

# INTERNATIONAL STUDENT CONGRESS



ABSTRACT  
BOOK  
**2022**

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# ISC 2022



Dear participants of the ISC 2022,  
our team was able to welcome over 120 students from 33 countries this year. I want to thank our sponsors, especially the medical university of Graz and vice rector of studies and teaching Mag. Dr. Vogl for all the support.

I want to say a big thank you to all the ISC team members for all their great ideas, time and effort they put into the congress.

We already received a lot of positive feedback from you, the participants and from our prof chairs! Thank you so much for your great presentations and all the interesting talks. I hope you enjoyed the congress and the social program as much as I did and were able to get to know our lovely city Graz. We would love to see you again next year and to meet our virtual participants in person. We will keep you updated!

A handwritten signature in black ink, appearing to read 'Sanela', followed by a long, horizontal, wavy line that extends across the width of the signature area.

Sanela Nikodijevic BSc MSc  
ISC President 2022

# SPECIAL THANKS

## PEOPLE WHO HELPED THE ISC

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**KERSTIN DRECHSLER**  
*ADVISORY ROLE,  
FINANCE & HANDS-ON  
PROGRAM*



**JOHANNES WITTIG**  
*ADVISORY ROLE*



**GERLAD AUER**  
*HEAD OF PUBLIC RELATIONS  
AND EVENT MANAGEMENT AT  
MEDUNI GRAZ*



**SABINE VOGL**  
*VICE RECTOR FOR STUDIES AND  
TEACHING AT MEDUNI GRAZ*

# KEYNOTES



## 1

### SCIENCE COMMUNICATION WITH PROF MERZ

Professor Martina Merz is a physicist and head of the Department of Science Communication and Higher Education Research at the Alpen-Adria-Universität of Klagenfurt. Her research field encompasses the social and behavioral sciences. In 1985, she completed her diploma program in physics at the Ludwig-Maximilians-University in Munich and received her doctorate degree in 1990. Afterward, she worked as a postdoctoral research scientist at the Faculty of Sociology and Institute for Science and Technology Studies at Bielefeld University.



Martina Merz gained experience at many institutions, including the University of Berne, ETH Zürich, EPF Lausanne, University Lausanne and at the University of Helsinki. Following years of dedicated work, Dr. Merz became Professor of Science Studies at the Department of Science Communication and Higher Education Research at the University of Klagenfurt. Later, she took over the role of vice-rector of research in Klagenfurt.

Professor Merz research interests include interdisciplinary science and technology studies, the sociology of science, technology, innovation, and higher education, the sociology of knowledge & culture, qualitative social science research and gender studies.

In the age of information, millions of websites with an unfathomable amount of knowledge can be accessed within seconds. However, scientific information has to be communicated clearly and efficiently to facilitate knowledge transfer between experts and interested persons. Therefore, future researchers need to learn how to properly communicate scientific knowledge to patients, colleagues and the general public. Thankfully, Professor Martina Merz agreed to share her expertise with the ISC guests and shine a light on the core principles of Science Communication in her much anticipated keynote lecture at the International Student Congress.

# KEYNOTES

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2

## RARE DISEASES IN AN INTERDISCIPLINARY APPROACH WITH M.D. ZOBEL



Joachim Zobel, M.D. has studied human medicine at the Medical University of Graz from 2009 to 2015. During his studies, the scientific focus was on paediatric intensive care medicine, especially on mechanical ventilation. The basic education took place at BKH Lienz and 2016 he started his residency at Pediatrics and Adolescent Medicine at the Medical University of Graz. He is part of the Neuropaediatrics-Team since 2018 and started with the studies of medical science in the year 2017. Joachim Zobel, M.D., is a member of the Young European Paediatric Neurology Society, YEPNS, and a member of the commission of young neuropaediatrics. He works as a reviewer for some journals, for example the journal "Neuropaediatrics". At the moment his specialized science project deals with rare monogenetic epileptic encephalopathy, in cooperation with university hospital for human genetics. According this science project he often gives lectures, national and international.

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3

## PERFORMANCE UNDER STRESS - MINDSET TRAINING WITH KLARA FUCHS B.SC



Professional athletes not just train their muscles, they also train their mind so they'll be able to perform under pressure. In this keynote we will discuss these strategies so you'll perform at your best during your medical studies and in your future medical career - without getting too stressed out.

Klara Fuchs is a writer, blogger, sports scientist, certified mental trainer and medical student who has her own blog. For more information feel free to visit her website.

# SURGICAL SKILLS



## PRE CONGRESS WORKSHOP

During this workshop you will be able to learn and enhance your suturing skills by practicing a variety of techniques ranging from basics like surgeon's knot to simple interrupted suture to more advanced ones like back-and-forth sutures.

Moreover, the workshop will offer you the opportunity to learn more about laparoscopic surgery. The session will consist of basics about the technical background of laparoscopic cameras, with its correct guidance during such surgeries and taking part in a game of skill. Furthermore, during this workshop you can learn about haemostasis and the approaches during surgery. The whole session will be guided by a surgeon explaining and demonstrating the techniques and giving personal instructions and guidance, so you will never have to feel

overwhelmed during your studies and can ask as many questions as you wish. At the end of the day, you will take with you the basic knowledge and skills needed to enhance your future level of surgical abilities by an extent!

Participants will:

- Enhance their suturing skills
- Familiarize themselves with laparoscopic surgery
- Acquire knowledge about laparoscopic suturing
- Learn about the approaches to haemostasis during surgery

Tutors:

Medical doctors from the department of general, abdominal and transplant surgery



# HANDS ON PROGRAMS

## WORKSHOPS I

### *Night Shift problems and how to solve them*

Night Shift Problems - and how to solve them  
Night shifts are filled with all kinds of problems varying from patients, who need sleep-inducing medication, up to patients, who suffer from dyspnoea caused by hypertensive pulmonary edema. In this workshop, you will learn basic emergency evaluation and some useful tricks and medications you can use. It will provide you with some guidance that will help you navigate through your night shifts. Target audience: Medical students / doctors

Tutor: Richard Brodnig  
Location: UR 20

### *HIV - still a Worldwide Challenge*

In the last years HIV/AIDS has changed from a deadly disease to a chronic infection. People living with HIV who adhere to an HIV treatment get an undetectable viral load and do not transmit HIV through sexual intercourse. They can grow old and have healthy children. But... Being HIV positive still means to be discriminated - over 50% of the recorded cases in Austria happened in the medical field. In the workshop, you get a worldwide overview about the situation of HIV/AIDS with a special focus on Austria and the work of the AIDS-Hilfe Steiermark information centre.

Tutor: Fellner Eva  
Location: MC 03



# HANDS ON PROGRAMS

## WORKSHOPS II

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### ***Doctoral Programs at the Medical University of Graz***

This workshop will introduce current PhD programs as well as the Doc Schools of the Doctoral Program of Medical Science at the Medical University of Graz and give information about admission criteria and application procedures.

Tutor: Miriam Sedej  
Location: UR 09

### ***Ready for Nightshift- X RAY Interpretation***

When starting your career in medicine, it won't be long until your first nightshift. It's going to be just you and the patient in your emergency room. Are you going to wake up your on-call doctor at 4 a.m. just to ask him about that chest X-ray you ordered? In this workshop we will go through cases based on X-ray pictures that are very common in the night shift. It is going to be an interactive workshop that teaches you how to tell emergencies (that do require to wake your superior) from casualties.

Tutor: Tschauner Sebastian  
Location: MC 02



### ***Science Communication***

This interactive workshop will introduce you to concepts of science communication. Effective research communication to the public is an asset to every scientist, because it promotes engagement and enhances visibility.

Tutor: Ariane Pessentheiner  
Location: UR 17

# HANDS ON PROGRAMS

## WORKSHOPS III



### ***Happy & Healthy (throughout your studies and life)***

Working in the medical field is connected to stressful times and complicated situations for every one of us. In this workshop you will learn about how this influences your health and mind, what can you do to care for yourself and how you can profit from certain habits. We will also try out some relaxation exercise together so you can discover what suits you best.

Tutor: Christian Vajda  
Location: UR 19

### ***Basic Principles of Good Scientific Practice/scientific misconduct***

This workshop is designed to introduce students into THE cornerstone of any career in research: the basic principles of Good Scientific Practice. Learn about the internationally accepted standards and why it is so important to internalize them in any research team's daily work. The workshop will also give examples of practices which are considered breaches of Good Scientific Science.

Tutor: Carolin Auer/ Susanne Scheipl  
Location: UR 10

# HANDS ON PROGRAMS

## PRECOURSES I

### *Sono4You – Abdominal Sonography*

In this course the participants are going to learn and reinforce the practical skill of abdominal sonography. It is important for us to teach structured procedures with a highly practical component in small groups of max. 5 students. Per group, there will be two tutors of the peer-teaching-group „Sono4You Graz“ helping the attendees to reach the learning target.

Tutor: Sono4You-Team  
Location: UR 19

### *Sono4You – Heart Sonography*

In this course the participants are going to learn and reinforce the practical skill of heart sonography. It is important for us to teach structured procedures with a highly practical component in small groups of max. 5 students. Per group, there will be two tutors of the peer-teaching-group „Sono4You Graz“ helping the attendees to reach the learning target. This course is only for participants which have some experience with sonography, because heart sonography is not so easy.

Tutor: Sono4You-Team  
Location: UR 20



### *Symptom Based Diagnosis*

In this course we support you in developing basic diagnostic skills. We guide through short clinical cases and present important spot diagnoses in an interactive manner. Three medical students who have already competed international diagnostic competitions will moderate this training and teach you how to interpret common clinical signs and how to elaborate the most likely diagnosis. In this course you will not only deepen your medical knowledge but also train your diagnostic abilities by using targeted diagnostics.

Tutor: Students  
Location: UR 09

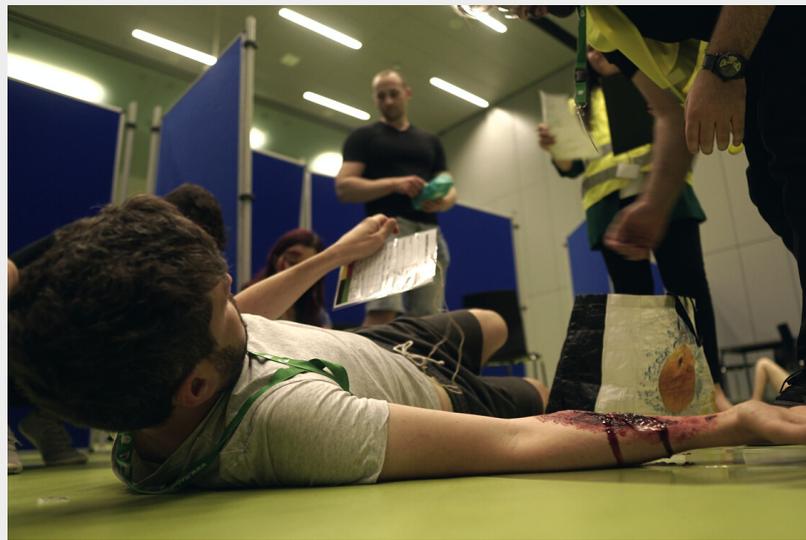
# HANDS ON PROGRAMS

## PRECOURSES II

### ***Disaster Management – Practical Triage and Haemostatis***

This course gives you the opportunity to learn and to train the fast patient-centred care and triage in multiple casualty incidents (MCI). After a short theoretical introduction the participants will train the triage on case studies and the fast treatment of critical bleedings on a training dummy. The highlight will be a big simulation with mimes.

Tutor: Lars Schäfer,  
Jens Korn, Johannes Maierhofer  
Location: MC 05 + UR 10



### ***Motivational Interviewing***

Motivational interviewing (MI) is a counseling approach that helps people find the motivation to make a positive behavior change, if they have mixed feeling about changing their behaviour. This precourse teaches you the basics of MI.

Tutor: Kerstin Pretterhofer  
Location: UR 17

### ***Medicine in Space***

Did you ever wonder, what happens with the human body in space? Do you know, how much an astronaut and your grandparents have in common? In this workshop aspects related to spaceflight physiology, aging and medicine will be presented in a form of lecture. Prof Goswami will clarify these aspects and show the laboratory of Gravitational Physiology Aging and Medicine

Tutor: Nandu Goswami  
Location: Lab of Gravitational Physiology

# ABSTRACTS FRIDAY

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- 12** online session 1
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**FRIDAY**  
***online session 1***

## **Innovative gold (III) derivatives with anticancer activity against colorectal cancer cells**

**AUTHOR(S): I. M. Agnieszczak, S. Lipiec, P. Szymański, A. Gurba, P. Taciak, J. Fichna, I. Młynarczuk-Biały**

*1: Histology and Embryology Students' Science Association at the Department of Histology and Embryology, Faculty of Medicine, Warsaw Medical University, Chałubińskiego 5, 02-004 Warsaw, Poland; 2: Department of Pharmacodynamics, Faculty of Pharmacy, Medical University of Warsaw, 02-097 Warsaw, Poland; 3: Department of Biochemistry, Faculty of Medicine, Medical University of Lodz, 92-215 Lodz, Poland*

### Introduction:

Cisplatin, platinum(II) complex, was the first metal-based agent to enter into clinical use for the treatment of cancer. This successful drug is effective at inhibiting cancer cell activities by producing non-selectively a direct lesion on DNA what produce side effects. Several studies pointed out that the binding affinity of gold complexes for the DNA double helix was relatively low. Thus Au(III) compounds, due to isoelectronicity and isostructurality to Pt(II) have been qualified as excellent candidates for the potential anticancer drug. Therefore, we have synthesised an innovative gold(III)-based drug of the following structure:  $[\text{Au}(\text{CN})_4]_2 (\text{ClO}_2)\text{Na}$ , TGS 121.

### Aim.

The aim of this project was to determine the anticancer potential of novel gold (III) complexes in a colon cancer cells and to discuss their mechanisms of action.

### Material and Methods

We studied cytostatic/cytotoxic effects in the human colon cancer line COLO-205 using the PrestoBlue assay and calculated IC50 values for further experiments. We then performed assays investigating cellular ATP levels, cell apoptosis and necrosis, colony formation assay and cell cycle phase analysis.

### Results:

The tested compounds induced cell death of colon cancer lines in an apoptosis-independent mechanism, inhibited clonal growth and induced a block in the G2/M phase of the cell cycle.

### Discussion:

Our results show that TGS 121 have strong anticancer properties in vitro against human colorectal cancer. The discovery of the effect of these compounds on cell cycle inhibition in the G2/M phase provides a basis for the search for their exact mechanism of action in further tests.

*Impact on medicine: Due to the approximately 50% mortality rate of colorectal cancer new methods of its treatment are urgently needed.*

**A cross sectional study : Use of simulation in team-based learning to enhance performance of undergraduate medical students in emergency medicine care at Sultan Qaboos University: Students' Perception**

**AUTHOR(S): F. A. Al Rajhi**

*Sultan Qaboos University, Oman*

**Introduction:**

Team-based learning (TBL) and simulation are effective educational approaches. However, the impact of combining these methods as part of emergency medicine education (EME) was not reported before. This study evaluated the use of simulation as a tool in TBL in EME.

**Aim:**

To compare pre and post confidence level in knowledge of undergraduate medical students in myocardial infarction and anaphylaxis as emergency medicine presentations using the simulation-TBL methods at Sultan Qaboos University Hospital (SQUH). It also evaluated students' satisfaction.

**Materials & Methods:**

This study included a convenience sample of senior medical students who rotated through Emergency Medicine Department at SQUH from April 2020 to March 2021. Pre and post confidence level in knowledge and students' satisfaction was evaluated using validated questionnaires. 54 students attended the sessions and completed the questionnaires. Wilcoxon signed-rank test and descriptive statistics were used.

**Results:**

38.89% of students in acute coronary syndrome topic and 42.30% of students in anaphylaxis topic had a significant increase in their level of confidence. 36% and 46% of responses indicated an increase in confidence in both topics, respectively. The highest increase in students' confidence was noticed in managing acute emergencies. An agreement percentage of 86% towards the method was noted. Students were satisfied with linking knowledge to practice, alignment with learning and appropriate scenarios for their level of competence.

**Discussion:**

Simulation combined TBL is an effective educational method in enhancing students' confidence with a high level of students' satisfaction noticed. We recommend implementing this method in undergraduate emergency medicine education.

*Impact on medicine: Simulation combined TBL is an effective educational method particularly in enhancing students' confidence in managing patients presenting with acute medical conditions. There is a high level of students' satisfaction towards this approach.*

## **Reversible splenial syndrome induced by antiepileptic treatment**

**AUTHOR(S): I. Halczuk, M. Kuczynska, A. Zbroja**

*Students' Scientific Society at the Department of Interventional Radiology and Neuroradiology,  
Medical University of Lublin, Poland*

We present a case of a woman who reported to the emergency unit due to recurrent episodes of severe headache and collapse. MRI examination revealed no relevant findings apart from small meningioma of the right parietal region. The patient was diagnosed with epilepsy, and received outpatient treatment, which was changed due to poor toleration. A follow-up MRI was performed which revealed an isolated, focal lesion of the splenium of corpus callosum. The patient underwent extensive laboratory testing and antiseizure medications were started again. Another MRI indicated substantial regression of the splenium of corpus callosum lesion. Both the complete clinical image, and results of the diagnostic evaluation spoke in favor of cytotoxic of the corpus callosum associated with anti-epileptic drug treatment. Pathologies involving corpus callosum include congenital, demyelination, infection, neoplasm, trauma and vascular changes. Isolated, non-specific lesions of the splenium of corpus callosum usually indicate multiple sclerosis, however other pathologies should be considered. Anti-epileptic drugs may evoke cytotoxic lesions of the corpus callosum.

## **Bouveret syndrome**

**AUTHOR(S): I. Trkulja, D. Marijanović, L. Brkić, L. Matijašević, O. Deban, P. Matošević**

*1: School of Medicine, University of Zagreb, Zagreb, Croatia; 2: Department of Surgery, University Hospital Centre Zagreb, Zagreb, Croatia*

Bouveret syndrome (BS) is a sporadic form of gastric outlet obstruction due to the impaction of a large gallstone through a cholecystoduodenal fistula into the duodenum. It can be considered a type of gallstone ileus – an extremely rare state, complicating only 0.3-0.5% of patients with cholelithiasis. BS represents 1 to 3% of gallstone ileus.

A 96-year-old male was admitted to the ER after diarrhoea without any trace of blood or mucus, complaining of medium intensity, localised, dull pain in the epigastrium, without nausea or vomiting. Distended stomach and omentum grown to the cholecyst were shown during the surgery. The 4,5 cm gallstone was manoeuvred from the duodenum to the stomach and extracted through the previously made anterior stomach wall gastrotomy. The perforated duodenal bulb was stitched. An entero-enteral and a gastro-enteral anastomosis were performed. The patient was recovering well until the abdominal wall dehiscence required reoperation. He was diagnosed with dyspnoea, hypotension, and tachycardia. Inflammation parameters were high and referred to sepsis that the patient did not successfully carry out. When managing BS, there are many choices – endoscopy, lithotripsy, and open surgery. Although open surgery carries higher mortality and morbidity, in this case, it was inevitable due to the gallstone's dimensions. The most extensive review of 128 cases of BS found that over 85% of patients presented with nausea and vomiting. This case is an example of minority BS and gallstone ileus that did not present with typical symptoms of upper bowel obstruction or gastric obstruction.

Impact on medicine: Bouveret syndrome is an extremely rare cause of gallstone ileus that is by itself very rare. There are no specific guidelines in treatment of this syndrome causing acute obstruction of small intestine. Therefore, any clinical experience can be useful.

## **Extricating The Umbilical Cord Paradox : Is Umbilical Cord Milking the future for cord management in preterm neonates?- A Randomised Control Trial**

**AUTHOR(S): N. N Rao**

*SDM MEDICAL COLLEGE, India*

### Introduction

The protocol of clamping umbilical cord immediately after the birth of the infant has been in the lime light. Most preterm infants today are born by cesarean with and associated risk of low placental transfusion compared to those born by vaginal route. Delayed cord Clamping (DCC) is thus recommended for premature infants to improve blood volume

An alternative to DCC is umbilical cord milking (UCM) in which the unclamped umbilical cord is grasped and blood is pushed toward the infant several times before it is clamped to auto infuse blood into the preterm neonate quickly allowing for immediate transfer of the baby for resuscitation, thus preventing the unethical practice of immediate cord clamping.

### Material and methodes

Preterm neonates born during the study period through C-section and meet the criteria's underwent randomization by lottery method into study(UM) and control (DCC) group and had various hemodynamnic parameters measured post randomisation

Statistical analysis would be performed through the SPSS software (Version 22).

### Results

It is an ongoing RCT and Babies with UCM required fever NICU admission and saw low mortality rates UCM in infants delivered at <33 weeks demonstrated that infants who undergo UCM have higher hemoglobin (Hb) and a lower risk for oxygen requirement at 36 weeks

### Conclusion

By improving the hemodynamics in the first hour of life in preterm neonates, UCM offers many advantages over the conventional DCC and can be effective substitute for the same, especially in preterm who would otherwise have their cord clamped immediately for need of resuscitation. UCM offers added advantage in babies born via cesarean over vaginal delivery who by virtue of mode of delivery have reduced placental transfusion.

Impact on medicine: Improve the present modality of care by evidence based medicine

## **The utility of magnetic resonance in the assessment of renal cancer invasion.**

**AUTHOR(S): K. StępniaK**

*Medical University of Lublin, Poland*

### Introduction and aim:

Triple negative breast cancer (TNBC) stands for the most aggressive breast cancer subtype and is frequently associated with mutations in BRCA1/2 genes. Patients with mutated BRCA1/2 genes can be treated with approved PARP (Poly (ADP-ribose) polymerase) inhibitors. PARP is involved in base excision repair and its inhibition in homologous recombination-deficient cells leads to an increased cell death. The long non-coding RNA Activated by DNA Damage (NORAD) has been implicated in molecular mechanisms associated to carcinogenesis.

As NORAD function is maintaining genomic stability, we examined if combining NORAD knock-down and PARP inhibitor treatment lead to an increased cell death in TNBC cells.

### Methods:

To identify the role of NORAD in breast carcinogenesis, we used a gapmer-mediated silencing in three independent TNBC cell lines and examined its influence on cancer phenotype. We generated BRCA1/2 mutated cell lines by CRISPR/Cas9 based approach to analyze if a combination of NORAD knock-down and PARP inhibitor olaparib effects the expression pattern of DNA repair proteins.

### Results:

The lncRNA NORAD is significantly up-regulated in cancerous tissue of TNBC patients compared to healthy tissue and associated with poor progression-free survival (HR=1.76, (1.3 – 2.39), p-value: 0.00024; n=417). We found a reduced cellular growth in cells with decreased NORAD levels. The combination of NORAD knock-down and PARP inhibitor olaparib influenced the expression pattern of several DNA repair proteins.

### Conclusion

First data suggest a role of NORAD in TNBC and combining a targeting approach of NORAD and PARP inhibitors might significantly impact DNA repair mechanisms.

## **Characterization of the Novel Tumor Suppressive MicroRNA miR-4646 in Triple Negative Breast Cancer**

**AUTHOR(S): K. Jonas**

*1: Department of Internal Medicine, Division of Oncology, Medical University of Graz, Austria; 2: Research Unit for Non-Coding RNAs and Genome Editing in Cancer, Division of Oncology, Medical University of Graz, Austria; 3: Department of Experimental, Diagnostic and Specialty Medicine, University of Bologna, Italy*

Triple negative breast cancer (TNBC) is a breast cancer subtype that appears particularly aggressive and difficult to treat. As microRNAs (miRNAs) have been found to contribute to virtually all types of cancer, the aim of this study was to identify a novel miRNA involved in TNBC.

We initially identified miR-4646 in a genome-wide expression study of 3D breast cancer spheres. To determine whether miR-4646 might possess clinical relevance, we analyzed the survival of breast cancer patients from a Cancer Genome Atlas (TCGA) dataset. We then started an in vitro characterization of miR-4646 in TNBC cell lines by overexpression as well as inhibition. We performed various growth and migration assays and assessed the effect on apoptosis, proliferation, stemness and endothelial tube formation. By RNAseq analysis, target predictions and luciferase-based reporter assays we eventually identified a target of miR-4646. Our study found low expression of miR-4646 to be associated with poor survival of TNBC patients. In vitro growth assays showed that overexpression of miR-4646 resulted in decreased TNBC cell numbers whereas inhibition had the opposite effect. Moreover, increased caspase 3/7 activity and cleavage of PARP hinted at the induction of apoptosis. We also observed decreased/increased migration upon overexpression/inhibition, respectively. In addition, we found that miR-4646 impedes tube formation of endothelial cells and reduces aldehyde dehydrogenase activity, a marker for stemness, in TNBC cells. We identified GRAMD1B, a protein involved in cholesterol homeostasis, as a direct target of miR-4646. To conclude, this study revealed miR-4646 as a novel tumor suppressive factor in TNBC.

**FRIDAY**  
***varia 1 - oral***  
***session***

## **Covid-19 Infection: A New Etiology For Acute Pancreatitis – Case Report**

**AUTHOR(S): R.-G. Peia**

*1: University of Medicine and Pharmacy "Iuliu Hatieganu" Cluj-Napoca, Romania; 2: Emergency Clinic Hospital for Children, Pediatric Clinic I, Cluj-Napoca; 3: Emergency Clinic Hospital for Children, Department of Radiology and Medical Imaging, Cluj-Napoca*

### Introduction:

Acute pancreatitis is a common disease with an average annual increase of 2,7%, worldwide. Childhood pancreatitis is mainly caused by viral infections, and Covid-19 infection proves to be a new cause of this disease.

### Aim:

The main purpose is to educate how and why we should take into consideration acute pancreatitis as a post Covid-19 complication.

### Case presentation (material and methods, results):

We report the case of a 9-year old child who was diagnosed in 2013, at 4 months, with a very rare disease, named ALCAPA syndrome (a congenital anomaly in which the left coronary artery arises from the pulmonary artery), for which he underwent surgery immediately after being diagnosed. In January 2022, he was admitted to the Emergency Clinic Hospital for Children, Pediatric 1 for acute pancreatitis. The diagnosis was confirmed by a thoraco-abdominal-pelvic CT scan following the ultrasonic examination and also by the level of serum amylase(1300 U/l). After the CT scan the patient was transferred to the ICU Pediatric Surgery Clinic. The therapeutic approach consisted of antibiotic treatment, hydroelectrolytic rebalancing, anticoagulants and gastric antisecretory drugs. Subsequently, the patient had a favorable clinical evolution.

### Discussions and conclusions:

This case is a complex one because of the complications that occurred after the Covid-19 infection. Specifically in children, acute pancreatitis is a disease that requires a multidisciplinary team consisting of: a pediatrician, a surgeon, a radiologist and an anesthesiologist.

Impact on medicine: The aim of this report is to raise awareness about the variability of acute pancreatitis' etiologies, including one of nowadays' biggest interest among physicians. Therefore, detecting this etiology and subsequently treat it is of mere importance.

## **Biohacking: An exploratory study of application in prepartum, labor and postpartum periods**

**AUTHOR(S): L. Z. Fortuna, S. M. Shrestha**

*KMU Kyiv Medical University, Ukraine*

To assess the efficacy of safe biohacking practices on prepartum, labor, and postpartum periods, a comprehensive electronic bibliographic database search was carried out. Four oral supplements containing ginger root, quince fruit, date fruit, and a probiotic containing Lacto- and Bifidobacteria were investigated in order to assess the effectiveness and estimate the potential for self-administration leading to beneficial outcomes in females during and post-pregnancy as well as influence on labor quality. Based on the evidence, the review suggests that the selected supplements should be considered a harmless and uprightly effective alternative options for women needing professional pharmacotherapeutic assistance during prepartum, labor, and postpartum periods.

*Impact on medicine:* Overview and summary of the available evidence exploring the beneficial influence of various supplement consumption on prepartum, labor, and postpartum periods

## **Cytomorphological features of bronchoscopic samples in patients with non-small cell lung cancers**

**AUTHOR(S): N. Gardić**

*1: University of Novi Sad - Faculty of Medicine, Serbia; 2: Institute for Pulmonary Diseases of Vojvodina, Sremska Kamenica, Serbia*

### Introduction:

With advances in lung cancer pharmacotherapy, non-small cell lung cancer (NSCLC) typing has become crucial. Namely, the wrong therapeutic protocol for a particular subtype of lung cancer will not improve the patient's condition and could cause complications.

### Methods:

The retrospective study included 108 patients. Cytology samples obtained by the bronchoscopy were assessed by using qualitative cytomorphological parameters; the presence of necrosis, cell distribution, nuclear atypia, nucleus size and visibility of nucleolus. An experienced cytologist evaluated all the samples.

### Results:

Presence of necrosis wasn't a significant parameter in determining tumor type. Cell distribution in small clusters form proved to be a significant parameter and was found in 17.95% of SQ, while it was far more common in ADC and O (>50%). Large clusters also proved to be a significant parameter, and it was found in almost half of SQ samples, while in ADC and O were 5.36% and 7.69%, respectively. Nuclear atypia wasn't a significant parameter. Nucleus size proved to be a significant parameter in the diagnostics of SQ. Nuclei sized >5 lymphocytes were found in only 10.25% of SQ samples. Nucleus size in 89.75% SQ samples was <5 lymphocytes. Regarding ADC, 16.07% contained cells whose nuclei were <3 and 83.93% were >3 lymphocytes. Nucleolus visibility in tumor cells proved to be a significant parameter for ADC, presented in 92,86% of cases.

### Conclusion:

Some of the examined cytomorphological parameters have proven to be very useful in diagnosing NSCLC, while some are very uncertain, and the cytologists shouldn't rely on them in their daily work.

Impact on medicine: Along with other studies on this topic, we think that this study could be the basis for forming a cytological score that will increase the sensitivity and specificity of cytological diagnosis of non-small cell lung cancer.

## **CA Clinical Overview Of Cystic Fibrosis – Case Report**

**AUTHOR(S): M. Dobos**

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### Introduction:

Cystic fibrosis (CF) is an autosomal recessive disease of exocrine gland function that involves multiple organ systems, resulting in chronic respiratory infections, pancreatic enzyme insufficiency, and associated complications. It is caused by loss-of-function mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene.

### Aim:

The main purpose of this case report is to raise awareness about the complications that may occur in this disease.

### Case presentation(material and methods, results):

We report the case of a 19-year old female, who was diagnosed with cystic fibrosis at the age of 2 months, based on the result of sweat chloride test. The diagnosis was later confirmed at the age of 2 years by molecular genetic testing, which revealed delta F508/CFTR del 2.3 mutation. Later, the patient developed multiple complications: liver cirrhosis at the age of 4 with progression to hepatic decompensation at 13 years old, cystic fibrosis-related diabetes at the age of 15, pulmonary bacterial infections with *Staphylococcus aureus* and then *Pseudomonas aeruginosa* (at 15 and 16 years old, respectively). The treatment approaches were initiated promptly with common medication for this disease. As several complications developed, specific medication was associated, such as: antibiotic therapy for pulmonary infections, liver cirrhosis therapy with hepatoprotective, diuretics and beta-blockers, and insulin for diabetes. The evolution of this case was stationary.

### Discusions and conclusions:

The complexity of the clinical expression of cystic fibrosis requires a multidisciplinary team and multiple investigations, in order to detect and treat the complications as early as possible.

*Impact on medicine:* The main aim of this case report is to educate and give expression to what can cystic fibrosis lead to, thereby gaining a deeper awareness of the therapeutic approaches for this disease.

## **The Usefulness of Vanin-1 and Periostin as Markers of an Active Autoimmune Process or Renal Fibrosis in Children with IgA Nephropathy and IgA Vasculitis with Nephritis - a Pilot Study**

**AUTHOR(S): E. J. Platos**

*Department of Pediatrics and Nephrology, Medical University of Warsaw, Poland*

This study aimed to evaluate the usefulness of vanin-1 and periostin in urine as markers of the autoimmune process in kidneys and renal fibrosis in IgA nephropathy (IgAN) and IgA vasculitis with nephritis (IgAVN). From a group of 194 patients from the Department of Pediatrics and Nephrology, who were included in the Polish Pediatric Registry of IgAN and IgAVN, we qualified 51 patients (20 with IgAN and 31 with IgAVN) between the ages of 3 and 17, diagnosed based on kidney biopsy, for inclusion in the study. All of the patients received glucocorticosteroids, immunosuppressive drugs, or renoprotective therapy. The control group consisted of 18 healthy individuals. The concentration of vanin was significantly higher in the IgAN and IgAVN groups than in the control group. The concentration of vanin/creatinine correlates positively with the level of IgA and negatively with the serum level of C3 at the end of the observation. Urinary vanin-1 concentration may be useful as a marker of the active autoimmune process in IgAN and IgAVN in children, but the study needs confirmation on a larger group of children, along with evaluation of the dynamics of this marker. Urinary periostin is not a good marker for children with IgAN and IgAVN, especially in stage 1 and 2 CKD.

*Impact on medicine:* This study aimed to finding the marker which could confirm autoimmune inflammatory process in kidneys and renal fibrosis in IgAN and IgAVN and succeed renal biopsy as a less damaging test

**FRIDAY**  
***young science -***  
***oral session***

## **Plant feeding green pea fowl and finding regions of similarity between biological sequences of human plant nutrition**

**AUTHOR(S): C. Chantaboon, N. Kangonta, A. Chaidee, W. Pfeiffer, C. Wongchai**

*University of phayao / School of science, Thailand; 2Division of Biology, School of Science, University of Phayao, Phayao, 56000, Thailand; 3Center of Excellence in Environment and Plant Physiology, Department of Botany; 4Fachbereich Biowissenschaften, University Salzburg, 5020, Salzburg, Austria*

Thailand is one of the biggest stronghold of green pea fowl population in the world. Plant feeding green pea fowl contains high essential nutrition for vitality, anti-oxidant components and dietary fiber. Finding regions of similarity between biological sequences of human plant nutrition will improve the study of nutritional and function quality related anti-disease properties. Bioinformatics analysis plays a significant role in medical crops improvement technology for food and drug development. Nutritional deficiency and long-term starvation leads to atrophy of cells and tissue, muscle wasting, decreased stature and increased susceptibility to infection and host of other diseases. This work aims to compare genetics sequence of plant feeding green pea fowl to human plant cereals, pulses and fruits and vegetables, especially medical functions related regions for health and disease improvement

*Impact on medicine:* Finding regions of similarity between biological sequences of human plant nutrition will improve the study of nutritional and function quality related anti-disease properties. Bioinformatics analysis plays a significant role in medical crops improvement.

## **Cannabis: Medicinal crop for Thailand and Austria 2022**

**AUTHOR(S): C. Wongchai, A. Chaidee, W. Pfeiffer**

*1Division of Biology, School of Science, University of Phayao, Phayao, 56000, Thailand.; 2Center of Excellence in Environment and Plant Physiology, Department of Botany, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand.; 3Fachbereich Biowissenschaften, Universität Salzburg, 5020, Salzburg, Austria.; 4Apinya Medical CO.LTD -Thailand and Cannabis Catalysts-Austria.*

Thailand and Austria celebrate 150 years of friendship in 2019. Both countries support each other in science and technology for research and education development, especially natural science (University of Salzburg) and medical knowledge (Medical University of Graz). During 2020-2022, the University of Phayao-Thailand provides Cannabis research with Apinya Medical CO.LTD -Thailand under the cooperation of technology from Cannabis Catalysts-Austria. Medical crop of cannabis in pilot-scale and smart greenhouse use as the growing site for biological experiment and observe for plant medical properties. Cannabis cloning in Austria is under the current law, cannabis can be cultivated in Austria, as long as it is not used for obtaining narcotics but not going to be used to harvest THC. The law does not limit the THC content of the plants though, so both high-THC or high-CBD plants can legally be grown. Moreover, Austria hosts a few major cannabis events throughout the year in Vienna. These include 1. Wiener Hanfmesse, is a notable expo, showcasing some of the cannabis industry's most innovative with exciting products. 2. Cultiva Hanfmesse, which focuses on the role of cannabis in medicinal practice. 3. Hemp Festival, exhibits cannabis products. Cooperation for medical research and crop improvement is an urgent concern and develop

## **New-Eco Food warrior and health concern: Alcohol, organic acid and sugar contents in local botanic winery and sugar contained drink in Thailand**

**AUTHOR(S): J. Nata, K. Sudjai, P. Prachamthong, T. Panyayong, A. Thumngern, A. Chaidee<sup>2</sup>, W. Pfeiffer, C. Wongchai**

*University of Phayao/School of Science, Thailand; <sup>2</sup>Center of Excellence in Environment and Plant Physiology, Department of Botany, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand; <sup>3</sup>Fachbereich Biowissenschaften, Universität Salzburg, 5020, Salzburg, Austria.; <sup>4</sup>Division of Biology, School of Science, University of Phayao, Phayao, 56000, Thailand*

Alcohol and sugar consumption causes health problems such as diabetes, heart disease and also make hypoglycemic medications less effective when human drink alcohol during on medicine. It was reported that, with out health awareness, Thai labors daily drink alcohol after hard work and consume lots of sugar contained energy drink during outdoor work. This work aims to analyze sugar content (Brixo and g/mL), alcohol content (% v/v), and organic acid content (g/mL) in six Sathos, eleven fruit wines and twenty-one sugar contained drinks from supermarket. The result show that Apple Satho contains highest sugar and sweetest (20.04 Brix), blackcurrant wine (Gold Serie) has high sucrose and citric acid content (284 mg/ml; 43 mg/ml). The highest alcohol content is apple Satho (Sakthong; 11.02 % v/v). The lowest sugar in wine is cantaloupe (10.32 Brix) while the alcohol content is lowest (5.68 % v/v). Sugar contained drink from energy drink, soft drink and fruit juices show significantly different in soluble sugar (Brix). Moreover, varieties of fruits and flowers mixed wine and Satho will use to promote food and beverage innopolis as New-Eco Food warrior and concern health problems. This project support Thailand and local Thai business and provide STEM education cooperate with community empowerment. However, drink-awareness strategy should install for Thai labors and the government should provide the health care system for people who over consume alcohol and sugar contained beverage.

## **Study of Cannabis culture for develop the properly conditions to improve aches relief properties**

**AUTHOR(S): J. Puttharak, S. kiddee, P. kaenkaeo, W. Pfeiffer, C. Wongchai, P. Puttharak**

*Demonstration School University of Phayao, Phayao 56000, Thailand; 2: Fachbereich Biowissenschaften, Universität Salzburg, 5020, Salzburg, Austria.; 3: Division of Biology, School of Science, University of Phayao, Phayao, 56000, Thailand.*

Nowadays, the cannabis plant is especially widely known in medical field as a plant with psychotropic effects. Cannabis is a plant that have an essential role from the treatment of diseases. Each country has begun to use cannabis as an ingredient in a lot of medicines in particularly due to pain from injuries. The aim of this research is for study the extracts of cannabis, CBD and THC, as well as studying the optimal environments in cannabis cultivation for CBD and THC to be effective and to relieve pain. Starting from the introduction of plant buds, shoots, and merited were sterilized and cultured with MS formulations in which 5 different concentrations of NAA and BA were added for 7 weeks. The cultured cannabis bouquets were then extracted for THC and CBD using SFE (Supercritical Fluid Extraction). The extracts were then analyzed for THC and CBD content in the extracts by HPLC (High-performance liquid chromatography) method and observed the suitable environment for cultivating cannabis to receive large amounts of THC and CBD for further medical use. This study is in the process of implementation.

Impact on medicine: In this research, we study about cannabis in medical field as well as explored the optimal growing conditions for the cannabis plant to improve aches relief properties.

**FRIDAY**  
***online session 2***

## **Application of bioinformatics and system biology in *Gardenia Sootepensis* Hunt for antivirus activity and inhibitors of SARS-CoV-2 main protease studies**

**AUTHOR(S): K. Suksup, W. Kiddee, A. chaidee, W. Pfeiffer, C. Wongchai**

*Demonstration School University of Phayao, Phayao 56000, Thailand; 2: Center of Excellence in Environment and Plant Physiology, Department of Botany, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand; 3: Fachbereich Biowissenschaften, Universität Salzburg, 5020, Salzburg, Austria.; 4: Division of Biology, School of Science, University of Phayao, Phayao, 56000, Thailand.*

*Gardenia Sootepensis* Hunt (Golden Gardenia) belongs to the family Rubiaceae which spreads among Northern to Southern Thailand. More than ten chemical constituents belonging to different classes of bioactive compounds have been reported and the plant has been found to possess potent biological activities, especially antiviral, anti-inflammatory and neurosurgical. However, it is still unclear whether bioinformatics and system biology of various phytochemical (Geniposide, 7,4'-Dihydroxyflavone, Oleanolic acid, Quinide etc.) and protease inhibitor of SARS-CoV-2 genes. Therefore, this study aims to evaluate regions of similarity between biological sequences of Golden Gardenia and others antivirus herbs and protease inhibitor of SARS-CoV-2 from plants. Moreover, Phyto-stem cell of Golden Gardenia is developing for various bioactive compound extracts and biological activity analysis. The HPLC and molecular genetics analysis are essential to support this work and conduct the pharmaceutical development

Impact on medicine: to provide the researchers with a comprehensive profile of the method of making Phyto-stem cells and the medicinal potential of Golden Gardenia for the development of anti-CoVs to highlight some present issues and future perspectives as well as to help us

## **The Influence of Photobiomodulation in the CAM-Assay – A Prospective Study** **AUTHOR(S): B. Firouz, L. Faihs, P. Dungal, N. Ghaffari Tabrizi-Wizsy, K. Schicho**

*Medical University of Vienna, Austria; 2: Ludwig Boltzmann Institute for Traumatology, Austria; 3: Medical University of Graz, Austria*

### Background:

Wound healing is of fundamental importance for the organism. Low-Level-Light-Therapy (LLLT) is an approved therapeutic option with a wide range of applications. The research of LLLT on the healing of wounds in humans is challenging, as wounds show a great heterogeneity and equal study conditions are difficult to establish. To understand the impact of LLLT on wounds the chick chorioallantoic membrane (CAM) is used in this study.

### Aim:

The aim of this study is to establish a new burn wound study model and to investigate the potential effect of LLLT.

### Material and Methods:

For the aim of our study, an ex ovo model offers many advantages. On the 8th day of incubation, burn wounds were applied on the surfaces. The CAM's of the intervention group were exposed to LLLT for 12 minutes daily. All CAM assays were imaged daily. Differences in length, area, and vessel sprouting of the combustion between both groups were analyzed.

### Results:

The number of the capillary sprouts were significantly higher in the treatment group on day 4 of treatment (32,5 vs. 27)  $p < 0.05$ . Furthermore, we could detect a significant difference in the length (2,22 vs. 1,74) and area of the burn wounds (4,1 vs. 2,65)  $p < 0.05$ .

### Conclusion:

Using this model, we could show that LLLT might have beneficial effects on the healing of burn wounds through accelerated wound healing and an increased vascularisation. Consistent with this are findings in the literature suggesting a positive effect of the LLLT on reepithelialization in vivo.

*Impact on medicine: With this study we tried to investigate new ways of treating wounds, to provide future patients with the best possible chances of recovery.*

## **Endometrial immune cells which ensure the onset of pregnancy**

**AUTHOR(S): N. O. Shapovalenko, B. V. Dons'koi**

*Bogomolets National Medical University, Ukraine; 2: Laboratory of Immunology, Institute of Pediatrics, Obstetrics and Gynecology, National Academy of Medical Sciences of Ukraine, Ukraine*

### *Introduction*

*For a woman an embryo is a foreign genetic material, which immune system is designed to protect against. For a normal pregnancy to happen, the immune system must change. Otherwise, immunological infertility occurs.*

### *Aim*

*Knowing how endometrial immune cells function in a normal setting, we will understand why women have implantation failures.*

### *Methods*

*The endometrium was collected from 22 healthy women on ovulation day (OV) and 23 healthy women during the implantation window (IW). NK and T-cells' features were evaluated in the collected endometrium. We used flow cytometer FACScan (BD Biosciences) to measure CD158 - receptors that prevent NK and T-cells from activating and killing, HLA-DR - sign of inflammation and InStat for Windows for statistical analysis.*

### *Results*

*Samples collected in IW compared to OV showed a significant increase of the number of NK-cells (95%CI 42.48-53.13; p-value<0.00001; tStat=-5.26) and CD158a on NK-cells (95%CI 34.18-49.22; p-value<0.00001; tStat=-5.08), decreased HLA-DR expression on NK-cells (95%CI 9.69-15.04; p-value=0.00004; tStat=4.53) in endometrium.*

*Meanwhile, the number of T-cells was lower during IW (95%CI 31.87-42.52; p-value=< 0.00001; tStat=5.26) without differences in HLA-DR production on their surface (95%CI 39.21-46.98; p-value=0.628931; tStat=0.48). CD158 expression on T-cells was higher during IW (95%CI 9.41-25.89; p-value=0.01; tStat=-2.69).*

### *Discussion*

*We investigated the characteristics of endometrial NK and T-cells. During IW, the number of NK-cells increases, however, they become more mature with higher CD158 expression and less active with lower HLA-DR expression. The number of T-cells decreases without any changes in HLA-DR expression. These changes suggest NK-cells are crucial for successful embryo implantation.*

*Impact on medicine: This work will help us to understand how the embryo implantation occurs in a normal setting. If we know this, we will establish why women have implantation failures.*

## **A survey to consider a surgeon's visual parameters and other attributes have an effect on the safety and rate of complications in eye surgery?**

**AUTHOR(S): F. Elahi, A. Raj**

*Ovidius University, Constanta, Romania; 2: Russells Hall Hospital, Dudley, United Kingdom*

### *Aims:*

*To investigate different factors which may play a factor in the affecting the safety of eye surgery.*

### *Method:*

*A survey comprising of 22 questions was designed using Survey Monkey to be shared to members of the Midlands Ophthalmic Society. With this survey we will use their opinions to inspire deeper research as this question calls for testing and examining surgical records.*

### *Results:*

*We received 72 responses. 77.78% were consultant ophthalmologists. 88.89% were right handed, 6.59% were left handed. The consensus was that ambidextrous surgeons were considered as the safest surgeons. 30.99% felt that there wasn't suitable surgical equipment for left handed surgeons. Only one clinician was colour-blind. 52.11% felt that there was no significant evidence to suggest that colour-blindness would impact surgical results. 67.61% had 20/20 vision and 90.14% felt that visual acuity is an important trait in surgeons. 53.52% agree on the idea of regular testing for the aforementioned factors. 40.28% never had their stereo-acuity measured. 26.76% say that an ophthalmology trainee should be tested once before joining the speciality then every five years thereafter. Other opinions suggested that there should be a self-check if the surgeon felt that their ability to perform surgery was deteriorating in any way. 35.21% disagreed with the idea of having a screening process at university.*

### *Conclusion:*

*Factors such as visual acuity and stereoacuity present an impact on the safety of eye surgery, but it doesn't confirm if handedness or colour-blindness have an effect on the safety of eye surgery.*

*Impact on medicine: This study aims to bring awareness into obstacles that surgeons need to overcome and how we can best accommodate surgeons who lack necessary provisions, we can ensure patient safety isn't compromised.*

## **Promus Premier Stent in Unstable Angina: A Case Report**

**AUTHOR(S): O. M. Voll, C. Clasen, E.-M.S. Haftstein, M. Pop. MD. PhD**

*University of Medicine and Pharmacy of Targu Mures, Romania*

### *Introduction:*

*Main cause of unstable angina is an atherosclerotic plaque, incidents increasing with age. Patients have an increased risk of cardiac events such as myocardial infarction.*

*Aim: The aim of this study is to control with a clinical case the studies suggesting coronary artery stenting has short- and long-term benefits in unstable angina.*

### *Patient and Methods:*

*A 44-year-old patient presented in emergency with burning precordial pain at minimal effort and rest with superior left radiation accompanied by dyspnea. The ECG at admission showed right bundle branch block, ST elevation of 0.5mm in aVL, and ST depression in D2, D3, aVF, and T-wave was negative in D3 and biphasic in aVF. Echocardiography showed a light hypokinetic inferior wall. Coronary CT showed a significant stenosis with a plaque in proximal third of the right coronary artery (RCA). Coronarography showed the RCA with a 25-50% stenosis in the first segment (SI) and subocclusive in the second segment (SII).*

### *Results:*

*The lesion at the level of RCA SII was approached and a Promus Premier 3.5/20mm stent expanded with 14atm was placed. The result was good without dissection and residual stenosis. Post-angioplasty ECG showed sinus rhythm with 55bpm and a biphasic T-wave in D3 and aVF.*

### *Discussion:*

*Especially pharmacologically active stents such as Promus Premier seem to have beneficial effects for the patient. The patient now has a TIMI III meaning full perfusion and normal flow.*

*Impact on medicine: To confirm that the current treatment with drug-eluting stents is a good method to ensure proper blood flow in unstable angina.*

## **Genetics aspects and volatile oil of floral fragrance in ornamental flowering plants AUTHOR(S): J. Khumthonkool, K. Khampok, A. Chaidee, W. Pfeiffer, C. Wongchai**

1: University of Phayao / School of science, Thailand; 2: Center of Excellence in Environment and Plant Physiology, Department of Botany, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand; 3: Fachbereich Biowissenschaften, Universität Salzburg, 5020, Salzburg, Austria.; 4: Division of Biology, School of Science, University of Phayao, Phayao, 56000, Thailand

From the study of genes that control aromatic and odor generation in *Oryza sativa* subsp. *japonica* (betaine aldehyde dehydrogenase 2 (BADH2), Q84LK3/ Protein sequence) and *Petunia hybrida* (S-adenosyl-L-methionine: benzoic acid/salicylic acid carboxyl methyltransferase 1 (BSMT1), Q84UB5/Protein sequence), the report showed that gene expression was found in rice grain and flower part, respectively. To answer the questions about the fragrant of flowers which partially similar to *Oryza sativa* subsp. *japonica* or *Petunia hybrida*, this research, therefore, studied the bioinformatics of the gene in more than 25 flower species that are expected to exhibit both aromatic related genes. The align of biological sequence found that Protein coding of BADH2 shows the correlation to 16 plant species (Per. Ident 75.00-79.00%) as the following, *Camellia sinensis* (Theaceae), *Helianthus annuus* (Asteraceae), *Nelumbo nucifera* (Nelumbonaceae), *Prunus mume* (Rosaceae) and *Vanilla planifolia* (Orchidaceae) Protein coding of BSMT1 shows the correlation to 18 plant species as the following, *Agave amica* (Asparagaceae; Per. Ident 54.47%), *Antirrhinum majus* (Solanaceae; Per. Ident 56.76%), *Camellia sinensis* (Theaceae; Per. Ident 65.85%), *Handroanthus impetiginosus* (Bignoniaceae; Per. Ident 60.60%), *Jasminum sambac* (Oleaceae; Per. Ident 59.89%), *Lilium hybrid cultiva* (Liliaceae; Per. Ident 42.46%), *Nymphaea thermarum* (Nymphaeaceae; Per. Ident 34.96%), *Oryza sativa Japonica* (Poaceae; Per. Ident 41.11%), *Prunus armeniaca* (Rosaceae; Per. Ident 48.51%), *Rhododendron simsii* (Ericaceae; Per. Ident 63.23%), *Stephanotis floribunda* (Apocynaceae; Per. Ident 62.36%), and *Vanda hybrid cultivar* (Orchidaceae; Per. Ident 42.98%). This work support alternative aromatherapy from flower and aroma-crop for medical use.

## **Bioinformatics and genetic relationship of Avian malaria parasites in the world**

**AUTHOR(S): P. Khamkaew, P. Wonghan, A. Chaidee, C. Wongchai, W. Pfeiffer**

*1: University of Phayao / School of science, Thailand; 2: Center of Excellence in Environment and Plant Physiology, Department of Botany, Faculty of Science, Chulalongkorn University, Bangkok, 10330, Thailand; 3: Division of Biology, School of Science, University of Phayao, Phayao, 56000, Thailand.; 4: Fachbereich Biowissenschaften, Universität Salzburg, 5020, Salzburg, Austria.*

*Avian malaria caused by Plasmodium parasites, especially, infects various birds in tropical and temperate zone. The Plasmodium relictum is the most common, when migratory bird such as Alauda arvensis (Skylark), Anas acuta (Pintail duck) and Spheniscidae family (Penguin) spread out around Europe, Asia, Africa and North America and carry a disease engender infection to local bird or endangered species. Avian Plasmodium transmitted by mosquitoes and density of vector related to the danger of spread out. The recent studies were reported DNA sequence of Avian malaria parasites which indicate genetic diversity and the possibility of existence, but there is rare information about description and molecular data of Plasmodium species in bird. The focus of this study is attempted to encompass Plasmodium species which infected in bird around the world by using 27 genomic information of Plasmodium parasites in NCBI (GenBank) to evaluating the impact of genetic relationships and then identifying type of host species and environment based on biogeography data. The findings indicate that, highly significant similarity conserved sequence of Plasmodium gallinaceum (accession no. AAM47771.1) gene which infected in genus Gallus showed 96-99% identity and query cover 100% with 0.0 of E-value were found in 11 Plasmodium species. The Plasmodium lopherae (accession no. CAA25698.1) that can be found in Lophura diardi (Fire-backed Pheasant) which is Galliformes and Phasianidae groups which is local animal in northern Thailand. showed only 1 result with 85.71% identity of Plasmodium gallinaceum (accession no. XP\_028530795.1) which is the most common in Thailand.*

*Impact on medicine: The focus of this study is attempted to encompass Plasmodium species which infected in bird around the world by using 27 genomic information of Plasmodium parasites in NCBI (GenBank) to evaluating the impact of genetic relationships.*

**FRIDAY**  
***poster session 1***

## **Investigation of the role of fibroblasts in the morphogenesis of branched organs (original basic research)**

**AUTHOR(S): D. Belisova, A. Kuony, E. Grofova, J. Sumbal, Z. Koledova**

1: Department of Histology and Embryology, Faculty of Medicine, Masaryk University, Brno; 2: Institute for Neurosciences, University of Montpellier, Montpellier

### **INTRODUCTION:**

*Branching morphogenesis is a developmental process of many organs, which require large epithelial surfaces created within limited volume to fulfill their functions. Epithelial-mesenchymal interactions play a crucial role in the regulation of branching morphogenesis. Mesenchymal fibroblasts provide crucial signals for epithelial morphogenesis, but their exact roles, both general and organ-specific, have not been fully elucidated.*

*AIM: In this study we aim to investigate characteristics, distribution and function of Fsp1+ and Col1a2+ fibroblast populations in two branched organs: mammary gland and lacrimal gland.*

### **METHODS:**

*We use mouse models for labeling (Fsp1-Cre;R26mT/mG and Col1a2Cre-ERT; R26mT/mG) and depletion (Fsp1-Cre;DTA and Col1a2Cre-ERT;DTA) of different fibroblast subpopulations, including and Col1a2+ fibroblasts. We analyze mammary and lacrimal gland tissue at specific developmental stages (embryonic, pubertal, virgin adult, pregnancy) by histology and immunofluorescent staining techniques, tissue clearing techniques and state-of-the-art imaging approach. Procedures involving live animals were approved by the Ministry of Agriculture of the Czech Republic (project license MSM-T-9232/2020-2).*

### **RESULTS:**

*We found that Fsp1+ and Col1a2+ cells are different cell populations and have distinct morphology and spatial distribution. While Fsp1+ cells are dispersed in stroma and have more rounded morphology, Col1a2+ cells are spindle-shaped and often localize in close contact with the epithelium. Depletion of Fsp1+ and Col1a2+ cells abrogated epithelial growth, suggesting important role of Fsp1+ and Col1a2+ cells in epithelial morphogenesis.*

### **DISCUSSION:**

*Our study brings new insights into fibroblasts biology and contributes to better understanding of their role in development of branched organs.*

*Acknowledgement: Supported by projects no. MUNI/G/1446/2018 and MUNI/IGA/1311/2021.*

*Impact on medicine: Proper understanding of the role of fibroblasts in normal development is crucial for cancer therapy advancement, where in breast cancer the fibroblasts stand for most prevalent cell type.*

## **Comparison of dried blood spots and plasma samples for detection of Anti-Rubella Virus IgG**

**AUTHOR(S): S. Amenitsch**

*FH Kärnten, Austria*

### *Introduction:*

*Rubella virus disease causes a mild skin rash that often occurs in childhood. It is highly contagious and gets transmitted primarily through the respiratory tract. Rubella can also be transmitted vertically. Especially in early pregnancy, this is a serious condition leading to miscarriage or congenital rubella syndrome (CRS). CRS includes blindness, deafness, congenital heart defects, and mental retardation of the fetus. In order to avoid these complications, the vaccination safety among the population has to be controlled tightly. Venous blood sampling may limit the frequency and extent of controls as it is not minimally invasive. It gets complicated by many factors, such as e.g., fear, vasoconstriction, multipunctured veins, rolling veins, or delicate pediatric veins. In addition, collection, shipping, and storage of plasma samples is expensive and laborious. The use of dried blood samples (DBS) would simplify this monitoring because this method is minimally invasive and requires a small sample volume only.*

### *Aim:*

*The aim of this research is to validate the detection of the rubella IgG antibody titre from DBS compared to plasma samples.*

### *Patients and Methods:*

*Plasma and DBS samples are collected from healthy volunteer subjects. Rubella virus IgG analyses are performed on the Euroimmun Analyzer I using the Anti-Rubella Virus ELISA IgG Kit (Euroimmun).*

### *Results:*

*The experiments are still in the process of being conducted.*

### *Discussion:*

*The DBS method could serve the rapid and comprehensive proof of the vaccination protection against rubella. Subsequently this knowledge could help develop better vaccination strategies for the population in the future.*

## **MicroRNA profiling in umbilical cord blood of pregnancies complicated by maternal metabolic derangements**

**AUTHOR(S): S. Wertschnig, G. Jäger, J. Strutz, U. Hiden**

*1: Institute of Biomedical Science, Carinthia University of Applied Science, Klagenfurt, Austria; 2: Department of Obstetrics and Gynecology, Medical University of Graz, Graz, Austria*

### *Introduction:*

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### *Results:*

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### *Discussion:*

*The DBS method could serve the rapid and comprehensive proof of the vaccination protection against rubella. Subsequently this knowledge could help develop better vaccination strategies for the population in the future.*

**FRIDAY:**  
***internal medicine -  
oral session***

## **Rosiglitazone Suppresses Renal Crystal Deposition by Ameliorating Tubular Injury Resulted from Oxidative Stress and Inflammatory Response**

**AUTHOR(S): X. Sun**

*Department of Urology, Medical University of Graz, Austria*

*Oxidative stress and inflammatory response are closely related to nephrolithiasis. This study aimed to explore whether rosiglitazone (ROSI) could reduce renal calcium oxalate (CaOx) deposition by ameliorating oxidative stress and inflammatory response.*

*Male C57 mice were equally divided into 7 groups (ID: TJ-A20180206). Pizzolato staining and polarized light optical microscopy were used to detect crystal deposition. PAS staining and TUNEL assay were performed to assess the tubular injury and cell apoptosis, respectively. Gene expression was assessed by immunohistochemistry, immunofluorescence, ELISA, qRT-PCR, and western blot. Reactive oxygen species (ROS) level, Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>), malonaldehyde (MDA), and glutathione (GSH) were evaluated to determine oxidative stress. Adhesion of CaOx monohydrate (COM) crystals to HK-2 cells was detected by crystal adhesion assay. HK-2 cells death or renal macrophage polarization was assessed by flow cytometry.*

*In vivo, renal crystal deposition, tubular injury, crystal adhesion, cell apoptosis, oxidative stress, and inflammatory response were significantly increased in the 7-days glyoxylic acid (Gly)-treated group but were decreased in the ROSI-treated groups, especially in the groups pretreated with ROSI. Moreover, ROSI significantly reduced renal macrophages (Mps) aggregation and M1Mps polarization but significantly enhanced renal M2Mps polarization. In vitro, ROSI significantly suppressed renal injury, apoptosis, and crystal adhesion of HK-2 cells and markedly shifted COM-stimulated M1Mps to M2Mps, presenting an anti-inflammatory effect. Furthermore, ROSI significantly suppressed oxidative stress by promoting the Nrf2/HO-1 pathway.*

*These findings indicate that ROSI could ameliorate renal tubular injury by suppressing oxidative stress and inflammatory response. ROSI is a potential therapeutic drug for CaOx nephrolithiasis.*

*Impact on medicine: Our findings indicate that rosiglitazone is a potential therapeutic and preventive drug for CaOx nephrolithiasis.*

## **Pentraxin 3 – the biological marker with a great potential for early diagnosis of pulmonary aspergillosis: a retrospective study**

**AUTHOR(S): V. Skopelidou, J. Strakoš, D. Višňovská, R. Dobiáš**

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*Agents of Aspergillus genus, predominantly Aspergillus fumigatus, can cause life-threatening lung infections, with the most severe form being invasive pulmonary aspergillosis (IPA). Due to immunodeficiency or other basic respiratory diseases (e.g., severe influenza, COVID-19), the chances of colonization and subsequent development of invasive infection by these opportunistic pathogens increase. Prompt identification is essential for successful treatment, therefore an effort to improve and accelerate the diagnostic process is needed, especially on intensive care units.*

*The goal was to observe the concentration of acute phase protein, Pentraxin 3 (PTX3), in bronchoalveolar lavage fluid (BALF) and serum, then compare individual cohorts of patients with aspergillus, candida, and bacterial infections.*

*This retrospective observational study included samples of patients aged >18 years admitted to ICUs and Respiratory Departments in three centres in the Moravian-Silesian Region of Czech Republic in the period 2018-2020. The study comprised a total of 301 patients, of which 89 were finally included. Patients with IPA showed a median concentration of 4545.5 pg/ml of PTX3 in their BALF, which was statistically significant ( $p < 0.05$ ) as compared to control cohorts with chronic aspergillosis (1746 pg/ml), fungal colonization (242 pg/ml), and bacterial infection (224.5 pg/ml). Serum PTX3 did not show significant differences in concentrations between cohorts of critically ill patients.*

*According to the results, PTX3 appears to be a biomarker with great potential for early detection of pulmonary aspergillosis. Evaluation of the level of PTX3 from BALF seems to be more appropriate, as its values in the serum are dependent on the overall patient's condition.*

*Impact on medicine: Our main goal is to improve and accelerate the diagnosis of pulmonary aspergillosis. We will continue our research to uncover the best diagnostic biomarker combination for early diagnosis of invasive fungal infections.*

## **The effect of Chamber-REST on electrophysiology of the heart in young people: a pilot study**

**AUTHOR(S): J. Strakoš, V. Skopelidou<sup>1</sup>, P. Švorc Jr., V. Jarkuliš, T. Michalčák, A. Závadová, E. Diomin, D. Škrda, J. Cieslarová, M. Malůš**

*1: Department of Physiology and Pathophysiology, Faculty of Medicine - University of Ostrava, Czech Republic; 2: Department of Psychology, Faculty of Arts - University of Ostrava, Czech Republic*

### Introduction:

It is a therapeutic method based on a stay in a complete darkness in order to improve health status of people living under constant stress. Aside from improving the psychological status, this method could also affect vital functions including electrophysiology of the heart.

### Aim:

The aim of the study was to determine the effect of Chamber-REST therapy on electrocardiographic (ECG) parameters in young people.

### Methods:

32 students aged between 19 and 26 years were placed individually in a special room with maximal darkness for 96 hours. There were 4 ECG measurements in total – the day before starting the therapy, 30 minutes after leaving the chamber, then 4th day and eventually 7th day after the stay. The measured variables included PQ, QT and QTc intervals as well as the heart rate based on the 2nd bipolar lead of the ECG.

### Results:

The heart rate was significantly lower in the day of completing the stay, as well as in the fourth and the seventh day. The QT interval was significantly prolonged in the day of completing the stay, and the rest of ECG intervals remained unchanged.

### Discussion:

96 hours of darkness therapy lowered the heart rate of young people. This effect is beneficial because higher heart rate is associated with an increased risk of cardiovascular disease. The prolongation of the QT interval is a marker for development of ventricular arrhythmias. However, the QTc interval remained unchanged, therefore the predisposition to the emergence and progression of ventricular arrhythmias was not lowered.

*Impact on medicine: The aim of this work is to find out what are the impacts of the Chamber-REST on human beings and whether this could be used as a therapy in the future.*

## **Establishing sensitivity and specificity of novel electrocardiographic criteria for diagnosing left ventricular hypertrophy in hypertensive patients**

**AUTHOR(S): J. A. Curcic**

*Medical University of Novi Sad, Serbia*

### Introduction:

Echocardiography and magnetic resonance imaging are the gold standard for the diagnosis of left ventricular hypertrophy (LVH). As a widely accessible and cheaper tool, electrocardiography (ECG) could also potentially be a good method in LVH assessment. However it has many limitations, predominately low sensitivity. Recently there has been a rise in the number of new ECG diagnostic criteria that could eventually improve electrocardiographic diagnosis of LVH.

### Aim:

The goal of this study is to establish sensitivity, specificity and validity of The Cornell, The Sokolow-Lyon and newly suggested The Peguero-Lo Presti diagnostic criteria for diagnosing LVH.

### Methods:

Medical documentation of 55 hypertensive patients hospitalized at the Clinical Centre of Vojvodina was retrospectively analyzed. Echocardiography was used as a method of reference to estimate the presence of LVH. Electrocardiograms were analyzed, amplitudes of different R and S waves measured and then used to calculate three different criteria, proposed and named by their authors. Receiver operator characteristics (ROC) analysis was performed to assess the predicted performance of selected ECG criteria.

### Results:

Sensitivity, specificity and AUC value of The Peguero-Lo Presti criterion were 59,09%, 81,82% and 0,705, respectively. Values of The Cornell criterion were 22%; 73%; 0,621; and of The Sokolow-Lyon criterion were 54,4%; 15,6%; 0,659.

Conclusion: The novel Peguero-Lo Presti criterion showed higher sensitivity and specificity than The Cornell and The Sokolow-Lyon criteria for the diagnosis of left ventricular hypertrophy.

*Impact on medicine: Faster, widely accessible and more cost effective methods of diagnosing left ventricular hypertrophy*

## **Can eosinophils predict asthma? A meta-analysis of the predictive value of peripheral blood eosinophil count in wheezing infants.**

**AUTHOR(S): A. Adamiec, M. Cieřlik, K. Mączka, J. Tarnoruda, S. Jensen, B. Chawes, K. Bønnelykke, M. Ruszczyński, W. Feleszko**

*1: Department of Paediatric Pneumonology and Allergy, Medical University of Warsaw Children's Hospital, Poland; 2: Doctoral School, Medical University of Warsaw, Poland; 3: Department of Paediatrics, Medical University of Warsaw Children's Hospital, Poland; 4: Copenhagen Prospective Studies on Asthma in Childhood, Herlev and Gentofte Hospital, University of Copenhagen, Denmark*

### Introduction:

Pre-school children with wheezing disorders represent a diagnostic and therapeutic challenge, consuming large amounts of healthcare resources. There exists an unmet need for cheap and reliable methods of differentiating between transient wheezers and those who develop asthma in later life. Peripheral Blood Eosinophil Count (EBC) could be one of the possible indicators. Hitherto, there has been a lack of systematic data on the subject.

### Aim:

The purpose of this review was to assess the value of EBC in asthma prediction and to identify the cut-off points.

### Material and Methods:

In November of 2020 we conducted a search of PubMed, EMBASE and Cochrane Library databases in order to identify studies comparing EBCs in wheezing infants who would continue to wheeze in later life, and those who would not. Included studies had to be concerned with children with a wheezing disorder, aged <6 years, their EBCs, and subsequent asthma status at school age.

### Results:

The data retrieved from the included studies indicates that high EBCs in wheezing infants predict asthma development at school age. There is a lack of uniformity between the cut-off points defining an elevated EBC, which range from 84 to 470 cells/mm<sup>3</sup>. The optimal cut-off point for asthma prediction is likely at or above the 450 cells/mm<sup>3</sup> threshold (OR = 4.42, 95% CI 2.57-7.60), although further research is necessary to validate it.

### Discussion:

EBC testing is a cheap tool, broadly accessible in hospital wards and primary care units which can aid physicians' diagnostic workup of preschool wheezers.

*Impact on medicine: Given the proper systematic data eosinophil blood count can aid physicians to introduce early asthma treatment with benefit to the patient.*

**Friday**  
***online session 3***

## **Orbital amyloidoma – a case report of a rare condition in an elderly woman**

**AUTHOR(S): M. Matuszek, E. Kopyto, M. Kuczyńska, A. Drelich-Zbroja**

*1: Department of Paediatric Pneumonology and Allergy, Medical University of Warsaw Children's Hospital, Poland; 2: Doctoral School, Medical University of Warsaw, Poland; 3: Department of Paediatrics, Medical University of Warsaw Children's Hospital, Poland; 4: Copenhagen Prospective Studies on Asthma in Childhood, Herlev and Gentofte Hospital, University of Copenhagen, Denmark*

### Background:

Amyloidosis is a protein-misfolding condition that results in extracellular amyloid deposition. It can be subdivided into localized and systemic that occurs in course of systemic inflammatory diseases.

Typically, it affects kidneys, heart, liver leading to nephrosis, cardiomyopathy, and coagulopathy, respectively. The orbital cavity is an extremely rare location. There are controversies, whether orbital amyloidosis is more frequently due to localized disease or secondary to systemic amyloidosis.

### Case report:

A 50-year-old woman was admitted to the hospital due to vision impairment and stuffing feeling in the right eye. She presented red eye syndrome and poor pupillary light reflex. Magnetic resonance imaging (MRI) revealed intraorbital mass causing optic nerve thickening (up to 10mm) partially enhancing after contrast administration, mimicking meningioma. After 7 years of the stable clinical picture, the patient reported right-sided vision deterioration and exophthalmos. Follow-up MRI showed a newly discovered mass (25x20x15mm) located laterally to the optic nerve and dislocating inferior rectus muscle. The patient was qualified for non-radical transconjunctival tumor resection. Eventually, the diagnosis was localized amyloidosis with no evidence of systemic involvement (primary amyloidoma). Post-operation follow-up MRI indicated mass enlargement next to the optic nerve (22x15x10mm) and inferior rectus muscle (32x19x10mm). However, the patient refused reoperation due to a lack of symptoms reduction and iatrogenic vision deterioration.

### Conclusions:

Orbital amyloidosis is a rare condition but it should be considered when asymmetrical ocular symptoms occur. Localized amyloidosis tends to be locally invasive and recur. MRI cannot be used alone but appears as a useful tool in the diagnosis.

Impact on medicine: One of the aim of this scientific work is to remember that amyloidosis might be the first symptom of serious disease but it is necessary to underline that may occur solitarily. Other reasons were mentioned in the conclusions section.

## **Association between pathological characteristics of upper tract urothelial cancer and the expression of anti-apoptotic markers**

**AUTHOR(S): L. G. MARJANOVIĆ**

*Medicinski fakultet Niš, Serbia*

### Introduction:

Survivin and Bcl-2 are anti-apoptotic proteins with a significant role in the carcinogenesis of many malignant tumors. Survivin isn't normally expressed in terminally differentiated tissues.

### Aim of the study:

In this paper an association of Survivin and Bcl-2 expression and pathological characteristics of upper tract urothelial cancer (UTUC) – histological grade, pathological stage, growth of pattern, lymphovascular invasion, necrosis, squamous divergent differentiation; was examined.

### Material and methods:

Histological sections of 61 patients with confirmed UTUC were analyzed. H&E-stained slides were used for the analysis of pathological parameters. Monoclonal anti-Survivin and anti- Bcl-2 antibodies were used to evaluate the expression of Survivin and Bcl-2 in tumors.

### Results:

The average age of the patients with UTUC was 64.2 +/- 11 years. UTUC were high grade (59%), high stage (69%), solid of growth (56%), with presence of lymphovascular invasion (33%), macroscopic necrosis (41%), and squamous divergent differentiation (21%). Altered expression of Survivin was present in 48% of UTUC. UTUC with lymphovascular invasion had a significantly less altered expression of Survivin ( $p < 0.005$ ) in comparison to tumors lacking such. Whereas, only 15% of examined UTUC patients showed an altered expression of Bcl-2, therefore no significant association between the expression and analyzed phenotypic characteristics was found.

### Conclusion:

Altered expression of Survivin was significantly associated with lymphovascular invasion of the upper tract urothelial cancer. The expression of Bcl-2 was not significantly associated with the phenotypic characteristics of UTUC.

Impact on medicine: Defining the anti apoptotic markers in upper tract urothelial cancer significant for future therapy

## **TTP in a patient with COVID – 19: a case report**

**AUTHOR(S): K. Pourmodjib, D. Pulanic**

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Thrombotic thrombocytopenic purpura (TTP) is rare microangiopathic hemolytic anemia with thrombocytopenia and high thrombotic risk caused by low ADAMTS13, with high mortality if not urgently treated. COVID-19 is also prothrombotic disease, but some patients with COVID-19 develop thrombocytopenia and bleeding.

The aim of this case-report is to describe a patient with TTP as the first presentation of COVID-19. In August 2021 a 35-year-old female patient was hospitalized in a regional hospital, because of being febrile, with anemia and thrombocytopenia (Hb 69 g/dl, platelets 9 g/dl) and LDH 1499 kU/l. TTP was suspected and she was transferred to clinical hospital in Zagreb. The ADAMTS13 was below 0.01 kU/l and the diagnosis of TTP was confirmed. The first PCR test for COVID-19 was negative. Treatment was started with plasmapheresis together with corticosteroids, and she also received one dose of 700mg of rituximab. Third day of admission she became PCR COVID-19 positive and she was transferred to COVID-19 unit at our institution. She continued with plasmapheresis and steroids, and also received remdesivir, with no further administration of rituximab due to the COVID-19, with normalization of platelets, anemia, LDH, and ADAMTS13 level, and with complete resolution of COVID-19. She did not have clinically important bleeding and did not develop thrombosis. She was discharged home and remains in remission of TTP in the following 3 months of follow-up.

This case report showed very rare association of TTP and COVID-19. Treatment of such concomitant prothrombotic diseases might be very challenging and requires multidisciplinary approach.

Impact on medicine: COVID - 19 as probable etiological factor of TTP

## **Differences in microbiome composition in cirrhotic patients with high and low zonulin levels**

**AUTHOR(S): R. Haller, A. Horvath, V. Stadlbauer**

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Liver cirrhosis, the 10th most common cause of death in the western world, is associated with increased intestinal permeability and alterations of the gut microbiome. However, it is not yet fully understood how intestinal permeability and the microbiome are interrelated in cirrhosis.

We aim to investigate the differences of the gut microbiome in cirrhotic patients with increased intestinal permeability and link these changes to clinical outcome.

Intestinal permeability (zonulin in stool), microbiome composition and mortality of 78 cirrhotic patients were assessed. Microbiome composition was analysed by ANCOM and LEfSe. Mortality risk after 24 and 36 months was compared between groups with Kaplan-Meier curve and log rank test.

When assessing the development of zonulin levels over six months, patients with deteriorated gut barrier function after six months observation (n = 45) had a higher mortality than those whose zonulin levels improved (n=33). In patients with improved gut barrier function *Phascolarctobacterium* was more abundant, which was associated with better hepatic function and decreased mortality risk.

In agreement with our results, lower abundance of *Phascolarctobacterium* was previously associated with a higher risk for hepatic encephalopathy, a potentially lethal complication of cirrhosis, recurrence. The abundance of *Phascolarctobacterium* increased in an insoluble fibre diet in a piglet model, which was associated with increased expression of tight junction proteins, which are important for gut barrier function. *Phascolarctobacterium* can be used as predictor in cirrhosis for mortality and might have a positive effect on gut barrier function.

Impact on medicine: Better understanding of the interplay between liver cirrhosis, gut barrier function and microbiome

## **Neurological recovery after treating Shiga toxin-producing *E. coli* Hemolytic Uremic Syndrome with Eculizumab. A case report.**

**AUTHOR(S): F. P. Domke, K. Acevedo**

*Pontificia Universidad Católica de Chile*

### *Introduction:*

*Hemolytic uremic syndrome (HUS) is characterized by the simultaneous presence of microangiopathic hemolytic anemia, thrombocytopenia and acute kidney injury. It can associate encephalopathy that may be severe. Few reports describe the benefit of Eculizumab treatment in neurological involvement secondary to HUS.*

### *Aim:*

*Present a new therapeutic option for severe HUS.*

### *Case description:*

*A previously healthy 4 years old boy, presented on October 7th, 2020 with gastrointestinal symptoms, malaise and fever, followed by decreased diuresis. On October 11th he had a 2 minutes tonic seizure and was admitted. The patient was diagnosed with Shiga toxin-producing *E. coli* HUS (STEC-HUS), evolving with severe kidney failure and neurological compromise, initially coma and seizures. Dialysis was initiated along with metabolic and systemic support in the ICU. As seizures persisted and no improvement in his mental status was observed, and due to lack of other treatment options, Eculizumab was initiated. At discharge, after 2 months in the hospital, he was encephalopathic, with absence of language and was completely dependent, reaching fully recovery after 26 Eculizumab doses, with normal renal function, neurological examination and EEG.*

### *Discussion:*

*HUS is one of the leading causes of pediatric acute kidney failure. We present a patient with severe nephrological and neurological impairment who reached complete recovery after Eculizumab therapy. Even though there is insufficient evidence to recommend this therapy, our experience suggest that Eculizumab may be considered and trials with this monoclonal antibody are needed, especially in severe HUS cases.*

*• Informed consent was signed by parents.*

*Impact on medicine: Present a new therapeutic option for severe hemolytic uremic syndrome.*

# ABSTRACTS SATURDAY

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**SATURDAY**  
***varia 2 - oral***  
***session***

**Treatment of Recalcitrant Isolated Congenital Fibular Pseudarthrosis: Fibular Segment Transfer and Tibiofibular Synostosis with Unilateral External Fixator**  
**AUTHOR(S): D. F. Yamanel, B. Karaismailoglu, T. N. Karaismailoglu**

*1:Istanbul University Cerrahpasa, Turkey; 2:Medical Park Samsun Hospital, Turkey*

Isolated congenital pseudarthrosis of the fibula is a rare entity with a limited number of cases reported in the literature. Treatment is challenging due to recalcitrant non-union and no consensus about the best treatment plan exists. We report a case of isolated congenital fibular pseudarthrosis with valgus deformity of the ankle. The patient had a history of two failed surgeries. We used a novel surgical plan which combined tibiofibular synostosis with fibular segment transfer through a unilateral external fixator. The patient showed good early results with fibular union. We advocate the combination of tibiofibular synostosis and fibular segment transfer to restore the integrity and stability of the ankle in recalcitrant isolated congenital fibular pseudarthrosis cases with a history of failed surgery.

*Impact on medicine: a new treatment plan to help patients*

## **Autoimmune inflammatory syndrome induced by adjuvants (silicone breast implants and fillers)**

**AUTHOR(S): B. Pocevski, S. Pavlov-Dolijanović**

1: Medical Faculty, University of Belgrade, Belgrade, Serbia; 2: First Surgical Clinic, University Clinical Center of Serbia, Belgrade, Serbia; 3: Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia; 4: Institute for Rheumatology, Belgrade, Serbia

### *Introduction:*

*Silicone breast implants (SBI) have been used since 1962. in the reconstruction of post-mastectomy cases, in augmentation of the breast, or for cosmetic purposes, and fillers with biopolymer (FB) have been used since the 1990s. Today, they are considered as adjuvants of the immune system. Most complications of SBI and FB are local in nature, but some patients experience systemic symptoms, which is defined as adjuvant-induced autoimmune inflammatory syndrome (ASIA).*

### *The Aim:*

*The aim of this study is to demonstrate the possible association of silicone breast implants and FB with the development of immune-mediated inflammatory rheumatic disease (IMIRD).*

### *Material and methods:*

*The research represent retrospective study which involved 15 women patients with immune-mediated inflammatory rheumatic diseases, 6 of whom were patients with implanted silicone breast implants for cosmetic reasons, and 9 patients with placement of fillers with biopolymer on the lips.*

### *Results:*

*The average time from silicone implantation to the onset of the first symptoms was  $6.10 \pm 5.3$  (range 6 months to 24 years).The following immune-mediated inflammatory rheumatic diseases were recorded: 3 patients with systemic sclerosis (SSc), 3 patients with undifferentiated arthritis, 3 patients with seropositive rheumatoid arthritis, 1 patient with systemic lupus erythematosus, 2 patients with undifferentiated SCTD, 2 patients with mixed connective tissue disease, and one patient with unexplained systemic disease. Seven patients had the Raynaud phenomenon. Spontaneous abortions were reported in 2 patients.*

### *Conclusion:*

*Earlier reports that silicone breast implants and biopolymer fillers are safe, today are changing with the description of ASIA syndrome.*

*Impact on medicine: Earlier reports that silicone breast implants and biopolymer fillers are safe, today are changing with the description of ASIA syndrome. So impact of this work is significant for better understanding of this topic.*

# SATURDAY 18TH

varia 2 - oral session

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## **Telemedicine (Telehealth) in the Era of COVID-19 Pandemic: Threat or Challenge**

**AUTHOR(S): B. Pocevski, M. Pocevski**

*1: Medical Faculty, University of Belgrade, Belgrade, Serbia; 2: First Surgical Clinic, University Clinical Center of Serbia, Belgrade, Serbia; 3: Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia; 4: Institution of Pharmacy, Vranje, Serbia*

Telemedicine is relatively new topic in medical field, and it is in constant development. It goes hand in hand with the development of Informational Technology sector. It is classified as a part of medical care and public health.

Telemedicine as a term firstly was used by Willem Einthoven, inventor of ECG and Nobel Prize winner, who successfully made telephonic transmission of ECG images as the "telecardiogram" in 1905.

When we talk about classification, there are telemedicine, telehealth, e-health, and m-health. It is not clear what is the difference between telemedicine and telehealth, so they can be used as synonyms. Telehealth was introduced decades later, in 1978 - represents wider spread of informations, with help of internet and all sorts of communication in that time, with a goal to help patients. E-health in 1999 and m-Health in 2003 followed.

In the era of COVID-19 certainly telehealth or m-Health was good strategy, because of physical distancing - it is important to emphasize that in the term it is used physical, but not social distancing (represents psychological condition). In that manner doctors were able to communicate with patients with mobile applications and social networks.

Even though science and technology goes dramatically fast, as well as communication through internet, smart phones and social networks, and even though pandemic used helpful tools for diagnostics and healing of i.e. milder clinical manifestations of COVID-19 at distance, nothing can change in-person examination and tete-a-tete conversation of patient and a doctor, both in pandemic and non-pandemic times.

*Impact on medicine: Review of telemedicine impact will help to better understand patients help on distance, and to be prepared for the future outbreaks.*

# SATURDAY 18TH

varia 2 - oral session

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## **Different Types of Gallbladder Surgery**

**AUTHOR(S): B. Pocevski, P. Pocevski**

*1: Medical Faculty, University of Belgrade, Serbia; 2: First Surgical Clinic, University Clinical Center of Serbia, Belgrade, Serbia; 3: Faculty of Medical Sciences, University of Kragujevac, Kragujevac, Serbia; 4: Health Center Vranje, Surgical Department, Vranje, Serbia*

Various gallbladder (GB) pathology requires surgical interventions. When it comes to GB surgery, there are nine different ways to operate it.

After searching scientific papers from PubMed, Medline and ResearchGate with keywords gallbladder surgery, cholecystectomy, laparoscopy, gallstones, cholelithiasis, the aim of this study was to classify several different types of GB surgery into nine possible ways to operate. We point out the division of GB surgery based on the surgical incision, in order: Open Classic Cholecystectomy (CCY), Conventional/Classic Minilaparotomy CCY, Minilaparotomy CCY, Microlaparotomy CCY (which co-author of this study presented to the professional public in 1996 after 10 years of improving it), Conventional Laparoscopic CCY, Minilaparoscopic/Microlaparoscopic CCY, Single-port Laparoscopic CCY, Multiport Robotic CCY, Single-site Robotic CCY. Which method will be applied depends, both on experience of the surgeon and manual skills, and cost and availability of surgical devices.

Open Classic CCY requires skin incision over 8cm, Conventional/Classic Minilaparotomy CCY from 6.1 to 8cm, Minilaparotomy CCY from 4.1 to 6cm, Microlaparotomy CCY requires skin incision up to 4cm, Conventional Laparoscopic CCY two trocars with 5mm, one with 5-10mm and one with 10-12mm, Mini/Microlaparoscopic CCY one 5mm port and three 3mm ports, Single-port Laparoscopic CCY with one 20 mm port, Multiport Robotic CCY one 8-12mm camera port and three 8 mm ports, and Single-site Robotic CCY 2-2.5cm transumbilical incision. It is very important for young surgeons to have basics in training to perform open cholecystectomies, because in cases when laparoscopic or robotic cholecystectomy complicate, surgeon must be prepared for bigger operation.

Impact on medicine: This study represent division in gallbladder surgery which will help young surgeons in understanding GB surgery. There is no such study in literature which comprehensively classify GB surgery in this manner.

**SATURDAY:**  
***poster session 2***

## **A CASE REPORT OF ACCIDENTALLY INGESTED FOREIGN BODY ASSOCIATED WITH LIVER ACTINOMYCOSIS: THE DIAGNOSTIC VALUE OF IMAGING**

**AUTHOR(S): I. Marica**

*University of Medicine and Pharmacy "Iuliu Hațieganu", Romania*

### Introduction:

We present a patient with liver actinomycosis developed in relation with a gastric perforation secondary to an accidental foreign body ingestion.

### Aim:

The aim of this case report was to emphasize the importance of imaging techniques for the final diagnosis of a life-threatening situation that raises many problems in clinical practice.

### Case:

A 54 year old patient presented with intense pain in the upper abdomen, associated with postprandial bloating and important weight loss. The patient was an amateur fisherman and frequently ate fish.

The abdominal ultrasound revealed a solid, ill circumscribed liver tumor, situated in the left lobe of the liver. On the Doppler examination presented an uncharacteristic signal. Contrast enhanced ultrasound showed a moderate contrast uptake in the arterial phase, no wash-out during the portal venous and the delayed phases and an intense vascular signal in the surrounding liver parenchyma. A hyperechoic, linear image was found, protruding from the gastric cavity towards the liver. An endoscopic ultrasound was performed and it confirmed the presence of the liver mass with a large extension. The material obtained by endoscopic fine needle aspiration showed a colony of Actinomyces.

As a result, the diagnosis was formulated: liver abscess secondary to a perforation of the digestive tract through an accidentally ingested foreign body.

The patient put on long term therapy with broad spectrum antibiotics and antimycotics and the evolution was favourable.

### Conclusions:

The presence of an image suggesting a foreign body correlated with clinical and morphological studies, represents the key to the diagnosis.

*Impact on medicine: Actinomycosis has been described as "the most misdiagnosed disease". That is why we tried to emphasize the importance of modern imaging techniques for the etiological diagnosis.*

## **An experimental study of the molecular circadian clock in asthma**

**AUTHOR(S): J. Teppan, I. Red, J. Schwanzer, A. Heinemann, E. Sturm**

*Division of Pharmacology, Medical University of Graz, Austria*

### Introduction:

Asthma is a chronic inflammatory lung disease with a strong circadian signature. In 75% of asthmatic patients, symptoms worsen overnight. At 4 a.m. most severe asthma attacks occur and the highest number of eosinophils, one of the main effector cells in asthma, is observed in the sputum. The molecular clock produces oscillating expression pattern to time biological processes such as leukocyte recruitment. Disturbances within the circadian system can promote inflammatory diseases.

### Aim:

Therefore, this project aims to investigate the impact of the molecular circadian clock in asthma.

### Material and Methods:

Whole blood or isolated blood cells from daily donors were used for ex vivo assays. Additionally, the cells were treated with cytokines or synthetic agonists targeting the circadian nuclear receptors named Rev-erb or ROR.

### Results:

Comparing the expression level of molecular circadian clock receptors in leukocytes from asthmatic and non-allergic donors revealed differences in several components e.g.: a decrease in Rev-erb alpha. Similar, a lower Rev-erb alpha expression was observed in a mimicked inflammatory environment using cytokines. The application of agonists targeting circadian nuclear receptors impacts the receptor expression levels and human leukocyte functions including migratory responsiveness or respiratory burst.

### Discussion:

We observed that circadian nuclear receptors altered their expression in leukocytes from asthmatic patients. Targeting these receptors has an influence on their expression and on cellular functions. Further experiments will decipher the role of the molecular clock in asthma pathogenesis and clarify if exogenously applied agonists may represent a novel treatment option.

*Impact on medicine: clarify the role of the molecular circadian clock in asthma pathology and if targeting the molecular circadian clock might be a novel treatment approach.*

**SATURDAY:**  
*neurology and*  
*psychiatry - oral*  
*session*

# SATURDAY 18TH

neurology and psychiatry - oral session

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## **Antioxidative enzymes from cerebrospinal fluid as protein biomarkers of neurorecovery in patients with severe traumatic brain injury**

**AUTHOR(S): T. Jagoić, V. Krušić Alić, S. Zrna, M. Biberić, L. Valenčić, K. Grabušić**

*1: University of Rijeka, Faculty of Medicine, Rijeka, Croatia, Croatia; 2: Pula General Hospital, Pula, Croatia; 3: Clinical Hospital Centre Rijeka, Rijeka, Croatia*

### Introduction:

Severe traumatic brain injury (TBI) is intracranial damage initiated by external force. This primary injury triggers a cascade of further harmful processes like inflammation, oxidative stress and hypoxia collectively known as secondary injury. Only supportive care is currently available for TBI patients since no biomarkers for ongoing processes in brain are available.

### Aim:

To identify circulating antioxidative biomarkers for neurorecovery of brain-injured patients.

### 3. Patients and methods

Severe TBI patients whose treatment required ventriculostomy were included in the study after obtaining informed consent from a family member. Intracranial cerebrospinal fluid (CSF) was collected every 24 hours during applied external ventricular drainage. CSFs were lysed and separated by electrophoresis followed by western blot. Total proteins were detected by Ponceau staining. Immunodetection was performed for superoxide dismutase 1 (SOD1), peroxiredoxin-2, peroxiredoxin-6, parkinsonism associated deglycase 7 (PARK7) and catalase.

### Results:

Study included 9 patients aged 19 to 83 years, 2 were females. A total of 66 CSF samples was collected up to 10 days after TBI. PARK7 and catalase were detected at various levels in all or majority of CSFs, respectively. SOD1, peroxiredoxin-2 and -6 showed distinctive and discontinuous patterns ranging from a single positive day per patient to all positive days per patient.

### Discussion:

Our results show that CSF levels of PARK7, catalase, SOD1, peroxiredoxin-2 and -6 are highly dynamic during acute phase of recovery after severe TBI. This indicates that all 5 antioxidative enzymes could have biomarker potential.

*Impact on medicine: Circulating antioxidative enzymes might provide insight into early events in brain during recovery after injury.*

# SATURDAY 18TH

neurology and psychiatry - oral session

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## **Weighted gene co-expression network analysis in exploration of neuronal and glial transcriptome of patients suffering from sporadic Alzheimer's disease**

**AUTHOR(S): K. Horvatović, A. Gelemanović**

*1: Faculty of Science, University of Zagreb, Croatia; 2: Mediterranean Institute for Life Sciences, Split, Zagreb*

### Introduction:

Alzheimer's disease (AD) is a chronic neurodegenerative disorder with progressive impairment of cognitive function. Accumulating evidence suggests that the interplay of neurons and glial cells has an important role in development of the disease.

### Aim of the study:

This in silico study aimed to identify highly correlated genes for pathogenesis of AD based on the transcriptome profile of neurons and astrocytes from superior frontal lobe.

### Materials and methods:

AD RNA-seq dataset GSE125050 was acquired from NCBI GEO database and weighted gene co-expression network analysis (WGCNA) pipeline was applied. Following data pre-processing, scale-free network was constructed, and module eigengenes were correlated with AD neurons and astrocytes. Gene significance (GS) and module membership (MM) were quantified to select the key genes. Functional enrichment analysis was performed on modules of interest.

### Results:

WGCNA clustered genes into 11 modules, of which four modules with 628 key genes were significantly correlated with AD astrocytes, while eight modules with 2396 key genes with AD neurons ( $p < 0.05$ ;  $GS > 0.3$ ,  $MM > 0.8$ ). *FMN1*, *ATP13A4*, and *SORCS1* were identified as hub genes both in neurons and astrocytes but with opposite directions of effect. Changes in *TTC7A*, *SLCO4A1*, *USP34*, *TTBK1*, and *FZD3* were observed in neurons and *FAT1* in astrocytes. Enriched pathways included synaptic transmission regulation, Wnt signaling pathway, adherens junction, immune response, and extracellular matrix organization.

### Discussion:

The results of this study indicate the importance of cell communication and presence of synaptic transport dysregulation between neuronal and glial cells in AD and offer potential target molecules to be investigated further.

*Impact on medicine: Finding new target molecules for pathogenesis of Alzheimer's disease with an unbiased unsupervised correlation network analysis.*

# SATURDAY 18TH

neurology and psychiatry - oral session

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## **Visualizing EEG Data in Augmented Reality using the HoloLens 2**

**AUTHOR(S): A. A. Fakia, F. Fischmeister, G. Grabner**

*1: Department of Medical Engineering, Carinthia University of Applied Sciences, Klagenfurt, Austria; 2: Institute of Psychology, University of Graz, 8010 Graz Austria; 3: Department of Biomedical Imaging and Image-guided Therapy, Medical University of Vienna, 1090 Vienna, Austria; 4: BioTechMed, Graz, 8010 Graz Austria*

Through recent development of new technologies, it became essential to use the most modern tools in the medicine world to visualise and predict the outcome of certain disorders. With the recent rise of VR and AR, it is now possible to look on things from a different perspective. This work tries to use this technology to explore its potential in real world scenarios.

The aim is to visualise the EEG-Data of an eyes open-eyes closed experiment using a heatmap on a 3D head model in the 3D AR world. The main goal is to visualise the increase of alpha activity during the rest state of the brain.

The EEG-Data were recorded using a DSI 24 EEG system, a zero-phase band pass filter with the low and high cut-off frequencies of  $f_l=7$  Hz,  $f_h=13$  Hz was applied and the short-time Fourier transform was used to calculate the frequency-spectra.

The area of the frequency-spectra from 7 to 13 Hz was calculated to illustrate the change of frequency when the event occurred. Using the MRTK library in Unity and the Microsoft HoloLens 2 the data was then visualized in form of a heatmap projected onto a 3D head model.

The result was an animation of the event occurrence showing the increase of alpha activity in the occipital region in AR.

This work provides a new possibility of visualizing EEG-Data and it opens the door for real life use cases. The next step would be visualization of brain activity in a real time environment.

*Impact on medicine: a new method to visualize eeg data.*

# SATURDAY 18TH

neurology and psychiatry - oral session

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## **LOCAL CHEMOTHERAPY FOR TREATMENT OF GLIOBLASTOMA – A BASIC BIOMEDICAL RESEARCH PROJECT**

**AUTHOR(S): M. Knittelfelder, L. Waldherr, B. Bramreiter, P. Possert, M. Asslaber, N. Ghaffari Tabrizi-Wiszy, S. Patz, R. Schindl**

*1: Medical University of Graz, Austria; 2: Gottfried Schatz Research Center - Division of Biophysics, MUG; 3: Otto Loewi Research Center, MUG; 4: Department of Neurosurgery, MUG; 5: Diagnostic and Research Center for Molecular BioMedicine, MUG; 6: Biomedical Analytics, FH Joanneum Graz*

### INTRODUCTION:

Glioblastoma multiforme (GBM) is a rapidly growing brain tumor carrying poor prognosis and devastating survival rates. The current standard treatment consists of a maximum safe resection of the tumor mass and radiochemotherapy with temozolomide. Alternatively, drug-soaked wafers can be used for local chemotherapy after tumor resection. However, therapeutic measures don't bring satisfying success in fighting this disease.

### AIM:

Here, we study a new treatment method called organic electronic ionic pumps (OEIPs) as a precise delivery method of different locally administered chemotherapeutic drugs. This method bypasses the blood brain barrier and allows to use potent chemotherapeutic drugs like Gemcitabine (Gem) as a new therapeutic option for GBM treatment.

### MATERIAL AND METHODS

Gem was evaluated in-vitro as new chemotherapeutic drug by determining EC50 values in various GBM cell lines in comparison to the toxicity on neurons. Currently, I use OEIPs to treat GBM tumors grown on chicken egg based CAM-Assay by administering precise doses of Gem over time. Effects on tumor growth, solidity and viability will be observed by immunohistological readouts.

### RESULTS:

The results show that Gem is an ideal chemo drug for local treatment of brain tumors, based on its potent toxicity in contrast to neurons. Recent advances of in-vivo treatment with this new technology will be included in the presentation.

### DISCUSSION:

A targeted local application of various chemotherapeutic drugs via OEIP bear potential to lengthen the time between recurrences and reduce the concentrations of systemic chemotherapeutic drugs. This could reduce adverse effects and improve the quality of patient's lives.

*Impact on medicine: Research for a new possible treatment method for glioblastoma multiforme*

# SATURDAY 18TH

neurology and psychiatry - oral session

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## **Relationship between Students' Literacy of Suicide, Suicidal Ideation and Attitudes toward Seeking Professional Psychological Help**

**AUTHOR: E. Žilinskas<sup>1</sup>, S. Lesinskienė<sup>1,2</sup>**

*1: Faculty of Medicine, Vilnius University, Lithuania; 2: Clinic of Psychiatry, Vilnius University, Lithuania*

### *Introduction:*

*students of higher education express high levels of suicidal ideation. However, data regarding students' knowledge of suicide and attitudes toward seeking professional psychological help is lacking. Thus, the aim of the study was to evaluate students' literacy of suicide and attitudes toward seeking professional psychological help and to measure relationships between suicidal ideation, literacy of suicide and attitudes.*

### *Materials and methods:*

*an online survey shared at higher education institutions consisted of 12 questions examining student's literacy of suicide, the short form of the Attitude Toward Seeking Professional Psychological Help (ATSPPH-SF) scale, the Suicidal Ideation Attributes Scale (SIDAS) and questions related to exposure to suicidality in a close environment.*

### *Results:*

*2004 students have completed the survey. Highest literacy of suicide was measured among female students ( $p=0.002$ ) and students of Biomedical field ( $p<0.001$ ). ATSPPH were most positive among female students ( $p<0.001$ ) and students of Biomedical field ( $p<0.001$ ). Attitudes were more positive along with higher year of studies ( $p<0.001$ ). Students of Arts expressed highest scores in SIDAS ( $p<0.001$ ). Students who were exposed to suicidality in a close environment were significantly more suicidal ( $p<0.001$ ). Students' higher literacy of suicide had weak positive correlation with more positive ATSPPH (Spearman's  $\rho=0.186$ ,  $p<0.001$ ).*

### *Conclusion:*

*literacy of suicide and ATSPPH depend on student's gender, year of studies and study field. Better literacy of suicide may promote mental help-seeking behaviour.*

*Keywords: mental health, students, suicidal ideation*

*Impact on medicine: Our study provides additional information regarding students' mental health and their attitudes toward seeking mental help.*

## **Neurological recovery after treating Shiga toxin-producing E. coli Hemolytic Uremic Syndrome with Eculizumab. A case report.**

**AUTHOR: F. P. Domke, K. Acevedo**

*Pontificia Universidad Católica de Chile*

### *Introduction:*

*Hemolytic uremic syndrome (HUS) is characterized by the simultaneous presence of microangiopathic hemolytic anemia, thrombocytopenia and acute kidney injury. It can associate encephalopathy that may be severe. Few reports describe the benefit of Eculizumab treatment in neurological involvement secondary to HUS.*

### *Aim:*

*Present a new therapeutic option for severe HUS.*

### *Case description:*

*a previously healthy 4 years old boy, presented on October 7th, 2020 with gastrointestinal symptoms, malaise and fever, followed by decreased diuresis. On October 11th he had a 2 minutes tonic seizure and was admitted. The patient was diagnosed with Shiga toxin-producing E. coli HUS (STEC-HUS), evolving with severe kidney failure and neurological compromise, initially coma and seizures. Dialysis was initiated along with metabolic and systemic support in the ICU. As seizures persisted and no improvement in his mental status was observed, and due to lack of other treatment options, Eculizumab was initiated. At discharge, after 2 months in the hospital, he was encephalopathic, with absence of language and was completely dependent, reaching fully recovery after 26 Eculizumab doses, with normal renal function, neurological examination and EEG.*

### *Discussion:*

*HUS is one of the leading causes of pediatric acute kidney failure. We present a patient with severe nephrological and neurological impairment who reached complete recovery after Eculizumab therapy. Even though there is insufficient evidence to recommend this therapy, our experience suggest that Eculizumab may be considered and trials with this monoclonal antibody are needed, especially in severe HUS cases.*

- Informed consent was signed by parents.*

*Impact on medicine: Present a new therapeutic option for severe hemolytic uremic syndrome.*

**SATURDAY:**  
***biochemistry and***  
***molecular biology -***  
***oral session***

# SATURDAY 18TH

biochemistry and molecular biology - oral session

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## **Structural and functional insights into a type IV secretion system in Gram-positive bacteria**

**AUTHOR: T. M. I. Berger<sup>1</sup>, V. Kohler<sup>2</sup>, N. Gubensäk<sup>1</sup>, T. Sagmeister<sup>1</sup>, L. Petrowitsch<sup>1</sup>, T. Pavkov-Keller<sup>1</sup>, W. Keller<sup>1</sup>**

*1: University of Graz, Austria; 2: University of Stockholm, Sweden*

The propagation of resistances against antibiotics is a serious global problem. We witness the so-called antibiotic resistance crisis. To be able to prevent the transfer of resistances it's crucial to understand the involved process first. Conjugative DNA transfer is the most important means to transfer antibiotic resistance genes and virulence determinants encoded by plasmids, integrative conjugative elements, and pathogenicity islands among bacteria. In Gram positive (G+) bacteria, there exist two types of conjugative systems, (i) type IV secretion system (T4SS)-dependent ones, like those encoded by the Enterococcus, Streptococcus, Staphylococcus, Bacillus, and Clostridia mobile genetic elements and (ii) T4SS-independent ones, as those found on Streptomyces plasmids.

The broad-host-range plasmid pIP501 harbors a T4SS (T4SSpIP501) consisting of 15 different proteins participating in the process of conjugation and transfer. Although, no T4SS core complex structure from G+ bacteria is available, several structures from T4SSpIP501 protein key factors have already been solved. In addition, function of some players could be determined. Structures of different T4SS in G- bacteria are available and contain at least 12 components. To address the size and composition of the T4SSpIP501 we are using dynamic light scattering, multiple angle light scattering and mass spectrometry. First steps towards the overall structure were obtained with negative stain electron microscopy. Taken together we provide new insights into the functionality of T4SS in G+ bacteria, which can help in the fight against the propagation of multi drug resistant pathogens.

Impact on medicine: Help to prevent the spread of multiresistant pathogens.

# SATURDAY 18TH

biochemistry and molecular biology - oral session

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## **Porous poly L-lactid infiltrated bioactive glass scaffolds enable the chondrogenesis of human mesenchymal stromal cells in vitro**

**AUTHOR(S): C. Gögele, S. Müller, S. Wiltzsch, A. Lenhart, M. Hornfeck, A. Rübling, K. Schäfer-Eckart, B. Minnich, T. M. Weiger, G. Schulze-Tanzil**

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Large joint cartilage defects have to be repaired to prevent osteoarthritis. Cartilage tissue engineering provides highly promising repair strategies. The aim for this study is to answer the question whether bioactive glasses (BG) as scaffolds enable chondrogenesis. In addition to our novel patented Bioglass (CAR12N), poly L-lactid (PLLA)-infiltrated CAR12N were seeded with primary porcine articular chondrocytes (pACs) and primary human mesenchymal stromal cells (hMSCs), respectively, and dynamically cultured for up to 35 days. Scaffold characterization, cell adherence, proliferation, survival, and expression of cartilage-specific extracellular matrix components were analyzed. Both scaffold variants were highly porous (porosity >70%) with similar topology. PLLA infiltration increased scaffolds stiffness. No scaffold variant was cytotoxic and no decrease in viability was detectable. The metabolic activity of both cell types remained stable on both scaffold variants. Both cell types colonized the bioglass struts and the PLLA forming cell layers. In particular, PLLA increased the cell adherence as well as DNA and sulfated glycosaminoglycan contents of scaffolds colonized with hMSCs. Successful chondrogenesis of hMSC colonized scaffolds was demonstrated by immunoreactivity for collagen type II, cartilage proteoglycans and the transcription factor SOX9. pAC and hMSC colonized CAR12N and PLLA infiltrated scaffolds showed an increasing relative expression of collagen types II, IX and XI, aggrecan, cartilage oligomeric matrix protein, SOX9 and FOXO1 after 21 days. The maintenance of the chondrogenic phenotype of chondrocytes as well as the initiation of chondrogenesis of hMSCs was demonstrated and therefore, PLLA infiltrated CAR12N scaffolds may be used in future for cartilage tissue engineering.

Impact on medicine: cartilage tissue engineering, cartilage defect repair

# SATURDAY 18TH

biochemistry and molecular biology - oral session

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## **Binding energy analysis for wild-type and D508H and R786H mutants TxGH116 protein-GBA2 inhibitors: Quantum chemical calculations based on the ONIOM method**

**AUTHOR(S):** K. Pijadee, P. Thammakhan, W. Meelua J. Jitonnom

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Gaucher disease is a genetic disorder caused by a lysosomal storage disease characterized by fatty deposits in the spleen, liver, bone marrow, and causing osteoporosis and fractures. Deficiencies of the glucosylceramidase enzyme by mutating amino acid residues can cause the Gaucher disease. Recently, beta-glucosidase (TxGH116) has been crystallized which provides a structural basis for the study of protein-inhibitor interaction. Of particular mutations are aspartic acid at position 508 (D508H) and arginine at position 786 (R786H). Here we aim at understanding the interaction between the GBA2 inhibitors and the enzyme in both wildtype and mutants (D508H and R786H). The binding energy between protein and ligand was calculated using quantum chemistry calculations based on the ONIOM2 method. Molecular details of interactions such as van der Waals, conventional hydrogen bond, pi-donor hydrogen bond, and unfavorable acceptor-acceptor between proteins and individual ligands were discussed. The results of energy and molecular structure values can provide useful information for structural design and development of new or improved drugs. It will also be useful in treating the Gaucher disease in the future.

Impact on medicine: For drug design

# SATURDAY 18TH

biochemistry and molecular biology - oral session

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## **Molecular insight on the non-covalent interaction between GBA2 inhibitors and TxGH116 protein: ONIOM study**

**AUTHOR(S): T. Ya-i-ta, D. Phonsutthitham, J. Jitonnom, W. Meelua**

*1: Demonstration School University of Phayao, Phayao, 56000, Thailand; 2: Division of Chemistry, School of Science, University of Phayao, Phayao, 56000, Thailand*

The project aims to investigate the molecular data of proteins in the glucoside hydrolase family (GH116), an enzyme that catalyzes the breakdown of glycosidic bonds in complex sugars with an amino acid sequence similar to the human gene GBA2. Abnormal GBA2 results in genetic disease. Therefore, we aim to study the interactions between GBA2 inhibitors and the enzyme beta glucidase (TxGH116) by using computational chemistry methodology and ONIOM model. This study begins by modeling the active site structure of the enzyme with ONIOM model. We focus on determining the binding sites of a group of inhibitors, deoxynojirimycin, glucoimidazole, and conduritol B epoxide, etc., to protein beta-glucosidase (TxGH116). The ONIOM results are binding structure and binding energy value. This research project will provide useful information for the further design and development of new highly effective drugs for treatment of Gaucher disease.

*Impact on medicine: for drug design.*

# SATURDAY 18TH

biochemistry and molecular biology - oral session

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## **Analysis of antioxidative enzymes in human erythroleukemia cells**

**AUTHOR(S): M. A. Curcic, J. A. Curcic**

*Medical University of Novi Sad, Serbia*

### Introduction:

Oxidative stress is a cellular phenomenon that occurs as a result of physiological imbalance between the levels of antioxidants and reactive oxygen species (ROS). Antitumor drug doxorubicine (DOX) is a very efficient chemotherapeutics, with a primary antitumor mechanism attributed to the generation of ROS. However, the oxidative stress also induces normal cells toxicity, thus reducing the DOX therapeutic index. In cells exposed to DOX the addition of antioxidants such as N-acetylcysteine (NAC) and proanthocyanidins (PAC) may increase the efficacy of DOX in malignant and decrease the toxic effects towards normal cells. The analysis of antioxidative capacity of enzymes superoxide dismutase (SOD) and catalase (CAT) upon treatment with DOX and antioxidants may be used as useful biomarker to evaluate the effects on DOX therapeutic index.

### Aim:

The aim of our study was to compare the SOD and CAT activity in cells exposed to doxorubicin alone or in combination with antioxidants.

### Material and methods:

We carried out our experiments in two cell lines – malignant K562 and normal CHO cells, and determined the SOD and CAT analysis by standard enzymatic methods.

### Results:

Our results showed that DOX induces significant induction of oxidative stress, as shown by induced activity of SOD and CAT in DOX-treated cells, whereas the NAC and PAC pretreatment of DOX-treated cells induces decreased antioxidative enzymes activity in comparison with cells treated by DOX only.

### Conclusion:

According to our results we may conclude that NAC and PAC reduce antioxidative enzymes activity in cells exposed to DOX-induced oxidative stress.

*Impact on medicine: Expanding our knowledge of antioxidants and their possible therapeutic use.*

# SATURDAY 18TH

biochemistry and molecular biology - oral session

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## **Influence of melanocortins on lipid production by meibomian glands studied using a cell line and a new 3D ex vivo slice culture.**

**AUTHOR(S): I. Zahn, V. Altersberger, J. Dietrich, F. Garreis, M. Schicht, Y. Liu, F. Paulsen**

*1: Institute of Functional and Clinical Anatomy, Friedrich-Alexander-Universität Erlangen-Nürnberg, 91054 Erlangen, Germany; 2: Sechenov University, Department of Topographic Anatomy and Operative Surgery, 119146 Moscow, Russia*

Meibum, a lipid-rich secretion, is produced by meibomian glands (MG) located in the tarsal plate of the eyelids. After release, it forms the outer layer of the tear film and prevents its excessive evaporation. MG dysfunction (MGD) is the leading cause of dry eye disease (DED), an ever-growing public health problem. An immortalized human meibomian gland epithelial cell line (iHMGECS) is mainly used in MGD research but shows limitations in in vitro analysis. Therefore, we established a new ex vivo long-term slice culture of mouse MG using vibratome section as a 3D model to elevate MGD research to a more physiological level (TS12\_14). Cultivation of this 3D model was possible for up to seven days without degradation, as shown by studies of tissue viability, lipid production, and morphological changes during a 21-day cultivation period. Melanocortin-5 receptor (MC5R), a marker of differentiation and lipid production in sebaceous glands, was detected in human and in mouse MGs and iHMGECS. Stimulation with  $\alpha$ - and  $\beta$ -melanocyte-stimulating hormone ( $\alpha/\beta$ -MSH), a MC5R agonist, induced lipid production in iHMGECS in a dose-dependent manner and increased the expression of lipid synthesis markers. Similarly, stimulation of slice cultures with  $\alpha$ -MSH increased lipid production and MC5R expression levels, whereas this effect was absent when cultures were simultaneously incubated with an MC5R antagonist (JNJ-10229570). Thus, functional studies using the newly established 3D model are possible and represent a promising approach to investigate the (patho)physiological properties of MG and accelerate the exploration of new treatments for DED and MGD.

*Impact on medicine: research on novel treatment for meibomian gland dysfunction/ dry eye disease*

# SATURDAY 18TH

biochemistry and molecular biology - oral session

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## **Enzymatic hydrolysis of pharmaceutical peptides**

**AUTHOR(S): M. Zenker**

Technische Universität Graz, Austria

Quality control of drugs represents an integral part of the pharmaceutical industry. For pharmaceutical peptides, the evaluation of the correct chemical composition regarding L- and D- amino acids in the drug is therefore essential. Currently, this kind of quality control is done by acid hydrolysis, which separates the peptides in the respective amino acids. Subsequently, the composition is analysed via LC/MS. A major drawback of this technique is the racemisation of individual amino acids due to the hydrolysis conditions (6 M HCl, 160 °C).

An entirely new approach is to use proteases, an enzyme family that conducts hydrolytic cleavage, to separate therapeutic peptides into their respective amino acids in a structure-preserving manner.

In this project the feasibility of enzymatic hydrolysis was investigated by means of the two peptides Lanreotide and Icatibant with the biocatalysts Pronase and Flavourzyme. In order to study enzymatic and acidic peptide hydrolysis quantitatively, photometric methods were established. Reaction parameters of enzymatic hydrolysis were varied, to generate recommendations for an enzymatic hydrolysis protocol. It was demonstrated that a partial enzymatic hydrolysis without racemisation is possible. However, autolysis of the proteases posed a problem. Yet, the contribution of autolysis amino acids was successfully reduced by purification of proteases. Furthermore, the requirement for a correction of linear trends over time for LC/MS measurements was observed and trends were corrected mathematically. Based on the low degree of hydrolysis and the strong influence of autolysis, the enzymatic approach is no suitable alternative to acid hydrolysis at the current state of research.

*Impact on medicine: This work serves to improve quality control of pharmaceutical peptides.*

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