 0{,}05$.

**Results:** The VAS score was 7,16 points on admission and 3,5 points on discharge ($p \leq 0{,}000$), that is 3,66 points (51,11%) improvement. The FIM scale point was 117,67 on admission and 122,87 on discharge ($p \leq 0{,}000$), the improvement is 5,2 points (4,41%). The Barthel Index score average was 88,25 points on admission and 96,15 points on discharge ($p \leq 0{,}000$), this is 7,9 points (8,95%) improvement. The SF-36 questionnaire's first dimension (Physical Activity) score was 47,75 points on admission and 75,25 points on discharge ($p \leq 0{,}000$). That is 27,5 points (57,59%) improvement.

**Conclusions:** It seems that the complex therapy what we use can be effective in the treatment of hip and knee joint pain. To the efficient therapy of course essential the patients' overall cooperation. Examining the efficiency of the therapy in the case of other groups of illnesses would be worthy anyway in the future.

*Keywords: quality of life; complex therapy; limited articular range of motion; hip joint pain; knee joint pain*

## The role of hip joint abductors in stabilizing the knee joint during unilateral jumping and unilateral landing on unstable surface

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**Introduction**: In sports where unilateral jumps and arrivals occur, injuries in the knee joint are usually the most common. In previous studies, the role of knee joint extensors in jumping performance has been widely studied, however their role in knee joint stabilizing is much less unclear. Knowing the relationship between unilateral jumping ability and knee joint stabilization, we could easily predict the risk of knee injuries with simple tests.

*Objectives*: We assume that there are associations among unilateral jumping ability and knee joint stabilization. Furthermore, we assume that there is a relationship between the activity of hip joint abductors and knee joint stabilization. The purpose of our research is to perform quantitative dynamometric and electromyographic measures in order to prove our hypothesis.

**Methods**: Twenty-five healthy men participated in our examinations. First, the maximum isometric force was measured in knee extension and flexion, as well in hip joint abduction. After that, with force plate we measured the ground reaction force during the maximal unilateral jumps, from which a propulsion pulse was calculated. Then landing was performed by the subjects from a height of 30 cm to an unstable surface. In all three tests, the activity of the vastus lateralis, the vastus medialis, the biceps femoris, and the gluteus medius were measured using EMG surface electrodes. EMG values received during jumps and arrivals were normalized to the values received during force measurement.

**Results:** The order of normalized EMG activities during unilateral jumps was: GM (172%), VL (122%), VM (108%), BF (52%). The EMG activities has shown similar values during landing: (114%, 94%, 92%, 50%). The relative abduction torque has correlate with the propulsion pulse. The relative hip joint abduction torque has correlate negatively with the relative BF activity during landing.

**Conclusions:** From the high activity values of GM during jumps and landings we can conclude that the control of the knee joint is important in the frontal plane. The vertical jumping performance is influenced by the relative strength of GM. Subjects with weaker jumping ability and/or weaker hip joint abduction torque has activate BF more during landing on unstable surface. We conclude that the strengthening of GM is a suitable preventive strategy of the knee joint injuries.

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*Keywords: Knee joint injuries, gluteus medius, EMG, landing*

## Cost analysis of mechanical thrombectomy and intravenous thrombolysis for the treatment of acute ischemic stroke patients in Hungary

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**Objectives**: Intravenous thrombolysis (IVT) with alteplase and mechanical thrombectomy (MT) are expensive health technologies used in the management of acute ischaemic stroke (AIS). Although their increasing use, there is a lack of data on the actual costs. Our aim is to assess the cost of AIS cases from provider's perspective.

**Methods**: Using the Stroke Registry of University of Pécs we searched AIS patients registered between 2017 November and 2018 July whose treatment included IVT or MT or both. We retrieved data on resource utilization such as length of stay in Neurology Department (ND), and if IVT or MT were performed. Unit costs were provided by the Healthcare Financial Management Department regarding cost of one patient day, and cost of MT individually. Price of alteplase was provided by the hospital pharmacy. We assigned costs to individual patients to determine the average cost of the treatments.

**Results:** We have identified 38 AIS patients, 22 IVT, and 14 „IVT+MT" who had both interventions. Gender ratio was 47% women, 53% men, the mean age was 69,8$\pm$10,8 years. The mean cost of MT surgery was 1,33M HUF. Alteplase for AIS patients is provided by the National Health Insurance Fund of Hungary, meaning approximately 270 000 HUF cost reduction. The average cost of care was 1M HUF, 2,15M HUF, 3,16M HUF (0,73M HUF, 2,15M HUF, 2,89M HUF without alteplase) for IVT, MT and IVT+MT patient groups. The cost of IVT+MT group was higher not only due to the cost of interventions but because of the longer length of stay (LOS): 6,63; 7,95; 13,50 days for IVT, MT, IVT+MT groups.

**Conclusions:** Our results suggest that resource utilization due to increased LOS is a very important cost component even regarding highly expensive therapies like IVT and MT.

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*Keywords: stroke, health-economy, thrombectomy, thrombolysis*

# Pharmacology and Pharmaceutical Sciences

## Application of machine vision to determine the concentration of API in pharmaceutical powder blends

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**Introduction**: In the pharmaceutical industry, the changing paradigm from batch to continuous manufacturing is in the center of the attention. Currently, to ensure the production of effective and affordable pharmaceuticals, the development and the introduction of modern, innovative pharmaceutical manufacturing lines are necessary. The recently published Process Analytical Technology and Quality-by-Design approach support the shift in the direction of continuous manufacturing. In line with this shift, it has a significant impact on the development of new analytical devices and methods. The machine vision systems can provide revolutionary solutions in the development of recently applied or new analytical systems.

**Aim of the work**: My work aims to develop a new, non-invasive, in-line, real-time machine vision system, which can determine the concentration of the colored API in pharmaceutical powder blends and is appliable in continuous manufacturing lines.

**Materials and methods**: My work is based on binary model powder blends, which contained the colored material (ground curcuma) and white excipient (microcrystalline cellulose). The image acquisition parameters were optimized and the correlation between the information in the pixels of the acquired images and the colored API concentration were established. To conclude my work, the developed machine vision system was implemented in an industrial model environment to monitor an impulse stimulus experiment. This measurement set consists of two feeders (one for the colored material and one for the excipient) which feed a twin-screw homogenizer. The powder blend was measured with a camera installed above a conveyor belt. Samples were taken from the powder blend throughout the experiment for the validation procedure with UV-VIS spectroscopy.

**Results:** The image processing algorithms used in my work became complex, ranging from the average of the RGB values of the images to the histogram of the RGB component that represents the sample. Powder blends were used with known concentrations to take images of and to make a calibration curve with PLS method. After that, the impulse stimulus experiment was executed using 1g ground curcuma as an impulse. At the end of my work, the developed system became capable of determining the concentration of colored active substance throughout the impulse stimulus experiment and the results were successfully validated by UV-VIS spectroscopy.

**Conclusions:** This developed in-line, non-invasive system can provide a new, simpler, cheaper alternative to the current analytical techniques in this field. It can support the quality assessment at continuous manufacturing lines individually or complement spectroscopic methods.

*Keywords: Machine vision, continuous manufacturing, Process Analytical Technology, powder blend, image acquisition, image processing, concentration monitoring*

## Formulation and investigation of amphiphilic graft co-polymer based polymeric micelles

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**Introduction**: Polymeric micelles present a promising tool to increase bioavailability, solubility and the toxicological profile of the encapsulated drug. [1] The optimal particle size is around 80 nm, which is optimal for passing the physiological barriers. We used an amphiphilic graft co-polymer, which offers the possibility of a good solubility enhancement in combination with a fast dissolution to drug loaded polymeric micelles.

**Aim**: Our project's aim is to formulate polymeric micelles with a model nonsteroidal anti-inflammatory drug to the extensive therapeutic use and numerous indications.

**Materials and method**: Soluplus® (BASF GmbH, Germany) is polymerized from polyethylene glycol 6000, vinyl caprolactam and vinyl acetate in a ratio of 13:57:30. We used Meloxicam, a BCS II class drug, therefore can be characterized as a poorly water soluble agent, as the active pharmaceutical ingredient and ethanol, acetone as solvents. The model drug was dissolved in the organic solvents under constant stirring and 1M NaOH solution was used to set the pH. To form the polymeric micelle Soluplus® was added to the solution [2]. The organic solvent was evaporated with rotational vacuum evaporation. The particle size and zeta potential was measured using Malvern nanoZS instrument (Malvern, Wercestershire, UK). We used XRPD, DSC and spectroscopic methods for our material structure investigations. Absorption spectroscopy methods were used to study the *in vitro* dissolution tendencies. The encapsulation efficiency was measured and calculated with HPLC.

**Results:** The precipitated polymeric micelles were easily dissolved in water unlike the original material. The particle size and distribution were decent. The material structure investigations showed us that a new material was formed which differs from both the polymer and the model drug. UV spectroscopic studies showed fast drug release of the formulation. The encapsulation efficiency is very pleasing, a great proportion of the model drug was encapsulated.

**Conclusions:** We conclude that Soluplus® is a good excipient for the preparation of polymeric micelles. Formulation the polymeric micelles can improve the solubility of poorly soluble agents, which can be useful for developing „value added" preparations.

*Acknowledgements:* Supported by the ÚNKP-19-I. New National Excellence Program of the Ministry for Innovation and Technology.

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*Keywords: polymeric micelle, nanotechnology, pharmaceutical technology*

## QbD-based formulation of resveratrol-enclosing intranasal liposomes

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**Introduction**: Resveratrol is a type of polyphenol which is under investigations for the prevention and the treatment of Central Nervous System (CNS) diseases due to its antioxidant property [1]. Studies showed that liposomal resveratrol has a stronger protective effect on the dopaminergic cells of the Striatum nigra in parkinsonian rats than the free drug [2], moreover, other rat models proved that the neuroprotective effect of the resveratrol-containing nanodelivery systems can improve the memory impairment in Alzheimer's disease [3]. The compound has low oral bioavailability due to its poor water solubility, thus the use of liposomes to enhance the absorption, delay the drug release and reach better stability is advisable [2]. Nasal administration, as an alternate 'nose-to-brain' route, means a way to reach the brain without the limitations of the blood-brain barrier [4].
The application of a new quality management procedure, the Quality by Design (QbD) method in pharmaceutical developments becomes more and more frequent since the beginning of the 2000s. Our research project aims to develop a liposomal resveratrol-containing formulation with brain target and nasal administration. This study presents how to apply this risk-focused QbD approach in the development process.

**Materials and Methods**: Applying the QbD-based approach, the quality target product profile was defined, the critical factors were selected and a risk assessment (RA) was performed. A factorial design was made for the liposome preparation (lipid-film hydration method) based on the results of the RA. Instrumental investigations were conducted to check the process.

**Results:** The factorial design-based liposome preparation focused on the most critical parameters that led to not only a lower number of investigations but even a higher chance for successful sample preparation.

**Conclusions:** The results proved that using the QbD approach in a liposomal development can improve the formulation process via the optimization and the rationalization of the required experiments and measurements.

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*Keywords: Quality by Design, risk-based formulation, risk assessment, resveratrol-containing liposome, nasal administration*

## Multi-drug co-crystal polymorph control by solvent parameters

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**Introduction**: Multi-drug co-crystals represent a convenient approach for disease treated by a combination of active pharmaceutical ingredients (APIs) [1]. Despite polymorphism of crystalline APIs being a common phenomenon, the number of reported polymorphic co-crystals is limited [2]. Controlling the generated form is crucial as polymorphism can vastly affect API properties. The control of the polymorph nucleation in different solvents has been used vastly [3]. Solvents with different solubility parameters interact differently with the APIs therefore affecting co-crystallization [4]. Two polymorphic forms of 4-aminosalicylic acid-sulfamethazine co-crystals have been reported with different thermodynamic stabilities [5]. However, an attempt to control co-crystal polymorph generation using preparation parameter manipulation has never been reported for pharmaceutical co-crystals.

**Aim**: Establish the effect of different solvent parameters on co-crystal polymorphic forms.

**Methods**: Co-crystals were prepared by fast solvent evaporation in one of eight solvents. Solutions were evapoetated by a rotatory evaporator at 23°C. Co-crystals were characterized by powder X-ray diffraction (PXRD). The Hansen solubility parameters (HSPs) of solvents and APIs were calculated using the Hansen Solubility Parameters in Practice software. Differences in solubility parameter were calculated using the modified radius method [4].

**Results:** The PXRD patterns of the co-crystals were found to be either of the two previously reported forms [5]. The HSPs of the solvents and APIs, together with the property parameters of the organic solvents, show that higher hydrogen bond acceptance ability value ($\beta$) of solvents and lower polarity favoured the formation of form I, while solvents with lower values of $\beta$ generated predominantly form II.

**Conclusions:** The initial results suggest that solvents play a significant role in co-crystal polymorph generation and can therefore be explored in polymorph control. Hydrogen bond acceptance ability seemed to influence polymorph generation. HSPs may be utilized to control the co-crystal forms. Further studies are needed to assess the effect and extent of the different solvent parameters on polymorph in association with thermodynamic parameters of the forms.

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*Keywords: Co-crystals, polymorph, solubility parameter, 4-aminosalicylic acid, sulfamethazine*

## Evaluation of the effect of using autoclave on the rate of change of color indices of dental color guide

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**Introduction**: Gradual discoloration of the tooth color guide due to the use of autoclave is one of the clinical problems for correct shade matching for restorations [1]. Evaluation of the effect of autoclave on dental shade tab was completed in 2019 in the Prosthodontics section of Faculty of Dentistry of the IRAN University, Tehran [2].

**Aim**: The purpose of the research was examine the effect of autoclave on dental color shade tabs.

**Methods**: This experimental in-vitro study was performed on 20 specimens of dental shade guide or shade tabs. Standard tooth color guide (A3) Vita was specified and prepared .The standard primary color, which was manufactured by spectrophotometer CS2000 Minolta at the Japan Color Research Institute, determined and recorded on Form 1. Subsequently , they were divided into two color guide groups by accident. First, all samples were rinsed in distilled water before placement in Autoclave for 3 minutes and dried with a paper towel. The first group is at 121 °C for 40 minutes and the second group was kept at 134 °C for 10 minutes. These samples were placed in an autoclave 180 times and 3 times daily, 5 days a week. These samples were placed in the Autoclave VOSO Class B. The samples were washed with distilled water for three minutes and dried with a napkin before each sterilization. After this, the samples were immediately sterilized again by Autoclave. At each stage, the color indicators (abl) and their color change index ($\Delta$E) were determined by Spectrophotometer. Statistical analysis was performed by SPSS software, using Mann-Whitney test.

**Results:** Mean value of $\Delta$E in the group with a temperature of 121 °C was $3.79 \pm 0.63$ and in the group with a temperature of 134 °C was $3.55 \pm 1.04$, which are not significant, according to the statistical test ($P < 3.0$) . No significant differance was observed for the other measured indicators L, a, b, c and H between the two groups.

**Conclusions:** In this study, it was observed that the process of sterilization by Autoclave can change the color properties of the color selection kits.

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*Keywords: Color guide, Autoclave, Temperature, Color change, Spectrophotometer* phantomsection

# Psychiatry and Mental Health

## Elevated osteopontin and IFNy serum levels and increased neutrophil-to-lymphocyte ratio are associated with the severity of symptoms in schizophrenia

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Inflammation and immune dysregulation could contribute to the pathogenesis of schizophrenia [1]. Osteopontin (OPN) is a key cytokine-like molecule in cellular immune response and it can directly modulate the cytokine expression and survival of microglia. Furthermore, its mRNA expression is elevated in first episode psychosis. [2, 3] We were, to our best knowledge, the first to measure the serum concentration of OPN in schizophrenia patients. Imbalance of T-helper subtypes could also represent a vulnerability factor for schizophrenia [4]. In this study, we analyzed the concentration of OPN, levels of cytokines associated with T-helper subtypes: IFNy for Th1, IL-10 for Th2, IL-8 for Th17, and neutrophil-to-lymphocyte ratio (NLR) in 22 patients with schizophrenia assessed for the intensity of their symptoms by PANSS and CGI scores. Serum OPN, IFNy, IL-10, and IL-8 concentrations were measured by ELISA kits and NLR was calculated from blood count.

**Results:** We found significant correlation between the level of OPN and PANSS-total and PANSS-general scores. IFNy level and NLR showed significant correlation with PANSS-total, PANSS-positive, PANSSgeneral and CGI score. Among the measured markers antipsychotic therapy only had significant effects on NLR and OPN level, both of which were significantly reduced after long-term antipsychotic treatment.

**Conclusions:** Our results indicate that elevated OPN and IFNy concentrations, and increased NLR are associated with severe symptoms in schizophrenia and suggest the importance of Th1 subtype in patients with high PANSS-positive and PANSS-general subscore. Antipsychotic treatment had significant effects on the level of OPN and NLR but not on the level of IFNy. Overall our results strengthen the inflammation hypothesis of schizophrenia.

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*Keywords: osteopontin, cytokines, schizophrenia, PANSS, inflammation, antipsychotics*

## The impact of the childhood environment unpredictability on adult pain perception

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Previous studies suggested that unpredictability of the childhood environment might strongly influence beliefs and behaviour characterizing later the adult individuals. Specifically, when children face unpredictable, uncontrollable and stressful experiences, they develop an unpredictability schema, in which other people, the future, and overall the world is unreliable and chaotic. This unpredictability schema has been found to affect adult health outcomes, risk-assessment, self-regulation, as well as perception and processing of internal and external cues. No studies have, however, addressed the impact of unpredictability schema on pain perception.

**Hypothesis**: Since negative life-attitudes generally have an impact on pain perception and pain behaviour, we assumed that such an unpredictability schema can also intensify individuals' reaction on and attitude toward pain. We predicted that this schema primarily affects pain perception through heightened external focus and lowered body awareness.

**Results:** In a survey study, we examined the pain perception of young adults (N = 252) in association with their childhood environmental unpredictability. The validity of our hypothesis was tested with structural equation model. Our results suggest that the unpredictability schema, through body awareness, has an impact on pain catastrophizing and pain sensitivity. That is, people with more highly developed unpredictability schema reported higher subjective pain ratings.

**Conclusions:** In unreliable environments, it might be an adaptive strategy to assess a schema that facilitates enhanced and permanent behavioral preparation for potential dangers and damages, but it can lead to undesirable health outcomes.

*Keywords: pain perception, childhood environment, early life experiences, unpredictability schema*

## Following sojourners' changes in culture shock - mental health aspects of Erasmus students

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Based on the fact that work and study related migration in the European Union has become increasingly important, I considered it momentous to examine the Y generation's mental health during Erasmus program, the culture shock [1] they experienced, their integration experiences, and the psychological processes that take place at various stages of integration and reintegration. The term sojourner refers to those individuals who cross the borders in order to attain a specific goal during a determined period of time [2]. In the present study I was following intercultural exchange students (Erasmus students who are one type of sojourners as they spend 6 months in other countries) from 9 different countries worldwide, over a period of 6 months: before, during and after their Erasmus scholarship. Sample was chosen from the Erasmus class of University of Novi Sad 2017 with convenience sampling, it consists of 20 students. Study method consisted of 4 structured interviews in the four stages of the travel in a longitudinal follow up study design. Interview questions were formulated for this specific study based on recent literature of stage theories [3]. Questions aim to explore the four phases (observation phase, the culture shock phase, the adaptation phase, and the reverse culture shock) of the culture shock and asses attitudes towards migration and integration.

**Results:** 15 of 20 students reported the symptoms of culture shock included cognitive, emotional and physiological reactions. They announced financial stress, misunderstandings, loneliness and separation reactions. The integration into a new culture was successful for all interviewees, but there was a discrepancy in how much time they needed to adapt. After 3 months in the new culture they became emotionally independent, self-supporting and productive. In the reverse culture shock most students reported attitude change as well as confusion and sadness. Qualitative analysis of the interviews proved the W-curve hypothesis theory [4].

**Conclusions:** Overall, the results showed that the stages of culture shocks are the same in 5-6 months as the previous studies have demonstrated over a longer period of time. Majority of students showed signs of culture shock proven by previous research. There were some students who returned relatively quickly to their original culture, but there were also those who declared that they were struggling with all their power to refrain from adapting back. The reverse culture shock was more intense than expected and it deserves more attention from research as well as from mental health support programs. Further studies might be needed to investigate which factors can support integration and reintegration.

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*Keywords: culture shock, stage theory, reverse culture shock, sojourner, attitude*

## The role of social support in adolescent mental health

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**Introduction**: Social support is one of the important protective factors for adolescent mental health [1]. Social support is a help or assistance that a person gets when he/she needs help from social network, and this assistance is provided by various parties such as family, friends, colleagues and teachers [2].

**Aim**: The purpose of this cross-sectional pilot study was to investigate how social support (support from family, friends and significant others) may be related to mental health in a sample of Jordanian students.

**Methods**: Data were collected from public and private schools in Irbid governorate located in the north of Jordan. Multistage cluster sampling technique was used. Data were collected by a self-administered, online questionnaire which was given to 112 students (14-18 years old). The socio-demographic data form, Multidimensional Scale of Perceived Social Support, Diener's Satisfaction with Life Scale, Rosenberg's Self-Esteem Scale and the Center for Epidemiological Studies Depression Scale for Children (CES-DC).

**Results:** The results indicated that depression was related to lower level of life satisfaction ($r = -.33$, $p = .000$). Satisfaction with life was positively associated with all types social support; the strongest correlation was found with family support ($r = .67$, $p = .000$). A positive correlation was also found between family support and self-esteem ($r = .19$, $p = .045$). Depression, on the other hand, was negatively correlated with family support ($r = -.42$, $p = .000$) and support from significant others ($r = -.21$, $p = .026$). The study also indicated that adolescents rely more on support from their families as compared to their friends, and the protective role of social support is much more relevant for boys than girls.

**Conclusions:** These findings have justified the role of effective social support from the parents and other family members which can provide a peaceful and safe environment for children. Encouraging the concept of peer friendship with building it on love, respect and cooperation may also serve as protection to improved mental health and reduced mental disorders among adolescents.

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*Keywords: Social support, Depression, Satisfaction With Life, Self-Esteem, Mental health, School students, Jordan*

## Burnout syndrome and depressive symptoms in nurses

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Burnout syndrome is a physical, emotional and mental state of extreme exhaustion, a result of excessive accumulation in work situations that are emotionally demanding and/or stressful, demanding a lot of competitiveness or responsibility, especially in the health area. The main cause of the disease is overwork [1]. Depression is defined as a state of psychological distress that has consequences on interpersonal relationships [2]. And these two diseases are increasingly being reported in nurses. The objective was to analyze the relationship between burnout and depression among nurses.

**Results:** All articles found in the literature brought a significant association between Burnout and depression/depressive symptoms. Two articles showed that all dimensions of the syndrome were significantly correlated with depression, the others articles presented moderate/high levels of burnout in nurses, with the Emotional Exhaustion dimension of burnout were associated with greater depression. The Emotional Exhaustion dimension was associated with neuroticism, extraversion, responsibility, agreeableness and conscientiousness, and also with the low quality of life.

**Conclusions:** Nurses with burnout have a greater chance of triggering depressive symptoms, due to exposure to high levels of psychological and physical job demands (Aiken et al., 2013). May these results further broaden the understanding of the relationships between burnout and depression, demonstrating that those illnesses potentially impacting nurse's quality of life.

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*Keywords: Occupational exhaustion, nurse, depressive symptomatology*

# Poster session I.

## Prognostic value of CK-18 and ccCK-18 cell death markers in cardiac arrest survivors

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Ischemia-reperfusion injury during and after resuscitation from cardiac arrest results in increased systemic cell death. Cytokeratin-18 (CK-18) is released into the blood during cell death, its caspase cleaved form (ccCK-18) is specific to apoptosis. This study evaluates their prognostic value for mortality, neurological outcome and their association with conventionally used clinical parameters after successful cardiopulmonary resuscitation (CPR).

**Methods**: Plasma samples of 40 resuscitated patients were collected 6, 24, and 72 hours after successful CPR to determine the CK-18, ccCK-18 concentrations by ELISA. The circumstances of the cardiac arrest and CPR, laboratory and physical parameters were recorded. Mortality within 30 days was considered end-point.

**Results:** The 6-hour troponin-T, GOT, GPT, INR, lactate levels and WBC count were significantly elevated among the 26 non-survivors. Significant negative correlations were found between the survived days and 6-hour GOT, GPT, troponin-T, INR values (r=-0.551, -0.443; -0.446; -0.462; $p<0.05$). Resuscitated patients had highly elevated CK-18, ccCK-18 levels and decreased ccCK-18/CK-18 ratio compared to healthy subjects, septic and postoperative patients (CK-18: 3842 vs. 242; 559; 1644 ng/L; ccCK-18/CK-18 ratio: 0.14 vs. 0.58; 0.22; 0.24) [1]. Neither the values of CK-18 and ccCK-18 nor their kinetics showed difference between survivors and non-survivors and they did not show association with the length of the resuscitation, the initial rhythm, the neurological outcome or the number of the damaged organ systems either. CK-18 showed a declining kinetics in patients with good renal function in contrast to patients with renal failure. Significant negative correlation was observed between the 6-hour CK-18 and hemoglobin concentrations (r=-0.400, $p<0.01$).

**Conclusions:** This study was the first to investigate CK-18 and ccCK-18 levels among resuscitated patients. Surprisingly, the marker levels did not have prognostic value for mortality or neurological outcome in a general resuscitated population. The increased levels of troponin-T, GOT, GPT, INR and WBC count in non-survivors indicate severe organ damage as expected.

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*Keywords: cardiopulmonary resuscitation, cytokeratin, apoptosis, necrosis*

## Evaluation and validation of gas chromatographic columns for the analysis of the fatty acid methyl esters

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**Introduction**: Fatty acids (FAs) and their associated derivatives are the main constituents of lipids, having biological, structural and functional roles in living organisms. Investigation of FAs is becoming of growing interest thanks to their high relevance for human nutrition and health.

**Aim**: The present study investigates the elution behaviour of Fatty Acid Methyl Ester (FAME) standard mixtures including compounds from C4 to C24 with high structural diversity on three commercial capillary columns of different polarity, the non-polar HP5-MS, the mid/high polarity DB225-MS and the extremely polar SLB-IL111 using Gas Chromatography-Mass Spectrometry (GC-MS). The proposed method was evaluated to 56 fatty acid components on the three columns. In this regard, sensitivity, precision, accuracy, system suitability, repeatability, limit of detection (LOD) and limit of quantification (LOQ) were determined.

**Results:** For the separation of cis and trans FAME isomers, the column with the ionic liquid phase proved to be preferred. In case of SLB-IL111 column the RSD values of the intraday repeatability were between 0.64% and 8.04%, while the RSD of the interday repeatability were between 1.22% and 4.15%, and the LOD values were between 0.02 and 0.18 $\mu$g mL-1 for the substances. The results of the validation correspond to the general criteria

**Conclusions:** Results indicate that the non-polar and medium/high polarity, polysiloxane-based columns are suitable for the separation of saturated and 10 monounsaturated fatty acid groups, and the IL-based, extremely polar column is appropriate for the separation of diverse structured fatty acids in the complex samples, that cannot be completely resolved with the two other columns, during 40 min.

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*Keywords: Fatty acid analysis, cis-trans isomer spearation, Gas chromatography, Mass spectrometry*

## In vivo diffusion tensor imaging of the brains of stressed rats

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**Aim**: Stress is the most important triggering factor for the development of various psychiatric disorders, but the underlying neurobiological events are not completely understood. Stress exposure can affect neuroplasticity and structural integrity of limbic brain areas. Here, we used diffusion tensor imaging (DTI) to study the temporal dynamics of stress induced structural changes in the brains of laboratory rats.

**Method**: Young adult male Sprague-Dawley rats (control group: 16 animals, stress group: 16 animals) were subjected to restrain stress (6 hours/day) for 21 days. DTI were acquired with a 4.7T Bruker PharmaScan pre-clinical MR scanner. Baseline measurements were performed before stress and the protocol was repeated three times: one week (acute stress), three weeks (chronic stress) after stress initiation and two weeks after the end of the stress (recovery). A pre- and post-processing pipeline was built up by using FMRIB Software Library. Repeated-measures ANOVA was used to assess within-subject differences.

**Results:** Diffusion data were corrected for eddy currents and subject movements by the detection and the replacement of positive and negative outliers and then fractional anisotropy (FA), mean diffusivity (MD), eigenvalues ($L_{1,2,3}$) and eigenvectors ($V_{1,2,3}$) were calculated. After Bonferroni adjustment significant within-subject differences were found in FA and MD in the corpus callosum, external capsule and inferior colliculus of control rats, while no differences were observed in stressed rats.

**Conclusions:** After the development of a modern image processing pipeline, stress appears to have negative impact on the development of rat brain.

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*Keywords: stress, rat MRI, diffusion tensor imaging (DTI), data processing*

## Analsyis of waiting list cases according to the type of the treatment in Hungary between 2015-2018

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The subject of waiting lists has a significant interest throughout the world. In prevous years, data related to the Hungarian waiting lists were not so remarkable in light of the prolonged waiting times, and numerous waiting cases. In 2015, the National Health Insurance Fund Administration of Hungary established a waiting list reduction programme with an aim to significantly shorten waiting cases and waiting times (these cases were counted in financing code 'X'). The goal of the study is to analyse the cases which were releted to the Hungarian waiting lists financed with „X" financing code according to type of the treatment, the type of health care institutions, medical fields and related DRGs as well. The analysed period lasted from 2015 to 2018.

**Results:** During the analysed period 24.771 cases were counted by the National Health Insurance Fund of Hungary with „X" financing code. Most of these cases performed in inpatient treatment (market share = 58%, number of cases = 14.356), altough the number of cases in one-day surgery was considerable too (number of cases = 10.415). Most of the cases were treated in county hospitals (market share = 33%, number of cases = 8.230). One-day surgery cases were remarkable in 02P DRG main group (so-called: eye diseases) (market share = 94%) as well, while most of the inpatient cases linked to the 08P DRG main group (so-called: diseases of muskuloskeletal disorders) (market share = 64%, number of cases = 8.874). According to the medical fields, 45% of the financed cases took place in the field of opthalmology (number of cases = 11.255), but the cases related to orthopaedic field had a considerable number as well ( number of cases = 8.709). The sum of these case numbers exceeded more than 80% of total financed cases (market share = 81%).

**Conclusions:** The market share of one-day surgery was less than the market share of inpatient treatment. Most of the cases linked to the one-day surgery treated in 02P DRG main group while the most inpatient cases took place withhin the 08P DRG maing group.

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*Keywords: health insurance, waiting list, one-day surgery*

## Regional distribution of cases in waiting list reduction programme in Hungary between 2015-2018

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The subject of waiting lists have a significant interest throughout the world. In prevous years the Hungarian health care- and waiting list system were criticized by the public, but the National Health Insurance Fund Administration established a waiting list reduction programme in 2015 with the aim to significantly shorten waiting list cases and waiting times. The goal of the study is to analyse the regional distribution of cases within the waiting list reduction proccess (counted in „X" financing code) based on the counties between 2015-2018. Further aim of the research is to identify the pathways of patients who were in the above- mentioned programme.

**Results:** During the analysed period 24.764 cases were counted in Hungary, most of these individuals have been living in Baranya county (market share = 13,3%). 77% of the cases were hospitalized within the same county as the patients' residence county (number of cases = 19.064). In this regard the highest rate was in Baranya county (97%), while Pest county had the lowest rate (3%). Those cases which were treated outside of the patients's county of residence (number of cases = 5.700), 52% were performed by Budapest's hospitals (number of cases = 2.992). We could identify, that those cases which were treated outside of the county of residence, patients traveled 130 km (SD= 42,93 km) on average to the place of treatment. The lowest distance patients had to travel was from Komárom-Esztergom county (65 km), and the highest distance could be assigned to the patients of Békés county (214 km).

**Conclusions:** The regional distribution of waiting list cases were diversified. Most of the cases were treated within the same county as of the residence, altough patients from Pest county had a very small rate in this regard. Those cases which were treated outside of the county of residence, are usually hospitalized at Budapest.

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*Keywords: waiting lists, health insurance, X financing code*

## Invention of a complex rehabilitation method and examination of its effectiveness in COPD patients

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The number of patients suffering from COPD is steadily increasing all over the world. The disease affects an estimated 600 million people globally. Every year more than three million people die of lung diseases. This is more than the number of those dying of breast cancer and the consequences of diabetes combined. By the year 2030, according to estimations, it will become the third most frequent death cause after heart diseases and stroke.

In Hungary, the estimated number of patients is between 600 and 700 thousand, still only a little less than 40% of the COPD patients receive adequate modern treatment. The group at the highest risk includes smokers of over 40 years of age. Early diagnosis and adequate medical treatment may significantly increase patients' life expectancy. Adequate care includes medical treatment on the one hand and appropriate procedures of rehabilitation on the other. Complex rehabilitation is achieved by personalised respiratory physiotherapy, breathing exercises, conditional physiotherapy, dietary and life quality counselling and also disease related patient education. To cope with the pathological metabolic processes occurring in the respiratory and peripheral muscles and to cure myopathy personalised treatment can be offered by physiotherapists. The programs applied need to include training in loading and also controlled respiratory and sputum mobilising techniques. In addition to this, one of the leading activities is breaking the habit of smoking, nevertheless, dietotherapy and psychosocial support are also indispensable part of the program.

Bioimpedance measurement procedure is an especially usable method for everyday body composition measurements, as it is secure, cost effective, portable, quick and easy to use and to reproduce. Bioimpedance measurement is an indirect method which utilises the electric tissue characteristics for determining body composition. Our research team has developed such a new body composition measuring procedure which is capable to test and determine body fat, and which differs from the currently used technique applied under clinical conditions for several years. The multifrequency bioimpedance spectrum measuring instrument designed by us (range of measurement: 0,001 Hz-100 kHz) is an instrument specifically developed for determining body fat. As opposed to the instruments available in the international markets, they are capable of performing high precision measurements at low frequencies ($10^6$accuracy) which, in addition to body fat determination provides reliable results about water compartments. The portability of the instrument and the parameters of the evaluating software developed together with the measuring instrument provides for it a significant advantage over competitors in the market. Another important but in other measuring instruments unsolved feature of it is that it can be made capable to measure any body region desired. Using the information originating from the complex rehabilitation program to solve a given task we think that we have become capable of solving the task detailed above, especially in cases where pre- and post-training measurements are required by the protocol.

## Nanotube formation between the immune cells in hetero-culture condition

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**Introduction**: Membrane nanotubes (NTs) are long, non-adherent actin-based cytoplasmic extensions facilitate the intercellular transfer of different materials between the connected cells located in a fair distance of each other [1]. This mechanism of transport can involve nutrients, signaling molecules, RNAs and proteins, ions, autophagosomes, pro- and anti-apoptotic factors, membrane components and even cellular organelles in a uni- or bidirectional manner [2]. Membrane nanotubes could be abused by different pathogens as a route for spreading among their host cells. In this case, the pathogens use the nanotube as a physical route to translocate from one side (the infected cell) to the cell (most likely normal target cell) on the other side of the tube [3].

**Aim**: In our study, we focus on the formation of nanotubes between particular immune cell types (IP12-7 T cells and 2PK3 B cells) in both hetero (cells of different types) and homo-culture conditions.

**Methods**: Following the labeling of IP12-7 murine hybridoma T cells with 1,1'-Dioctadecyl-3,3,3',3'-Tetramethylindocarbocyanine Perchlorate (DiI) dye, and 2PK3 murine lymphoma B cells with Alexa488-Cholera Toxin-B, both cell types were co-incubated in fibronectin pre-coated petri dish for approximately 3 hours. The cells then visualized with Zeiss LSM 710 confocal laser scanning microscope at 63x magnification under live condition (37°C, 5% CO2) in order to investigate the formation rate of the nanotubes in between.

**Results and discussion**: Analyzing the images revealed that cells form hetero-NTs with a higher rate than homo-NTs. B cells showed more capability of forming NTs than T cells referring to their nature as potent APCs. Nanotubes showed a homogeneous pattern in thickness but a great diversity was presented in case of their length and thus, the length depends highly on the position of the cells in regard to each other.

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*Keywords: Membrane nanotubes, tunneling nanotubes, nanotubes, immune cells, B cells, T cells, cell communication*

## Nurses' Awareness of Infection Control in Lebanon: A Cross Sectional Survey

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**Introduction**: Healthcare Associated Infections (HAI) are serious problems in healthcare sector that threatened patient safety since decades till present [1]. Infection Control (IC) practices have been successful in reducing the transmission of HAI in different settings [2]. Several studies have shown that in addition to education to improve practices, continuous assessment of staff knowledge is needed to identify education needs [3].

**Aim**: The aim of this study was to assess the level of nurses' awareness with IC measures in Lebanon.

**Methods**: A cross-sectional survey was conducted in May and June 2016. A self-administered questionnaire was distributed to 260 nurses at four hospitals in Lebanon.

**Results:** The response rate in filling the questionnaire was 83.46 % (217 nurse). 81.57 % of the Lebanese nurses had a high awareness level of IC, with having the highest percent of awareness in handling infected linen (97.2 %), and the lowest in blood borne diseases (13.8 %). 99.1 % of the nurses attended trainings on IC at their current hospital. When comparing nurses' awareness level across job titles, head nurses had the highest awareness level followed by registered nurses, then practical nurses, (96 %, 84.7 % and 68.1 % respectively, $p = 0.004$). As for the effect of nurses' educational level, the highest awareness level was among nurses with master's degree and the lowest was among nurses with TS or lower degree (94.1 % and 66.7 % respectively, $p = 0.001$). When compared across hospital units, nurses in the hematology-oncology had the highest percent of awareness level while those in surgery had the lowest percent (97.2 % and 68.4 % respectively, $p = 0.018$).

**Conclusions:** The study showed that 81.57 % of nurses in Lebanon were highly aware of IC measures, and highlighted the topics where deficiencies were found. The major recommendation was for Lebanese hospitals to put more efforts on their training programs by improving the quality of trainings and putting emphasis on the practical part.

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*Keywords: Nurses, infection control, awareness, knowledge, Lebanon.*

## How Does Medication Charasterstics Affect Doctors Loyalty in Palestine?

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**Introduction**: World Health Organization (WHO) defines the promotion of medications as, „all informational and persuasive activities by manufacturers and distributors, the effect of which is to induce the prescription, supply, purchase and use of medicinal drugs" [1]. Doctors underestimate the extent to which their prescribing decisions are affected by the promotion of pharmaceuticals [2]. While most studies refer that doctors prescribtion frequency is impacted by medication price and quality, few studies illustrates the effect of these factors on the doctors long term loyalty [3].

**Aim**: Investigating the effect of medication's quality and price on the doctor's loyalty in Palestine.

**Methods**: A cross-sectional descriptive study was conducted in December 2014. A questionnaire was distributed to a convenient sample of the top 100 doctor in Palestine. The effect of drug quality (both efficacy and fast onset of action) and the effect of price on doctor's loyalty has been assessed. Doctors loyalty was measured through three perspectives: Doctors satisfaction, prescribing frequency, recommendation to other colleagues to prescribe.

**Results:** The response rate was 100% ; all questionnaires were returned. Regarding the quality: 95% of Palestinian doctors mentioned that their prescribing frequency is either always or usually affected by quality, 97% of doctor's felt satisfied toward high quality medications, moreover all doctors said they would like to recommend high quality medications to their colleagues. Regarding price: 66% of doctors prescribing frequency is affected by the lowest price, 62% of doctors were feeling satisfied to prescribe the medication of the lowest price, 43% of doctors referred that they will recommend the least price medication for their colleagues to prescribe.

**Conclusions:** Both medication's quality and low price have good influence on Palestinian doctors' Loyalty. Palestinian pharmaceutical companies should emphasize on these two factors when they develop strategic plans or allocate resources.

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*Keywords: doctors, loyalty, prescription, medication, drug, quality, price*

## Online assessment of English for Specific Purposes

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**Introduction**: The poster is about a preliminary study on the online assessment of English for specific purposes (ESP). The focus is on *online approach* as a potential future form of language testing.

**Goal**: The main target of the study is to uncover the intriguing question of validity of online assessments. A positive outcome of the study would indicate an optimistic and bright future in a number of aspects for not only language assessors but for future candidates of online exams as well.
Beside the primary goal of the study, other issues of online assessment will be taken into consideration to gain a complete picture of LSP testing. These areas include ability, context, discourse, competence, tasks, test developing, technology and other potential, yet ill-defined targets.

**Methods**: The main question how can we measure or indicate whether a computer-assisted assessment can truly be as valid as the traditional version. Or is the traditional 100 % valid? In order to find out, first aof all, sapmle tests will be carried out in both ways.

**Results:** Throughout the entirety of this research, my primary goal is to identify such perspectives of online testing. I want to achieve results which can be an aid for actively assessing teachers and also for students desiring to improve their LSP skills.

**Conclusions:** In this context, the presentation focuses on the possible exploratory questions, techniques and approaches of the issue of online assessment which can be widely used.

*Keywords: assessment, online, English for Spesific Purposes, validity, online assessment*

## Flow cytometric analysis of tonsillar B cells activated via CD180

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**Introduction**: In systemic sclerosis the ratio of memory B cells is shifted towards isotype-switched (S) cells [1]. Non-switched memory (NS) B cells in human blood resemble B1 B cells possessing innate-like features [2]. CD180 molecule is a TLR homologue and anti-CD180 stimulation extensively activates human B cells in vitro [3] and we have already shown that CD180 expression is decreased in SSc B cells. Additionally, complementing anti-CD180 stimulation with CpG resulted in enhanced proliferation of peripheral blood B cells [4].

**Aim**: We aimed to model the activation of B cells via CD180 in tonsillar B cells to investigate its effect on memory subsets and B1 B cells. We also assessed whether addition of CpG influenced the effects of anti-CD180 stimulation.

**Methods**: Tonsillar B cells purified using Ficoll gradient centrifugation and magnetic bead-based negative selection were activated by anti-human CD180 mAb and with the combination of anti-CD180 and CpG. NS and S B-cell subsets were defined by CD27 and IgD staining, while CD27 and CD43 were used to identify B1 B cells by multiparametric flow cytometry. Activation of the subsets was assessed by the percentage of CD69 positive cells.

**Results:** We found significantly elevated percentage of CD69+ cells in all investigated B-cell subsets upon anti-CD180 ligation, and costimulation with anti-CD180 and CpG. The frequency of CD69+ cells was the highest in the NS subsets following both treatments, and CpG did not augment the effect of anti-CD180. Percentage of CD180+ cells was elevated in the NS subset and the anti-CD180 ligation appeared to elicit stronger effect on NS cells compared to S and B1 B cells.

**Conclusions:** Analysis of B-cell activation via CD180 could help to delineate the role of innate immune signals in NS B cell activation, which may contribute to the better understanding of the pathogenesis of systemic sclerosis.

*Acknowledgements:* Supported by PEPSYS GINOP-232-15-2016-00050.

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*Keywords: B cells, CD180, Non-switched memory B cells*

## The centrally projecting Edinger-Westphal nucleus in the rotenone model of Parkinson's disease

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**Introduction**: The neuropathological diagnosis of Parkinson's disease (PD) is based on cell loss in the dopaminergic substantia nigra (SN) and the presence of Lewy bodies. Anxiety and depression are commonly occurring non-motor symptoms preceding the occurrence of the motor deficit. [1] Morphological changes were found in numerous other nuclei of the brainstem including the Edinger-Westphal nucleus (EW). In this nucleus, the centrally projecting cells (cpEW) expresses urocortin1 (Ucn1) that contributes to stress response and emotional reactions [2].

**Aims**: Our aim was to show the involvement of cpEW-Ucn1 in PD-associated mood disorders using the rotenone model of PD in the rat. We hypothesized that besides the well-known neurodegenerative alterations in the SN, morphological changes in the urocortinergic cpEW will occur, that contributes to depressed mood and increased anxiety.

**Methods**: To induce PD, Wistar rats received subcutaneous rotenone injections for 5 weeks vs. solvent treated controls. Open field (OFT) and sucrose preference tests (SPT) were conducted. Morphological changes were assessed by multiple label immunofluorescence.

**Results:** Rotenone treated rats showed increased anhedonia level in SPT. In OFT, increased anxiety was found, besides motor dysfunction. The model's validity was proven by the reduced dopaminergic cell count in the SN that correlated with the loss of the urocortinergic cells and the reduction of Ucn1 density. The drop of Ucn1 expression correlated with the behavioural changes. Occasionally, activated microglia cells were found performing phagocytosis on Ucn1 cells upon rotenone treatment.

**Conclusions:** The impairment of the Ucn1 neurons in the cpEW may contribute to the non-motor symptoms of PD.

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*Keywords: Parkinson's disease, rotenone, Edinger-Westphal nucleus, depression*

# The effect of modifications of the gastrointestinal microbiota on behavioral processes

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**Background and objectives**: The composition and the ecological balance of the gut microbiome are crucial for physiological functioning of the organism; therefore, dysfunctions of this fragile system have huge impact on the peripheral, moreover, the central regulatory processes. Among others, neuroplasticity and various other neurobiological functions are also affected [1]. Recently, greatly due to the results of germ free animal studies, it has been revaled that modulation of the gut microbiota has broad impact on the central nervous system also leads to behavioral alterations; though we have to keep in mind that these studies have numerous limits [2]. For these reasons, our main purpose in this study was to explore the impact of qualitative and quantitative alterations of the gut microbiota on emotional, cognitive and social behavioral processes in adulthood. To investigate the influence of these alterations we used adult male Wistar rats. Animals have been divided into four groups: 1. control group; 2. antibiotic treated group; 3. antibiotic and probiotic treated group; 4. probiotic treated group. Antibiotic treated groups received broad spectrum antibiotic mixture, dissolved in their drinking water for 4 weeks. After these treatments, probiotic treated groups were given our mixture, per os every day for 2 weeks, (the probiotic mixture of ours contained four beneficial bacterial species). Throughout the whole experiment, fecal samples were collected to monitoring the microbial and the short chain fatty acid alterations. Following the treatments, we carried out behavioral tests (passive avoidance test, open field test, three-chambered social test) to elucidate the functional changes in the central nervous system.

**Results:** Significant differences were observed in the results of behavioral tests and in the analysis of short chain fatty acids. In the antibiotic treated group, we identified abnormal behavioral phenomens, but these were no longer observed following the probiotic treatment: symptoms have become similar to those of the control group's behavior.

**Conclusions:** The characteristic differences found in the behaviors of the groups well demonstrates that alterations of the gut microbiota plays important modulating role in the central regulatory processes of cognitive, social and emotional functions.

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*Keywords: Brain-gut-microbiota axis, gut microbiota, cognitive functions, probiotics, antibiotics.*

# Focused transthoracic echocardiography in differential diagnosis of the chest pain in the Emergency Department

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**Introduction**: Evaluation of the patients of symptoms with acute chest pain, is a common work-up every day in the Emergency Department (ED). The differential diagnosis usually not easy, includes many potentially serious diseases acute coronary syndrome (ACS), pulmonary embolism (PE), aortic dissection, serious arrhythmia. Often in the background of the chest pain are so high risk serious diseases so the early differential diagnosis is essential in the emergency department. The transthoracic echocardiography (TTE), is a valuable non-invasive, bedside examining method, which one helps the fast differential diagnosis of patients of symptoms with chest pain and his treatment.

**Methods**: This study was performed at the Gróf Tisza István Hospital and Jahn Ferenc Dél Pesti Hospital department of emergency medicine 2017-2019. We examined patients with symptoms acute chest pain. This study investigates the utility of bed-side focused transthoracic echocardiography (TTE) by emergency specialist in the emergency department compared to the conventional cardiological exam and laboratory tests. Beside descriptive statistics, t-test, ANOVA was applied using SPSS22.0. Level of significance was p<0,001.

**Results:** 45 of 76 patients was reported a positive bedside TTE. The length of full screening showed differences amoung emergency TTE (53,86 min); conventional cardiology TTE (2480,5 min); laboratory test(troponin) (96,06 min)(p<0,001). Average waiting time in patient has wall motion abnormality (n=24) also differed significantly (emergency TTE: 60,58 min; cardiology TTE: 2480,5 min; troponin test: 109,29 min)(p<,001). In 24 cases later cardiological verification was performed in order to certify the first emergency diagnosis. The first finding were congruent with later examination (100% sensitivity and 81 specificity). Troponin level and wall motion abnormatility had significant ability to discriminate between patients with or without cardiac disease in background (n=62; p<0,001). It resulted in 68% sensitivity, 78% specificity, 52% positive predictive value, and 87% negative predictive value.

**Conclusions:** The emergency TTE ultrasound can be performed significantly earlier in time like the cardiological exam and laboratory test. Its sensitivity and specificity shows well congruent with later cardiological verification suspect wall motion abnormatility. In summary the focused bedside TTE ultrasound is a sensitive and specific screening method for differential diagnosis of chest pain in the emergency department, which can be enhanced by the use of a specific biomarker for certain conditions.

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*Keywords: bedside, echocardiography, transthoracic, emergency department, ultrasound*

## Influence of Glucocorticoid hormone on T cell receptor activation induced $Ca^{2+}$ signal in T cell subgroups

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**Introduction**: T lymphocytes play a pivotal role in the cellular immune response. One of their subgroups, helper T cells (Th) are required for adaptive immunity. They regulate the humoral and cellular immune responses through their cytokine production. Another subpopulation of T cells are the regulatory T cells (Treg) that play a pivotal role in maintaining tolerance to self-antigens. Glucocorticoid hormones (GCs) are involved in the regulation of T cell physiological processes. Interestingly, they have immunosuppressive effect via influencing cytokine production and cell activation. The intracellular (IC) free calcium ($Ca^{2+}$) can have a beneficial effect on cell survival and metabolism, since it plays an important role in the IP3-mediated signalling pathway as a secondary messenger.

**Objectives**: Our aim was to compare the basic IC baseline $Ca^{2+}$ level of Th and Treg cells. In addition, we examined the effect of GC hormone on T cell receptor (TCR) activation in Th and Treg cells by measuring the $Ca^{2+}$ signal.

**Materials and methods**: For our experiments, $CD4^+$ T cells were isolated from Balb/c mouse thymus and spleen. $CD4^+$ Th and Treg cells were stimulated with anti-CD3 antibody in the presence and absence of GC hormone (Dexamethasone (DX)). For T cell stimulation purified Hamster anti-mouse-CD3$\varepsilon$ monoclonal antibody was applied. Then these T cells were treated with goat anti-Hamster IgG pAb. For nonspecific stimulation ionomycin was used. Following the stimulation the change in IC $Ca^{2+}$ signal was monitored with flow cytometry, utilizing Fluo-3 AM fluorescent calcium indicator.

**Results:** We investigated the basal cytosolic free $Ca^{2+}$ levels of $CD4^+$ T helper and $CD4^+CD25^+$ Treg cells of spleen and thymus. Our results show that both nTreg and pTreg cells had higher basal IC $Ca^{2+}$ levels than $CD4^+$ Th cells. Non specific activation with $Ca^{2+}$ ionophore ionomycin of thymic and splenic cells provoked a rapid increase in the $Ca^{2+}$ signal. In both thymic and splenic Treg cells ionomycin induced lower $Ca^{2+}$ signal than in $CD4^+$ Th cells. Furthermore, In vitro 30 minutes high dose DX pretreatment decreased the $Ca^{2+}$ signal both in splenic and thymic T cells. Using specific TCR mediated stimulation ($\alpha$-CD3) splenic Th and pTreg cells showed lower IC free $Ca^{2+}$ level elevation than thymic T cells. Short-term (30 min) DX pretreatment did not cause changes in the $Ca^{2+}$ signal of the cells through TCR stimulation.

**Conclusions:** Based on our results, thymocytes have higher basal IC $Ca^{2+}$ levels than splenic T cells. In both organs, Treg cells were less activated than $CD4^+$ T helper cells, which probably related to maintain central tolerance. In vitro high dose DX pretreatment decreased the $Ca^{2+}$ signal induced by non specific activation, but did not influence TCR mediated $Ca^{2+}$ signal. We assume that DX raised the cell membrane resistance. In spleen, specific stimulation resulted in lower $Ca^{2+}$ signal, which can be explained by the different signaling pathways initiated by the TCR activation of immature and mature or memory type peripheral T cells.

*Keywords: T lymphocytes, Glucocorticoid hormones, flow cytometry, Ca kinetics*

## Examining the distribution of the three most common spa treatments between 2012 and 2016

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**Objectives**: Due to the attendance of different therapeutic agents and their long-lasting healing effect, our countries health resorts are truly famous. Our aim is to analyse the utilization of physiotherapy-type spa services and the social insurance indicators.

**Methods**: In our analysis we examined the distribution of the three most common spa treatments and territorial disparities in the use of services. Our data were obtained from the Central Statistical Office and National Health Insurance Fund of Hungary. The list of spa and other medical treatments contained 11 activities. The examined period was 2012-2016.

**Results:** Regarding the number of treatments each year, the most frequent form of service was 'medicinal water therapy', the second was 'medical therapy massage', while the third most frequent treatment was 'underwater group physiotherapy'. These services accounted for 30%, 24%, and 10% of the total number of treatments on average over the period under review. The number of treatments showed a decreasing trend year after year. Medicinal water therapy was decreased by 10% (in 2012: 2.108.371, in 2016 only: 1.898.338), while therapeutic massage treatments were decreased by only 1% (in 2012: 1.601.505, in 2016: 1.590.565) over the years. Underwater group physiotherapy showed an increase of 17%. Services having lower number of treatments, such as 'mud packaging', 'weight bath', 'complex bathing care', and 'carbonic bath' are also becoming more common every year.

**Conclusions:** : Thankfully to the developments, the labour market and tourism infrastructure grew in the mentioned regions, tourism revenues increased, and the number of guests also grew, therefore the regional inequality became negligible. Particularly good examples in case of medicinal and thermal waters include that tourist accommodation is always a beneficial factor, but it can only be efficient, if the tourist offer is adequately designed for receptivity and if the regions are utilizing thermal water resources properly.

*Keywords: spa treatments, health resorts, medical water*

## Change of fatty acid composition of edible vegetable oils by multiple heating sequences

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**Background**: Plant-based cooking oils have an important role in the human nutrition and nowadays their reuse is a general practice in the household. According to recent studies heated and several times heated oils may play a role in the pathophysiology of certain chronic diseases. In our study we investigated the effects of repeated heating on the fatty acid composition of plant-based cooking oils.

**Materials and methods**: We investigated five, in the household commonly used plant-based oils and fats. Potatoes were fried on 180 °C in sunflower-, rapeseed-, soy-, palm- and extra virgin olive oil and then we let the oils cool down to 70 °C. After sieving this procedure was repeated ten times. Samples were collected from each fresh, unheated oil as well as after the 1st, 5th and 10th heating sequence. Fatty acid composition of the samples was determined by Agilent 6890 GC with COC and FID. Chromatograms were evaluated with Chromeleon 7.2 software, for statistical analysis SPSS 25.0 program was used for ANOVA tests and Post Hoc analysis.

**Results:** Values of both essential fatty acids: n-3 alpha-linolenic acid and n-6 linoleic acid were significantly decreased in the course of the heating period, while values of the investigated trans isomers as well as the sum of trans isomers significantly increased except for soy oil. Both the calculated iodine value and the unsaturated to saturated fatty acid ratio significantly decreased in all of the investigated oils.

**Conclusions:** In this study we corroborated that during repeated heating of cooking oils the values of the health beneficial polyunsaturated fatty acid decreased, while values of trans isomers with unfavourable health effect significantly increased. Further studies are needed to evaluated for the health effect of the use of these oils.

*Keywords: vegetable oils, reheating, fatty acid change, trans fatty acids*

## Cost evaluation of the falsified medicine directive in the representative sample of Hungarian hospital pharmacies

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**Objectives**: Medicine counterfeiting and its impact on patient safety is an emerging healthcare problem with an estimated annual prevalence of 0,005% (1,5 million packs) in the European legal drug supply chain. The aim of the Falsified Medicines Directive 2011/62/EU (FMD) is to prevent the entry of illegitimate medicines into the legal supply chain. There is, however, a relative lack of in-depth assessments of cost implications for hospital pharmacies. This study aims to evaluate the financial burden of FMD on Hungarian hospitals.

**Methods**: Based on literature review and interviews with hospital pharmacy experts, a 41-question data collection form was developed to evaluate the implementation process before February 2019 and for the following stabilization period. Institutional data, infrastructural and IT developments and procedures related to authentication (verification and decommissioning) were evaluated in 42 hospitals. Data collection started from September 2019.

**Results:** This research analyses the cost of serialization in small, medium and large hospitals based on the number of hospital beds. The cost of serialization includes wage cost and the cost of equipment required for serialization. The research also provides information on the number of medication packs/months and the number of packs that are in the scope of FMD.

**Conclusions:** Our results illustrate that FMD may have a significant financial impact on hospital pharmacies. The findings of this study might offer a better understanding of influencing factors of FMD implementation in hospitals contributing to an optimized cost estimation methodology.

*Keywords: Falsifed Medicines Directve; Hospital Pharmacy; Health Care*

# Poster session II.

## Importance of stool analysis in children with cow's milk protein allergy

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**Introduction**: The most common food allergy in the paediatric population is cow's milk protein allergy (CMPA). The clinical manifestations of this entity are diverse, thus establishing the diagnosis can be challenging. The aim of our human research is to observe the gastrointestinal changes induced by this nutritional allergy and to monitor the effect of dairy elimination diet on these symptoms.

**Methods**: Children with symptoms suggesting cow's milk protein allergy were included in this study (n=47). The investigation was performed at the Balassa János County Hosptital in Szekszárd, Hungary. Stool samples were collected from the participating children at the time of the diagnosis, and after 3 months of elimination diet. On these occasions, a self-edited questionnaire was filled in by the parents. Stool samples were evaluated using the Bristol stool scale and analysed with Quantum Blue fecal calprotectin (FC) rapid test. Evaluation of the data and the questionnaires was performed with SPSS statistical software.

**Results:** In the entire study population (n=47, mean age:7.36 years, 42.6 % female), no significant difference in fecal calprotectin values was observed before (mean: 73.98 $\mu$g/g, SD: 71.12) and after (mean: 68.11 $\mu$g/g, SD: 74.04) the elimination diet (p=0.21). However, after dividing the participants into two subgroups according to the questionnaires, the following was observed: a significant decrease in FC values (p<0.001) was detected in children who strictly followed the diet (n=35) comparing the first (mean: 84.057 $\mu$g/g, SD: 79.48) and the second (mean: 41.114 $\mu$g/g, SD: 34.24) stool sample. Evaluating the results of Bristol stool scales before eliminaion diet, 32.2% (n=17) of the study population presented with normal stool, 34% (n=16) had constipation and 29.8% (n=14) showed diarrhea. After 3 months of elimination diet, the former results changed as the following: 93.6% (n=44) showed normal stool, 4.3% (n=2) still had constipation and 2.1% (n=1) complained of diarrhea.

**Conclusions:** According to our research data, fecal calprotectin can be an objective parameter in monitoring of allergic colitis in children with CMPA. Significant improvement in clinical symptoms can only be expected after a strictly followed elimination diet. Beneficial effects of elimination diet ont he gastrointestinal symptoms can also be confirmed using the Bristol stool scale among children with cow's milk protein allergy.

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*Keywords: cow's milk protein allergy, food allergy, fecal calprotectin, Bristol stool scale*

## Single-center retrospective study of paraneoplastic neurologic syndrome-related autoantibody testing in Hungary

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**Introduction**: Paraneoplastic neurologic syndromes (PNS) are rare neurological disorders associated with cancer. Classical PNS are caused by immune reaction against intracellular antigens (Ma2, Yo, CV2, Hu, amphiphysin, Ri, Tr, GAD65, Zic4, titin, SOX1, recoverin) expressed in tumours, resulting in production of autoantibodies cross-reacting with neuronal structures and presenting in various neurological symptoms [1]. In autoimmune encephalitis (AIE) antibodies are directed against the neuronal cell surface receptors and synaptic proteins (NMDAR, LGI1, Caspr2, $GABA_BR$, AMPAR1, AMPAR2). Patients vary in outcome and treatment strategy because of different pathomechanisms, emphasising importance of autoantibody detection in differencial diagnosis [2].

**Materials and methods**: Here we report a single-center 8-year retrospective study of autoantibody testing in PNS and AIE in the Hungarian population. We evaluated the autoantibody test results of serum and CSF from 2362 patients with suspected PNS and 1034 patients with suspected AIE. For autoantibody testing, immunoblot assay (PNS) and cell-based indirect immunofluorescence assay (AIE) were used.

**Results:** Autoantibodies were present in 8% of patients with suspected PNS: anti-Yo > anti-Hu > anti-Ma2 > anti-CV2 > anti-titin > anti-Zic4 > anti-amphiphysin > anti-Ri > anti-GAD65 > anti-Sox1 > anti-recoverin. Mostly elderly women were affected [3]. Autoantibodies were present in 5.8% of patients with suspected AIE: anti-NMDAR (young women) > anti-LGI1 (middle-aged men) > anti-$GABA_BR$ (elderly men) > anti-Caspr2 (adult men) [**??**].

**Conclusions:** We report the most comprehensive clinical laboratory study of autoantibody testing in PNS and AIE in the Hungarian population. Our results correspond to the data described in the literature. The number of patients with suspected PNS and AIE shows an increasing tendency, where the autoantibody testing with modern laboratory diagnostic methods helps in the early introduction of the appropriate therapy.

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*Keywords: Paraneoplastic neurologic syndromes, autoimmune encephalitis, autoantibody, laboratory diagnostics*

## New stereotest – sensitivity and specificity

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Even though amblyopia has a high prevalence in the population (3-6%), screening for the disease is not properly implemented. In this study we evaluated the sensitivity and specificity of a new Android based stereotest (dynamic random dot stereogram E - DRDSE) for the detection of amblyopia.

We used different densities of random dots to set several levels of difficulty: very low density (VLD 0.7%) and low density (LD 1%). In comparison: Lang II, TNO, Stereofly and Frisby stereotests were also performed.

We examined 409 children in Alicante, Spain (aged 4-15, mean age 7.3). Ophthalmological examination was performed at first. DRDSE was presented on a tablet. We estimated and compared the sensitivity and specificity of all stereotests. For statistical analysis we used custom made MATLAB software.

DRDSE with VLD had a 100% sensitivity for amblyopia, and with LD had 87% sensitivity. Specificity was 71% in a VLD and 67% in a LD. The sensitivity and specificity of the stereotests were as follows: Lang II 42% and 98%, TNO 82% and 85%, Stereofly 63% and 95%, and Frisby 53% and 94%.

DRDSE test is highly effective for the detection of amblyopia compared to other stereotests.

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## Breast cancer cure and fake news: an analysis of content shared on social network sites

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**Introduction**: In the last few years, social networking sites (SNSs), online services that allow users to connect with other individuals through different ways, such as audio, video and text, have emerged as powerful health communication platforms. However, a progressively documented component that impacts information distribution online is the „fake news" phenomenon. This term means „news articles that are intentionally and verifiably false" [1], often used to attract the attention of the readers and manipulate people's observations of real facts.

**Aim**: The aim of this study is to analyse the most shared content on SNSs about breast cancer cure, measuring the credibility of this material. Methods: We use a mixed-methods approach, comprising a qualitative and quantitative study with a descriptive purpose. For collecting Twitter data, we use NodeXL, a social network and content analysis tool that imports data into Microsoft Excel [2]. For Facebook data collection we use Buzzsumo, which lists the contents that are performing best on this social media [3]. The analysis of textual content is based on Bardin's methodology, which allows the inference of knowledge out of these messages [4]. The period analysed is one month. We look at the top 100 most engaged posts on Twitter (in the form of retweets, which is when a user shares the original content) and on Facebook (the sum of likes, comments, and shares on a given post).

**Results:** Although the content shared across the two SNSs is different, we note that there is a tendency for users to engage more in content related to solidarity, testimonials, and science / health texts. However, scientific content is not always correct. On the contrary, we note that content with fake news has a greater total engagement than scientifically proven content.

**Conclusions:** Content about fake breast cancer cure can lead readers to make wrong decisions that directly affect their health and that of their family members. To lessen the impact of the spread of this type of content, cancer health professionals should be dedicated to understanding what engages audience the most in SNSs and produce informational materials for the general public that are based on scientific evidence.

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## Investigation of the TIGIT/CD226/CD155 immune checkpoint pathway in the pathogenesis of early-onset preeclampsia

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**Introduction**: Numerous studies examined the TIGIT/CD226/CD155 interaction and their critical role in maintaining peripheral immune tolerance. Nevertheless much less study has been published in the context of this immune checkpoint pathway during healthy- or pathological pregnancy. The aim of this present study was to examine the contribution of the TIGIT/CD226/CD155 immune-checkpoint pathway in the pathogenesis of early-onset preeclampsia.

**Methods of study**: 22 healthy pregnant women and 22 women diagnosed with early-onset preeclampsia were involved in this study. Peripheral blood mononuclear cells were isolated from peripheral blood by Ficoll-paque gradient. Using fluorochrome-conjugated monoclonal antibodies different immune cell subsets were characterized and the expression level of TIGIT, CD226, and CD155 molecule were measured by flow cytometry.

**Results:** Significant differences were not observed in the distribution of T cell subpopulations in the examined groups. The co-inhibitory TIGIT expression by CD3+ CD4+ T-cells, and by CD3+ CD8+ T-cells was significantly reduced in early-onset preeclamptic group compared to healthy controls. The co-stimulatory CD226 molecule expression by regulatory T-cells was significantly decreased in women with early-onset preeclampsia. No significant difference was observed in the expression of the CD155 ligand molecule on monocytes.

**Conclusions:** Our findings demonstrate the complexity of the activating and inhibitory immunological mechanisms at the materno-fetal interface. Based on our results we assume, that the TIGIT/CD226/CD155 immune checkpoint pathway might have a role in the pathogenesis of early-onset preeclampsia.

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## Oxidative transformations of lipids and ibuprofen in hyperglycemic rats

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**Introduction**: Several acute and chronic diseases are accompanied by an elevated level of reactive oxygen species (ROS). Diabetes and chronic inflammations are those that can induce non-enzymatic (ROS-mediated) oxidation of both endogenous and exogenous molecules. ROSs react with sensitive cellular macromolecules (nucleic acids, lipids, proteins) and exogenous (e.g. drug) molecules to form characteristic products [1].

**Aims**: This study is an effort to better understanding of how oxidative stress develops diabetic complications in STZ-treated rats, and to what extent oxidative stress modifies the metabolism of ibuprofen (IBP), as an example of an exogeneous compound. In addition, in vitro non-enzymatic oxidation of IBP was studied.

**Methods**: STZ-treated (hyperglycemic) rats were studied for four weeks. Then, the level of peroxidation was examined by means of a) UV-Vis determination of malondialdehyde (MDA), and b) HPLC-UV-Vis determination of lipid peroxidation (LP) generated carbonyl compounds. GSH level was determined by UV-Vis method. For comparison, oxidative metabolism of IBP was studied by analysis of the intestinal pertfusate of the rats. The structure of the investigated derivatives was proved by HPLC-MS. In addition, Fenton and Udenfriend hydroxylation tests were used to evaluate non-enzyme-catalyzed oxidation of ibuprofen.

**Results:** The MDA level was slightly increased in the 1st week of the small intestine and liver, decreased in the 2nd and 4th week of the small intestine. GSH level of the small intestine and the liver was significantly elevated in all groups but the 4th-week initiate to become falling. While MDA and HNE derivatives could not be identified. Overall, the chromatograms of liver and small intestine were not significantly different from the control samples. IBP-COOH and 2-OH-IBP were formed in the Udenfriend and the Fenton reactions.

**Conclusions:** Hyperglycemia can promote ROS accumulation through different metabolic pathways. The results of the 1st week (increased MDA) gives evidence of increased ROS production. Lack of increase in the secondary carbonyl LP products indicates that the oxidative and reductive enzymes effectively transform them in the liver and small intestine. The increased GSH levels can be the result of the increased ROS formation, which induces GSH biosynthesis [1].

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*Keywords: Hyperglycemia, Lipid peroxidation, Oxidative stress, Malondialdehyde, Glutathione, ROS, Ibuprofen*

# A study of interaction glutathione (GSH) with some chalcones and chalcone analogs *in vitro* and *in vivo*

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**Background**: Chalcones or 1,3-diaryl-2-propen-1-ones, are intermediary products and precursors of flavonoid biosynthesis. Both natural and synthetic chalcone analogs are proven to have various therapeutical activities such as cytotoxicity, anti-inflammatory, antitumor, and cancer-preventive properties. In our previous experiments, some cyclic chalcone analogs showed a significant effect on the GSH status of Jukart T cells. It was also found that most of the investigated chalcones displayed spontaneous reactivity with GSH.

**Aims**: The aims of the work were to investigate the relationship between GSH-reactivity of chalcones and their anti-cancer properties; the influence of this reactivity on other biological effects of chalcone derivatives under investigation; and the relevance of the conjugation reaction under *in vivo* conditions. Furthermore, it was also the aim of the study to investigate how the ring size, the substituents, and the pH affects the reactivity of the compound.

**Results:** The investigated chalcones showed an intrinsic reactivity towards reduced glutathione (GSH). This reversible reaction yields two diastereomeric adducts in case of the open-chain chalcones in both *in vitro* and *in vivo* experiments, and four ones in the case of the cyclic chalcones. The open chain and the six-membered chalcone derivatives were found to be the most reactive ones. The methyl derivatives were shown to have the highest and the dimethylamino compounds were shown to have the least reactivity with GSH. In the *in vivo* experiment, (using anesthetized rats), the parent chalcone, and its glucuronide-, sulfate- and glutathione-conjugates were found in the small intestine perfusates.

**Conclusions:** The rate of the reactions was found to depend on the ratio of the deprotonated to protonated GSH, being the deprotonated form the more reactive one. It was found that the ring size of investigated chalcones also has a pronounced effect on their reactivity. Based on the stereochemical outcome of the reactions, the mechanism of the addition of the protonated and the deprotonated GSH is different. Reactivity of the chalcone derivatives was also found to be dependent on the aromatic substituent of the A ring. Based on the results it seems the GSH-reactivity of the derivatives being not determining factor in their cancer cytotoxic effect. The results of our *in vivo* experiments demonstrated that the GSH-conjugation reaction of chalcones is playing role in the fate of the *per os* administered compounds.

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*Keywords: chalcones, Michael addition, cytotoxic, metabolism, glutathione*

## Comparative analysis of N-Glycosylation profiles of patient samples of chronic inflammatory and malignant pulmonary diseases as well as their comorbidity by capillary electrophoresis

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Both lung cancer (LC) and chronic obstructive pulmonary disease (COPD) are among the leading worldwide health concerns. Lung cancer is one of the highest mortality rate cancer types all over the world. The reason of this high mortality could be caused by misdiagnosis since it is difficult to distinguish LC, COPD, and their comorbidity based on symptoms only. In addition, the presence of COPD increases the risk of lung cancer development. Commonly applied diagnostic methods, including biopsy, are invasive and often serve late results in many cases. Therefore, it is important to develop a non-invasive molecular diagnostic method capable of predicting the presence of the actual ailments (lung cancer, COPD or their comorbidity) even in early stage. Recently, glycobiomarker research on serum sample utilization gained increasing importance.
In this study pooled human serum samples were investigated by capillary electrophoresis-laser-induced fluorescence assay. Samples were from lung cancer (90), COPD (90) and comorbidity of COPD with lung cancer (90) patients. Sample pooling was applied in order to minimize information loss of species below the detection threshold and improve efficiency of the measurements. In this study 61 N-glycan structures were identified from healthy human serum. The N-glycosylation profiles of the pooled samples were quantitatively compared against pooled sample of healthy individuals. Based on the reported comparative study, a dozen glycan structures were identified as potential glycobiomarker panel, revealing significant changes (>33% relative peak area change) between the pathological and control samples. Moreover, besides the comparison of individual N-linked glycan structures, we compared the alteration of N-linked glycan subclasses compared to control sample and we found that alterations of these subclasses also carry interesting diagnostic informations.

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*Keywords: capillary electrophoresis, N-linked glycans, human serum, COPD, lung cancer*

# High throughput analysis of fluorophore labeled N-glycans from the aspect of the biopharmaceutical industry

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Glycoprotein based biotherapeutics gaining higher and higher importance in the pharmaceutical market, as new biological drugs like antibodies and fusion proteins are available for medical treatments. Due to the post-translational modifications glycans are attached to the polypeptide backbone of these proteins. N-glycomic analysis of these products is crucial since compositional changes in glycosylation of the Fc region can lead to discrepancies in serum half-life, immunogenicity, anti-inflammatory and effector functions. For example, terminal sialylation influences anti-inflammatory mechanisms, while the presence of high mannose type oligosaccharides leads to faster clearance and concomitantly shorter serum half-life. Glycosylation should be considered as a critical quality attribute (CQA) in the biopharmaceutical industry and be inspected during every step of the manufacturing process.

Deep structural determination of these new drug modalities requires an appropriate, accurate and fast method, which is able to succeed in high-throughput analysis. After PNGase F digestion, the released N-glycans were labeled with a fluorescence dye (APTS) and were analyzed by LED induced fluorescence detector in a multicapillary gel electrophoresis device. The individual structures were identified with the help of Glycostore database.

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*Keywords: biotherapeutics, capillary electrophoresis, high troughput, multicapillary*

## Efficiency study of an endoglycosidase enzyme for improved glycosylation analysis

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Glycomic analysis of human serum could open a new chapter in the field of biomarker discovery [1]. Disease related changes in glycan expression and structures could be valuable indicators in early recognition and in distinction between illnesses with similar symptoms –such as lung cancer and COPD [1, 2].

For this purpose, a reliable and robust sample preparation method is required to be able to provide statistically valuable results for data evaluation. One of the key steps is the enzymatic release of glycans using the endoglycosidase PNGase F. In this work, the denaturation parameters of the glycoprotein and the PNGase F digestion parameters were optimized for human serum N-glycome profiling of lung cancer and COPD patients.

Sample preparation of N-glycan analysis includes four major steps: 1) glycoprotein denaturation, 2) enzymatic N-glycan release, 3) fluorophore labeling and 4) cleanup – excess dye removal [3]. The released N-glycans were labeled with APTS (8-aminopyrene-1,3,6-trisulfonate, APTS) followed by magnetic bead based purification and capillary electrophoresis analysis with laser-induced fluorescence (CE-LIF) detection.

By optimizing glycoprotein denaturation and PNGase F enzymatic reaction, a robust and reproducible sample preparation method was achieved for the analysis of N-glycans by capillary electrophoresis.

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*Keywords: capillary electrophoresis, glycome, endoglycosidase enzyme*

## Impact of Ammonium Salts on N-Glycan Release

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**Introduction**: The suggested buffer components are controversial during N-glycan release with the endoglyosidase PNGase F. Kuster at al. among others showed that ammonium acetate and ammonium bicarbonate buffers caused shifts in peak area ratios, generating false results[1]. Despite of these earlier reports, some recent methods still suggest ammonium salts based buffers for PNGase F release [**??**].

**Aim**: To clarify this contradiction, the effect of different ammonium salt containing buffers was examined on signal strength and peak area distribution.

**Methods**: Ammonium bicarbonate ($NH_4HCO_3$), ammonium acetate ($CH_3COONH_4$) and ammonium carbonate ($(NH_4)_2CO_3$) salts were used in 20 mM and 50 mM concentrations at 7.5 pH for PNGase F digestion. Standard deglycosylation buffer (phosphate) and water were used as blank. Human IgG1 samples were digested overnight at 37°C. Using these buffers the samples were labeled with ATPS fluorophore dye [5] and analyzed by capillary electrophoresis.

**Results:** The relative fluorescence intensities (RFU) of all peaks were normalized on the FA2G2 peak. All type of ammonium salts based buffers resulted shifted peak area ratios at 50 mM concentration compared to the control. The FA2G2S2 and FA2BG2S2 structures had higher relative fluorescence intensities than that of the control group, while the FA2 glycan peak area decreased.

**Conclusions:** Ammonium salt containing reaction buffers interfere with N-glycan release by PNGase F. During N-glycan analysis of pharmaceutical glycoprotein products, it is recommended to take this report consideration.

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*Keywords: ammonium salt, N-glycan, PNGase F, capillary electrophoresis*

# Relationship between trait mindfulness, trait anxiety, physical activity and the use of relaxation technique among young hungarian adults

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**Introduction**: Being physically active [1] and using relaxation [2] has a positive effect on mental health. In addition being active and being an athlete can lead to different impact either on pysical or emotional status.

**Aim**: The aim of the study was, to investigate the relationship between being or not being physically active; the using of relaxation technique and trait mindfulness, trait anxiety, trait aggression.

**Methods**: A total of 109 young hungarian adults were tested (average age:18,98) with a socio-demographic questionnaire and with three psychological questionnaires: (1.) The Spielberger Trait Anxiety Inventory (STAI, 1970), validated in hungarian Sipos and Sipos, 1978. (2.) The Buss-Perry Aggression Questionnaire (BPAQ, 1992), which measures the trait agression total score, and four subscales (anger, physical and verbal agression, hostility); validated in hungarian Gerevich et al. 2012. (3.) The Mindfulness Attention and Awareness Scale (MAAS, 2003), validated in hungarian Simor et.al, 2013; measures dispositional mindfulness. All of the respondents were volunteers and to fill out the questionnaire was anonymous. Sporting attributes were divided into 3 groups: athletes (competitive), physically active, physically non-active.

**Results:** We used Independent T test and found significant difference between athlete group and the physically non-active group in case of trait mindfulness (t= -2,05; p=0,043), and trait anxiety (t=3,37; p=0,01). Nevertheless we did not found any significant difference between the physically active and the physically non-active groups. We analyzed the subscales of trait aggression and the sporting attributes with Mann Withney test and found significant difference with the subscale of anger (p=0,053). Suprisingly we did not found any difference between the use of relaxation and any psychological factors. We accepted the results as significant if $p < 0.05$.

**Conclusions:** The athletes who attend to competitive sports show higher trait mindfulness level and lower trait anxiety level. Maybe they learned how to cope adaptively with stress, because of the many stressful situation through sporting career, furthermore they have a good skill to controll their attention. Futher investigation is needed to understand the accurate effect of competitive sport on emotions.

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*Keywords: trait mindfulness, trait anxiety, physical activity, relaxation*

## Investigation of somatostatin receptor expression in renal tumors

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**Introduction**: Kidney cancer is the 10th most common malignancy worldwide and around 2,000 new cases are reported each year. The disease is poorly predicted and difficult to treat, can spread asymptomatically, is resistant to chemotherapy, and is very common in metastatic cases. The hormonal neuropeptide receptors for somatostatin are SSTR 1-5, with subtypes 2 and 5 showing the highest affinity for the hormone and its synthetic analogues. In the literature, SST receptors are expressed at high levels in certain tumors and in blood vessels formed by tumors, compared to normal tissues. Following the expression of the characteristic somatostatin receptor (SSTR) in kidney tumors and the ligand binding, the internalization of SSTR may serve as a basis for future treatment.

**Aims**: Our aim was to investigate the presence of SSTR (1-5) in human kidney tumor tissue samples and cell lines. In vitro studies aim to investigate the presence of somatostatin on the expression of somatostatin receptors on human kidney tumor cell lines (A-498 and CAKI-2).

**Materials and Methods**: In our examinations, we had tumor and norml kidney tissue samples from 20 patients with surgically removed kidney tumors from the University of Debrecen. Total RNA was isolated from the samples and following reverse transcription, the expression of SSTR -1, -2, -3, -4, -5 was analyzed by specific oligonucleotide primers by real-time qRT-PCR (CFX-96, BIORAD). The human kidney tumor cell lines A-498 and CAKI-2 were used for in vitro studies.

**Results:** According to our results, a significant proportion ($\sim$90%) of the tested kidney samples express SSTR-2 and SSTR-5 receptors to a greater extent than SSTR-1,3,4. The age group and gender distribution of the examined cases did not show any correlation with the somatostatin receptor expression. The presence of SSTR-2 and SSTR-5 was confirmed in both A-498 and CAKI-2 cell lines, and the receptor expression on the cell line showed a similar pattern to that observed in tissue samples.

**Conclusions:** A significant proportion of tissue samples express subtypes of various somatostatin receptors at the mRNA level. Our findings will hopefully contribute to a better understanding of the disease, help in the early detection of metastasis, the use of synthetic analogues of somatostatin, their radionuclide or cytotoxic derivatives in diagnostic and / or targeted tumor therapy, and provide new knowledge in the use of somatostatin peptide.

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*Keywords: renal cell carcinoma, somatostatin, receptor, SSTR*

# The impact of oxidative stress on reproductive potential: Level of 8-hydroxy-2'-deoxyguanosine in saliva of patients undergoing in vitro fertilization

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**Introduction**: The impact of oxidative stress markers, as total non-enzymatic antioxidant capacity (TAC) and 8-hydroxy-2'-deoxyguanosine (8-OHdG) in serum and follicular fluid (FF) on IVF outcome was analysed in our previous research [1]. Where FF 8-OHdG had negative impact on the number of good quality embryos.

**Aim**: The current study was designed to evaluate the level of 8-OHdG in patients undergoing in IVF using saliva samples.

**Methods**: A cross sectional cohort study was carried out, samples were obtained from 58 patients with infertility diagnosis (age: 34.6±5.14 years, BMI: 22.54±2.46, infertility: 47.0±28.0 months) before ART treatment. 8-OHdG was measured by Abcam's in vitro ELISA kit (ab201734).

**Results:** No relationship could be detected in reproductive performance with number of retrieved oocytes, matured oocytes and Grade 1 embryos. Although, we found significant positive corelation with Spearman's rank correlation analysis between 8-OHdG and HCG level (R=0.467, p=0.028). The results showed significant differences in 8-OHdG in chemical pregnancies measured with Mann-Whitney U test (pregnant: 54.82±35.56 ng/mL, non pregnant: 30.06±10,40 ng/mL, p=0.022)

**Conclusions:** Our findings support anew the notion that OS had an important contribution to the reproductive potential in IVF patients, the ideal biomarkers of outcome measures however need to be further explored.

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*Keywords: oxidative stress, assisted reproduction, reproductive potential*

## Preconcentration of prostate-specific antigen (PSA) as a potentional biomarker for prostate cancer from low-concentration medias for capillary electrophoresis (CE) analysis

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Prostate cancer is one of the most commonly diagnosed cancer in men worldwide. Serum prostate-specific antigen (PSA) is a widely applied biomarker for this disease, as it is frequently used for prostate cancer screening or monitoring disease progression. Unfortunately the lack of selectivity and sensitivity of this method often leads to over-diagnosis and over-treatment, therefore the discovery of new biomarkers is of high importance. It was reported earlier that prostate cancer - like many other tumor diseases - modify the glycan profile of certain proteins. Alteration of the PSA glycoform can be detected using highly sensitive analytical methods. Capillary electrophoresis coupled with laser induced detection have been proved to be suitable for this task, although the limit of detection is restrictive for most of the biological samples. Other glycoproteins could interfere with the analysis as well, thus the capture and concentration of PSA from the samples can be essential. Monoclonal antibodies (mAb) are widely used for immobilization due to their strong affinity and high selectivity, but mAb contains glycan structures which can cause contamination in the samples. The price of them is also very high and their sensitivity can require special conditions.

In this study a new method is presented for PSA capture from low-concentration mediums, aiming biological samples like semen, urine or blood. Due to the disadvantages of mAbs new immobilizing agents were searched for. Single domain antybodies (sdAb) are smaller in size and more stable than mAbs. They do not contain sugar chains. They can be overproduced in bacteria with recombinant techniques which makes them cheaper and various linker tags like His-tag or GST-tag can be attached to them. Our single domain antibodies were C9 aPSA amino acid sequences, which were synthesized by GenScript. The genes were amplified by PCR, digested with NdeI and XhoI restriction endonucleases and after purification on agarose gel, ligated into pET23b vector which fuses the DNA sequence of a C-terminal 6-histidine tag to the aPSA genes. SHuffle T7 Express Competent E. coli bacteria were cloned by the resulting plasmids to ensure correct disulphide bond formation and protein folding.

Due to the various sample volumes the sbAbs were immobilized to Ni-IMAC PhyTip (provided by PhyNexus) nickel-coated columns filled into pipette tips. By automate pipetting the C9 sbAbs were immobilized to the columns, making them ready for capturing of PSA from the samples. The PSA could be gained from the column by denaturing the proteins. In addition, the denature can easly connected to the standard glycan sample preparations for CE analysis. The method was applied with good results on standard PSA from human semen solution in PBS buffer and urine samples as well.

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*Keywords: prostate specific antigen, pipette tip, capillary electrophoresis, single domain antibody*

## Medication errors committed by jordanian nurses: an e-mail based study

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**Introduction**: Medication error is a potentially life-threatening problem that is relatively common in all hospitals around the world. In United States of America, the Institute of Medicine (IOM) reported that 7000 deaths occur yearly due to medication errors [1].

**Aim**: The aims of this study were to explore Jordanian nurses' perceptions of the number of medication errors that committed by them over the course of their career, and to explore the relationship between number of medication errors and selected demographical variables.

**Methods**: A descriptive cross-sectional design was used. Data were collected from 245 Jordanian registered nurses by contacting them on their electronic mail addresses. The validated modified Gladstone's instrument (2005) was used to assess the nurses' perceptions about different aspects of medication errors [2]. A sample of 262 Jordanian registered nurses was conveniently selected by gathering the electronic mail addresses through professional relations; eventually a total of 245 questionnaires were returned giving a 93.5% response rate. Data were analyzed using the Statistical Package for Social Sciences (SPSS). Different frequency and descriptive tests in addition to ANOVA, t-test and Pearson's r correlation tests were used to answer the study questions.

**Results:** The mean of remembered medication errors was 2.24 medication errors per nurse (SD = 2.151). Findings of Pearson Correlation test showed that there is a significant positive correlation between both number of medication errors and experience ($r = 0.136$, $p \leq 0.05$), and number of medication errors and age ($r = 0.2$, $p \leq 0.01$). Results of ANOVA showed a significant association between number of medication errors and unit that nurses work in. Results of Post Hoc Test showed that the nurses who indicated that the operation room and recovery as a common work setting, remembered making more medication errors than other nurses. Regarding the gender of nurses, results of independent T-test showed that there is a significant difference in number of medication errors between male nurses (mean=3.35) and female nurses (mean=2.17).

**Conclusions:** There was a significant positive correlation between number of medication errors and experience. Results also showed a significant difference in the number of medication errors depending on the nurses' gender and unit that nurses work in.

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*Keywords: nurses, medication errors, Jordan*

## Efficacy of conservative treatment in Osgood Schlatter disease

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**Introduction**: Osgood-Schlatter disease (OSD) is a common condition in sports-practicing adolescents due to the inflammation of the patellar tendon insertion on the tibial tuberosity. Even though it is a selflimiting it can negatively influence the career of young athletes.[1]

**Aim**: I wanted to examine the frequency of OSD among young athletes in one of the most physically demanding sports, gymnastics. My other goal was to explore which treatment options are recommended in this sport (conservative or surgical treatment)[2] and what is the rate of convalescence. For the complete evaluation regarding the full spectrum of this condition I chose retrospective analysis.

**Method**: An online questionnaire was sent to a group of gymnasts in Jordan and the answers were collected and analysed. The study population consisted of 5 girls and 4 boys (age group from 19-24) asking about anterior knee pain they experienced while practicing the sport (knowing that the main cause of knee pain in adolescence who plays such demanding sport is OSD), questions focused on what would increase it, which knee was affected, whether or not they sought medical attention and what relieved their pain.

**Results:** 100% experienced knee pain during there active sporting career, 77.8% both knees while 22.2% only the left knee was affected, 88.9% went to the doctor, the doctors recommended resting with ice in 66.7% of the cases, while 22.2% suggested surgery and 11.1% quitting the sport. 44.4% answered that squats increased their pain, 33.3% jumping, 11.1% running, 11.1% walking. As for the things that releived the pain 33.3% asnwered ice, 33.3% increasing muscle mass (other answers included pain killers, resting in 43.4%).

**Conclusions:** OSD is a self-limiting condition that affect athletes in their growing period and can last for a few years. Athlete can learn how to live with it or go to surgery only as a last option. Regular icing and rest can help a lot in decreasing the pain but will not be fully eliminate clinical symptoms [3].

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## Does pulse wave velocity indicate higher risk in patients with chronic myocardial infarction?

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**Introduction**: Pulse wave velocity (PWV) as a marker of asymptomatic organ damage has a crucial role in cardiovascular risk stratification. Several different non-invasive methods have been proposed for the assessment of PWV, but the results show significant differences due to variant distance measurements. Cardiac magnetic resonance imaging (MRI) provides an accurate method to measure PWV beside left ventricular (LV) volumes, function and infarct size. Our study aims to show the comparison of an MRI and an oscillometric based method for calculating PWV, and we aimed to investigate the association between PWV and LV dimensions, function and myocardial scar extension in patients with previous myocardial infarction (MI).

**Methods**: In the course of cardiovascular MRI imaging using Siemens Avanto 1,5 T MRI, a 3D aortic angiography and then phase-contrast velocity imaging was performed at two predefined locations of the aorta. The accurate distances between the planes of the flow measurements were registered and PWV was calculated from the temporal shifts between the max-upslopes of the ascending part of the flow waveforms and from the actual distances. LV dimensions, volumes and mass, as well as infarct size using the threshold limit of 5 SD above the mean signal intensity of the remote myocardium were assessed. Arteriograph (AG) measurements were also performed, and PWV was calculated using the jugulum-symphysis direct distance measurement.

**Results:** 75 patients (56 male, 19 female, average age: 56 years) referred for cMRI were investigated, of whom 36 had previous MI and showed ischaemic late enhancement (LE) pattern. Patient groups with or without LE did not differ in actual systolic and diastolic blood pressure and heart rate. Comparing the two methods, AG and MRI PWV values were significantly correlated (rho: 0,343, $p<0,05$). Absolute PWV values were significantly higher for AG compared with MRI measurements (median(IQR): 10,4 (9,2-11,9) vs. 6,44 (5,64-7,5); $p<0,001$). Bland Altman analysis showed that in general the mean difference between the two measures was 3,7 m/s. In patients with MI significantly ($p<0,05$) and non-significantly higher PWV values were measured by AG and MRI, respectively, as data were compared to the patients without LE. Significantly lower ejection fraction (EF) and significantly higher indexed end-diastolic and end-systolic volumes (EDVi, ESVi) were assessed in patients with MI ($p<0,01$). However, neither the LV function indicating parameters, nor the infarct size correlated with PWV derived by both methods.

**Conclusions:** Our study showed a good agreement between the AG and MRI methods in PWV calculation. AG overestimated PWV due to uncertain distance measurements, corresponding to other studies. Using MRI, an accurate PWV could be derived and precise volumetric and infarct size assessments could be performed. Finally a higher PWV, but no correlation was found between PWV and LV function parameters in MI patients.

*Keywords: pulse wave velocity, cardiac MRI, oscillometry*

## Effect of years spent in health care systen on burnout of radiographers

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**Introduction**: Given the potential negative consequences of stress and burnout, additional information is needed on the frequency of occupational burnout among radiology department workers.

**Aim**: The aim of our research was to assess the burn-out rate of above mentioned group of workers and to analyze the causes related to the workplace characteristics behind this phenomenon.

**Methods**: In terms of the type of our research was cross-sectional, descriptive study, which was carried out by purposeful, non-random sampling. We used the email addresses of nearly 3,000 radiology department workers registered at the Association of Hungarian Radiographers (MRAE) to send online questionnaires from June 2018 to September 2018. Descriptive statistics, two-sample t-test, ANOVA test, Mann-Whitney and Kruskal-Wallis test was performed at 95% confidence level.

**Results:** After data clearing, total of 404 responses were included in the statistical analysis. The respondends were employed mostly in county hospitals, and has been working in the health care system for an average of 18.3 years (SD 13.7). Educational level, age, and ears spent in health care system significantly influenced on all three dimensions of burnout ($p \leq 0.05$). The 31-35 age group and the 16-20 years experience in the healthcare system is considered to be the most at risk in all three dimensions of burnout. The emotional exhaustion of MSc graduates was significantly lower than that others. ($p \leq 0.05$)

**Conclusions:** Professionals working in radiology departments had above-average depersonalization and emotional exhaustion values, which are partially correlated with years spent in health care system. Higher scale scores in the dimension of personal effectiveness may be due to the positive impact of feedback from patients and colleagues.

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*Keywords: burnout, radiograher, MBI*

## The efficacy of *Kinesitherapie Respiratoire* on Infants' Quality of Life

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**Introduction**: The aim of the study was to investigate the efficacy of *Kinesitherapie Respiratoire* on the quality of life applied in viral respiratory disease among infants and small children in the Upper Rhine region, France.

**Material and Methods**: The investigation lasted for a year, from December, 2017 to December, 2018. The survey took place in the Upper Rhine region, France. The sample involved 127 participants: 48 females and 79 males. The mean age was 20.01 months. The youngest participant was 3.13 months old and the oldest participant was 50.86 months old. Assessment of infants' quality of life and clinical severity was performed by 'Score d'évaluation de l'encombrement des voies aériennes (SEVA)' recommended by the duty system and supplemented by the Physiotherapy Patient Record Sheet. The method applied was *Kinesitherapie Respiratoire*.

**Results:** Based on the SEVA scale, significant improvement was found in the general condition of the children on the effect of the 1st ($p<0.001$) treatment and the 2nd ($p<0.001$) treatment. Regarding the quality of sleep, significant improvment was also observed following the treatments. 1st treatment: $p=0.000$; 2nd treatment: $p=0.000$. Positive finding was obtained in the correlation between sleep and fatigue: $p=0.000$. Improvement was found to be significant regarding nutrition following both treatments: 1st treatment: $p=0.000$; 2nd treatment: $p=0.000$.

**Conclusions:** *Kinesitherapie Respiratoire* had a positive effect on the quality of sleep, nutrition, the changes of clinical severity, and the degree of fatigue. The findings support the efficacy of *Kinesitherapie Respiratoire* widely recognized and applied in France.

*Keywords: infant, bronchiolitis, SEVA, kinesitherapie respiratoire*

# Keywords

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