

WELCOME

The Association of Medical Schools in Europe (AMSE) is a professional organization that promotes and develops the co-operation between Medical Schools in WHO-Europe, enhances and ensures the quality of their activities. AMSE is concerned primarily with the functions and responsibilities of Medical Schools. These include their development of the fields of medicine, medical science, social sciences and society and their conversion into policies of medical education. This conversation affects admission and research management, organizational and academic management and the institutional problems faced by Medical Schools. AMSE also focuses on the relationship between Medical Schools, health service and health care organizations, and relevant national and international authorities, plus the developments in professions allied to medicine and their links with Medical Schools. Another important interest is the role of Medical Schools in post-graduate and continuing professional development, the role of Medical Schools in research and research training, the quality assurance of medical education according to the WFME standards and Medical Schools across Europe.



The history of higher education in Pécs dates back to 1367, when Louis the Great initiated the establishment of a university in the episcopal city of Pécs. As a result of an integration process of several stages the University of Pécs was founded and has become one of the most famous and prestigious institutions having a leading role in regional education. The University of Pécs has 20 000 students out of whose more than 4000 with international background, and 1 400 lecturers and researchers. The 10 faculties cover the full spectrum of high-quality higher education, thus it is one of the largest higher education institutions in Hungary and the center of science within the Trans-Danubian

region. The University of Pécs is a full member of AMSE and its Medical School will host the annual conference and the General Assembly meeting of AMSE. The central topic of this year's conference will be the role of research in the training of medical students and the activity of student researchers in Europe.

We wish our distinguished conference guests – professors, educators and students a pleasant stay in Pécs and a fruitful discussion. In addition to the warm working climate we wish to attract our guests with the Sub-Mediterranean weather of the city and with some excellent local wines of the area.



**Prof. emeritus
Gábor L. Kovács**

member of the Hungarian
Academy of Sciences
University of Pécs, organizer



**Dr. assoc. prof.
Andrea Tamás**

Department of Anatomy,
University of Pécs, organizer



**Prof.
Peter Dieter**

President of AMSE,
Dresden, Germany

CONGRESS OFFICE

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PÉCS



Pécs is the administrative and economic centre of South-West Hungary.

It is best described as a cosy, mediterranean city with over 20.000 students, including thousands of foreign students, from all over the world. With its' 150.000 inhabitants it ranks as the 5th largest city in Hungary.

SZENTÁGOTHAJ RESEARCH CENTRE

(Pécs, Ifjúság Street 20.)

Szentágotthai Research Centre is the main centre of Research, Development and Innovation strategy of the University. There are 22 research groups operating in the building.

The facility focuses on 10 major fields of science from High-field terahertz research to Neurobiology.



DEAN'S COUNCIL HALL

Medical School, University of Pécs
(Pécs, Szigeti Street 12.)



LOCAL ORGANIZING COMMITTEE

- Prof. Gábor L. Kovács *member of the Hungarian Academy of Sciences, University of Pécs*
- Dr. Andrea Tamás *Department of Anatomy, University of Pécs*
- Dr. Zsófia Duga *Head of Admission and Hungarian Student Service Centre, University of Pécs*
- Korinna Kajtár *Registrar's Office, Medical School, University of Pécs*
- Dr. Péter Maróti *Department of Public Health Medicine, PTE 3D Print Centre, University of Pécs*

PROGRAMME COMMITTEE

- Prof. Gábor L. Kovács *member of the Hungarian Academy of Sciences, University of Pécs, Hungary*
- Dr. Andrea Tamás *Department of Anatomy, University of Pécs, Hungary*
- Prof. Peter Dieter *President of AMSE, Dresden, Germany*
- Prof. Harm Peters *Charitae Universitätsmedizin, Berlin, Germany*
- Dr. Joanna Ortolí *University of Katowice, Poland*
- Prof. Janusz Janczukowicz *Head of the Centre for Medical Education, Medical University of Lodz, Poland*

EVENT VENUES

- Dean's Council Hall, Medical School, Univ. of Pécs > H-7624 Pécs, Szigeti Street 12.
- Szentágothai Research Centre > H-7624 Pécs, Ifjúság Street 20.
- Hotel Makár**** Sport&Wellness > H-7635 Pécs, Középmakár dűlő 4.
- Tenkes Csárda > H-7811 Csarnóta, Kültelek 11.
- Cella Septichora > H-7624 Pécs, Szent István Square
- 3D Printing Centre > H-7624 Pécs, Boszorkány Street 2.

PRESENTATIONS

Please hand over all of your lecture materials (including name and title) to the technical team working in the current lecture hall, either in the morning or in the breaks between the symposiums.

POSTERS

The posters will be displayed in the aula in front of the Dean's Council Hall. Posters compete for a free conference participation at the 15th International

Medical Postgraduate Conference in Hradec Kralove. Only posters of PhD students can take part in the poster competition. Participants will be able to put up their posters on the morning of 5th October from the start of registration and will have to take them down after the scientific programme has finished.

WIFI LOGIN

Login: AMSE2018 • **Password:** AMSE2018

These login details apply to both of the congress' venues.

PARKING

There are limited parking spaces reserved next to the Szentágothai Research Centre, which can be occupied by showing the official conference badge at the entrance. Please see on the map!

INSURANCE

The registration fee of the congress does not include any accident, illness, luggage and/or liability insurance. In the event of any of the mentioned, the organizers cannot be held responsible.

COFFEE BREAKS

During the breaks between the symposiums, there will be mineral water, coffee and soft drinks as well as savoury and sweet snacks served to all participants of the congress.

LUNCH

On the 5th of October, lunch will be served in the aula in front of the Dean's Council Hall.

REGISTRATION/INFORMATION DESK

Szentágothai Research Centre:	Thursday 4 th October	13:00 – 17:00
Dean's Council Hall:	Friday 5 th October	08:00 – 17:00

Thursday 4th October 17:00 – 18:30 (Pécs, Boszorkány Street 2.)
PTE 3D PRINT AND VISUALIZATION FACILITY

3D print technology will significantly alter the activities including engineering, health and the fine arts. The goal of the PTE 3D Print and Visualization Facility is to form an intellectual workshop within this rapidly developing field, bringing together a wide array of interests, proceed to the forefront of the latest technologies through testing, and the implementation of today's innovations.

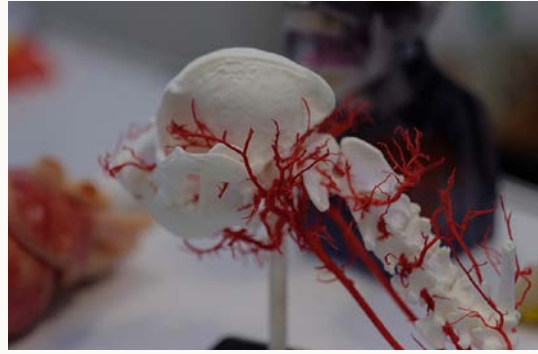
The 3D Print Facility seeks to absorb the practical knowledge, develop and enhance skills required in comprehending 3D printing. It also builds partnerships within the industry, facilitate products amongst its stakeholders and with its various and high quality services it strives to evolve into a catalyst promoting contemporary innovations and fostering long term development of the university including the entire region in all aspects of 3D solutions.

3D Printing and Visualization Technology may appear in the University's portfolio (as part of the Entrepreneur University project) not only as a significant pursuit of Research, Development and Innovation, but distinctively in the role of providing professional and responsive services to participating faculties throughout the University of Pécs.

Notably, PTE 3D is currently offering professional support to several interdisciplinary projects and contractors between the various University Faculties including the PTE MS Medi-

SkillsLab, PTE-E-Health projects, Neural Rehabilitation and Human-Machine Research Centre. Additionally, it is aligned with the education development in cooperation with Zinemath Co., Ltd., and Ottobock Hungária Ltd.

As service provider, the main goal of PTE 3D is to focus on developing and manufacturing medical and industrial prototypes, and to be the region's important market participant in the field of modelling and designing products of various industrial and medical needs. PTE 3D offers diverse 3D print and



plastic foundry technologies, and with the region's most advanced material testing laboratory, the best achievable material structure and quality can be easily found.

Coach information

For those participating in Workshop A, the coach is going to leave for the 3D Print Centre at 17:00 from the entrance of the Szentágotthai Research Centre.

For those participating in Workshop B, the coach is going to leave for the 3D Print Centre at 17:30 from the entrance of the Szentágotthai Research Centre.

Friday 5th October 17:00 – 17:45 (Pécs, Szigeti Street 12.)

MEDISKILLSLAB – MEDICAL SIMULATION CENTRE

The MediSkillsLab project started in 2012 at the Medical School of the University of Pécs.

The Lab's main objective is to improve the manual abilities of medics, both graduates and post-graduates.



The inventory – in which you can find high fidelity simulators, equipment with 3D technology, and innovative demonstration tools – is top quality both domestically and internationally. IT and audiovisual system, which was made in a unique development, uses “smart” solutions that greatly helps the execution of interdisciplinary and complex simulations.

Saturday 6th of October 09:00 – 11:00 (Pécs, Ifjúság Street 20.)

AMSE EXECUTIVE COMMITTEE MEETING

The AMSE Executive Committee Meeting is for the Committee Members only!
Venue: Szentágotthai Research Centre (A214 meeting room)

Thursday 4th October 19:00 – 23:00 (Pécs, Szent István Square)

**NIGHT VISIT AND DINNER AT CELLA SEPTICHORA
WORLD HERITAGE SITE**



The coach is going to leave from the 3D Print Centre at 18:30 and takes participants straight to Cella Septichora. After the dinner, the coach returns to Hotel Makár Sport&Wellness at 23:00 approximately. We would like to kindly advise you not to wear high heeled shoes.

Cella Septichora is part of the antique Sopianae, late Roman, ancient Christian world heritage, which provides an insight into the burial habits of

ancient times. The site's history dates all the way back to 1716, and in 2005-2006, Cella Septichora and its surroundings were fully explored and reconstructed. The ancient Christian crypt counts as a cult place of Pécs nowadays, and also has become a major tourist destination as it enchants every visitor with its slightly mystical mood.

Friday 5th October 18:00 – 23:00 (Csarnóta, Kültelek 11.)

**WINE TASTING AND DINNER IN THE VILLÁNY/SIKLÓS WINE REGION
(TENKES CSÁRDA, CSARNÓTA)**

The coach is going to leave from the Medical School, University of Pécs at 18:00 and takes all participants to Tenkes Csárda, Csarnóta. The coach returns approximately at 23:00 to Hotel Makár Sport&Wellness.

Villány Wine Region is amongst Hungary's architectural and cultural heritage, and it's particularly prominent for its excellent wines and picturesque landscapes. Tenkes Csárda fits in perfectly with the wine region's traditions, gastronomic culture and its' overall warm and welcoming atmosphere. The ancient, tasteful and authentic renovated and restructured restaurant offers delicious home-made dishes from fresh, locally produced goods and the area's finest wines.



Thursday 4th October

Szentágotthai Research Centre (Room B002)

7624 Pécs, Ifjúság Street 20.

- 13.00 – 17.00 Registration/information
- 14.00 – 16.00 **WELCOME ADDRESSES AND PRESENTATIONS OF THE BEST STUDENT RESEARCHERS**
Chairs: **Prof. Janusz Janczukowicz** (Poland) and
Prof. Gábor L. Kovács (Hungary)
- 14.00 – 14.10 **Welcome Address**
Prof. Dóra Reglődi
Vice-dean of the Medical School, Pécs, Hungary
- 14.10 – 14.25 **Welcome Address**
Prof. Peter Dieter
President of AMSE, Germany
- 14.25 – 14.40 **The Szentágotthai Research Centre and its role in student research activities at the Medical School of Pécs**
Prof. Zsuzsanna Helyes
President of the Szentágotthai Research Centre Pécs, Hungary
- 14.40 – 14.50 **Abdominal spreading of a high-grade B-cell lymphoma in mouse**
Gábor Bedics
Department of Immunology and Biotechnology,
Medical School, University of Pécs, Hungary
- 14.50 – 15.00 **Preclinical and clinical study of cost-effective functional upper limb prosthesis and their development process by EEG analysis and 3D technologies**
Dávid Berki
Medical School, University of Pécs, Hungary

- 15.00 – 15.10 **Early transient hyperglycemia and oxygen induced retinopathy**
Eszter Flóra Horányi
Department of Neonatology, Clinical Centre, Department of Anatomy, Medical School, University of Pécs, Hungary
- 15.10 – 15.20 **Uninterrupted direct oral anticoagulant therapy is an efficacious and safer alternative to vitamin K antagonists in patients undergoing catheter ablation for atrial fibrillation. A meta-analysis**
Máté Ottóffy
1st Department of Internal Medicine, Division of Cardiology and Angiology, Medical School, University of Pécs, Hungary
- 15.20 – 15.30 **Ultrafast laser spectroscopic observation of photolyase**
Jonatán Pasitka
Department of Biophysics, Medical School, University of Pécs, Hungary
- 15.30 – 15.40 **Analysis of double-hit lymphoma**
Orsolya Szél
Department of Pathology, Medical School, University of Pécs, Hungary
- 15.40 – 15.50 **General activity and sensorimotor gating in the MAM-E17 schizophrenia rat model**
Zsófia Beáta Tóth-Pál
Department of Physiology, Medical School; Centre for Neuroscience; Molecular Neuroendocrinology and Neurophysiology Research Group, Szentágotthai Centre, University of Pécs, Hungary
- 15.50 – 16.00 Discussion
- 16.00 – 16.15 Coffee break

16.15 – 18.30 **WORKSHOPS / VISIT OF LABORATORIES**16:15 – 17:00 **Workshop A: Bioprinting – complexity of a simple theory: 3D printing in medical education**
Room B002

Prof. Judit Pongrácz (Hungary), Prof. Gábor L. Kovács (Hungary)

Bioprinting sounds easy when enthusiastic researchers are talking about the process. However, while the bioprinting process itself is not a complicated one, the actual product can only be used for research studies and the bioprinted products have rarely made it into clinical applications. The limitations are partly due to legislative problems but also the actual lack of knowledge about how the human body works. To make bioprinting part of the clinical applications used in the therapeutic arsenal, the regenerative as well as the physiological mechanisms of the human body need to be studied and understood at the molecular level. The printed tissue has to fulfil all the expectations and there is no room for error.

Challenges and promises of adipose tissue derived stem cells in regenerative medicine

Orsolya Rideg (Hungary)

While we frequently hear about the human adipose tissue that is used in plastic surgery as an excellent source for treatment of the human body (e.g. after serious skin injuries) we know much less about the great variety of human adipose tissues and even less is known about the human adipose tissue stem cell. In the presentation the actual isolation protocol will be discussed.

After Workshop A, participants will be taken to the 3D Print Centre of University of Pécs at 17:00.

16:15 – 17:30 **Workshop B: Working in international and/or interdisciplinary research teams – rules, standards and team-spirit**
Room B001

Joanna Ortolí (Poland), Prof. Harm Peters (Germany)

The workshop covers key information on standards and good practice in communicating within international projects & organizations, including organization of a successful international meeting. The international perspective is complemented by frameworks and practices about how to work effectively in interdisciplinary research teams at an institutional level.

After Workshop B, participants will be taken to the 3D Print Centre of University of Pécs at 17:30.

19.00 – 23.00 **Night visit and dinner at Cella Septichora
UNESCO World Heritage Site (Pécs, Szent István Square)**

Friday 5th October

Medical School, Dean's Council Hall

7624 Pécs, Szigeti Street 12.

- 08.00 – 17.00 Registration/information
- 09.00 – 11.00 **OPENING OF THE CONFERENCE:
BEST PRACTICE FOR RESEARCH TEACHING
IN MEDICAL EDUCATION – SYMPOSIUM 1**
Chairs: **Prof. Dusan Suput** (Slovenia) and
Prof. Miklós Nyitrai (Dean of the Medical School, Pécs, Hungary)
- 09.00 – 09.05 **Welcome Address:**
Prof. Miklós Nyitrai
Dean of the Medical School, Pécs, Hungary
- 09.05 – 09.20 **Welcome Address:**
The role of AMSE in medical education & research
Prof. Peter Dieter
President of AMSE, Germany
- 09.20 – 09.40 **Best practice research teaching in medical education
in Hungary**
Prof. László Mátyus
Dean of the Faculty of Medicine, University of Debrecen, Hungary;
Member of the Board of National Council of Student Research Societies
- 09.40 – 10.00 **Significance of the doctorate in scientific medical education**
Prof. Matthias Frosch
Dean of the Faculty, University of Würzburg, Germany; Member of the
Board of the Association of Medical Faculties in Germany, Würzburg, Germany
- 10.00 – 10.15 **Research activity of medical students in University of Pécs**
Prof. Tibor Ertl
Chairman of Undergraduate Research Society
Medical School University of Pécs, Hungary

- 10.15 – 10.30 **Facilitating undergraduate research in Germany: experiences from establishing a research project module as part of the international BM(EU) programme**
Anja Timm
Medical Education, Faculty of Medicine, University of Southampton, UK
- 10.30 – 11.15 Coffee break and poster visiting
- 11.15 – 13.25 **SYMPOSIUM 2**
Chairs: **Prof. Nebojsa Lalic** (Serbia) and **Andrea Tamás** (Hungary)
- 11.15 – 11.25 **Demonstrator activity at the Medical School, University of Pécs**
László Czopf
Vice-dean of the Medical School University of Pécs, Hungary
- 11.25 – 11.40 **The role of demonstrators in developing medical interviewing and clinical skills**
Ágnes Koppán – Judit Sebők
Board Members of Circle of Demonstrators,
Medical School University of Pécs, Hungary
- 11.40 – 11.50 **Demonstrator's „Workshop” and experience in cardiology**
Juliane Wagner – Roland Hetényi
Medical School University of Pécs, Hungary
- 11.50 – 12.05 **Interdisciplinary simulation-based education to improve clinical skills and medical communication competencies at the University of Pécs, Medical School**
Judit Sebők – Eklics Kata – Ágnes Koppán
2nd Department of Medicine and Nephrological Centre, Department of Languages for Specific Purposes, Medical School University of Pécs, Hungary
- 12.05 – 12.25 Coffee break and poster visiting

12.25 – 12.40 **Bedside teaching in general and subspecialized internal medicine departments translates into similar competence in basic physical examination skills in the first clinical year**

Dorota Długosz

Jagiellonian University Medical College, Faculty of Medicine,
Department of Medical Education and Students' Scientific Group at
the Second Department of Cardiology, Cracow, Poland

12.40 – 12.55 **Incorporating research into medical curriculum: Sarajevo Medical School experience**

Semira Galijasevic

University of Sarajevo School of Science and Technology,
Sarajevo Medical School, Bosnia and Herzegovina

12.55 – 13.10 **Curricular and extra-curricular activities enhancing student engagement in research at the Faculty of Medicine, University of Maribor**

Monika Sobocan

Faculty of Medicine, University of Maribor, Slovenia

13.10 – 13.25 **Programmatic Issues of the MD students` Progress in Developing Scientific Skills and Aspects of their Quality Evaluation Benchmark**

Nia Tabagari

David Tvildiani Medical University, Tbilisi, Georgia;
East European University, Tbilisi, Georgia

13.25 – 14.00 Lunch and poster visiting

14.00 – 15.00 **General Assembly**

- 15.00 – 17.00 **SYMPOSIUM 3**
Chairs: **Prof. Algirdas Utkus** (Lithuania) and
Prof. Dóra Reglődi (Vice-dean of the Medical School, Pécs, Hungary)
- 15.00 – 15.20 **Regular AMSE Conference Lodz 2019**
Prof. Janusz Janczukowicz
Head of the Centre for Medical Education, Medical University of Lodz, Poland
- 15.20 – 15.50 **International Medical Postgraduate Conference in Hradec Kralove**
Prof. Vladimir Palicka
Faculty of Medicine Hradec Kralove, Czech Republic
- 15.50 – 16.05 **Components of case based education in studying internal medicine based on modern educational web-technologies**
Nataliia Lopina
Kharkiv National Medical University, Ukraine
- 16.05 – 16.20 **Teaching empathy and health communication**
Prof. María Trinidad Herrero
University of Murcia, Spain
- 16.20 – 16.35 **Physician migration at its roots: a study on the emigration preferences and plans among medical students in Romania**
Anca Dana Buzoianu
University of Medicine and Pharmacy "Iuliu Hatieganu"
Cluj-Napoca, România
- 16.35 – 16.50 **Best Practice in education for health and social care professionals in working with marginalised and „hard to reach” communities – lessons from the UK**
Prof. Margaret Greenfields
Buckinghamshire New University (Institute for Diversity Research/IDRICS), UK

- 16.50 – 17.00 Closing of the Conference
(announcing the winner of the poster competition)
- 17.00 – 17.45 **Visit to the MediSkillsLab**
– Medical Simulation Centre of the Medical School
- 18.00 – 23.00 **Wine tasting and dinner in the Villány/Siklós**
Wine Region (Tenkes Csárda, Csarnóta)

Saturday 6th October

Szentágotthai Research Centre (A214 meeting room)

7624 Pécs, Ifjúság Street 20.

- 09.00 – 11.00 **AMSE Executive Committee Meeting**



ABDOMINAL SPREADING OF A HIGH-GRADE B-CELL LYMPHOMA IN MOUSE

Gábor Bedics, Péter Balogh

Department of Immunology and Biotechnology, Medical School, University of Pécs

Lymphatic structures of the serosal surface of the gut play crucial role in immunological functions and may play an important role in spreading of various tumors in the abdominal cavity. I investigated the features of the abdominal spreading of a spontaneous high-grade B-cell lymphoma (Bc-DLFL1), and intended to optimize techniques in order to improve this investigation. Tumor-cells were labelled with an intracellular fluorescein molecule (CFSE), I injected the cells i.p., then after 3, 6, 20, 36 hours of incubation, the whole mesenterium and omentum were resected, and the cells were detected by anti-fluorescein immunohistochemistry. Tumor cells formed discrete groups at the earliest time of investigation in the omental-, and mesenterial samples. Then, between 6 and 20 hours the applied cells migrated towards the mesenterial lymph node, forming line-like structures in tubes, which were thought to be lymph capillaries.

In order to determine the lymphatic endothelial nature of the seen structures, lac-Z transfected A20 lymphoma cells and LYVE-1 antibody were used. However the A20 cells showed similar tumor adhesion-, and spreading pattern as the Bc-DLFL1 cells, the applied X-gal method showed remarkable background-activity especially in the mesenterial lymph node. As an alternative method, I used alkaline-phosphatase conjugated antibodies to identify LYVE-1 antibodies, then this method was combined with peroxidase-based CFSE identification.

This procedure resulted in intense LYVE-1 activity of macrophages on the peritoneal surface, and the applied cells were seen in „palisade-like” lines. According to my results, the diffuse-large-B-cell like lymphomas show selective adhesion pattern on the mesenterium and omentum, then the cells reach the deeper layers of the mesenterial adipose tissue relatively quickly, then they reach the mesenterial lymph node probably via lymphatic vessels.

The peroxidase-conjugated anti CFSE method was sensitive and specific to identify tumor cells, and their spreading in the abdominal cavity. The LYVE-1 staining was partially inadequate, therefore the identification of the probable lymph vessels needs further markers and stainings.

PRECLINICAL AND CLINICAL STUDY OF COST-EFFECTIVE FUNCTIONAL UPPER LIMB PROSTHESIS AND THEIR DEVELOPMENT PROCESS BY EEG ANALYSIS AND 3D TECHNOLOGIES

Dávid Berki, Miklós Nyitrai, Péter Maróti

Medical School, University of Pécs, Hungary

Introduction: The aim of the study is to investigate proprietary, cost-effective, and personalised functional prosthetic upper limbs for children and adults with transradial amputation. We have developed a myoelectrically controlled prosthesis using 3D technologies. Our objective is to develop a BCI system controlled by EEG signal processing. This could provide opportunity for a wider application of this method. Long term objective is to develop a 3D printed upper limb prosthesis that is capable for separate movements of fingers.

Materials and methods: We have created our current prototype based on a ready to use product. The palmar component has been made of flexible PLA composite by FFF AM technology (FilaFlex Black 500 G). Dorsal component and forearm have been created using hard PLA plastics. Braided plastic cords running in tunnels along the fingers provide connection with Micro Linear Actuator 7N (12 mm/s) in the palm. The frame of forearm contains a 5000 mAh battery, a processor, and some wires that connect one of the myoelectric sensors to our system. The other sensor does the same using Bluetooth connection; thereby it is not necessary to connect the device to a computer during use.

Results: We have developed a program code allowing complex sequences of motion to be executed sequentially. The completed myoelectrically controlled upper limb prosthesis is capable of real-time motion, based on 3D printing and the components used and the prototype is affordable. Using 3D printing is fully customizable to meet the needs of individuals.

Discussion

Further studies of myoelectric and EEG control will be designed based on preliminary results.

PHYSICIAN MIGRATION AT ITS ROOTS: A STUDY ON THE EMIGRATION PREFERENCES AND PLANS AMONG MEDICAL STUDENTS IN ROMANIA

Anca Dana Buzoianu, Codruta Popescu, Mugur Ciumageanu, Soimita Suciuc
University of Medicine and Pharmacy "Iuliu Hatieganu" Cluj-Napoca, România

Background: Migration of healthcare workers is receiving increased attention worldwide. In Europe, the creation of a border-free labor market and its expansion with the EU enlargements of 2004, 2007, and 2013 endowed health professionals with the right to provide services and to relocate to another EU Member State. For the Romanian doctors, the EU-wide recognition of the medical degree obtained in Romania has created new opportunities, while inadequate working conditions and relatively low salaries pushed many of them to search for employment abroad. As there is considerable uncertainty about the magnitude of the Romanian physicians' exodus, we performed a survey to assess the emigration intention of future Romanian doctors.

Methods: The study was conducted over three consecutive years: 2013, 2014, and 2015 at the University of Medicine and Pharmacy "Iuliu Hatieganu" Cluj-Napoca, Romania. The self-administrated questionnaire included 19 questions regarding students emigration intentions.

Results: All the 957 license-degree students participated in the study. In this study, 84.7% of subjects planned on seeking employment abroad after graduation. A large number of the students who have participated in the study have already started preparing for emigration, 21.7% of those who wished to migrate had already performed at least one Erasmus mobility in their country of choice, 44.5% have been enrolled in a language course, and 42.7% have searched for jobs on the Internet.

Conclusions: The majority of Romanian medical students considering migration see it as a serious alternative to the continuation of their professional training started in Romania. The findings of this study are upsetting and can impact both policy crafting and future research. Structural reforms in the healthcare provisions are needed in order to facilitate the retention of medical personnel. Romanian policy makers need to devise a comprehensive national health workforce plan to deal with physician migration.

WELCOME ADDRESS: THE ROLE OF AMSE IN MEDICAL EDUCATION & RESEARCH

Peter Dieter

President of The Association of Medical Schools in Europe, Germany

All participants will be welcomed and thanked for their participation.

The organization team will be thanked, especially Dr. Andrea Tamas and Prof. Gábor L. Kovács, as well as the organizing company Partners Pécs Kft., especially Nora Cservenka.

A short summary will be given about the number of participants, from which countries they

are coming and how many abstracts have been submitted.

A short introduction will be given about the schedule and content of the congress.

This year, the main topic of the conference is to learn about "Best Practice Models in Research in Sciences and Education in Undergraduate and Post-graduate Medical Programs.

AMSE is the Association of Medical Schools in WHO Europe. Members of AMSE are Medical Schools (represented by the Deans) and Organizations which are involved in Medical Education and Medical Research. AMSE would like to support the Deans in their responsibility to deliver high quality medical education and high quality research in their Medical School.

In the last years, the number of Medical Schools, especially Private and Profit Medical Schools which are mostly doing no or only marginal medical research, increased dramatically.

Also, the movement of medical doctors across borders increased, especially movement from the East to the West of WHO Europe.

In WHO Europe, no common quality assurance (accreditation) including common standards and procedures exist so far. Each country has its own standard.

AMSE will start a Pilot Project from November this year offering to AMSE Member Schools an accreditation (together with a European-recognized accreditation agency) where Medical Schools will be certified that they meet the ESG and WFME standards. This certification can be used to demonstrate that their graduates will be educated according to these standards.

BEDSIDE TEACHING IN GENERAL AND SUBSPECIALIZED INTERNAL MEDICINE DEPARTMENTS TRANSLATES INTO SIMILAR COMPETENCE IN BASIC PHYSICAL EXAMINATION SKILLS IN THE FIRST CLINICAL YEAR

Dorota Długosz, Jolanta Świerszcz, Agnieszka Skrzypek, Konrad Jabłoński, Andrzej Surdacki, Michał Nowakowski

Jagiellonian University Medical College, Faculty of Medicine, Department of Medical Education and Students' Scientific Group at the Second Department of Cardiology, Cracow, Poland

Background: Owing to a recent worldwide decline in physical examination (PE) skills, an early remedial intervention is mandatory. A large diversity of patients encountered by students during their core clinical rotations is beneficial for the acquisition of knowledge in internal medicine. However, whether patient diversity - commonly lower in subspecialized internal medicine departments - affects basic PE competence in the first clinical year, is not clear. In our 6-year curriculum, students acquire basic competence in PE through preclinical training in a clinical skills lab in year 2 of study, followed by bedside teaching during the Fall semester of year 3, i.e. an introductory clinical course. The introductory clinical course consists of mini-clerkships in clinical departments, including departments of general internal medicine (with high patient diversity) as well as subspecialized internal medicine departments.

Aim: To compare students' competence in PE on an objective structured clinical examination (OSCE) - carried out at the completion of the introductory clinical course - according to the type of internal medicine department where the introductory clinical course took place.

Methods: We retrospectively analyzed examination data from 490 third-year OSCEs during February 2016 and February 2017 exam sessions. Scores at PE stations were compared between students who attended their introductory clinical course in the general internal medicine departments (n=280) and those assigned to the subspecialized internal medicine departments (n=210). Based on OSCE grades, OSCE scores at PE stations were calculated as relative values (percentages), with the reference to an optimal result for the given task, assumed to be 100%.

Results: Average third-year OSCE scores at PE stations were similar after bedside teaching in general and subspecialized internal medicine departments (median [interquartile range]: 88 [79-94] % vs. 87 [76-94] % for general and

subspecialized departments, respectively, $p=0.2$ by Mann-Whitney U test). The results were consistent for two different sets of PE stations (stations set I: 86 [78-100] % vs. 85 [75-100] %, $p=0.1$; stations set II: 88 [75-100] % vs. 87 [75-100] %, $p=0.7$) and across 2016 and 2017 exam sessions (2016: 91 [83-95] % vs. 89 [82-94] %, $p=0.2$; 2017: 83 [75-92] % vs. 83 [74-93] %, $p=0.9$).

Conclusions: Competence in basic PE skills is similar after bedside teaching in general and subspecialized internal medicine departments in the first clinical year. This may result from a lower relevance of a limited patient variety in subspecialized departments for the acquisition of basic PE skills in year 3 of study compared to advanced clinical competence in later years during core clinical clerkships. Additionally, the preceding second-year preclinical training in a clinical skills lab could minimize the impact of lower patient diversity in subspecialized internal medicine departments.

INTERDISCIPLINARY SIMULATION-BASED EDUCATION TO IMPROVE MEDICAL COMMUNICATION COMPETENCIES AT THE UNIVERSITY OF PÉCS, MEDICAL SCHOOL

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Medical communication training is being challenged to meet the demands of a more internationalized world. As a result, interdisciplinary simulation-based education is designed to advance clinical skill development, specifically in doctor-patient interactions. The Standardized Patient Program has been applied in American Medical Schools since the 1960s, implementing patient profiles based on authentic cases. At the University of Pécs, Medical School in Hungary, this model is being adapted to facilitate improving patient-interviewing, problem-solving, and medical reporting skills. The interdisciplinary program operates in Hungarian, German and English languages, utilizing actors to perform as simulated patients under the close observation of medical specialists and linguists.

This innovative course is designed to train students to successfully collect patient histories while navigating medical, linguistic, emotional, and socio-cultural complexities of patients. Experts in medicine and language assess student performance, offering feedback and providing individualized training that students might improve their professional and communicative competencies. Our presentation unfolds how this interdisciplinary course provides valuable opportunities for more efficient patient-oriented communication practices. Through responding to medical emergencies, miscommunications, and conflicts in a safe environment, medical students prepare to deal with a diverse patient context, that more qualified and empathetic health personnel may be employed throughout clinics worldwide.

Our program is not only applicable for communication skills development, but also compatible with other clinical subject simulations, thus paving the path for future activities.

Keywords: interdisciplinary simulation-based education, doctor-patient interaction, MediSkillsLab, medical history taking, language for specific purposes competencies

RESEARCH ACTIVITY OF MEDICAL STUDENTS IN HUNGARY

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The National Scientific Students' Association in Hungary has 16 sections and organizes conferences biannually. In 2017 the Section of Medical and Health Sciences Conference was held in Pécs as an important event among jubilee conferences celebrating the 650th anniversary of the establishment of the first Hungarian university in Pécs.

We welcomed 1096 participants. During the conference 531 presentations were evaluated by 335 jury members. The efforts of the students were honoured with 77 first place, 84 second place, and 13 third place prizes. The medical societies and sponsors acknowledged with special awards another 77 and 78 presentations, respectively. The budget was approximately 200.000 Euro financed by grants from the National Scientific Students' Association and the Ministry of Human Resources. The University of Pécs, medical societies and other sponsors also contributed.

At the Medical School in Pécs the number of students is about 3800 -including over 2200 "foreign" students studying in the English or German Program (arriving from more than 60 different countries of the world). The number of students who registered at the Students' Science Circle in the present academic year was 247.

In 2018 at the local Students' Research Conference the students of the Medical School and Faculty of Pharmacy participated with 136 presentations. The number of presentations this year increased by approximately 30%, most probably due to the success of the National Students' Research Conference of the previous year. This year for the first time the jury panel included experts from the "partner" universities besides the mentors of our university.

Taking into consideration the high number of foreign students at our University, our goal is to involve more students in research from the English and German Programs.

INCORPORATING RESEARCH INTO MEDICAL CURRICULUM: SARAJEVO MEDICAL SCHOOL EXPERIENCE

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Medical education is nowadays more than ever experiencing new ideas with new concepts being integrated into the system in order to follow rapidly changing landscape of medical science. Basic scientific methods are integral part of the practice of medicine. Clinicians use concept and ideas when treating a patient that are very much based on basic and applied scientific inquiry. However, some authors presented cases where research practice in medicals school as a part of curriculum did not give significant benefits to students involved in research practice. In many cases, research programs were not structured properly, and students were left to choose research programs without any connection to medical practice that lacked meaningful ideas and practice. In this presentation, we reviewed current literature investigating different research programs in Medical schools and addressed conflicting ideas describing the necessity of research incorporated in Medicals School curriculum. We here present a case of Sarajevo Medical School where research practice and research methods are heavily incorporated in the curriculum as a standard subjects. In addition, students are encouraged to participate in research group by choosing a mentor and producing tangible results. One of the programs incorporates clinical training and mentoring one to one with research components and required participation at scientific conferences. This practice already produced significant participation of students at conferences, published research papers and abstracts. More importantly, students acquired important skills that are going to be used heavily in their medical practice.

BEST PRACTICE IN EDUCATION FOR HEALTH AND SOCIAL CARE PROFESSIONALS IN WORKING WITH MARGINALISED AND „HARD TO REACH“ COMMUNITIES – LESSONS FROM THE UK

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This presentation draws upon the experience of Buckinghamshire New University/IDRICS in the development of multidisciplinary education and training for health and social care professionals on working with ‘hard to reach’, vulnerable and marginalised populations. The discussion and recommendations are underpinned by a 360 degree scope of current best practice and relevant literature supporting clinical education in the context of the delivery of primary care (including targeted outreach), and draws also upon findings from research studies led by the presenting author over a significant number of years which focus on marginalised patients’ experience of engagement with health practitioners and barriers and solutions to enhancing engagement and communication. In defining these ‘marginalised’ or ‘vulnerable’ groups we take as an exemplar those individuals and communities who formed a core focus of the remit of the UK National Inclusion Health Board (<https://www.gov.uk/government/groups/national-inclusion-health-board>) which was tasked with providing cross-sector and interdisciplinary leadership at a national level to champion the needs of vulnerable groups: homeless people; Gypsies and Travellers (in the broader context including Roma populations); ‘vulnerable migrants’ (which may include refugees and asylum seeking populations) and sex workers.

Trainee medical practitioners and other health and social care professionals anecdotally (supported by findings from commissioned research for Clinical Commissioning Groups undertaken by Greenfields and Lowe in 2013 and Greenfields/IARS 2014 work with refugee women on access to health care) find such ‘non-normative’ populations particularly challenging to engage with in mainstream clinical/social care settings where communication and treatment provision are often predicated on a ‘one size fits all’ model which fails to prepare practitioners for the specific needs, cultural and social contexts and impact of long-term exclusion across diverse Social Determinants of Health (SDOH). This approach and prior experiences in turn impact on patient behaviours, health literacy, compliance and treatment requirements.

Furthermore, practitioners working with a specific focus on these specific 'hard to reach' client groups not infrequently report that they themselves become seen as somehow 'outside' of main stream practice and report a lack of understanding of their role and at times experience of 'in-practice marginalisation' from colleagues as they become seen as detached from normative health care practices and associated with stigmatised groups who are their 'special responsibility'. The paper concludes with recommendations for training on the needs of such populations, and placement experiences for health and social care practitioners in settings outwith typical clinical settings whilst additionally a discussion is presented on how best to ensure that healthcare education challenges normative treatment presumptions and engages with practice which is innovative and enables the trainee to develop empathy with marginalised populations who are largely outside of their range of prior contact or clinical experience; with it is asserted, demonstrable improvements in outcomes for such patient groups.

THE SZENTÁGOTHAÏ RESEARCH CENTRE AND ITS ROLE IN STUDENT RESEARCH ACTIVITIES AT THE MEDICAL SCHOOL OF PÉCS

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The János Szentágotthai Research Centre of the University of Pécs is a research institute established in 2012 on the basis of modern international science organizational principles. It covers all aspects of education, research and innovation at biomedical, natural and environmental sciences. The infrastructure, instrumentation and expertise of the 24 research groups operating in the building provide an excellent basis to become a well-known, leading research facility not only in Hungary, but in Central-Europe with an extensive and fruitful collaboration network.

Our main aims are 1) to concentrate the most outstanding power and serve exploratory and innovative research potentials by establishing a critical researcher mass with well-equipped new laboratories of the highest standard, 2) to have strong and tight cooperation between academic researchers and industrial partners, 3) to reflect quickly and flexibly to the modern research trends and needs of knowledge-based economy. There are 5 research clusters related to natural sciences in accordance with the Research & Development & Innovation strategy and excellence centres of the university: Neuroscience (Neuroscience Centre of the University of Pécs with the synergistic activities of basic and clinical neuroscience), Molecular Biology, Immunology, Translational Medicine, and Physics-Chemistry. We cover neurobiology, neurophysiology, neuroendocrinology, and neuropharmacology; genetics, pharmaco-genomics, functional genomics and proteomics, cardiovascular research; biophysics, cell and immune biology, biotechnology, signal transduction research, reproductive immunology, lymphoid organogenesis; infective diseases (Biosafety level-4 virology laboratory), laboratory diagnostics, analytics, lab-on-a chip technology; as well as green chemistry, analytical chemistry and geoanalytics; high-field terahertz research, spectroscopy and atmospheric physics.

The research centre provides an excellent basis for collaborative research projects across these different disciplines, as well as for intensive involvement of PhD students and student research fellows including medical students.

DEMONSTRATORS IN CARDIOLOGY

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Introduction: Teaching medical students to the art of medicine may come with its gruelling challenges. An in-depth view at the fabrics of this student-doctor-patient relation can reveal much room for improvement. This paper presents an approach to improve educational standards in cardiology.

Materials and methods: One solution is luckily at hand: demonstrator students. Macroscopically, a win-win situation. This form of education aids clinical doctors in their hustling duties and shoulders a handful of their energy. Elder and experienced medical students are chosen on a voluntary basis to teach other students the standards they had given proof of at their previous exams. We introduce an indeed heartwarming approach for educational assistance: demonstrators in cardiology. Hungarian cardiac patients possess invaluable history and clinical signs but are often difficult to approach in other than Hungarian language. Another major issue arises when the number of medical students exceeds 5. At this point, the focus on the patient disappears: the clinician will no longer be able to provide fair time and focus for each student and the patient will also exhaust of the repeated examinations practiced by the crowds of doctors-to-be. This is one means of aid where demonstrator students might be wonderful colleagues for the clinicians. Another tool to communication is their clinical knowledge. History taking, physical examination, clinical discussion are certainly means of assistance, too. Last but not least, smaller teams around more patients can be formed to increase the productivity and efficiency of clinical education.

Results: Our experience indicates that students, especially foreign students, ease into contact with the patient more easily, yield more data on the patient's clinical status and their productivity results in better grades at exams. On the other hand, new materials for educational purposes are created. This will help students to have essential pieces of knowledge at hand and be able to acquire a global vision of a clinical condition with an improved student-patient relationship.

Conclusions: In this paper we present an effective means of aid in clinical education of medical students. This means, demonstrator students, has greatly increased the effectivity of teaching medical students, shouldering the challenges of clinicians and preparing an interconnected fabric of improved medical knowledge.

EARLY TRANSIENT HYPERGLYCEMIA AND OXYGEN INDUCED RETINOPATHY

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Introduction: Several clinical studies showed that hyperglycemic episodes on the first postnatal week has an influence on the severity of retinopathy in newborns. Our aim was to create a model to detect the effects of the high blood glucose level on oxygen induced retinopathy, the animal model of retinopathy of prematurity.

Method: Newborn Sprague-Dawley rats were cross-fostered and divided into two groups after birth. They were maintained in either normoxic (Cont) or a daily alternating hypo/hyperoxic (OIR) environment from postnatal day (PD)1 to 14. Both groups were further subdivided into two. The pups were injected intraperitoneally with either 100 mg/kg Streptozotocin (STZ) to induce hyperglycaemia (HG) or citrate buffer as a control (Cont). Blood glucose level and weight were measured daily. On PD17 the retinas were dissected after euthanasia and whole-mounted onto slides. They were stained with immunofluorescent lectin to visualize the retinal vasculature. For morphological analysis we evaluate the vessel density and the ratio of peripheral avascular area to the whole retina. We determined the expression of cytokins with semi quantitative methods on homogenised retinas.

Results: OIR groups developed oxygen-induced retinopathy with lack of peripheral vessels and neovasculare nodules at the border of vascularized and non-vascularized areas. Hyperglycemia had no influence on the extent of retinopathy and hyperglycemia itself did not cause any morphological vessel alteration on postnatal day 17. We found deviation in the level of seven cytokins in HG-OIR retinas.

Discussion and Conclusion: Although many clinical study associated hyperglycemia with ROP in our animal study we found that by PD17, at the peak of neovascularization, hyperglycemia had no influence on the morphology of retinal vessels, but the changes in cytokin levels predict cellular damage. We plan to do further biochemical and morphological studies on retinas in the acute hyperglycemic phase.

COMPONENTS OF CASE BASED EDUCATION IN STUDYING INTERNAL MEDICINE BASED ON MODERN EDUCATIONAL WEB-TECHNOLOGIES

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Introduction: Currently the most important direction in the sphere of higher medical education is the necessity strengthen the practical aspect of training future physicians. The classical system of higher clinical medical education is not able solve the problem of practical training of physicians. The main obstacles to this is the impossibility of a practical illustration of the whole variety of clinical situations.

Modern medical education should promote the formation of an active learning process; develop abilities for self-learning, memorization, systematization of the material passed, and the ability to use this knowledge in practice.

Purpose – to improve practical training of students and physicians according to development components of case based education based on modern educational web-technologies.

Results: Components of case based education in studying internal medicine in the undergraduate and postgraduate training of physicians in own experience modern educational web-technologies implementation to study process, can include:

1. Presentations of clinical cases – detailed presentation of a clinical case with visualization results of the examination, review of clinical guidelines important for presented in case pathology, discussing the peculiarities of the clinical case, treatment outcomes, discussion, outstanding issues, prospects of research, etc.;
2. Audio/video lectures of clinical cases with presentations;
3. Practical training simulators - a combination of theoretical material on a specific topic with a large number of clinical situational tasks for it's mastering;
4. The simulators of clinical cases - a combination of a specific clinical case with logically related test tasks on the topic of the concrete clinical situation;
5. Medical educational web-quests are a combination of several topics in the medical discipline due one problem task with the elements of the detective-style information game, with the construction of a branching scenario and a combination of theoretical material on several topics, with the improvement of practical skills and test simulators.

UNINTERRUPTED DIRECT ORAL ANTICOAGULANT THERAPY IS AN EFFICACIOUS AND SAFER ALTERNATIVE TO VITAMIN K ANTAGONISTS IN PATIENTS UNDERGOING CATHETER ABLATION FOR ATRIAL FIBRILLATION. A META-ANALYSIS

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Introduction: Adequate anticoagulation in catheter ablation of atrial fibrillation is crucial in preventing both thromboembolic events and life-threatening bleeding. The purpose of this meta-analysis was to assess the latest evidence to compare VKA to DOAC therapy for anticoagulation in catheter ablation for atrial fibrillation.

Methods: Studies comparing DOACs to VKAs were identified with multiple databases (Embase, PubMed, Cochrane and Scopus) using an electronic search. Interrupted and uninterrupted DOAC therapies were distinguished, VKA therapy was always uninterrupted. Statistical heterogeneity was analysed by the I² statistic and the chi-square test to gain probability-values; $p < 0.05$ was defined to indicate significant heterogeneity.

Results: 37 studies were included in the final analysis, encompassing a total of 19,899 patients. Regarding stroke and TIA occurrence there was no significant difference between DOACs and VKA (OR: 0.98, CI: 0.48-1.99). Comparing major bleeding rates between DOACs versus VKA showed a significant difference favoring the uninterrupted DOAC therapy (OR: 0.59, CI: 0.40-0.85), but interrupted DOAC therapy showed no significant difference (OR: 0.76, CI: 0.57- 1.01). Composite analysis of major bleeding and stroke/TIA showed a significant net benefit of uninterrupted DOACs over VKAs (OR: 0.6, CI: 0.42-0.85), no significance was observed with the interrupted DOAC group (OR: 0.78, CI: 0.59-1.02).

Conclusion: The risk of thromboembolic events was very-low with well managed uninterrupted anticoagulation. Based on our data, uninterrupted periprocedural DOAC therapy is a safe and preferable alternative to VKAs in patients undergoing catheter ablation for atrial fibrillation.

ULTRAFAST LASER SPECTROSCOPIC OBSERVATION OF PHOTOLYASE**Jonatán Pasitka, András Lukács***Department of Biophysics, Medical School, University of Pécs, Hungary*

In the last few decades an enormous technological expansion could have been seen in the field of lasers. This resulted in the application of basically biophysical methods in the every day medicine, methods like super-resolution microscopy, CARS microscopy, Raman-spectroscopy and even ultrafast laser spectroscopy. With the help of ultrafast laser spectroscopy the recording of intramolecular procedures became possible even on the scale of femtoseconds. Several, biologically relevant processes are known that take place within this scale. Such example is the photoisomerisation that means the basics of vision or the redox potential changes in photolyases and cryptochromes leading to their proper functioning. We have been focusing on the ultrafast laser spectroscopic features of these latter two proteins. They are phylogenetically connected, however photolyase is a DNA repair enzyme while cryptochrome is the member of the group of proteins composing the circadian clock. The explanation for such different functions so far from each other lays in the understanding of the procedures happening intramolecularly on the scale of femtoseconds.

CURRICULAR AND EXTRA-CURRICULAR ACTIVITIES ENHANCING STUDENT ENGAGEMENT IN RESEARCH AT THE FACULTY OF MEDICINE, UNIVERSITY OF MARIBOR

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Introduction: The Faculty of Medicine, University of Maribor is a young medical school (established in 2003) engaging students' in all its core activities¹. The school focuses on implementing evidence based medical education practices in all aspects of future doctor education, including research in medical sciences and medical education.

Methods: We analyze the three main tiers of introducing students to research early in their medical education. These tiers are: curricular components of research in education, extracurricular internal research competitions and engaging students in the Centre for medical education.

Results: The analysis of curricular changes and development (presented in Figure 1) show, that teaching has been reorganized to address the needs of student for early structured information on designing research in medical sciences and analyzing it.

Put into practice students then use the knowledge given to them through the structured curriculum in the extracurricular "Dean research competition" leading to a review of research work by field experts and the awarding of top student research. The award criterion accounts sound research conducted as well as the reached public recognition of their research (e. g. published in top peer-reviewed journals, participated in scientific conferences with their work). Each year this motivates students more and more to conduct robust studies and to try also in communicating their science and enhancing their scientific research abilities.

Independently of the institutionalized research competition also an informal medical education research initiative has been growing through the Centre for Medical Education (CME). This Centre has cultivated by promoting evaluation of the curriculum as an integral part of the school a culture of teaching methodology evaluation. The gained skills then lead to development of first prospective research in medical education in 2015 continuing up to now.

Conclusion: To support and enhance student research, multimodal approaches with frequent feedback seeking behavior should be implemented. Such

behavior leads to the development of curricula suiting the student needs in research as well as stimulating further quality research. Building a spirit of research behavior through research competition as well as bodies such as CME enables the improvement of student research as well as buildup of new research proposals.

1 Zdravković M, Serdinšek T, Sobočan M, Bevc S, Hojs R, Krajnc I. Students as partners: Our experience of setting up and working in a student engagement friendly framework. Med Teach. 2018; 40(6):589-594. doi: 10.1080/0142159X.2018.1444743.

ANALYSIS OF DOUBLE-HIT LYMPHOMA

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Introduction: Diffuse large B-cell lymphoma (DLBCL) is one of the most common lymphomas among adults. Cases that can be characterized by two different IGH translocations – typically IGH/MYC and IGH/BCL2 rearrangements – are called double-hit lymphoma (DHL). Patients with this subtype have poor prognosis when treated with standard therapy, thus, it is important to differentiate DHL from other DLBCL subtypes. The 2016 revision of the World Health Organisation (WHO) classification of lymphoid neoplasms has defined DHL as a new entity among high grade B cell lymphomas. Double-expressor lymphoma (DEL) is a not yet clearly defined category that includes cases without the chromosomal alterations, but with increased expression of MYC and BCL2 proteins.

Aims: We aimed to assess the incidence of DHL in the archive of the Pathology Department, University of Pécs and to identify correlations with clinicopathological parameters. We investigated the presence of the two translocations with fluorescent in situ hybridization (FISH).

Methods: Our retrospective study included histological samples from 76 patients. After the overview of the clinical information, tissue microarrays (TMA) were constructed. Using these, immunohistochemistry and FISH were performed to detect the BCL2 and MYC protein expression and the presence of the IGH/BCL2 and IGH/MYC gene alterations, respectively. The cell-of-origin (COO) was determined using immunohistochemistry according to the Hans-algorithm.

Results: DHL occurred in 3% and DEL was found in 11% of the cases. All of the DHL cases had germinal center (GC) phenotype. Among the DEL cases, two had GC, and six had non-germinal center (non-GC) phenotype. Considering the clinical parameters, shorter overall survival (OS) was observed in patients with DHL or DEL.

Conclusions: DHL is a rare subtype of DLBCL, which was demonstrated to confer an inferior outcome. DEL is also considered as an aggressive lymphoma, which has a different genotype compared with DHL. Identification of these entities is advised in routine diagnostics.

Supervisor: Dr. Béla Kajtár senior lecturer Co-supervisors: Dr. Adrán Burján Ph.D student

PROGRAMMATIC ISSUES OF THE MD STUDENTS' PROGRESS IN DEVELOPING SCIENTIFIC SKILLS AND ASPECTS OF THEIR QUALITY EVALUATION BENCHMARKS

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David Tvildiani Medical University, Tbilisi, Georgia; East European University, Tbilisi, Georgia

Medical schools use (or should use) any means to enhance research skills among MD students in their medical education programmes: their own and international results analysis, scientific and educational project opportunities, academic staff initiatives. This is not only related to the problem of financing (widely recognized problem, also relevant to developing countries). It is also related to 1) "weak development" of necessary structures, discussion formats, cooperation (teacher-student-administration) and even more to 2) "correct" research idea forming and project development problem among students. These are also some of the aspects of Quality Assurance in DTMU MD Programme research skills development process.

Regarding the first problem (structural capacity building, cooperation process) DTMU developed a "Research Based Learning Education University Concept"; new structure, introduced academic integrity culture and directional cooperative practice; also research component "practical" courses was revised. Classes are currently delivered in the "journal club" format which enhances students' active participation, simplification time and format management. Two guides are produced to support this process: "Presentation and Discussion in Journal Club" and "Article Review Summary Example". A course "Conduction of Scientific Sessions in the Journal Club Format" was developed and delivered to research tutors. A checklist on critical thinking skills assessment was developed; The curriculum committee and the quality assurance service gave positive evaluation to the format, content, evaluation system and research tutor preparedness. MD programme scientific component short term outcome analysis gives positive evaluation opportunity and recommendation to continue of activity in this direction.

**FACILITATING UNDERGRADUATE RESEARCH IN GERMANY:
EXPERIENCES FROM ESTABLISHING A RESEARCH PROJECT MODULE
AS PART OF THE INTERNATIONAL BM(EU) PROGRAMME**

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Undergraduate research is of interest to medical educators and policy makers alike. It is thought to play an important role in stemming the decline in those choosing clinical academic careers and is expected to assist in the mainstreaming of evidence-based medicine. Medical schools in the US, Saudi Arabia, the Netherlands, Norway and Germany – among others – are seeking to expose their students to research. However, organisationally, setting up research opportunities for large numbers of students can be extremely challenging. Moreover, it involves the balancing of research development and research participation against increasingly crowded medical curricula. Finally, there are practical aspects to consider, such as students' preparedness, faculty development and external aspects such as ever more elaborate (and lengthy) ethics approvals processes.

Since the inception of the medical school at Southampton (UK) in 1971, all undergraduate medical students on the five-year programme have participated in a research project and this is an important distinctior within the national and international contexts. In 2013, the University of Southampton started a new international undergraduate programme – the BM(EU) in collaboration with a German Healthcare provider, Gesundheit Nordhessen (GNH). We will be reporting on our experiences of and lessons learned from establishing the research module in Germany, which has been completed by three cohorts (n=62) to date. The presentation will include curricular aspects such as learning outcomes and assessment methods as well as findings from the student evaluation data.

GENERAL ACTIVITY AND SENSORIMOTOR GATING IN THE MAM-E17 SCHIZOPHRENIA RAT MODEL

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The MAM-E17 model is a generally accepted model for schizophrenia that follows the neurodevelopmental theory of the disease. Schizophrenia usually starts in late puberty or in young adulthood. Schizophrenia can be characterized with the presence of positive symptoms and decreased prepulse inhibition (PPI) which refers to the disturbance of sensorimotor gating mechanisms. The purpose of our present experiments was to examine the general activity and PPI of the MAM-E17 model rats in three different age-periods, namely in prepuberty, puberty and adulthood.

The general activity of the rats was examined in Open Field Test (OPF). Locomotor activity and stereotyped activities such as rearing, sniffing and grooming were registered. The sensorimotor gating mechanisms were tested in PPI paradigm of the startle response. For this experiment 20 blocks of 4 trial-types were used.

In the OPF task the MAM-E17 treated rats showed increased locomotor activity and elevated sniffing activity, furthermore, as a tendency, enhanced rearing activity could be observed. The elevated activity turned up in puberty and remained there in adulthood. There was a deficient PPI in puberty and adulthood, but not in prepuberty.

The increased locomotor activity in animal models is proposed to be equivalent to positive symptoms of schizophrenia that also appear in late puberty in schizophrenic patients. The enhancement of stereotyped behaviors can be observed in the same pattern. Those together might refer to an increased explorative-orientative behavior that can reflect an increased responsiveness to environmental stimuli. Deficient PPI was present similarly in puberty and adulthood. This refers to the disturbance of sensorimotor gating mechanisms which normally should ensure that the irrelevant stimuli from the incoming sensory information are filtered out and only the substantial stimuli are allowed to evoke motor response. The malfunction of these mechanisms leads

to increased responsiveness; which also can be the cause of hyperactivity observed in the OPF. Our results confirm that the MAM-E17 model represents the symptoms of schizophrenia properly and demonstrate the age-dependent appearance of hyperreactivity and PPI deficiency.

TEACHING EMPATHY AND HEALTH COMMUNICATION

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Communication has both verbal and non-verbal components, being body language almost 60% of communication. Health communication is essential for a correct diagnosis, treatment and prognosis (as well as for adherence to the treatment). But unfortunately, communication is not generally included in the Medical School programs. One main aspect of good communication is empathy as it has been associated physician empathy with higher levels of patient satisfaction. In fact, empathic communication not only contributes to avoid conflict and misunderstandings, also increase adherence to care plans and positive health outcomes of the patients, and even improve physician satisfaction.

Rather than emotional, empathy is a cognitive process implying the understanding and appreciation (not feeling) of concerns and perspectives of the patients. Empathy helps to communicate this understanding to the patient and transmit the intention to help. Then, even if there are people who are naturally empathic (and women show higher empathy scores than men), as empathy is a cognitive feature, empathy can be both learned and taught.

The objectives of the empathy program are to reduce defensiveness, improve listening skills, and decode facial expressions and body language. Listening empathically is more than listening selectively and carefully, is listening with intention to understand the value system of the other person, creating a positive psychological atmosphere and trying to exactly extract what this person wants to say (with verbal and non-verbal language).

In our programme we propose:

1. To teach both properties of empathy: attribution and accommodation.
2. To practice empathy with virtual patients instead of standardized patients.
3. To start from the first year of studies (with a lower-pressure atmosphere, being more natural and showing more interest).

THE ROLE OF DEMONSTRATORS IN DEVELOPING MEDICAL INTERVIEWING SKILLS

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Clinical skills including doctor-patient communication become especially important when medical students encounter real patients during their studies and after graduation. Therefore, the University of Pécs, Medical School (UPMS) launched a new educational method to improve those skills efficiently. Our innovative model has gained the Best Practice' Prize Awarded for Internationalization in Higher Education 2017 for the Trilingual Demonstrator System at the Medical School of the University of Pécs.

Those senior students (in their 4th,5th year) who decide to work as demonstrators are selected and trained by our interdisciplinary team (clinicians and language instructors) to enable peer-tutoring in a medical setting. Following a thorough exam (where the demonstrator has to convince the clinician of their active knowledge and skills while examining a real patient) the demonstrator student is allowed to lead small group practices; there the patient's medical history is taken with assertive and empathetic communication strategies. The aim to involve demonstrator students in clinical practice is to ease the burden of clinicians with multiplying presence of assistance and control in the ward, and also to increase motivational power by collaboration of students with diverse international and cultural backgrounds.

The previous semesters proved to be successful concerning demonstrator work, where history taking and fundamental physical examination skills could improve in clinical subjects like Internal Medicine Propedeutics and Cardiology. Our future objective is to share the experiences and expand the activity in further fields: neurology, traumatology, and dermatology.

Key words: demonstrators, medical interviewing skills, empathetic communication, interdisciplinary team, physical examination

DEMONSTRATOR'S PROJECT „WORKSHOP”

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Background: The project „Workshop” was developed and organized by 4th and 5th year medical german and hungarian students (demonstrators) in close collaboration with the Circle of Demonstrators (DDK) of the medical faculty Pécs.

Methods: The primary aim of this Demonstrator's project was to create an opened space for medical students where they can practicing different medical skills e.g. patients interview and physical examination, ECG placement and interpretation, blood collection and lab interpretation, injections and infusions handling during the 1:1 or 2:1 tutoring by a demonstrator. With the aid of diverse learning facilities the relieve of edginess and uncertainty of professional practice as well as a calmed and seasoned work with the patient and also be well prepared for the medical exams are the three main quality contents that the demonstrators focused in a relaxed atmosphere during the workshops. These contents are proofed by the supervision of authorized doctors and the board members of the DDK.

The project is specifically identified by voluntary demonstrators who want to share their knowledge from different professional practices in different countries also from different additional educations and the high motivation and inspiration of learning and benefit from each other.

Results: Overall the evaluation of the student feedbacks of the 1st demonstrators workshop “Internal Medicine-Propaedeutic” (18th November 2017, MediSkillsLab) and the 2nd demonstrators workshop “Internal Medicine- Fit For Famulatur” (22th April 2018) showed a 100% demand (for further medical workshops. 80% of the students welcomed the demonstrator tutoring skills with grade 5 (=excellent) and 20% estimated with 4 (= very good). The learning facilities are estimated in the first workshop by 85% of the students with grade 5 and 15% with grade 4 and in the second workshop by 95% with grade 5 and 5% with grade 4.

P01 ROLE OF SIRTUIN 1 ACTIVATION IN TRIGEMINAL SENSITIZATION

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Objectives: Orofacial pain and headache disorders are among the most debilitating pain conditions. Inflammatory pathways have been suggested to play role in these disorders, sensitization of trigeminal nociceptors, thereby causing hyperalgesia and allodynia. Members of the sirtuin family show different cellular activity and function and play critical roles in epigenetics, apoptosis, metabolism and cell survival, ageing, neuroprotection and inflammation. We aimed to investigate the role of sirtuin 1 (SIRT1) in Complete Freund's Adjuvant (CFA) induced orofacial inflammation and in trigeminal ganglion cell activation.

Methods: CFA was injected unilaterally in the whisker pad of male rats and mechanical pain thresholds of the orofacial region were determined with a series of von Frey filaments. SIRT1 gene expression changes were measured on day 1, 3 and 7 from trigeminal ganglia (TRG), trigeminal nucleus caudalis (TNC) and peripheral mononuclear cell (PBMCs) samples with qPCR. Markers of neuronal and glial activation were also determined. Intracellular free calcium levels were detected in trigeminal sensory neurons using fura-2AM fluorescence dye. In addition, radioactive ⁴⁵Ca uptake experiments in TRPV1-expressing CHO cells were also performed.

Results: CFA caused significant mechanical allodynia on day 1, which reached its maximum on day 3. This correlated with patterns of SIRT1, FosB, Iba1 and Gfap gene expression levels. Pretreatment with Ex527, a selective SIRT1 inhibitor, significantly decreased capsaicin-induced Ca²⁺ influx in cultured trigeminal cells. In TRPV1-expressing CHO cells the same treatment resulted in a 50% inhibition in receptor activation.

Conclusions: SIRT1 might play role in the sensitization of trigeminal primary afferents, which stands behind the arising pain in orofacial and headache disorders. Inhibition of SIRT1 might involve a TRPV1-mediated pathway.

Acknowledgements: 2017-1.2.1-NKP-2017-00002; EFOP-3.6.1.-16-2016-0004; GI-NOP-2.3.2-15-2016-00048

P02 EFFECT OF THE ENDOGENOUS PACAP ON BETA-SYNUCLEIN LEVEL IN THE MOUSE BRAIN

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Pituitary adenylate cyclase-activating polypeptide (PACAP) is a widespread neuropeptide, which has diverse effects. It has remarkable neuroprotective and neurotrophic properties, already described in animal models of Parkinson's disease, Alzheimer's disease and Huntington chorea. Beta-synuclein is a presynaptic protein. It can block the oligomerization of alfa-synuclein, which plays crucial role in the pathomechanism of Parkinson's disease. Based on this mechanism, beta-synuclein-related pathways could have protective effects in neurodegenerative diseases. Our former findings with matrix-assisted laser desorption/ionization (MALDI) imaging suggests that beta-synuclein levels are lower in PACAP knock-out mice than in wild type mice. Because MALDI Imaging is a relatively new technique with various factors influencing the measured intensities, we put forward to confirm the results with other methods. Previously we used gel electrophoresis and liquid chromatography-mass spectrometry and confirmed the observation by MALDI Imaging.

Here we aimed to compare the expression of the beta-synuclein in the mesencephalon and telencephalon in PACAP knock-out and wild type mice by semiquantitative immunofluorescence and densitometry.

Our hypothesis was that we will confirm the MALDI Imaging results and PACAP knock-out mice exhibit increased beta-synuclein level in the substantia nigra and hippocampus.

To our surprise, however our immunolabeling was successful and we could confirm the specificity of the antibody used, we did not find significant differences in the magnitude of beta-synuclein expression in hippocampus and substantia nigra samples when PACAP knock-out and wild type mice were compared.

As the effectivity of immunolabelings depends both on the specificity and sensitivity of the antisera, we plan to confirm these morphological findings by an alternative beta-synuclein specific antibody recognizing a different epitope of the beta synuclein protein. Alternatively, other mass spectrometry

techniques may also be applied.

Based on our findings we conclude that observations by MALDI Imaging require confirmation by multiple alternative techniques.

Funding: 2017-1.2.1-NKP-2017-00002; GINOP-2.3.2-15-2016-00050 "PEPSYS", MTA-TKI 14016, NKFIH K119759, 115874; EFOP-3.6.2-16-2017-00008: The role of neuro-inflammation in neurodegeneration: from molecules to clinics. Centre of Neuroscience, Pécs, Hungary.

P03 EFFECTS OF GYY-4137 ON K/BXN SERUM TRANSFER INDUCED ARTHRITIS IN TRPA1 WT AND KO MICE

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The precise role of hydrogen sulfide (H₂S) during inflammatory conditions is under extensive research. The transient receptor potential ankyrin 1 receptor (TRPA1) is one of the many molecules that is affected by H₂S. It is well established that H₂S is an agonist of TRPA1 and the activation of TRPA1 expressed by unmyelinated C sensory nerves leads to subsequent release of neuropeptides. In the present study we examined the effects of the slow-releasing HSS donor GYY-4137 (GYY) in the K/BxN serum transfer arthritis model in TRPA1 WT and KO mice.

Immune arthritis was achieved by a single dose of i.p. injection of K/BxN serum to four-month-old male mice. The animals were subjected to a daily i.p. injection of 50 mg/kg GYY. Control groups received BxN serum and vehicle. Mechanical pain threshold, swelling of the hind paws, grip stamina and observation of the extremities were assessed on days 0, 2, 4, 6, 8, 10, 12 and 14. In vivo myeloperoxidase activity and extravasation from the hind paws was measured on days 0, 2 and 6 using luminescent and fluorescent dyes. On a separate group of mice cytokine levels (IL-1 β , KC, MIP-1 α and MIP-2) were determined from the subcutaneous flushing fluid of the hind paws.

The parameters of GYY-treated TRPA KO mice regarding mechanical pain threshold, clinical condition of the extremities, grip stamina, MPO and plasma extravasation were deteriorated and MIP-2 levels were higher compared to WT mice.

Although both pro- and anti-inflammatory effects are attributed to H₂S, under our present experimental circumstances the effects of the slow-release H₂S donor GYY strongly depend on the presence or lack of TRPA1 in the K/BxN serum transfer arthritis model.

Supported by EFOP 3.6.2-16-2017-00009 Establishing and Internationalizing the Thematic Network for Clinical Research

P04 THEORETICAL KNOWLEDGE AS PREREQUISITES FOR MASTERING SCIENTIFIC OBSERVATION AND RESEARCH

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Neonatal Department of Intensive Medicine (NCIM) is a teaching department of the Faculty of Medicine. We provide undergraduate teaching of medical students for the 5th and 6th grade in the subject Paediatrics in both Slovak and English languages. Our main method of teaching is to provide students with direct contact with patients under the guidance of a teacher to extend their theoretical knowledge with practical experience. In addition, our department is part of the post-gradual specialist training in the field of Paediatrics.

Our contact with students is characterized by a direct dialogue, open communication and interactive workshops.

In the premises of the Clinic a modern Neonatological Simulator Centre was established in March 2015, that is directly connected to practical teaching.

In cooperation with the Institute of Simulation and Virtual Medical Education CU in Bratislava was for this purpose in 2015 put into practice neonatal simulator HAL 3010. It is a wireless and computer-controlled simulator newborn (gestational age 40 weeks) called Filip. From this moment we realised the project "Save the Life of Newborn at the Neonatal Department of Intensive Medicine".

Resusci Baby Q CPR neonatal manikin is called Lea. She allows students to practise and improve their competencies while providing cardiopulmonary resuscitation of the newborn and SkillGuide and mask. These methods of teaching guarantees to each student of Medical Faculty the uniform submission of information related to the topic of lecturing.

Thanks to the donation from Tatra Banka Foundation we could increase amount of practical modalities. Our equipments were spreaded by models of upper and lower extremities for improvement of practical skills (venous and arterial puncture,) and head for intubation.

Neonatal simulators do not attempt to replace the role of the patient or clinical practice. Simulation is a good representation of reality, but it can not fully reflect the personal practical experience of the student experiences obtained

during investigation of the real patients. Neonatal simulator allows prepare various scenarios images. Theoretical “practices” on simulators at our Department fluently continue with investigation of the real patient. That is specific characteristic of our strategy.

Implementation of neonatal simulator HAL 3010 in the educational process for students of 5th and 6th year of General Medicine, not only in Slovak but also in English language within the scope of Paediatrics at our neonatal department proved to be beneficial to all parties participating in teaching, not only for students but also for teachers. Among students Filip, Lea and new aids are found to be popular. Theoretical knowledge are a prerequisites for mastering scientific observation and research.

P05 THE ANALYSIS OF SELECTED SOMATIC PARAMETERS IN NEWBORNS ON THE 1ST DAY OF LIFE

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Newborn immediately after delivery is characterised by gestational age, birth weight, birth length, and value of Apgar scoring system. All these values give us very important information about the status of newborn.

In our work we concern with statistical evaluation of selected somatic parameters in newborns on the first day of life. Our sample consisted of 2331 children hospitalized at the Neonatal Department of Intensive Medicine Faculty of Medicine Comenius University and National Institute of Children´s Diseases in Bratislava. The focus of our work was to obtain data on birth weight, birth length and gestational week. When processing the data we took into account certain risk factors such as nicotinism, diabetes or gestational diabetes mellitus and hypertension in the mother.

The aim of our study was to compare the data obtained with the weight and growth curves by Fenton from 2013.

The obtained data were processed using retrospective analysis and statistically using contingential tables and graphs. In drawing up the work, we have used domestic and foreign literature. Graphic presentations of the results of Slovak neonates overlap with graphs resulting from data processing of nearly 4 million healthy newborns from 3 continents and from 6 countries. Our future goal is to develop Slovak standards that would best reflect the real characteristics of born newborns in Slovakia.

P06 SCIENCE COMMUNICATION TO MILLENNIALS – ARE THE MILLENNIALS REQUIRES DIFFERENT TEACHING METHODS THAN THE MEMBERS OF THE PREVIOUS GENERATION?

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Communication with the young generation is successful if only we know the characteristics of their communication style. The aim of our research was to observe the behavior and to learn about the decisions of young people (between 15-24 years). The aim of the study is to demonstrate identifiable results related to science, content consumption and media usage of the Millennials and examine the lifestyle groups among the Millennials from the point of view of their high school teachers and university lecturers. Compiling the results of the present study we processed results of focus group interviews and depth inquiries among high school students, college students, and high school and university teachers according to pre-defined criteria. The interest of the Millennials are wide-ranging and they have significant amounts of information. They learn things which they consider useful, relevant, fun, like the pictorial and video materials, practical tasks, experiments, interactive lessons. Their attention can't be sustained for a long time. Many of them are unmotivated and seek minimum requirements. The learning, knowledge-seeking motivations of today's young people are different than that of the members of previous generations. Millennials requires different teaching methods. Instructors also need computing, web-based knowledge and have to be able to apply the new devices, and it is important to learn new teaching methods as well.

Keywords: Millennials, science, science communication, content consumption, lifestyle groups

P07 EXAMINATION OF HEARING IMPAIRMENT IN PITUITARY ADENYLATE CYCLASE ACTIVATING POLYPEPTIDE (PACAP)-DEFICIENT MICE

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Pituitary adenylyate cyclase activating polypeptide (PACAP) is a neuropeptide with widespread cytoprotective effects besides its well documented neurotrophic and neuroprotective properties. It is present in several sensory organs, also in structures of the inner ear and auditory pathway. It has antiapoptotic effects against oxidative stress in inner ear cell cultures.

Hearing thresholds of wild-type and PACAP-deficient male mice were compared with auditory brainstem response test to evaluate the hearing functions of the animals. Neuron activation marker c-Fos protein was immunostained in the nuclei of the auditory pathway after acoustic stimulation to show the morphological changes related to the differences in acoustic functions. Protein profile was analyzed from cochlear duct lysates to evaluate if the functional and morphological findings were based on inner ear protein profile changes.

Higher hearing threshold was measured in PACAP-deficient mice compared to wild-type mice. Staining of c-Fos showed decreased neuronal activation in the cochlear nuclei of PACAP-deficient animals, compared to wild-type mice. However, there was no difference in the activation of neurons in the other nuclei of the auditory pathway. Endostatin, acidic FGF, osteopontine, BLC, CD54, PF4, TF, DPPIV, IGFBP-2, Serpin F1 and CXCL12 were in detectable amount from the lysates of cochlear ducts, but there was no significant difference between the WT and PACAP KO animals.

We showed impairment of hearing functions in the absence of PACAP, however, there were no changes at molecular level in the protein composition

of the inner ear cochlear duct lysates. For elucidating the exact function of PACAP in the inner ear we will continue our morphological and molecular biology experiments.

Support: OTKA K119759; GINOP-2.3.2-15-2016-00050; EFOP-3.6.1.-16-2016-00004; PTE AOK KA Research Grant; KTIA_13_NAP-A-III/5; TAMOP-4.2.4.A/2-11-1-2012-0001; UNKP-16-4-IV; MTA-TKI-14016; Bolyai Scholarship.

P08 THE ROLE OF IL-1 IN STRESS-INDUCED NEUROPATHY**Barbara Fülöp**, Ágnes Hunyadi, Éva Borbély, Zsuzsanna Helyes*Pharmacology and Pharmacotherapy Department, Medical School, University of Pécs, Hungary*

Fibromyalgia is a disease characterized by widespread musculoskeletal pain. Chronic stress is a well-known factor of this nociceptive disorder. Cytokines are known as important regulator of numerous immunologic and inflammatory procedures. However, the relation of stress-induced pain and the IL-1 superfamily has not been revealed yet. Therefore, in our study we investigated the influence of IL-1 α β on the pathogenesis of the mouse model of fibromyalgia. IL-1 KO and C57Bl/6J (WT) mice were involved in the study divided into stressed and non-stressed groups. Stress was applied by restraining the mice for 6 h every day by placing them into well-ventilated tubes. We registered the change of the withdrawal latency after immersing the paws into 0°C water. Mechanonociceptive threshold of the paws was measured using Dynamic Plantar Aesthesiometer. We performed forced swim, tail suspension and light-dark box tests at the end of the 4 weeks for assessing the stress and anxiety levels of the animals.

After the first week immobilization stress induced significant cold hyperalgesia in both (IL-1 KO and WT) groups. This parameter was significantly greater in WTs than in the IL-1 KO ones. This difference disappeared at later time points. Similarly, mechanical hyperalgesia was significantly smaller in IL-1 KO mice compared to the WT stressed groups during the second week. On the third week this difference vanished and from this point the stressed groups did not show significant difference from the non-stressed groups. At the end of the experiment the time spent in light did not change in the WTs, but significantly increased in IL-1 KO animals, while in the depression-like behaviour there was no difference between the groups.

Our present results show that IL-1 play an important regulatory role in the stress-pain interaction and in the pathogenesis of the stress-induced disorders, e.g. fibromyalgia, but the mechanism needs further investigation.

P09 MC3 AND MC4 RECEPTOR EXPRESSION IN UROCORTIN 1 NEURONS OF THE EDINGER-WESTPHAL NUCLEUS

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The role of the urocortin 1 (Ucn1) expressing neurons in the centrally projecting Edinger-Westphal nucleus (cpEW) has already been confirmed both in the regulation of the energy homeostasis and stress adaptation response. Morphological and functional experiments proved the presence of orexigenic and anorexigenic peptides and their receptors in the cpEW. The role of the hypothalamic melanocortin system (MC) in the control of energy-balance is also well known, but if there is an interaction with Ucn1 neurons in the cpEW is still unclear.

We first hypothesized that besides alpha-melanocyte-stimulating hormone (alpha-MSH) and agouti-related peptide (AgRP) their MC receptors, (i.e. MC3R and MC4R) are present in the cpEW. Our second aim was to test if two days fasting affects the MC4R expression. Third, we aimed at investigating if changes of the environmental temperature influences the expression of MC3R. Our further aim was to show that these receptors contribute to the functional control of Ucn1 neurons in the cpEW.

Our results proved that Ucn1 neurons of the cpEW express MC3R and MC4R. These cells were found in juxtaposition with alpha-MSH and AgRP nerve fibers. Using 2-days fasting period, the density of alpha-MSH immunoreactive nerve fibers decreased, in contrast with the AgRP, which was increased. In line with this, increased density of MC4R and Ucn1 immunoreactivities were found upon food deprivation. Our preliminary data suggest that the environmental temperature may affect the expression patterns of MC3R and Ucn1 in the cpEW.

We conclude that the melanocortin system is involved in the functional control of cpEW and this interaction might be involved in the regulation of energy balance via MC3R and MC4R signaling in Ucn1 cells. Pharmacological studies using MC3R and/or MC4R agonists and antagonists are in progress to further characterize the significance of these receptors in the cpEW.

“Supported BY the ÚNKP-18-3-III-PTE-202; VI-2 New National Excellence Program of the Ministry of Human Capacities”

P10 HEMOKININ-1 MEDIATES NEUROPATHIC PAIN IN A MOUSE MODEL OF TRAUMATIC NEUROPATHY: ROLE IN SPINAL GLIA ACTIVATION AND PERIPHERAL NGF PRODUCTION

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Hemokinin-1 (HK-1) is the newest member of the tachykinin family. It is encoded on the Tac4 gene and mainly found in white blood cells and neurons. Although the earlier research regarding the thachykinins' role in pain was promising, they were not successful in providing new targets for analgesic medications. HK-1 is similar to substance P pharmacologically and immunologically, but shows different expression patterns and functions. In our research we examined the role of HK-1 in neuropathic pain using HK-1-deficient (Tac4^{-/-}) mice.

We induced traumatic mononeuropathy by the 1/3-1/2 ligation of the right sciatic nerve. We determined the mechanonociceptive threshold of the hind paw with dynamic plantar esthesiometer, and the cold tolerance by measuring the hind paw withdrawal latency from 0°C water before operation, and 7 days after. Motor coordination was examined with RotaRod, and the peripheral NGF level in the paw homogenates with ELISA. We performed immunohistochemical staining to determine the amount of microglia (Iba1) and astrocytes (GFAP) in pain related regions of the central nervous system.

Significant mechanical and cold hyperalgesia developed in WT mice, but motor function did not change. In Tac4^{-/-} mice neuropathic mechanical and cold hyperalgesia were significantly smaller, motor function was worse throughout the 7-day experiment compared to WTs. Paw NGF-level of Tac4^{-/-} mice was basically lower and significantly increased compared to the pre-operation control values, but it did not change in WT mice. In the spinal dorsal horn of Tac4^{-/-} mice, but not in the periaqueductal gray and somatosensory cortex, microglia and astrocyte numbers were significantly lower.

We were able to prove that HK1 has a role in neuropathic pain through central (glia activation in dorsal horn) and peripheral sensitization (inhibiting NGF).

Identifying its target can open new perspectives in pain research.

Support: National Brain Research Program B (KTIA_NAP_13-2014-0022), EFOP-3.6.1-16-2016-00004, GINOP-2.3.2-15-2016-00050 „PEPSYS“.

P11 THE EFFECTS OF EARLY ENVIRONMENTAL ENRICHMENT AND PACAP IN AGING RAT MODEL OF PARKINSON'S DISEASE

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The causative therapy of Parkinson's disease (PD) is still under investigation. One of the well-studied effects of enriched environment and pituitary adenylylate cyclase-activating polypeptide (PACAP) is the strong neuroprotective effect. We have previously described the neuroprotective effects of PACAP and postnatal enriched environment in Parkinson's disease in young animals. The aim of our present study is to investigate the protective effects of these factors in aging (12-18-months-old) rats after unilateral 6-OHDA-induced lesion of the substantia nigra (s.n.).

Wistar rats were used in our experiment (n=35). Animals were divided into standard (n=17) and enriched groups (n=18). Animals of the standard group were placed under regular conditions. For environmental enrichment, during the first five postnatal weeks we placed pups in larger cages supplemented with objects of different shape, size and material. In aging animals PD was induced by unilateral injections of 6-OHDA (2 μ l, 5 μ g/ μ l) into the left substantia nigra, control animals received 2 μ l physiological saline. Following the 6-OHDA injections half of the animals received 2 μ l (1 μ g/ μ l) PACAP treatment into the s.n.. On the 7th postoperative day brain of the animals were removed and samples of the substantia nigra were collected. Dopamine levels and DJ-1 protein content of the substantia nigra were measured by HPLC-Q Exactive orbitrap MS system and ELISA method, respectively.

The substantia nigra of the 6-OHDA-treated standard and enriched animals showed significantly lower DA levels compared to the saline-treated animals of the same groups. Consistent with our previous studies in young animals PACAP treatment could also increase the DA levels after 6-OHDA-induced lesion in aging rats. The DJ-1 protein content of the substantia nigra was significantly higher in groups receiving PACAP treatment. However, early environmental enrichment did not have any protective effects in this experiment. Although the protective effect of early postnatal environmental enrichment

is described in young animals, we could not prove it in aging animals. However, similarly to younger animals PACAP could restore the decrease of DA and DJ-1 protein levels, which could play a role in its neuroprotective effect in Parkinson's disease.

This work was supported by: National Scientific Research Fund (OTKA K104984); the National Research, Development and Innovation Fund K119759; GINOP-2.3.2-15-2016-00050; PTE AOK KA Research Grant; National Brain Research Program (KTIA_13_NAP-A-III/5), TAMOP 4.2.4.A/2-11-1-2012-0001 National Excellence Program; UNKP-16-4-IV, New National Excellence Program of the Ministry of Human Capacities, MTA TKI 14016 Program.

P12 GROWTH IN STUDENT NUMBERS AT THE UNIVERSITY OF PÉCS MEDICAL SCHOOL CHALLENGES AND PROPOSED ANSWERS

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Background: We assessed the numbers of medical students admitted to the University of Pécs Medical School (UPMS) between 2012 and 2017, that of students entering the clinical module and that of graduating students in order to make proposals for the development of the educational capacities and to specifically design continuing professional development for the staff. We followed the growth at the general medicine major in the English, German, and Hungarian language programmes.

Summary of Work: Data were collected using the Neptun electronic educational system, the statistical evaluation was supported by Microsoft Excel.

Summary of Results: The numbers of students significantly increased during the observed period and in all language programmes. Graduating students in the English programme in the observed period: 52-51-58-67-89. This necessitated development of infrastructure, expansion and training of personnel. The insufficient room capacity of the campus may confine the organization of lectures and other teaching events. The growth in numbers of students entering the clinical module represents a challenge at the areas of lecturer capacity and patient numbers.

Discussion and Conclusions: The UPMS took a number of steps already to comply with the student numbers. These include the „Modern Cities Programme” funded by the European Union and the Hungarian Government, providing financial support to enlarge the campus. The largest building of the Clinical Centre was renovated, a University Research Centre and a simulation training centre were established.

The UPMS has also expanded its staff and offers free trainings for medical and administrative personnel as part of the continuing professional development.

Take Home Messages: To avoid crisis management caused by the growth of students' numbers in the future the continuous statistical analysis and monitoring is crucial. As a follow up of our current evaluation, we plan to further specify reasons and mechanisms behind the observed changes in order to estimate future tendencies in the clinical module and in the final year more accurately.

P13 EXAMINATION OF SOMATOSTATIN 4 RECEPTOR AGONISTS IN MOUSE MODELS OF NEUROPATHIC PAIN, ANXIETY AND DEPRESSION-LIKE BEHAVIOR

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Nerve damage of different etiological factors can cause chronic neuropathic pain which is often coupled with anxiety and depression, deteriorating quality of life. Adjuvant analgesics are used in clinical practice for treatment however they are often ineffective or have severe side-effects limiting their long-term use. Therefore, development of new analgesic drugs with novel mechanism of action are necessary. Somatostatin has been proven to have analgesic, anti-inflammatory and antidepressant effects mediated by the somatostatin 4 receptor (sst4) without influencing endocrine functions. We examined the in vivo actions of our two patented small molecule non-peptide sst4 agonists (VCC158015, VCC885587 synthesized by Vichem Ltd.) showing strong sst4 receptor activation in previous in vitro studies.

Traumatic sensory mononeuropathy was induced in male NMRI mice by partial ligation of sciatic nerve. The mechanonociceptive threshold of the hind paw was measured by dynamic plantar esthesiometry preoperatively and on the 7th postoperative day. Depression-like behavior was examined by tail suspension (TST) and forced swim (FST) tests, which represent different neuronal activation mechanisms of depression. Anxiety behavior was tested by elevated plus-maze (EPM) and spontaneous locomotor activity by open field tests. Agonists or vehicle was administered orally one hour before all examinations.

Both agonists significantly and dose-dependently decreased the operation-induced mechanical hyperalgesia (in 20, 100, 500 µg/kg doses). The highest doses which produced 70-80% attenuation in the drop of mechanonociceptive threshold, did not influence the spontaneous locomotor activity in open field test. Both agonists (100 µg/kg) decreased significantly the depression-like behavior in the TST, however have no effect in the FST. Neither agonist showed anxiolytic effect in the EPM.

To sum up, orally administered sst4 agonists effectively reduced neuropathic

mechanical hyperalgesia and depression-like behavior, therefore they provide novel perspectives for the development of new type of combined analgesic and antidepressant agent.

P14 AN ONLINE APPLICATION FOR THE PREVENTION OF AMBLYOPIA

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Introduction: Binocular depth perception is called stereovision, which enables the judgement of accurate 3D structure of the environment. Disruption of visual maturation in early childhood may result in the disturbance of stereopsis, which is often accompanied by amblyopia. Treatment is most effective in early childhood, the condition is mostly irreversible in adulthood. Our research group is currently working on the development of the EuvisionWeb stereopsis testing application, based on dynamic random dot stereograms. Ideally, only subjects with intact stereovision wearing binocular red-cyan (or any anaglyphic) goggles, can recognize the orientation of the Snellen E target. Viewing with one eye (thorough red or cyan filter), or without the goggles, the displayed optotype can not be identified.

Objective: In the present phase of the development the aim was to identify the potential artifacts that could be observed monocularly with or without glasses, or binocularly without glasses, thus improving the sensitivity of the application.

Methods: Altogether 41 adults with intact stereopsis and 7 stereoblind adults took part in the study. The participants received the protocol via e-mail and performed the EuvisionWeb test at home on

any device (PC, mobile device, tablet). During the test they had to evaluate the orientation of 10 Snellen E's in each viewing condition (with and without filter glasses, viewing with the right, left or both eyes).

Results: Viewing binocularly using the glasses, each group with intact stereopsis performed above the threshold (at least 8 out of 10 hits, $p < 0.001$, mean = 9.8/10), whereas the hit ratio was below the threshold (mean = 2.8/10) in case of stereoblinds. In monocular conditions we have found no consistently present artifacts in any of the groups, the success rate was 2.7/10.

Discussion: Our results so far demonstrate that EuvisionWeb is an easy-to-understand and manageable application. The applied stereotest does not contain monocular artifacts, so it may be suitable for early confirmation of lack of stereopsis. Since the performance of the test is convenient, because it can also be completed online at home, it is appropriate for mass screening therefore it could contribute to the secondary prevention of amblyopia and conditions leading to amblyopia.

P15 AGE AND ORIGIN OF THE P.LEU131PHE HEPARIN-BINDING-SITE ANTITHROMBIN MUTATION COMMON IN HUNGARY

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Antithrombin (AT) belongs to the serpin superfamily and regulates coagulation by inhibiting thrombin, activated factor X (FXa). Hereditary AT deficiency is classified as type I (quantitative) and type II (qualitative); in type II deficiency, the defect may affect the reactive site (IIRS), the heparin-binding site (IIHBS) or it can exert pleiotropic effect (IIPE). In addition to venous thrombosis, occasionally, arterial thrombotic events were also described in patients with AT deficiency. AT Cambridge II (IIRS), AT Budapest 3 (ATBp3, IIHBS) and AT Basel (IIHBS) are the most prevalent variants. The ATBp3 mutation underlies the vast majority of AT deficiencies in the Hungarian population and there is evidence that its elevated frequency may be due to a founder effect.

Our aims were to investigate the age and origin of the most recent common ancestor of the ATBp3 mutation-bearing chromosomes and to give a plausible historical and demographic scenario of the founder effect.

We analyzed 102 ATBp3 mutation carriers and 200 healthy control subjects. Eight (7 dinucleotide and 1 tetranucleotide) short tandem repeats (STR) were analyzed flanking the mutant locus and spanning approximately 13 cM. The fragments containing the STRs were amplified by multiplex PCR and fragment analysis was carried out on an ABI3130 Genetic Analyzer. Analysis of STR sequences was implemented by the GeneMapper v4.1 software. The decay of linkage disequilibrium (LD) over generations was modeled by DMLE+ method.

Assuming an average of 25 years per generation, the results of LD decay modeling would date the most recent common ancestor bearing the ATBp3 mutation back to middle of the XVII century.

The identification of a genetically coalescent cohort of families with the ATBp3 mutation and a documented history of AT deficiency will be of use in the search for disease modifying loci within ATBp3-carrying families and the investigation of genotype-phenotype correlations in AT deficiencies.

P16 AGE DEPENDENCY OF C-FOS EXPRESSION IN MALE RAT'S BRAINSTEM STRESS CENTRES AND EXTENDED AMYGDALA

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Introduction: The hypothalamus-pituitary-adrenal axis (HPA) is the chief regulator of the stress response. The key of the HPA is the parvocellular paraventricular nucleus of the hypothalamus (pPVN) controlled by higher-order limbic stress centres. The reactivity of the HPA axis is considered to be a function of age, but to date, little is known about the background of this age-dependency. Sporadic literature data suggest that the stress sensitivity as assessed by semi-quantitation of the neuronal activity marker c-Fos may also be influenced by age.

Methods: We aimed at investigating the HPA activity and c-Fos immunoreactivity 2 h after the beginning of a single 60 min acute restraint stress in eight age groups of male Wistar rats. We hypothesized that the function of the HPA axis (i.e., pPVN c-Fos and blood corticosterone (CORT) level), the neuronal activity of nine stress-related limbic areas (i.e., magnocellular PVN (mPVN), medial (MeA), central (CeA), basolateral nuclei of the amygdala, the oval (ovBNST), dorsolateral (dlBNST), dorsomedial (dmBNST), ventral and fusiform (fuBNST) divisions of the bed nucleus of the stria terminalis (BNST)), and two brainstem stress centres such as the centrally projecting Edinger-Westphal nucleus (cpEW) and dorsal raphe nucleus (DR) show age dependency in their c-Fos response.

Results: Our data indicate that the stress-induced rise in blood CORT titer was lower in young age reflecting relatively low HPA activity. All 12 stress-related brain areas showed c-Fos response that peaked at 2 months of age. The magnitude of c-Fos immunoreactivity correlated negatively with age in seven regions (MeA, CeA, ovBNST, dlBNST, dmBNST, fuBNST and pPVN).

Conclusions: The stress centres show strong age dependent basal and stress induced c-Fos expression both, which stress the importance of further examinations in age and stress associated mood disorders.

P17 THE ROLE OF PITUITARY ADENYLATE CYCLASE-ACTIVATING POLYPEPTIDE IN ENDOTOXIN-INDUCED RETINAL DEGENERATION

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Neuroprotective and anti-inflammatory specificity of pituitary adenylate cyclase-activating polypeptide (PACAP) have been shown in a number of studies, which confirm the peptide exerts protective effects against neurodegenerative diseases. PACAP-deficient (PACAP KO) mice respond with enhanced sensitivity to negative external factors and provide evidence that endogenous PACAP shows key role in different insults, such as hypoxia or oxidative stress. However, the proteomic background of the inflammation in PACAP KO mice is not clear yet, therefore our aim was to investigate the functional and morphological changes in endotoxin-induced retinal degeneration. We compared the retinas of PACAP KO and wild type mice (Wt) in healthy condition, and in intraperitoneally treated with 6mg/kg lipopolysaccharide endotoxin (LPS) - induced inflammation. We examined dark-adapted electroretinography (ERG) to detect the dysfunction of the retina. Histological structural analysis and glial fibrillary acidic protein (GFAP) immunoreactivity were also analyzed to support the functional results. During LPS infection the ERG responses of PACAP KO mice were disturbed (a-wave, b-wave amplitudes) compared to the Wt mice. Endogenous PACAP caused a significant protection in different retinal layers such as OLM-ILM, OPL, ONL, INL and IPL by preserving their thickness in LPS injected Wt mice. In LPS-treated PACAP KO retinas, the GFAP expression increased in Müller glial cells compared to the LPS-treated Wt. These results clearly showed that the endogenous PACAP has a protective, anti-inflammatory role in endotoxin-induced retinal inflammation in mice.

Acknowledgement: EFOP-3.6.1.-16-2016-00004, Comprehensive Development for Implementing Smart Specialization Strategies at the University of Pécs, GINOP-2.3.2-15- 2016-00050 "PEPSYS", PTE AOK Research Grant (KA-2017-15), Supported by the ÚNKP-18-4 and ÚNKP-18-2 new national excellence program of the ministry of human capacities, MTA-TKI Bolyai Scholarship, OTKA (NKFIFK129190), MTA-TKI PACAP Research Group. The role of neuro-inflammation in neurodegeneration: from molecules to clinics, EFOP-3.6.2-16-2017-00008

P18 INVESTIGATION THE EFFECT OF NMNAT-1 ON STABLE SILENCED OSTEOSARCOMA CELL LINE BY CRISPR/CAS9 SYSTEM

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Introduction: Nicotinamide mononucleotide adenylyltransferases (NMNATs) have long been known as key enzymes in NAD⁺ biosynthesis. They play a central role both in the de novo and salvage pathways. Three human isoforms of NMNAT have been discovered. They differ in tissue distribution, in function and in their subcellular localization. NMNAT-1 has a nuclear localization and supplies the substrate for the nuclear NAD dependent enzymes like the poly(ADP-ribose) polymerase 1 (PARP-1) and Sirtuin 1. The main function of NAD⁺ is to serve as an electron carrier, but it also participates as a substrate in a number of signaling pathways, including poly(ADP-ribosyl)ation. In one hand NMNAT- supports PARP-1 catalytic activity by producing enough substrate for its activity. On the other hand NMNAT-1 itself may also modulate the activity of PARP-1 independently of NAD-production

Aim of the study: The available information about the possible role of NMNAT-1 in tumor cells are limited. We aimed to prepare a stable silenced osteosarcoma cell line with the brand new CRISPR/Cas9 system. Then investigate the absence of NMNAT-1 on the viability of cells, NAD⁺ levels, proliferation rate, the sensitivity of most commonly used DNA attacking anti-tumor agents.

Material and methods: NMNAT-1 silencing was performed by CRISPR/Cas9 on U2OS osteosarcoma cell line. NMNAT-1-expression was analyzed with RT-qPCR and Western blot analysis. U2OS cell line was treated with different types of DNA targeted antitumor drugs. Cell viability was determined with Calcein-AM assay. Cell proliferation was determined with sulforhodamine B assay. Apoptosis was investigated with the measurement of caspase activity by a high content analysis based assay, while necrosis was measured by LDH activity.

Results: We successfully prepared NMNAT-1 knock out(KO) U2OS cell line. KO cell line showed increased sensitivity to H₂O₂ treatment and poly(ADP-ribose)ation was delayed. We found higher sensitivity to DNA attacking antitumor agents both in mono and in combined treatments. The absence of NMNAT-1 caused decreased total NAD⁺ level. Both the apoptosis and the necrosis were higher in the KO cell line.

Conclusion: NMNAT-1 protein expression was successfully eliminated by CRISPR-Cas9 method in U2OS cells. and higher sensitivity to DNA-targeted an-

ti-tumor treatments was found Our results show that NMNAT-1 could be a new pathway to block PARP-1 mediated DNA repair, and could be a potential pharmacological target in the therapy of malignancies

Work in the authors laboratory was funded by the National Research, Development and Innovation Office grants: Bolyai postdoctoral fellowship, ÚNKP-18-4 (Bolyai+) fellowship.

OTKA (PD 116845), OTKA K112336, GINOP-2.3.2-15-2016-00020 TUMORDNS, GINOP-2.3.2-15-2016-00048-STAYALIVE

EFOP-3.6.3-VEKOP-16-2017-00009

P19 PROTEOMIC ANALYSIS OF SALIVA IN PACAP KO AND WILD TYPE MICE

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PACAP (Pituitary adenylate cyclase-activating polypeptide) is an endogenous neuropeptide with widespread occurrence. PACAP mainly acts via its PAC1, VPAC1 and VPAC2 receptors, stimulating cAMP/PKA and several other downstream pathways. PACAP has diverse physiological effects and plays various roles under pathological circumstances. PACAP also affects the secretion of exocrine serous glands such as the lacrimal gland and salivary glands as well as the pancreas. Immunohistochemical studies have also shown the presence of PAC1 receptors in the salivary glands. In animal experiments exogenously administered PACAP stimulates the amount of secretion of the above mentioned serous glands and the excretion of several factors. Therefore, we hypothesized that PACAP may also affect the protein composition of saliva.

To confirm our hypothesis, we analysed saliva of PACAP knockout (KO) and wild mice with liquid chromatography mass spectrometry (LC-MS). This method is suitably sensitive for detecting small protein concentrations and for qualitative and quantitative comparative studies.

Hundreds of proteins were identified from our samples. Between samples from wild type and KO mice we found several differences in protein composition that can be divided into the following groups: antibacterial enzymes and immune factors (Lysozyme isoenzymes, immunoglobulins, Plastin A2), antioxidant and stress response proteins (Glutathione-S-transferase), metabolic enzymes (Alpha-enolase, Aldolase) and other proteins.

Based on our findings, we assume that PACAP affects the salivary composition and may also have immune functions in the oral cavity due to the proteins like the lysozyme isoenzymes, immunoglobulin profile and other immunologic functions. mice.

Funding: 2017-1.2.1-NKP-2017-00002; GINOP-2.3.2-15-2016-00050 "PEPSYS"; MTA-TKI 14016,NKFIH K119759, 115874; EFOP-3.6.2-16-2017-00008: The role of neuro-inflammation in neurodegeneration: from molecules to clinics. Centre of Neuroscience, Pécs, Hungary.

P20 THE RAPID EFFECT OF 17- β -ESTRADIOL ON DIFFUSION DYNAMICS OF P75 RECEPTOR IN LIVE NEURONS

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Introduction: In addition to classical genomic action, gonadal steroid 17- β -estradiol (E2) is known to exert rapid non-classical effect on membrane receptors and signaling molecules. The changes in surface movement of the receptors are essential to their function. These changes form membrane protein complexes that activate signalling molecules. Neurotrophin receptor p75 (NTR) is a regulator of neuronal survival. The key mechanism in NTR activation is the change of surface movement of the receptor. However, the effect of E2 on NTR surface trafficking is completely unknown.

Methods: We applied a unique total internal reflection microscopy system to perform super-resolution imaging of membrane receptor molecule surface trafficking. Trajectories of NTR molecules on live neurons were individually tracked and analysed. Mean square displacement (MSD) and the diffusion coefficient (D: $\mu\text{m}^2/\text{sec}$) were determined both on the soma and neurites. Movement parameters were calculated using at least 200 trajectories and compared statistically to the corresponding vehicle control.

Results: The MSD function of NTR molecules in the soma and neurite saturates suggesting restricted motion of NTR molecules in control condition. After 100nM E2 application MSD curve of NTR molecules changes to straight line in soma and neurite demonstrating un-restricted motion of NTR molecules after E2 application. Furthermore, our results showed that administration of 100 nM E2 rapidly increases the D of NTR molecules both on the soma and neurite.

Discussion: Our findings demonstrated that NTR molecules became faster and they showed Brownian motion after 100 nM E2 application. These effects were irrespective of the location of NTR in the neuronal membrane. The effect of E2 on molecule movement of NTR may be implicated the neuroprotective mechanism of E2.

P21 EFFECTS OF PACAP FRAGMENTS (PACAP3-38 AND PACAP5-38) IN ISCHAEMIC RETINOPATHY

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Intravitreal PACAP38 and 27 are neuroprotective in different retinal injuries, including ischemia induced by bilateral common carotid artery occlusion (BCCAO). We proved that PACAP passes through ocular barriers and so, retinoprotection can be achieved also by eye drops. PACAP is degraded by dipeptidyl-peptidaseIV to PACAP3-38 or 5-38, which have antagonistic properties. Therefore, it was of interest to examine whether topical application of these fragments worsens ischemic retinal injury that could interfere with future therapeutic applications. Right eyes were treated with PACAP3-38 or 5-38 eye drops. Retinas were processed for morphometric and biochemical analysis. BCCAO resulted in severely reduced thickness in retinal layers, while histological and molecular examinations did not show any, either ameliorating or aggravating, effect of PACAP3-38 and -5-38. We showed that degradation after topical application of PACAP38 or 27 does not lead to destructive fragments that could interfere with the retinoprotective treatment.

Support: NKFIH FK129190, GINOP-2.3.2-15-2016-00050"PEPSYS",KTIA_13_NAP-A-III/5, PTE-AOK_KA_Research-Grant (KA-2017-15), MTA-TKI, Bolyai_Scholarship, EFOP-3.6.3-VEKOP-16-15 2017-00008, UNKP-18-4, UNKP-18-2, UNKP-16-4-IV.

P22 INVESTIGATION OF LEARNING, MEMORY, LOCOMOTOR ACTIVITY AND ANXIETY IN SOMATOSTATIN RECEPTOR 4 DEFICIENT MICE, INTERACTIONS WITH AGING AND SEX

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Somatostatin receptor subtype 4 (sst4) is expressed in brain regions such as hippocampus, cortex, amygdala, and mediates anti-inflammatory, analgesic and anxiolytic/antidepressant effects without endocrine actions. Although according to its localization, it could be involved in cognitive functions, there is only one paper showing beneficial effect of an sst4 agonist. We examined the role of sst4 in behaviors related to learning and memory using gene-deficient mice.

Short and long-term learning in the Radial-Arm Maze (RAM), recognition and memory by Novel Object Recognition Test (NOR), spontaneous alternation in the Y-maze, and locomotor activity and anxiety in the Open Field Test (OFT) were investigated in young (3 months) and aging (12, 17 months) male and female sst4 knock out (KO) mice and their wild-type (WT) counterparts.

Neither locomotor activity nor anxiety were influenced by sst4 gene-deletion. However, sst4-deficiency only influenced behavior of females in the RAM, where KO mice were less active, visited less arms, but missed and repeated less than WTs. As for aging, old mice found less rewards and missed more than young and sst4-deficient counterparts, males were worse than females. Young WT males showed significantly higher anxiety compared to both age-matched females, and in the NOR they spend more time both by the familiar and novel objects than their older and female counterparts.

It is suggested that sst4 activation might promote some memory functions under healthy conditions, there are complex sst4-age-sex interactions, but further investigations are needed to determine its role in memory deficits during aging or pathological conditions.

Support: National Brain Research Program (2017-1.2.1-NKP-2017-00002), EFOP-3.6.1-16-2016-00004, GINOP-2.3.2-15-2016-00050 „PEPSYS” and StayAlive GINOP (GINOP-2.3.2-15-2016-00048)

P23 FUNCTIONAL AND MORPHOLOGICAL CHANGES IN THE VTA IN THE THREE HIT MODEL OF DEPRESSION

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Depression is one of the leading causes of chronic incapacity. Functional abnormalities in monoaminergic systems are proven, although antidepressant treatment on monoamines in 30% remains ineffective. The ventral tegmental area (VTA) is a center of mesocorticolimbic dopaminergic system involved in mood control and depression. The three hit concept is a commonly used model for major depression: co-occurring genetic, epigenetic and acquired stress factors precipitate the symptoms. Our research team aimed to develop a model by combining the lack of the PACAP gene (genetic factor), maternal deprivation (epigenetic factor) and chronic variable mild stress (CVMS) (acquired factor). We hypothesized that the expression of the neuronal activation marker FosB, in tyrosine-hydroxylase (TH) neurons of VTA, will be affected both by our model and by antidepressant (i.e. fluoxetine) treatment. To test our hypothesis litters of PACAP heterozygous mice were divided into main groups based on quality of maternal care. Offspring was subdivided into control and CVMS groups. Half of mice received either saline or fluoxetine injections. Indirect immunolabeling for FosB and TH was performed. Results showed that both maternal deprivation and the fluoxetine significantly increased FosB neuronal activity, but CVMS remained ineffective. The efficacy of fluoxetine in the VTA was stress-level dependent. The double-labeling proved that the effects were specific for TH immunoreactive neurons. In conclusion, animals with all risk factors showed inadequate neuronal activation in the VTA, which was not effected by fluoxetine treatment. This suggests that our model may help to study the therapy resistant depression cases.

Supported by OTKA PD 100706; PTE-ÁOK KA 2017/01.

P24 THE RETINOPROTECTIVE EFFECTS OF BIOBARRIER-TRAVERSING DERIVATIVES OF VIP (VIP-TAT) AND PACAP (PACAP-TAT) EYE DROPS IN ISCHEMIC RETINOPATHY

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Intravitreal PACAP and VIP exert a protective role against retinal injuries. Retinal ischemia can be effectively modelled by permanent bilateral common carotid artery occlusion (BCCAO). Our research group proved retinoprotective effect of the PACAP eye drops. Novel derivatives (PACAP-TAT, VIP-TAT) - with a cell penetrating peptide TAT at the C-terminus - were constructed and prepared to enhance membrane transport ability. The aim of our study was to investigate the potential retinoprotective effects of VIP- and PACAP-TAT eye drops in BCCAO in rats. After performing BCCAO, right eyes were treated with eye drops of the TAT peptides dissolved in vehicle. Routine histology was performed 2 weeks after the surgery, the number of cells in the ganglion cell layer was counted and the thickness of all retinal layers was measured. Histological analysis confirmed that topical application of PACAP- and VIP-TAT has retinoprotective effects in ischemic retinopathy.

Support: NKFIH FK129190, GINOP-2.3.2-15-2016-00050"PEPSYS";KTIA_13_NAP-A-III/5, PTE-AOK_KA_Research-Grant (KA-2017-15), MTA-TKI, Bolyai_Scholarship, EFOP-3.6.3-VEKOP-16-15 2017-00008, UNKP-18-4, UNKP-18-2, UNKP-16-4-IV.

P25 ATTITUDES REGARDING THE MEDICAL PROGRAMME COMPLETION AND EXIT REQUIREMENTS AMONG LECTURERS AND STUDENTS IN HUNGARY

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Introduction: Considering the rapid and global changes in medical education, quality and modernity are key factors in Hungarian medical teaching. In order to attain a detailed view of the quality of education we aimed to examine “both sides”, namely the attitudes of lecturers and that of students towards the completion and exit requirements of the medical programme (hereinafter: competences). Participants were recruited from the Hungarian higher education institutions offering medical education. Data collection was carried out in November 2017, with the help of online self-reported questionnaires.

Methods: A self-developed questionnaire was used to analyse the correlations between the attitudes of the lecturers and students regarding the competences. In the first part, they evaluated their view about the importance of these competences for the physician’s profession. In the second part, they expressed their opinion to what extent students acquire these competences during their studies. In the third part, lecturers rated to what extent they teach the competences in their courses. Altogether 1944 questionnaires (students: 1505, lecturers: 439) were processed and for data analysis crosstabs, Chi-squares, Anova tests, Gap analysis matrices were performed. As an extension of this study, additional deep interviews are in progress to supplement our research.

Results: In terms of the perceived importance of the competences we can conclude that every competence (except the historical overview of the discipline) was considered important (with an average of 3,8 on the 1-5 scale) by both sides but students underrated the degree of acquisition during the medical education at some competences (e.g. handling appropriately patients’ expectations on therapy). The importance of the work-life balance is considered very important (with an average of 4,4) by the lecturers but they do not strive for teaching it (this competence was signalled with the lowest attained average of 2,6).

Conclusions: During the recent changes of the competences by the European Qualifications Framework, an emphasis was put on the number and quali-

ty of practices. Besides acquiring the most important professional, practical knowledge, this questionnaire focused on other competences (e.g. communicational, logical, problem-solving skills) and revealed the attitudes towards them in the Hungarian medical education. The practices seem to be prominent in providing competences according to both sides. However, our analysis provides several additional viewpoints to this issue including soft competences such as the high perceived importance of work-life balance and optimal time management.

P26 BORDERLINE ANATOMY EXHIBITION**Viktória Vicena**, Dóra Reglódi, Dániel Balázs Fülöp*Department of Anatomy, Medical School, University of Pécs, Hungary*

A new optional course was introduced in the medical curriculum on the diverse aspects of anatomy. The topics include interesting anatomy-related topics with many different fields of anatomy/neuroanatomy. Although this knowledge is not necessarily required for the medical curriculum, it might help the student to learn anatomy with more interest and enthusiasm. The course gives an insight into topics like: Anatomy of massage, yoga, sports, dinosaurs, art, body modifications, strange traditions, skull collections, body conservation, veterinary anatomy, anatomy on the battlefield, police or combat anatomy or historical aspects of body conservation and studying the brain and other body parts etc. Students are offered to collect and anatomy-related topic themselves and submit a presentation. This exhibition shows selected student works further popularizing anatomy for the public and increase awareness of the human body, neuroscience and biology. However, this collection offers interesting insights also for scientists.

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A series of horizontal dotted lines for writing notes.



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