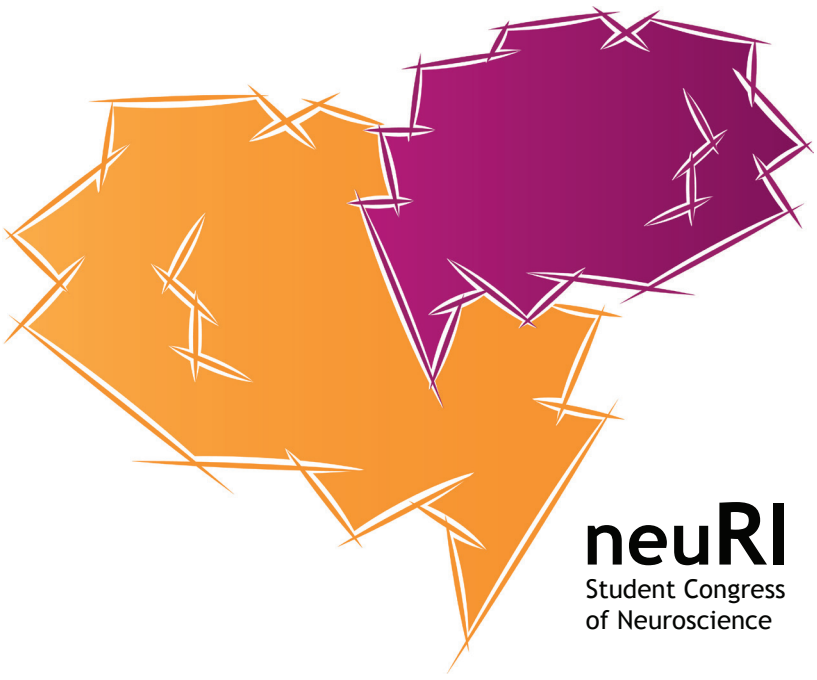
Abstract Book / 7th Student Congress of Neuroscience NeuRi 2017



neuRI

Student Congress
of Neuroscience

Abstract Book

7th Student Congress of Neuroscience
April 21st - 23rd, 2017
Rijeka/Rab

IMPRESSUM

PUBLISHED AND ORGANIZED BY
FOSS MedRi

CO-ORGANIZED BY
University of Rijeka, Faculty of Medicine
Rab Psychiatric Hospital

FOR PUBLISHER
Christina Isabell Jukić

EDITORS IN-CHIEF
Ema Ormanec
Emilija Borčić
Maša Lovrović

ENGLISH TRANSLATION
Josipa Kajić

LANGUAGE EDITORS
Ema Ormanec
Emilija Borčić

PRINT
Tiskara Sušak, Rijeka

COPIES
300

Printing of this Abstract book was made possible by the financial support of Faculty of Medicine, University of Rijeka and the Foundation of the Croatian Academy of Sciences and Arts. The translations, opinions, findings, conclusions and recommendations presented in this Abstract book do not necessarily reflect those of the Editing Board or the Sponsors and are exclusively the responsibility of the Authors.

ISBN: 978-953-7957-56-8
UDK: 612.8(0639(048.4)*616.89(063)(048.4)
CIP entry is available at the University Library of Rijeka in their Computer Catalog under number 131130025

CONTENTS

ORGANIZING COMMITTEE

PRESIDENT OF NEURI 2017:	Christina Isabell Jukić
HONORARY PRESIDENT:	Luka Fotak
VICEPRESIDENT OF NEURI 2017:	Maša Lovrović
GENERAL SECRETARY OF NEURI 2017:	Emina Horvat Velić
SCIENTIFIC LOGISTICS COORDINATOR:	Tena Piljušić
SCIENTIFIC LOGISTICS:	Ivan Franin
	Josipa Kajić
SCIENTIFIC COMMITTEE COORDINATOR:	Josip Aničić
ABSTRACT BOOK EDITORS:	Ema Ormanec
	Emilija Borčić
PARTICIPANTS COORDINATORS:	Kristina Kampić
	Martina Ivanišević
RESOURCES COORDINATOR:	Megi Pavletić
TECHNICAL SUPPORT COORDINATORS:	Ivana Babić
	Dominik Lenčić
DIETARY COORDINATORS:	Iva Dumančić
	Ljerka Delač
HONORARY MEMBER OF THE ORGANIZING COMMITTEE:	Aleksandra Krstić

SCIENTIFIC COMMITTEE

Prof Gordana Župan, MD, PhD, President
Asst Prof Ksenija Baždarić, PhD
David Bonifačić, MD, PhD
Asst Prof Đurđica Cekinović, MD, PhD
Petra Dolenec, MSc
Prof Tanja Frančišković, MD, PhD
Prof Srećko Gajović, MD, PhD
Asst Prof Mirjana Graovac, MD, PhD
Asst Prof Mario Habek, MD, PhD
Asst Prof Rajna Knez, MD, PhD
Sanja Kovačić, MD, PhD
Prof Daniela Malnar, MD, PhD
Prof Amir Muzur, MD, PhD
Daniela Petrić, MD, PhD
Asst Prof Kristina Pilipović, MD, PhD
Prof Gordana Rubeša, MD, PhD
Asst Prof Vesna Šendula-Jengić, MD, PhD
Martina Šendula-Pavelić, Prof
Asst Prof Ingrid Škarpa-Prpić, MD, PhD
Prof Mladenka Tkalčić, PhD
Prof Ivanka Živčić-Bećirević, PhD

HONORARY BOARD

Prof Pero Lučin, MD, PhD
Prof Nevenka Ožanić, PhD
Prof Bojan Polić, MD, PhD
Prof Tomislav Rukavina, MD, PhD
Prof Brigita Tićac, MD, PhD
Prof Snježana Prijić-Samaržija, PhD
Igor Salopek, MD

WELCOME NOTE

Dear Colleagues,

I am honored to welcome you to the 7th Student Congress of Neuroscience – NeuRi 2017!

It is an exciting time for neuroscience as we continue to grow and adjust, remaining always adaptable, motivated and curious. We're transforming the way we operate to continuously improve our ability to understand and cure illnesses that are beginning to affect more and more of the world's population. We are witnessing new discoveries and small breakthroughs that help shape modern ways of diagnosing, treating and living with neurological or psychiatric diseases. Every day we have new information, new evidence, which can ultimately lead to great discoveries and that is why I believe we can always expect the unexpected.

Through the past six years, NeuRi has established itself as a Student Congress that attracts more and more young scientists and neuroscience enthusiasts. We have prepared three days of scientific and social program at the Faculty of Medicine, University of Rijeka, as well as in the city of Rijeka – often called "the City that flows", and the Kvarner paradise – the island of Rab, with wonderful hosts at the Rab Psychiatric Hospital.

The world of neuroscience is an exciting area of research, and we'll continue to meet and bring inspired people together in conferences like this. Every work published in our Abstract book is a proof of hard work, potential and knowledge. We should all be very proud of where we are today and excited about where we are headed. Throughout this conference, I ask you to stay engaged, keep learning from your colleagues and help us shape the future of neuroscience. My personal respect and thanks goes out to all of you.

On behalf of Organizing, Scientific and Honorary Board -
Welcome to Rijeka and Rab at NeuRi 2017!

Christina Isabell Jukić
President of NeuRi 2017
Rijeka, April 21st 2017

Participants of the 1st Student Congress of Neuroscience – NeuRi 2011;
Faculty of Medicine, Rijeka

Participants of the 2nd Student Congress of Neuroscience – NeuRi 2012;
Rab Psychiatric Hospital

Participants of the 3rd Student Congress of Neuroscience – NeuRi 2013; Faculty of Medicine, Rijeka

Participants of the 4th Student Congress of Neuroscience – NeuRi 2014; Faculty of Medicine, Rijeka

Participants of the 5th Student Congress of Neuroscience – NeuRi 2015; Faculty of Medicine, Rijeka

Participants of the 6th Student Congress of Neuroscience – NeuRi 2016; Faculty of Medicine, Rijeka

Programme

Friday, April 21st 2017
FACULTY OF MEDICINE, RIJEKA

14:00 - 15:45 REGISTRATION (GREAT HALL)

16:00 - 16:30 OPENING CEREMONY NEURI 2017 (AUDITORIUM 2)
CHAIRPERSONS: Gordana Župan, Christina Isabell Jukić, Luka Fotak

16:30 - 16:45 GROUP PHOTO OF ALL PARTICIPANTS (In front of the Faculty)

16:45 - 17:45 PLENARY LECTURE (AUDITORIUM 2)
Ingrid Škarpa-Prpić: Is Fabry disease an "orphan"?
CHAIRPERSONS: Ksenija Baždarić, Iva Dumančić, Ivana Babić

17:45 - 18:00 COFFEE BREAK/REGISTRATION (GREAT HALL)

18:00 - 19:00 PLENARY LECTURE (AUDITORIUM 2)
Mario Habek: Clinical neurophysiology of multiple sclerosis
CHAIRPERSONS: David Bonifačić, Tena Piljušić, Emina Horvat-Velić

19:15 - 21:00 DINNER (GREAT HALL)

Saturday, April 22nd 2017
RAB PSYCHIATRIC HOSPITAL

07:00 DEPARTURE BY BUS TO RAB (BAN JOSIP JELAČIĆ SQUARE)

10:00 - 11:00 PLENARY LECTURE (CONGRESS HALL)
Vesna Šendula-Jengić, Gordan Bošković: Dissociative Experiences – From Obsession to Hierarchical Models of Dissociation
CHAIRPERSONS: Sanja Katalinić, Kristina Kampić, Josipa Kajić

11:00 - 11:15 COFFEE BREAK

11:15 - 12:30 STUDENT SESSION I (CONGRESS HALL)
CHAIRPERSONS: Ingrid Škarpa-Prpić, Christina Isabell Jukić, Maša Lovrović
1. Munira Karahodžić, Irnis Bišćo, Eliza Idrizi: Hypothyroidism and Organic Affective Disorders in an Adolescent: cause and effect or comorbidity? – A Case Report
2. Petar Brlek, Emina Horvat Velić, Anja Bukovac, Anja Kafka, Davor Tomas, Nives Pećina-Šlaus: Levels of N-cadherin expression in human meningioma
3. Sanela Hadžić, Ismir Kukić, Eldina Mahmuzić: The Paradox of Psychopathy
4. Marin Lakić, Joško Glavić: Case report: The efficiency of the robotic treatment in stroke and trauma case
5. Maja Ploh, Eliša Papić, Valentino Rački, Dalen Bernaca, Andrea Andrijašević, Natalia Kučić: Evidence-based sound therapy: Developing a new model using the Golden ratio and EEG waves
6. Irnis Bišćo, Munira Karahodžić, Eliza Idrizi: Depression in a Breast Cancer Patient: treatment cautions

12:30 - 13:30 LUNCH AND SIGHTSEEING

13:30 - 14:45 STUDENT SESSION II (CONGRESS HALL)
CHAIRPERSONS: Martina Šendula-Pavelić, Ivan Franin, Ema Ormanec

1. Lucija Šutić, Josipa Kajić: From a first sight to a happily ever after – biological and psychological mechanisms of liking and loving
2. Meliha Imamović, Danijel Gajić, Osman Sinanović: Cigarette smoking and month of birth in multiple sclerosis patients
3. Kristina Kampić, David Bonifačić, Ingrid Škarpa-Prpić, Lidija Tuškan-Mohar, Vladimira Vuletić: When does ALS win? (and when it wins)
4. Aleksandra Krstić: Aphasiology: towards the interdisciplinary approach to language disorders
5. Svetlana Tomić, Jelena Rnjak, Matea Podgornjak: A case of Progressive Supranuclear Palsy
6. Lara Pilepić, Kornelija Berečić: Differences in Communication Consequences Caused by Traumatic Brain Injury and Stroke

15:00 - 16:00 RAB SIGHTSEEING

16:00 - 18:00 RETURN TO RIJEKA

22:00 NEURI PARTY (INSOMNIA)

Sunday, April 23rd 2017
FACULTY OF MEDICINE, RIJEKA

07:30 - 08:30 BREAKFAST/REGISTRATION (GREAT HALL)

08:30 – 09:30 POSTER SESSION (GREAT HALL)
CHAIRPERSONS: Petra Dolenec, Megi Pavletić, Ljerka Delač
1. Marija Krpina, Andrej Belančić: What do we need to know about migraine?
2. Sabina Al-samarai, Josipa Kolobarić, Ana Filošević, Rozi Andretić Waldowski: Role of oxidative stress in behavioral sensitization to psychostimulants in Drosophila
3. Andrijana Mišković, Krešimir Šantić, Marta Okružnik, Dunja Degmečić: Cross-sectional study: Stereotypes and prejudice against people suffering from schizophrenia among young people and adults
4. Robert Rončević, Vedran Vizler, Svetlana Tomić: Parkinson plus syndrome (Corticobasal degeneration)
5. Nadija Gačo, Daniela Petrić: School phobia as a prodromal symptom of psychotic disorders
6. Katharina Marić: Add-on Bevacizumab in treatment of newly diagnosed Glioblastomas
7. Sajra Vinčević, Ilhana Šestić, Nurija Bilalović: Immunohistochemical analysis of pleomorphic xanthoastrocytoma: case report and literature review
8. Ante Prpić, Andrea Radolović, Matija Sošić, Olivio Perković: Pathological gambling in Parkinson's disease – case report
9. Nikolina Grbavac, Sanja Zagrajski: Legal status and position of persons with psychiatric disturbances who have committed a felony

09:30 – 09:45 COFFEE BREAK/REGISTRATION (GREAT HALL)

09:45 – 11:15 STUDENT SESSION III (AUDITORIUM 1)
CHAIRPERSONS: Daniela Malnar, Martina Ivanišević, Emilija Borčić
1. Tin Pavičić, Luka Crnošija, Magdalena Krbot Skorić, Ivan Adamec, Mario Habek: Video head impulse test can detect brainstem dysfunction in multiple sclerosis

2. Lea Rostohar: Guillain-Barré syndrome and Zika virus – the latest findings
3. Belma Islamović, Minela Izmirlić, Amina Jakubović, Lejla Omerčić, Eldin Burazerović: Colloid cysts of the third ventricle: clinical presentation, results of surgery and outcomes
4. Amila Muhić, Irfan Gljiva, Rubina Alimanović-Alagić: Neuropsychiatric disorders in patients with impaired thyroid function
5. Jana Radić, Tanja Jurin, Valerija Hauptfeld: Verbal memory function in the presence of brain dysfunction and psychological disturbances
6. Ika Bedekovič: Limbic declinations in healthy adult subjects reporting childhood maltreatment: A review
7. Lidija Stošić, Eni Tomović, Melanie Tepuš: Adult neurogenesis and its potential for recovery
8. Katarina Matić, Marija Milošević: Executive functions and learning disabilities in children with mild intellectual disability

11:15 – 11:30 COFFEE BREAK (GREAT HALL)

11:30 – 12:30 WORKSHOPS (AUDITORIUM 4, AUDITORIUM 5)
I. Infections of the Central Nervous System
(Đurđica Cekinović)
II. Psychiatric emergencies
(Igor Salopek)

12:30 – 13:30 LUNCH (GREAT HALL)

13:30 – 15:00 STUDENT SESSION IV (AUDITORIUM 1)
CHAIRPERSONS: Sanja Kovačić, Ivana Babić, Dominik Lenčić
1. Armin Hadžidedić, Nadina Joldić, Ivana Rabotić, Osman Sinanović: The Frequency of Depression and Anxiety at Multiple Sclerosis Patients
2. Ana Filošević, Azra Selimović, Rozi Andretić Waldowski: Drosophila melanogaster - a model organism in the addiction research
3. Ellen Saskia Voorrips, Christoph Johannes Kleineidam, Stefanie Neupert, Arie van der Lugt: Philantotoxin and the smell of paralysis

4. Eliša Papić, Valentino Rački, Natalia Kučić: Murine cytomegalovirus as a cellular re-engineer of BV-2 microglial cells
5. Belma Mešević, Ermin Silajdžić, Amra Novalić, Mersad Baručija: Correlation between size of decompressive craniectomy and survival outcome in patients with severe traumatic brain injury
6. Berislav Ruška, Magdalena Krbot Skorić, Luka Crnošija, Tereza Gabelić, Ivan Adamec, Mario Habek: Tibial somatosensory evoked potentials predict walking speed in early multiple sclerosis
7. Ivan Pavlović, Luka Crnošija, Magdalena Krbot Skorić, Tereza Gabelić, Mario Habek: Multimodal brainstem evoked potential in evaluation of brainstem involvement in multiple sclerosis
8. Armin Šarić, Ibro Habibović, Suzana Pavljašević-Nikolić: Differential diagnosis of optic nerve atrophy

15:15 - 15:45 CLOSING CEREMONY NEURI 2017 (AUDITORIUM 1)
CHAIRPERSONS: Christina Isabell Jukić, Maša Lovrović, Tena Piljušić

Plenary Lectures

Is Fabry disease an “orphan”?

Ingrid Škarpa-Prpić
University Hospital Center Rijeka, Clinic for Neurology, Rijeka, Croatia
University of Rijeka, Faculty of Medicine, Department of Neurology, Rijeka, Croatia

There are diseases that are called “rare” and there is a specific medical name for them – “orphan diseases”. However, recent statistical data shows these diseases are not as rare as we think, because data points to an important issue: 20 to 30 million people in Europe have a disease classified as “orphan”. One of orphan diseases that, if diagnosed early, can be successfully treated is Anderson-Fabry disease or Fabry disease. Yearly incidence is estimated to be between one in 40 000 and one in 80 000 live births, with a variable prevalence. In late (adult) onset of disease, prevalence is estimated to one in 3000 adults which then excludes Fabry disease from “orphans”.

Fabry disease is a disorder of glycosphingolipids metabolism caused by deficient or absent lysosomal alpha-galactosidase A activity related to mutations in the GLA gene (Xq21.3-q22) encoding the alpha-galactosidase A enzyme. Deficient activity results in accumulation of globotriaosylceramide (Gb3) within lysosomes, believed to trigger a cascade of cellular events. These cells grow, deform and impair proper function primarily of vital organs (heart, brain, kidneys, etc.).

Fabry disease is hereditary. It is more common in men because the responsible gene is on the X sex-determining chromosome. Since men only have one X chromosome, and women have two, the other one is usually healthy and women more rarely show symptoms. They do, however, pass the gene on to their offspring. Latest research shows that women are starting to show signs and symptoms more often, although it varies in intensity.

Clinically, it presents differently, but common symptoms are neurological (burning pain in distal parts of extremities), dermatological (angiokeratomas), cardiac (heart arrhythmia and cardiomyopathy), and renal symptoms (proteinuria, renal insufficiency). Other neurological symptoms include tinnitus in the ears and extreme chronic fatigue, which is why MR-scan or anamnestic differential diagnosis can point to multiple sclerosis in adults, and rheumatoid arthritis in children. These symptoms first appear in childhood, and periodically reappear through life. Definitive laboratory diagnosis involves demonstration of marked enzyme deficiency in hemizygous males. Enzyme analysis may occasionally help to detect heterozygotes but is often inconclusive due to

random X-chromosomal inactivation, making molecular testing (genotyping) of females mandatory. Prenatal diagnosis is also possible. Fabry disease is transmitted as an X-linked trait. The existence of atypical, late-onset variants and the availability of specific therapy complicate genetic counseling.

Enzyme replacement therapy is the basic treatment for Fabry disease, but additional symptomatic treatment can be used, like analgesics, antiarrhythmics, antihypertensives, dialysis etc. With age, progressive damage to vital organ system develops, possibly leading to organ failure. So, the end-stage of cardiovascular or renal, or cerebrovascular complications limit the life expectancy of untreated males and females with reductions of 20 and 10 years, respectively, versus the general population.

CONTACT: ingridskp@gmail.com

Clinical neurophysiology of multiple sclerosis

Mario Habek
University of Zagreb, School of Medicine, Department of Neurology, Zagreb, Croatia

In the diagnosis of multiple sclerosis (MS) three main principles are applied: demonstration of dissemination in space (DIS), in time (DIT) and reasonable exclusion of alternative explanations. The demonstration of DIS and DIT is heavily influenced with MRI. The last version of the McDonald criteria allows to make a diagnosis of MS in patients with typical clinically isolated syndrome. Despite these advancements, there is still a poor correlation between clinical symptoms and MRI findings in a substantial proportion of MS patients. Different neurophysiological methods such as evoked potentials (EP) and testing of the autonomic nervous system (ANS) have the potential to detect clinically silent lesions or to confirm the existence of an association between a clinical symptom and MS; previously undetected by MRI. In the most recent MRI criteria for the diagnosis of MS (MAGNIMS consensus guidelines), neurophysiological confirmation of optic nerve dysfunction on visual EP, support dissemination in space and, in patients without concurrent visual symptoms, dissemination in time. It is therefore important to know that EPs are reliable procedures to predict disability in MS patients and can possibly be used as an outcome for determining the efficiency of a particular treatment. The index of global EP alteration (EP score), which combines alterations in visual EP, auditory EP, motor and somatosensory EP, shows significant correlation with the EDSS at the time of neurophysiological study and at 5 years of follow-up. Furthermore, ANS dysfunction can lead to an array of clinical symptoms often observed in MS patients. There is a connection between dysfunction of ANS and development of cardiac side effects of several MS drugs; and cardiovascular and thermoregulatory autonomic dysfunctions in MS have considerable potential to adversely affect exercise.

CONTACT: mario.habek@mef.hr

Dissociative Experiences – From Obsession to Hierarchical Models of Dissociation

Vesna Šendula-Jengić, Gordan Bošković
Rab Psychiatric Hospital, Rab, Croatia

„Jeanne Fery was a French Dominican Nun who presented "more identities, including Mary Magdalene and several demons". Her apparent eating disorder seemed connected to her alleged sexual abuse when she was 4 years old by a demon Cornau who seduced her with sweets... Her autodestructive behaviour was caused by the demon Sanguinaire, who demanded pieces of her flesh... She presented with epilepsy-like seizures, aggressive behaviour, infantilism, sleeping disorder, conversion blindness, mutism, loss of knowledge and skills and amnesia..."

The term dissociation was first used by Jacques-Joseph Moreau (désagrégation) in the 18th century, who researched the effects of psychoactive substance use on the nervous system, and the term was used to describe failure to integrate ideas which causes multiple personalities. His ideas were used in attempts to describe automatic psychomotor phenomena (e.g. writing) or cases of possession among psychic mediums who claimed to have two separate personalities during "trance".

A while later, Jean–Martin Charcot, the founder of modern neurology, even though he thought that hysteria is a hereditary neurological disorder, used artificial hypnagogic states as models to explain hysteria symptoms, such as paralysis, claiming that these symptoms occur in separate states of consciousness.

First great contribution to understanding dissociative experiences was by Pierre Marie Félix Janet. He was one of the first to claim that there is a connection between the past life of an individual and his current trauma, and for the first time he described flashback episodes. His theoretical model is described as „Idees fixes" or traumatic memories, which are related to so called "fiery emotions" and other mental images, and many different physiological phenomena that can alternate with discernably normal states of personality and can cause intrusions when traumatic experiences are remembered.

"When approaching one state of personality, the individual seems as if they never experienced any trauma, but when approaching the other state, they seem like they never experienced anything but trauma".

Distinguishing elements consist of "mental events" as positive symptoms, including pain and automatic movement, and "mental stigma" as negative symptoms that included sensory loss, failure to perform movement, amnesia, etc.

Alfred Binett attempted to support this model experimentally, and he claimed that exchange of information was possible between dissociated personalities even when the person is not aware of separate states.

At the end of 18th century and the beginning of 19th century, the interest for dissociated states continues. William James considered separated states of consciousness with normal and abnormal manifestations. He tried to explain hysteria, dreams, hypnotism and multiple personalities.

Joseph Breuer and Sigmund Freud developed the idea of hypnotic or dissociated states as underlying cause of hysteria. Freud gives childhood trauma a central role in development of "hysterical" psychopathology, but that changed with improvement of his theory of intrapsychic conflicts between id, ego and superego, and he gradually replaced the concept of dissociation with the concept of repression. As a result, reports of child abuse and early-life traumatic experiences lost importance and were often interpreted as a manifestation of repressed sexual desires instead of actual events.

The First World War resulted in numerous soldier traumas called "shell shocks", which related to symptoms and effects of bombing, and they had important conversional or dissociative components. Overwhelming traumatic experiences were seen as psychologically unintegrated, but clearly recognizable and existent in "emotional personality" of the individual. In these states, the patients acted as if that trauma is happening again. In manifestly "normal" personality, they lacked awareness of trauma and apparent psychopathological symptoms. That term was replaced by "combat stress reaction" after the Second World War and later by "gross stress reaction", and in the 1980s the term "shell shock" was used in diagnostic classification as posttraumatic stress disorder.

Alongside that, structural and cognitive models of dissociation were developed. Structural models attempted to explain all posttraumatic states (e.g. simple and complex PTSD) as dissociated experiences, while cognitive models viewed simple posttraumatic states as failure to integrate, including separate states of consciousness and complex posttraumatic states as failure to integrate separate parts of self, caused by inhibition of central control system of behaviour.

At the end of 20th century, significantly revised thoughts on dissociative experiences are included in diagnostic classification systems and new research on theoretical modeling of disassociation revived the interest of professionals.

In the 1980s the classification of dissociative states was re-conceptualized and consequently shifted conversional towards somatoform disorders and placed them in a category of disorders not necessarily considered as dissociative. In

that way, most physical dissociative symptoms are disconnected from the rest of dissociative symptoms. Separation from dissociative category can lead to disregarding dissociation in all trauma-associated disorders, especially PTSD, but also eating disorders, borderline personality disorders and some anxious disorders.

Can all states of changed consciousness be described as dissociative (e.g. yoga, meditation, daydreaming) or should that term be reserved for certain pathological states? Does dissociation mean new quality of experience or is it a cumulation of qualitatively the same, but quantitatively different experiences? These and many other questions are the focus of discussions lasting to this day.

CONTACT: vesna.sendula@gmail.com

Symposia

Differences in communication consequences caused by traumatic brain injury and stroke

Kornelija Berečić, Lara Pilepić
University of Zagreb, Faculty of Education and Rehabilitation Sciences,
Department of Speech and Language Pathology, Zagreb, Croatia

The outcomes on communication differ in patients with traumatic brain injury and stroke. Traumatic brain injuries have repercussions on cognitive, psychological, physical, linguistic and psychosocial skills, due to their multifocal nature. Aphasia is typically caused by a cerebrovascular insult, which results in impaired language, speech, listening, writing and communication skills.

It would be incorrect to assume that a particular type of brain injury gives a simple clinical picture as speech and language can be described as a type of neural network operating simultaneously on different levels. The literature states that the repercussions on communication differ in patients with traumatic brain injury and stroke.

We compared effects on communication described in literature with our observations in patients with the same type of brain conditions. We have observed 4 patients with cerebrovascular insult and 4 patients with traumatic brain injury who have recently been hospitalized at the University Hospital Center “Sisters of Charity”. A simple questionnaire has been used, in order to test patient’s speech, language and communication skills. The research lasted for 2 months, depending on the accessibility of the patients that suited our sample of respondents.

The results showed that patients with traumatic brain injury only have communication disorders, such as difficulties in understanding figurative speech, sarcasm and jokes resulting in frustration, while their language production remained unaffected. As opposed to that, linguistic components are severely impaired in patients with stroke, which consequently prevents them from using comprehensive language. Therefore, communication impairments resulting from these brain conditions cannot be classified under the umbrella of aphasia.

CONTACT: kberecic@gmail.com

Differential diagnosis of optic nerve atrophy

Armin Šarić[1], Ibro Habibović[1], Suzana Nikolić–Pavljašević[2]
[1]University of Tuzla, Faculty of Medicine, Tuzla, Bosnia and Herzegovina
[2]University of Tuzla, Faculty of Medicine, Department of Ophthalmology, Tuzla, Bosnia and Herzegovina

The aim of this research is to show the importance of neurological diseases and differential diagnosis of optic nerve atrophy, track its progress and get to the cause by finding and removing the causes lead to a result in curing the same.

Optic nerve is the sensory second cranial nerve. Optic nerve atrophy is the outcome of pathological processes that leads to degeneration of axons of the retinal ganglion cells of the visual pathway from the beginning to the cortical center of vision. We distinguish a total and partial atrophy of the optic nerve. Clinically, it is manifested in different degrees of decline in visual acuity, as a disorder of color vision, central scotoma and narrowing of the visual field.

Textbooks that are available for students at general study of medicine were being used in this research. Combining technical and scientific literature in neurology and ophthalmology we attempted approaching to this serious disease in a comprehensive way. There are many diseases that can lead to the optic nerve atrophy. The causes of this disease may be ophthalmic, neurological, endocrine, and vascular pathological etiologies.

Differential diagnosis should be done many times to safely rule out certain diseases. The examination should start with determining visual acuity (with and without correction) and then do ophthalmoscopy with dilated pupils, and examine the fundus - disk and blood vessels of the retina. Testing of visual acuity, color vision test - Ishihara test, contrast sensitivity tests, pupil examination. Visual field testing and perimetry tests are required in the assessment of the situation in the beginning of edema and later of the optic nerve atrophy. Optical coherence tomography is a recent diagnostic tool and provides us with information on the state of the optic nerve fibers. To exclude glaucoma do an examination of the anterior chamber angle by gonioscopy, measuring intraocular pressure by tonometry. Ultrasonography - for tumors localized in the orbit, B scan ultrasonography with papilledema. CT or MRI of the orbits or neurocranium in suspected intracranial occurrence (fractures, aneurysms, tumors, inflammations).

Early and intensive treatment can offer patients a nearly normal vision. Timely action and good diagnosis is half of the treatment.

CONTACT: aki_car@live.com

Video head impulse test can detect brainstem dysfunction in multiple sclerosis

Tin Pavičić[1], Luka Crnošija[1], Magdalena Krbot Skorić[2], Ivan Adamec[2], Mario Habek[1,2]
[1]University of Zagreb, School of Medicine, Zagreb, Croatia
[2]University Hospital Center Zagreb, Department of Neurology, Zagreb, Croatia

The aim of this study was to investigate the potential role of video head impulse test (vHIT) in the detection of brainstem lesions in patients with multiple sclerosis (MS).

Sixty-eight participants were enrolled and divided into two groups: 39 healthy subjects (HC) (78 ears, 20 females, mean age 25.3 ± 6.3) and 29 MS patients (58 ears, 14 females, mean age 33.7 ± 7.7). Both groups underwent vHIT, and in MS group MRI was analyzed for the presence of brainstem lesions. vHIT pathology was defined if there was presence of overt saccades (<200 ms) or lateral gain lower than 0.8 for lateral canal, and presence of overt saccades (<200 ms) or posterior/anterior slope lower than 0.7.

In HC, pathological results on horizontal canals were found in 8 out of 78 ears (11%), while 16 out of 58 ears (38%) had pathological results in the MS group. Mean gain of the lateral canals (60 ms) was significantly reduced in MS group compared to HC (0.874 ± 0.143 vs. 0.954 ± 0.170, p=0.004, respectively). Compared to HC overt saccades <200 ms in the lateral canals (p=0.018) and in the posterior canals (p=0.011), overt saccades >200 ms in lateral (p<0.001), anterior (p=0.019) and posterior canals (p=0.009), and covert saccades in the anterior (p=0.042) and posterior canals (p=0.046) were more frequent in the MS group. There was statistically significant correlation between the presence of BS MR lesions and bilateral pathology on vHIT for lateral semicircular canal ($\chi(1)=3.982$, p=0.046).

These results indicate that vHIT can detect brainstem dysfunction in patients with MS.

CONTACT: tinpavicic@gmail.com

Tibial somatosensory evoked potentials predict walking speed in early multiple sclerosis

Berislav Ruška[1], Magdalena Krbot Skorić[2], Luka Crnošija[1], Tereza Gabelić[2], Ivan Adamec[2], Mario Habek[1,2]
[1]University of Zagreb, School of Medicine, Zagreb, Croatia
[2]University Hospital Center Zagreb, Zagreb, Croatia

We aimed to evaluate somatosensory evoked potentials of the tibial nerve (SSEPt) in correlation with timed 25 foot walk test (T25FW) and MRI findings in patients with first symptom of multiple sclerosis (MS). In 122 MS patients (mean age 32.3 ± 8.7 years, 85 females), EDSS, T25FW, brain and spinal cord MRI and SSEPt were performed. P40 latencies and N22a-P40 interlatency were analyzed and zscore for each latency was calculated and combined into SSEPt zscore. MRI was analyzed for the presence of brainstem and cervical spinal cord lesions. Walking speed measured with T25FW significantly correlated with SSEPt zscore (rs=0.211; p=0.021). When looking each component of the SSEPt separately, T25FW significantly correlated with left P40 wave latencies (rs=0.223; p=0.014) and N22a-P40 interlatencies (rs=0.241; p=0.008). There were no significant correlations for other SSEPt parameters. Furthermore, patients who presented with transverse myelitis (N=41) and patients who had spinal cord lesions on the MRI had significantly higher SSEPt zscore compared to other patients (0.07 vs. -0.27, p=0.023 and -0.02 vs. -0.38, p=0.023; respectively). A linear regression was calculated to predict T25FW based on SSEPt zscore, age, gender and cervical spinal cord MRI lesions. Significant regression equation was found (F(4.87)=6.815, p<0.001), with an R2=0.239. SSEPt zscore corrected for age, gender and cervical spinal cord MRI lesions is statistically significant predictor for T25FW (B=0.268, p=0.023). In MS patients SSEPt is a potential marker of walking speed and indicates presence of functional impairment at the level of the spinal cord.

CONTACT: berislav.ruska@gmail.com

Multimodal brainstem evoked potential in evaluation of brainstem involvement in multiple sclerosis

Ivan Pavlović[1], Luka Crnošija[1], Ivan Adamec[2], Magdalena Krbot Skorić[2], Tereza Gabelić[2], Mario Habek[1,2]
[1]University of Zagreb, School of Medicine, Zagreb, Croatia
[2]University Hospital Center Zagreb, Department of Neurology, Zagreb, Croatia

Several studies have shown the importance of brainstem lesions in the prediction of disability in multiple sclerosis (MS). The aim of this study was to evaluate the brainstem evoked potential score (BEP score) in detection of brainstem lesions in patients with early MS.

Fifty-eight MS patients were enrolled (38 females), mean age 32.2 ± 7.4. Brainstem functional system score (part of the EDSS), 9-Hole Peg Test (9HPT) and Timed 25-Foot Walk test (T25FW) were performed in all patients. Latencies of the major components for both sides of vestibular evoked myogenic potentials (P13, N23, N10 and P13, VEMP), brainstem auditory evoked potentials (III and V wave, BAEP), tongue somatosensory evoked potentials (P1, tSSEP) and somatosensory evoked potentials of the medial nerve (P14, mSSEP) were analyzed and z-score for each EP was calculated and combined into BEP score.

Patients with brainstem lesions on the MRI had significantly higher BEP score compared to patients without brainstem MRI lesions (0.15 vs. -0.17, respectively; p=0.027). When looking into each evoked potential z-score separately, the significant difference was evident for VEMP z-score (0.19 vs. -0.20, respectively; p=0.05) and mSSEP z-score (-0.03 vs. -0.37, respectively; p=0.013). We found significant correlations between BEP score and 9HPT for the dominant and non-dominant hand (rs=0.437, p=0.001 and rs=0.276, p=0.036, respectively).

This data indicates that BEP score is a valuable tool in evaluation of brainstem involvement in patients with early MS. Further studies evaluating the role of combination of different brainstem evoked potentials in MS are warranted.

CONTACT: ivan.pavlovic317@gmail.com

Levels of N-cadherin expression in human meningioma

Petar Brlek[1], Emina Horvat Velić[2], Anja Bukovac[1,3], Anja Kafka[1,3], Davor Tomas[1,4], Nives Pećina – Šlaus[1,3]
[1]University of Zagreb, School of Medicine, Zagreb, Croatia
[2]University of Zagreb, Faculty of Science, Zagreb, Croatia
[3]University of Zagreb, School of Medicine, Croatian Institute for Brain Research, Zagreb, Croatia
[4]University Hospital "Sisters of Charity", Zagreb, Croatia

Meningiomas represent one of the most common primary brain tumors. They originate from arachnoid cap cells of the arachnoid villi (Pacchioni's granulations) which are protrusions of second brain meninx called arachnoid mater. Although around 80 percent of meningioma show benign character and are classified as grade I, they can slowly grow and constrict the brain which can cause disability and even be life threatening. Remaining 20 percent show greater likelihood of recurrence and aggressive behavior and are classified as atypical (grade II) or anaplastic (grade III) which are considered malignant, therefore invasive. N-cadherin is Ca^{2+}-dependent glycoprotein that mediates cell–cell adhesion in adherens junctions. It has an important role in embryogenesis, leading cells to undergo an epithelial-mesenchymal transition. The similar mechanisms, in which N-cadherin is overexpressed, help cancer cells to lose cell adhesion and polarity, become motile and consequently invade surrounding tissue or develop metastasis.

The aim of our study was to assess and analyze different N-cadherin expressions in 30 samples of paraffin-embedded meningioma sections. To assess and localize N-cadherin expression, we used DAB-labeled immunohistochemical reaction using streptavidin horseradish peroxidase/DAB (EnVisionTM, Dako REALTM) and specific monoclonal antibody N-cadherin (D-4): sc-8424, Santa Cruz Biotechnology, Inc. Our results have shown that all investigated meningiomas express N-cadherin protein. We counted 200 cells of each meningioma sample and found N-cadherin to be expressed in every meningioma tumor. However, individual cells within meningioma sections display various levels of N-cadherin expression. N-cadherin is mostly expressed in cytoplasm, but was also found in nucleus and membranes.

CONTACT: pbrlek@gmail.com

Limbic declinations in healthy adult subjects reporting childhood maltreatment: a review

Ika Bedekovič
University of Maribor, Faculty of Arts, Department of Psychology, Maribor, Slovenia

Childhood maltreatment, or childhood abuse and neglect, is a severe stressor that produces a cascade of physiological, neurochemical, and hormonal changes, which can lead to enduring alterations in brain structure and function. Childhood maltreatment is also among the strongest risk factors for developing major depression disorder in later life. Previous studies have consistently reported enhanced amygdala responsiveness to negative emotional stimuli and reduced hippocampal volume in patients with major depressive disorder. Studies have also found reduced hippocampal volume in adult patients with major depressive and/or other psychiatric disorder reporting history of childhood abuse and/or neglect. However, it is not clear from these studies if such a limbic declination is a feature of a psychiatric disorder, or if it is already present in healthy subjects reporting childhood maltreatment. It is also not clear whether enhanced amygdala responsiveness to negative facial expressions previously found in youths persists into adulthood.

The main purpose of this study was to integrate findings of empirical studies published after 2010 that concentrated on the association between childhood maltreatment and amygdala responsiveness to negative facial expressions or hippocampal volume in adult subjects who have not developed a psychiatric disorder.

Results of examined studies show a significant positive correlation between childhood maltreatment and amygdala responsiveness to negative facial expressions and mostly a significant negative correlation between childhood maltreatment and hippocampal volume.

Results strongly resemble findings described in depression. Therefore, the present results might suggest that amygdala hyperresponsiveness and reduced hippocampal volume could be mediators between childhood maltreatment and the development of depression.

CONTACT: ika.bedekovic@student.um.si

Drosophila melanogaster - a model organism in the addiction research

Ana Filošević, Azra Selimović, Rozi Andretić Waldowski
University of Rijeka, Department of Biotechnology, Rijeka, Croatia

Drug addiction represents a complex phenomenon composed of simpler forms of behaviors which can be studied in laboratory setting. Despite the fact that fruit fly, Drosophila melanogaster, is used for scientific research for more than 100 years, there are only few studies about psychostimulant addiction. One reason for scarce studies is that there are only few available behavioral tests which measure features of addiction.

In our lab, we are developing new methods and protocols for measuring psychostimulant (cocaine and methamphetamine) induced behaviors. In order to objectively quantify behavior, we use Drosophila Activity Monitoring System (DAMS), which measures amount of locomotion of individual flies in unit of time. The simplest form of drug response is sensitivity, expressed as amount of drug induced locomotion. To obtain acute sensitivity phenotype we expose flies to drug orally or by volatilization. To measure chronic effects, we expose flies to repeated drug administrations of the same dose, which lead to either sensitization or tolerance, depending on the concentration and length of exposure. We have developed new high-throughput assay which can be used in future genetic screens, for induction and quantification of acute and chronic effects. To measure voluntary drug consumption, we adapted Capillary feeder (CAFE) assay which measures preferential drug consumption over the course of several days. We find that flies preferentially self-administer drug-food over non-drug-food, but with different long-term preferences for cocaine and methamphetamine. We also show that flies express several other features of addiction, such as relapse, consumption instead of negative consequences and that they consume drug in spite of aversive taste.

Our results show that Drosophila is a good model organism to study psychostimulant addiction, together with mice and rodents. Further research will be focused on gene screen, with the aim of defining changes in brain physiology caused by drug taking.

CONTACT: ana.filosevic@biotech.uniri.hr

Verbal memory function in the presence of brain dysfunction and psychological disturbances

Jana Radić[1], Tanja Jurin[1], Valerija Hauptfeld[2]
[1]University of Zagreb, Faculty of Humanities and Social Sciences,
Department of Psychology, Zagreb, Croatia
[2]University Hospital Center Zagreb, Department of Neurosurgery, Zagreb, Croatia

Assessment of both cognitive deficits and psychological disturbances is the key part of neuropsychological assessment. Existing research regarding the relationship of psychological disturbances and neuropsychological measures showed inconsistent results. Yet, there are indicators that psychological disturbances affect the results of the verbal memory tests, which complicates diagnostics of brain dysfunctions and psychiatric disorders.

Alongside evaluating differences in verbal memory measured by Auditory Verbal Learning Test and Logical memory subtest, this paper also analyses differences in achievement on these tests between people with and without brain dysfunction and psychological disturbances.

The research is based on the data obtained from the Neuropsychology Department of The Clinic of Neurosurgery at the CHC Zagreb (N=159). Based on the presence of brain dysfunction and psychological disturbances, the sample is divided in four groups: group with brain dysfunction, but without psychological disturbances; group with both brain dysfunction and psychological disturbances; group without brain dysfunction and without psychological disturbances and group with psychological disturbances, but without brain dysfunction.

MANOVA revealed that achievement of the brain dysfunction group on the given auditory-verbal memory indicators does not significantly differ from that of subjects without cerebral pathology. Group with psychological disturbances had significantly lower scores than group without psychological disturbances only for the first learning trial, while no significant difference between these groups was found on other indicators. For the Logical memory subtest, no significant effect of brain dysfunction on story recall performance was found. Subjects without psychological disturbances outperformed the patients with psychological disturbances. Results suggest that relation between psychological disturbances and immediate recall of list learning and story is independent of cerebral pathology presence. No significant difference between results on these verbal memory tests is found, neither for one of the four groups. The obtained results thus question applicability of these tests in differential diagnostics of brain dysfunctions and psychiatric disorders.

CONTACT: jradic1311@gmail.com

Guillain-Barré syndrome and Zika virus – the latest findings

Lea Rostohar
University of Rijeka, Department of Biotechnology, Rijeka, Croatia

Guillain-Barré syndrome (GBS) is an autoimmune disease in which the immune system attacks the myelin sheath around axons of numerous peripheral nerves, which is important for conducting signals from the brain to muscles. 1 out of 100 000 people suffers from the syndrome, and the cause is still unknown, but is actively researched. Zika virus (ZV) is a Flavivirus transmitted primarily by mosquitoes. Symptoms of infection include rash, arthralgia and fever. The aim of this presentation is to review the latest studies about the association between ZV and GBS.

During an outbreak of ZV in French Polynesia, 42 cases of GBS were reported in a 7-month period, compared to 3–10 cases annually in previous years. All GBS patients during the outbreak were positive for ZV antibodies. In Brasil, during 2015, 51 person was hospitalized and diagnosed with GBS which was connected to ZV outbreak. Three patients were hospitalized and diagnosed with GBS in Suriname in 2016, in one of which a link between GBS and ZV was confirmed, and in other two the link was plausible. The association between ZV outbreaks and an increase in the number of GBS cases is currently being observed in Brazil, El Salvador and Venezuela.

GBS is a severe neurological syndrome with sudden onset and fast progression, and can result in a complete paralysis, even death. The recovery is long and usually very slow, and for now the therapy is mostly symptomatic. It is still unclear whether ZV alone may be sufficient to trigger the development of GBS, however, further research might bring forth additional insight that could influence the diagnostic and therapeutic methods in GBS.

CONTACT: lea.rostohar@gmail.com

Philanthotoxin and the smell of paralysis

Ellen Saskia Voorrips[1], Christoph Johannes Kleineidam[2], Stefanie Neupert[2],
Arie van der Lugt[1]
[1]Maastricht University, Faculty of Psychology and Neuroscience, Maastricht, The Netherlands
[2]Konstanz University, Faculty of Biology, Konstanz, Germany

The ant Camponotus floridanus, like many social insects, relies on odor for discrimination between nestmates and non-nestmates. Discrimination is important for social insects that live in complex societies and aggression will be elicited when a non-nestmate tries to enter the territory. Because of this important role of odor, the subject of olfactory processing related to identifying nestmates and non-nestmates within the ant brain has been widely studied. To investigate these olfactory processes, a method is needed to present an ant-odor to the investigated ant (IA). This can be done in multiple ways: presenting a living ant, presenting a dead ant and presenting only the odor of an ant. All these methods, however, have their limitations.

In this paper a fourth option is evaluated: presenting a paralyzed ant. This method potentially solves all of the problems of the previous methods. The substance used for paralyzing is ‘Philanthotoxin’, and the question is whether injection of this substance alters the way the injected ant is perceived by the IA. This was tested by injecting either Philanthotoxin or a control substance (Ringer) in the ant. The behavior that the injected ant elicited in other was assessed by using a behavioral assay.

No difference was found in aggression elicited by ants injected with Philanthotoxin and ants injected with the Ringer solution. This is encouraging for the use of this method in further physiological experiments, although additional research is needed on concentration and method of injection.

CONTACT: ellenvoorrips@gmail.com

Hypothyroidism and Organic Affective Disorders in an Adolescent: cause and effect or comorbidity? - A Case Report

Munira Karahodžić[1], Irnis Bišćo[1], Eliza Idrizi[2]
[1]University of Sarajevo, Faculty of Medicine, Sarajevo, Bosnia and Herzegovina
[2]University Clinical Center Sarajevo, Clinic for Psychiatry, Sarajevo, Bosnia and Herzegovina

Psychiatric disorders are frequently found in patients with thyroid dysfunction. A prevalence of depression is in average 20.5% of the patients diagnosed with hypothyroidism while anxiety is found in about 30–40% of patients. The main reason behind is the impact of thyroid hormones (TH) on neurotransmitter's physiology.

We report a case of an 18-year-old male patient with symptoms: inattention, impaired concentration, apathy, dissatisfaction, dysfunctional perfectionism of adolescent personality, social phobia, lack of focus etc. In regard to these symptoms he was diagnosed with Mixed anxiety and depressive disorder (MADD) and Attention deficit disorder (ADD) in October 2016. The first psychiatric symptoms developed 4 years ago and presented as anxiety and impaired concentration.

In previous history, the patient was diagnosed with Hashimoto thyroiditis infancy, and has been treated with hormone replacement therapy (HRT) ever since. The HRT caused thyroid goiter and consequently total thyroidectomy in 2010. The patient has hypovitaminosis D that may also increase depression. Furthermore, suffers from asthma and cardiac arrhythmia diagnosed in 2015. These conditions are considered as direct consequences of iatrogenic hyperthyroidism (IH), discovered only in October 2016. CT scan was normal but EEG showed theta activity in frontal lobe. Family psychiatric history is negative.

Two months of psychopharmacological treatment resulted in the reduction of symptoms of anxiety, apathy and dissatisfaction, with no observable changes in cognitive symptoms.

In conclusion, this case report shows hypothyroidism is more likely a cause and effect of organic affective disorders than a comorbidity. In addition to that our aim is to emphasize the importance of TH testing in patients with affective disorder symptoms. It may lead either to revealing the potential cause of psychiatric disorder or to prompt treatment of thyroid dysfunction.

CONTACT: munira.karahodzic@yahoo.com

Colloid cysts of the third ventricle: clinical presentation, results of surgery and outcomes

Belma Islamović[1], Minela Izmirlić[1], Amina Jakubović[1], Lejla Omerčić[1], Eldin Burazerović[2]
[1]University of Sarajevo, Faculty of Medicine, Sarajevo, Bosnia and Herzegovina
[2]University Clinical Center Sarajevo, Department of Neurosurgery, Sarajevo, Bosnia and Herzegovina

Colloid cysts are slow-growing benign intracranial tumors mainly located in the third ventricle at the foramen of Monroe. Typically, patients are asymptomatic, although colloid cysts may cause symptoms of raised intracranial pressure. Sudden death is the most extreme presentation of the disease. Colloid cysts account for approximately 1% of all intracranial tumors.

The aim of the study is to present a variety of symptoms, results of surgery and patient outcomes with colloid cysts diagnosis. This retrospective study included all patients with colloid cyst of the III. ventricle, surgically treated at the Department of Neurosurgery, University Clinical Center Sarajevo, from January, 2006 to December, 2016. The clinical presentation, radiological findings, surgical approaches and outcomes were analyzed. During this period a total of 16 patients have been surgically treated at our Institution.

Most of the patients were male (62.5%), while the percentage of females was smaller (37.5%). The male to female ratio is 1.6:1. The age of the patients ranged from 21 to 55, with an average of 35.8 years of age. The most common symptoms were headaches and vomiting, which were found in 10 out of 16 patients (62.5%). Disturbance of consciousness was present in 4 patients (25%). One patient (6.25%) died during the postoperative period, while the other 15 patients (93.75%) had a full recovery.

Although a benign tumor colloid cyst is still surgically challenging lesion because of its deep midline location, the definitive method for treating colloid cysts is surgical removal either by microsurgery or endoscopic approach. Early detection and total excision of the colloid cyst carries an excellent prognosis.

CONTACT: belma.s.islamovic@gmail.com

When does ALS win? (and when it wins)

Kristina Kampić[1], David Bonifačić[2], Ingrid Škarpa - Prpić[2],
Lidija Tuškan - Mohar[2], Vladimira Vuletić[2]
[1]University of Rijeka, Faculty of Medicine, Rijeka, Croatia
[2]Clinical Hospital Center Rijeka, Clinic for Neurology, Rijeka, Croatia

Amyotrophic lateral sclerosis (ALS) is the most common motor neuron disease, which usually occurs sporadically, starting with the motor neurons of the peripheral and central nervous system and motor pathways. The first symptoms usually begin in the form of atrophy, weakness of certain muscle groups, usually the small muscles, or the damage of the corticospinal and/or corticobulbar pathways.

The incidence of ALS is around 1-2 per 100,000 people, and the survival 3-5 years from diagnosis.

The cause of ALS is unknown, it is believed that free oxygen radicals cause the deterioration of motor nerve cells because of a gene mutation and consequently the inability of ejecting the radicals.

Symptoms start as progressive weakness and reduction of muscle volume in parts which are innervated by the damaged nerve, causing motor weakness, hypotonia, hyporeflexia and fasciculations. Dysphagia and impaired speech are also possible. With the progression of ALS, respiratory insufficiency usually develops.

Diagnosis is based on EMG, while MRI is used in differential diagnosis to exclude other causes of the symptoms.

The treatment includes riluzole, antioxidants, atropine and baclofen. Physical therapy is often useful. Due to respiratory failure in terminally ill patients, a ventilator is required.

This case report shows a middle aged patient, who suffers from typical symptoms of ALS, and after the applied treatment, dies in the terminal stage from respiratory failure due to rejection of mechanical ventilation. This case is special because it shows how a mentally healthy and highly educated person, in spite of the possibility of staying alive, still refuses to live tied to the machine for mechanical ventilation and dependent on other people's help. Among other things, is the 3-5 years of life expectancy after the diagnosis a definite rule or are there exceptions? Do we even have a sufficient treatment which would enable slowing down the disease or prevent it, or is it all just an attempt? When does ALS truly win?

CONTACT: kristinaa.kampic@gmail.com

Cigarette Smoking and Month of Birth in Multiple Sclerosis Patients

Meliha Imamović[1,3], Danijel Gajić[2], Osman Sinanović[1,3]
[1]University Clinical Center Tuzla, Department of Neurology, Tuzla,
Bosnia and Herzegovina
[2]Healthcare Center Orašje, Orašje, Bosnia and Herzegovina
[3]University of Tuzla, Faculty of Medicine, Tuzla, Bosnia and Herzegovina

Multiple sclerosis is a chronic, inflammatory disease of central nervous system, characterised by demyelination and axonal loss. Aetiology is multifactorial and not well understood. As aetiological factors studies consider possible association of genes and environment, such as virus infections, tobacco smoking and vitamin D deficiency.

The aim of this study is to investigate frequency of cigarette smoking and month of birth in multiple sclerosis patients in Tuzla Canton.

Case group materials were obtained from histories of 50 multiple sclerosis patients who were hospitalized at Clinic of Neurology, University Clinical Center Tuzla during period from 2012. until 2016. Control group consisted of 30 subjects who were randomly selected and given questionnaire on date of birth and smoking history.

Results show that 64% multiple sclerosis patients were born in the first six months of a year (January - June), compared to the control group where that percentage was 36% (p=0.017). In case of cigarette smoking habit, 44% of multiple sclerosis patients smoke compared to 30% in control group (p=0.213).

In conclusion, the results of this study demonstrated high percentage of cigarette smoking among the multiple sclerosis patients (44%) but without statistically significant difference compared with controls. However, multiple sclerosis patients were born more frequently in first six months of the year than controls (p=0.017), and it is possible to postulate connection of vitamin D deficiency and appearance of multiple sclerosis.

CONTACT: melihaimamovic@hotmail.com

From a first sight to happily ever after - biological and psychological mechanisms of liking and loving

Lucija Šutić[1], Josipa Kajić[2]
[1]University of Zagreb, Faculty of Humanities and Social Sciences, Zagreb, Croatia
[2]University of Rijeka, Faculty of Medicine, Rijeka, Croatia

Love is all around us and includes many neurobiological and endocrinological mechanisms of social behavior and interpersonal engagement. It also had a significant role in evolution, hence many scientists from different fields of science investigated this topic. The aim of this study is to explain on theoretical basis biological and psychological mechanisms underlying liking and love and their simultaneous effects on interpersonal relationships. Pheromones are defined as chemical secretions that elicit immediate unlearned behavioral or developmental response in a member of same species. Further, there are many examples of pheromonal communication between mammals such as rabbit mammary pheromone 2-methylbut-2-enal, but there is no evidence of a consistent and strong response to any human-produced chemical compound. Some of the suspected human pheromones include four androstene steroids (androstenone, androstenol, androstadienone, and estratetraenol). Moreover, human olfactory system during evolution adapted to detect and discriminate between thousands of chemical compounds that could affect the reproductive readiness of the organism.

However, a couple of human experiments proved the existence of modulator pheromone which affects the mood or mental state of the recipient. On the other hand, it is well known that psychology has a great effect on biology and so it is also an important component in understanding the processes of liking and loving. There are numerous psychological factors influencing these chemical reactions, such as the similarity between two persons, distance among them and mutual attractiveness. Biological mechanisms of love are not strong enough to keep a lifetime relationship. Loving someone is a decision and according to Sternberg's theory (1985), the decision is only one of the three components of love. Beside decision, love includes passion and intimacy and these three components can form different kinds of love. It can be concluded that the maintenance of relationships requires constant feedback trough sensory and cognitive systems.

CONTACT: lucija.sutic@gmail.com

Depression in a Breast Cancer Patient: treatment cautions

Irnis Bišćo[1], Munira Karahodžić1, Eliza Idrizi[2]
[1]University of Sarajevo, Faculty of Medicine, Sarajevo, Bosnia and Herzegovina
[2]University Clinical Center Sarajevo, Clinic for Psychiatry, Sarajevo, Bosnia and Herzegovina

Depression is common in breast cancer patients with prevalence varied between 10% and 25%. However, management of these two conditions together may be a challenge since certain selective serotonin reuptake inhibitors (SSRIs) may exhibit the interactions with agents used in endocrine therapy for breast cancer.

We report a case of a 49-year-old menopausal woman who was diagnosed with major depressive disorder 4 years ago after she has been divorced. Last year she was diagnosed with estrogen receptor-positive invasive breast cancer and underwent treatment with surgery, followed by radiation therapy. Currently, she is being administered with endocrine therapy with letrozole, which is aromatase inhibitor.

The cancer was a trigger for onset of Recurrent Depressive Disorder, so she was admitted on the clinic. Current episode is severe, including lowering of mood, reduced self-esteem and self-confidence, present ideas of guilt and worthlessness, disturbed sleep and diminished appetite, without psychotic symptoms. She was treated with SSRI paroxetine for depression, without significant side effect but it seems to have placebo effects. The psychiatrist considers switching the patient from current antidepressant to another one from the same group, escitalopram. Before doing so, psychiatrist consults the oncologist about the endocrine therapy that is being currently used. The reason behind is the fact that aromatase inhibitors (letrozole) may potentially inhibit the activity of cytochrome P450 liver enzymes, and subsequently alter the pharmacokinetics of coadministered drugs. In this case, combination of escitalopram with letrozole may increase the plasma concentration of the antidepressant, thus resulting with serious side effects such as arrhythmias, as well as serotonin syndrome.

Therefore, we emphasize the importance of drug interaction thinking during coadministration of aromatase inhibitors with SSRIs, and the effectiveness of multidisciplinary clinical approach to the treatment of depression in breast cancer patients.

CONTACT: irnis_bisco@hotmail.com

Adult neurogenesis and its potential for recovery of neurodegenerative diseases

Lidija Stošić, Eni Tomović, Melanie Tepuš
University of Rijeka, Department of Biotechnology, Rijeka, Croatia

Neurogenesis is the process of neuronal birth and proliferation. Contrary to the old belief that neurogenesis ceases after embryonic development, today scientists know that hippocampal neurogenesis is present in adult humans as well. The question is whether adult neurogenesis has functional significance, and if it does, could it be enhanced? Here we review major advances in understanding questions related to adult neurogenesis while focusing on the enormous potential adult neurogenesis has in contributing to the recovery and plasticity of the CNS.

The source of the newly generated cells are so called neural stem cells which remain active only within the subgranular zone (SGZ) and the subventricular zone (SVZ). Researchers at the University of Auckland studied post-mortem brains of people with Huntington's disease (HD). They examined nine HD patients at the age ranging from 41 to 74. The control was six neurologically normal cases. Tissue samples were examined with the neuronal marker called βIII-tubulin, the cell cycle marker proliferating cell nuclear antigen, and the glial cell marker called glial fibrillary acidic protein.

The result was evidence of increased numbers of neural progenitor cells in the HD human brain. Furthermore, they found an interesting correlation – the ones who had the most neural progenitors were the ones with the most severe stages of HD.

This evidence suggests that newly generated neurons are trying to compensate for the neural damage. Although this increase in neurogenesis is insufficient to compensate for the progressive cell loss, the potential for cell renewal exists (if the potential for an endogenous neural replacement could be increased with the use of exogenous factors such as neuronal growth factor (NGF). There is a possibility that NGF can stimulate neuronal regrowth, resulting in neurogenesis having more impact on existing neural damage.

CONTACT: melanie.tepus@gmail.com

The Frequency of Depression and Anxiety at Multiple Sclerosis Patients

Armin Hadžidedić[1], Nadina Joldić[1], Ilvana Rabotić[1], Osman Sinanović[2]
[1]University of Tuzla, Faculty of Medicine, Tuzla, Bosnia and Herzegovina
[2]University Clinical Center Tuzla, Department of Neurology, Tuzla, Bosnia and Herzegovina

Depression and anxiety are the most common psychiatric disorders which can be found in MS patients at frequency of 50%. Aim of this research is to determine frequency of depression and anxiety in people suffering from MS in relation to age, gender, and duration of the disease.

Prospective study included 64 subjects, out of which 32 with MS diagnosis and 32 subjects as part of the control group. Inquiry was done in the Association of MS Patients in Tuzla Canton, in a time period from 16th of January to 3rd of February. Becks inventor of anxiety and Becks inventor of depression were used for the research. Statistical softwares as Graphpad Prism, ANOVA test and t-test with single and double direction, were used for calculating group differences.

42 women and 22 men (2:1) were included in the research with equal distribution among both groups of subjects. Average age of people suffering from MS is 46.78 (SD 10.33), and in the control group the average age was 48.19 (SD 11.87); ($p>0.5$). Average depression in people with MS was: 4.9/56.25%, 17.3/9.4%, 23.7/18.75%, 39.4/15.6%; whereas within the control group it was: 4.6/90.6%, 16.33/9.4; which holds a statistically significant difference ($p<0.001$). There is a noticeable difference in amount of anxiety between the control group (5.4/68.8%, 12.7/12.5%, 20.3/18.7%) and people with diagnosed MS (8/6.25%, 12.8/15.6%, 20.9/40.6%, 41.8/37.5%; $p=0.0001$), while there is no difference in terms of men and women with MS diagnosis ($p>0.05$). By comparing the duration of disease with frequency of depression no statistically significant difference is noticeable ($p>0.05$), while in terms of anxiety it is significant ($p=0.01$) and most noticeable in subjects suffering from the disease 11-20 years back (34.3/43.75%).

Results of this study point to a significant amount of depression and anxiety in MS patients.

CONTACT: armin.hadzidedic@hotmail.com

The Paradox of Psychopathy

Sanela Hadžić, Ismir Kukić, Eldina Mahmuzić
University of Tuzla, Faculty of Medicine, Tuzla, Bosnia and Herzegovina

According to World Health Organization, psychopathy represents highly incorporated, badly adjusted behavior that usually manifests since childhood or adolescence and continues throughout adulthood, although that specific behavior becomes less obvious in elderly life. Psychopathy, as any other psychiatric condition, unfortunately has a long history of stigmatization.

The aim of our work is to break the myth. Unfortunately, psychopaths are mostly seen as bad and dangerous people, and we hope that at least we could make people see the other aspect of psychopathy.

Our research is based on accessible literature and review of studies on antisocial personality disorder and psychopathy.

According to some estimates, psychopathy is found in about 1% of the general population. Contrary to popular belief, only a minority are violent, and because studies seek out psychopaths in prisons, many focus on only convicted criminals. Other researchers suggest that many psychopaths are very successful people using their psychopathic traits to achieve professional success. More recently, researches have speculated that people with pronounced psychopathic traits may be found disproportionately in certain professions.

Successful psychopathy is a controversial idea and presents paradoxical condition. It's tempting to see psychopathy as black and white, but researches are suggesting that the condition occurs on a spectrum. It's possible to have minor psychopathic tendencies, or even more moderate or severe characteristics. From our research we could conclude that there are many psychopathic individuals who are successful interpersonally and occupationally precisely because of some psychopathic traits.

CONTACT: childintime.moi@gmail.com

Correlation between size of decompressive craniectomy and survival outcome in patients with severe traumatic brain injury

Belma Mešević[1], Ermin Silajdžić[1], Amra Novalić[1], Mersad Baručija[2]
[1]University of Sarajevo, Faculty of Medicine, Sarajevo, Bosnia and Herzegovina
[2]University Clinical Center Sarajevo, Clinic for Neurosurgery, Sarajevo,
Bosnia and Herzegovina

Decompressive craniectomy (DC) is the salvage treatment in patients with increased intracranial pressure (ICP) which did not respond well enough to conservative or other operative treatments. Beginnings of DC are in Neolithic period, when first trepanning or making a burr hole was used in human healing. DC, as we know it today, was first performed in 1977. Today's recommendation is opening with a diameter bigger than 10 cm.

Our aim was to determine correlation between size of craniectomy and survival outcomes in patients with severe brain injury treated between 2013 and 2016 in Neurosurgery Clinic (UCCS). We expect that, both, increase in antero-posterior (AP) diameter and reduction of the distance between temporal base and lower edge (BE distance) of the craniectomy will improve survival.

We included 20 patients in this retrospective study, excluding criteria were: patients who had DC for a reason other than trauma, death before the first postoperative computed tomography (CT) scan (due to inability to measure craniectomy size), bilateral craniectomy as first procedure. Using the first postoperative CT, AP diameter and BE distance were measured. We used Student's t test and Point Biserial correlation to determine link between these parameters and survival.

Average AP diameter was 12.02 cm. More than two thirds of patients with bigger AP diameter survived. Average BE distance was 9.95 mm, 58% of patients with smaller BE distance survived. P1 value, for correlation between AP diameter and survival, was 0.0428 in both tests. Results for correlation between BE distance and survival were P2 0.026. These results indicate that HA should be accepted, and that there is significant correlation between AP diameter and survival rate. They also indicate that reduction of BE distance improves survival. We think that standard craniectomy size should be bigger than 12 cm, and BE distance less than 10 mm.

CONTACT: belma.mesevic@gmail.com

Murine cytomegalovirus as a cellular re-engineer of BV-2 microglial cells

Eliša Papić[1], Valentino Rački[2], Natalia Kučić[2]
[1]University of Rijeka, Faculty of Medicine, Rijeka, Croatia
[2]University of Rijeka, Faculty of Medicine, Department of Physiology and Immunology, Rijeka, Croatia

Microglial cells are the residential phagocytic cells in the brain, originating from the same progenitors as peripheral macrophages. They perform various macrophage-like functions like phagocytosis, antigen presentation and damaged tissue repair. They possess several activation states, depending on various stimuli, from a ramified, resting shape in a healthy brain, to a more condensed, activated form in a brain exposed to endogenous or exogenous stimuli. Homeostasis disruption leads to the adaptation of morphology and function, suited to the causal stimuli. It has widely been established that they separate themselves into M1 and M2 phenotypes depending on these stimuli, however further studies point out even more types that are still being characterized. The aim of our study is to determine how the murine cytomegalovirus (MCMV) infection affects the microglia in both form and function.

Our in-vitro studies are based on the BV-2 microglial immortalized culture. We used the method of immunofluorescence and light microscopy to observe the effects of MCMV on the cell line. Markers used were Arginaze-1 and CD206 for M2, while iNOS and CD16/32 measured M1 activity. HIF-1α was used as a marker of metabolic activity. The cells were analyzed after 24h and 48h of infection.

Infected cells changed their morphology from ramified to amoeboid. Likewise, infected cells had a higher expression of M1 markers over M2, measured by immunofluorescence. There were no significant differences in both times of infection.

Our results indicate that the MCMV modifies both the morphology and phenotype of microglial cells, causing them to subtly shift to a M1, pathogen killing, phenotype.

CONTACT: codeicarus@gmail.com

Marin Lakić[1], Joško Glavić[2]
[1]University of Mostar, Faculty of Medicine, Mostar, Bosnia and Herzegovina
[2]Polyclinic "Glavić", Dubrovnik, Croatia

The duration of rehabilitation after stroke and severe head trauma, using conventional physical therapy, sometimes takes several years.

The aim of this research is to present the most sophisticated robotic devices that have unlimited neuro feedback and they are more effective in the treatment of certain neurological disorders. This paper describes two cases which are: stroke in seven year old girl and head trauma in adult person tended with quadriplegia.

Therapeutic treatments were performed in the clinic in Dubrovnik using robots: LOCOMAT and ARMEO SPRING. In the moment of therapy robot is controlling and have body-weight support, intuitive user interface, adjustable robotic gait orthosis and most important, unlimited neuro bio-feedback.

In case of trauma this person started 3 month rehabilitation programme with ArmeoSpring. He was a quadriplegic person. After 3 month therapy with ArmeoSpring he can completely rely on his hands. Before robotic treatment he used the treatments of physical therapy for three years without results.

In case of stroke (7 year-old-girl), she lost movement and speech. After neurorehabilitation with this robotic devices, she began to write with her left hand and she was right-handed person. She can normally walk, jump, write and talk. Before robotic treatment, she used the treatments of physical therapy on department intensive health care for 2 years.

Robot-assisted therapy enables effective and intensive training and ensures the optimal exploitation of neuroplasticity and recovery potential. There is unlimited neuro and biofeedback. Compared with conventional therapy and physical medicine robotic therapy reduces treatment time and utilization of brain plasticity is maximum.

CONTACT: m.lakic.du@gmail.com

A case of Progressive Supranuclear Palsy

Svetlana Tomić, Jelena Rnjak, Matea Podgornjak
Josip Juraj Strossmayer University of Osijek, Faculty of Medicine,
Osijek, Croatia

Progressive supranuclear palsy belongs to a group of neurological disorders called Parkinson plus syndromes. It features classical signs of Parkinson's disease, but it also has a poor response to the standard treatments for Parkinson disease and a poor prognosis. Some signs of Progressive supranuclear palsy are early onset of dementia, postural instability and hallucinations, ocular signs involving impaired vertical gaze, nystagmus, blepharospasm and apraxia of eyelid, pyramidal tract signs, postural hypotension and urinary incontinence, motor apraxia and symmetry of signs in early stages of the disease. The hummingbird sign, noted on MRI in these patients, refers to the atrophy of the midbrain. There is no effective way to stop the progressive course of disease, but drugs can help relieve symptoms.

We report a case of a deceased patient who suffered from Progressive supranuclear palsy. Patient was observed and treated in Clinic for Neurology, University Hospital Center Osijek. Upon diagnosis of Parkinson's disease in 2003, the patient continued to show signs of progressive postural instability, impairment of vertical gaze and horizontal nystagmus. Patient initially responded to levodopa and dopamine agonists, but the response decreased over time. Patient developed incontinence, impairment of speech, impairment of gaze in all directions and apraxia of eyelid. Neurological examinations were realized to confirm diagnosis of Progressive supranuclear palsy. The course of disease was complicated with development of renal failure, which with progression of existing neurological symptoms led to patient's death in 2013.

Diagnosis of Progressive supranuclear palsy is purely clinical and the optimal treatment has not been established yet. Correct diagnosis can only be obtained by following the course of disease, which can take several years. Current therapy is centred around a multidisciplinary treatment of symptoms. The additional features of the disease may respond to medications not used in PD.

CONTACT: jelena.rnjak@gmail.com

Evidence-based sound therapy: Developing a new model using the Golden ratio and EEG waves

Maja Ploh[1], Eliša Papić[1], Valentino Rački[2], Dalen Bernaca[3], Andrea Andrijašević[3], Natalia Kučić[2]
[1]University of Rijeka, Faculty of Medicine, Rijeka, Croatia
[2]University of Rijeka, Faculty of Medicine, Department of Physiology and Immunology, Rijeka, Croatia
[3]University of Rijeka, Faculty of Engineering, Rijeka, Croatia

Neurofeedback (NFB) is a type of biofeedback that uses real-time displays of brain activity — most commonly electroencephalography (EEG). Typically, sensors are placed on the scalp to measure activity, with measurements displayed using video displays or sound. Research show neurofeedback may be a potentially useful intervention for a range of brain-related conditions. Main aim of our research is to compare neurofeedback effects on human subjects while listening Golden ratio sound sample (Bach's fugue) and sound patterns created by our prototype software, based on EEG waves, in order to establish the model for evidence-based sound therapy.

Research started in 2016 and included 21 healthy respondents of different age (52-74 years old) and sex, divided into two experimental groups (n1=7, n2=7) and one control group (n3=7). Experimental groups were tested for neurofeedback response on Golden ratio sound sample (Bach's fugue) and sound patterns based on human EEG waves, while control group was tested for neurofeedback response in silence, during one minute of measurement. In order to record EEG samples and create database, as well as to measure and analyse neurofeedback effects it was used Biopac Pro system. For EEG wave samples sonification we developed our own software, based on correlation between sequence of sound samples and brain wave amplitude range. For statistical analysis it was used MS Excel and Statistica for Windows.

Results reveal amplitude (voltage) range widening and increased median voltage value while listening Golden ratio sound sample and EEG-based sound sample, remarkable in all respondents. Both stimuli show effects on stimulating brain activity in form of periodic peak patterns in EEG recordings.

Interpretation of preliminary research results show that used stimuli can be used for inducing evoked potential activity and can be used as a prototype for evidence-based sound therapy, but research must be previously expanded on larger number of respondents.

CONTACT: maja.ploh95@gmail.com

Neuropsychiatric disorders in patients with impaired thyroid function

Amila Muhić[1], Irfan Gljiva[1], Rubina Alimanović - Alagić[2]
[1]University of Sarajevo, Faculty of Medicine, Sarajevo, Bosnia and Herzegovina
[2]University Clinical Center Sarajevo, Clinic for Nuclear Medicine and Endocrinology, Sarajevo, Bosnia and Herzegovina

Patients with neuropsychiatric disorders accompanied by other diseases more often visit clinicians and have need for more specialized interventions and hospitalizations. Recent studies have led to an improved understanding of the thyroid hormones impact on the brain and the pathophysiology of psychiatric disorders. The aim of the study was to determine the occurrence of various neuropsychiatric disorders in patients with impaired thyroid function.

A cross-sectional study was conducted at Clinic for Nuclear Medicine and Endocrinology, University Clinical Center Sarajevo. The study included 200 patients (92.1% female, 7.9% male, mean age 49 ± 12). Data were extracted from the hospital records in two weeks period. Statistical analysis was done using SPSS 16.0. Values of $p<0.05$ were considered statistically significant.

Regarding the thyroid disorder, 76.8% had hypothyroidism, 12.0% had hyperthyroidism, 10.3% of the cases were with nodular changes and 0.9% were thyroid carcinoma patients. 2% of hyperthyroid had bipolar affective disorder, 3% of hypothyroid patients had schizophrenia and 10.3% of all patients had simultaneously two psychiatric disorders. There was no statistically significant difference in occurrence of insomnia episodes, headaches and depression in hypothyroid and hyperthyroid patients. There was a statistically significant difference ($p=0.001$) in occurrence of tremor episodes between the hypothyroid and hyperthyroid group. Statistically significant positive correlation ($rho=0.418$; $p<0.0004$) was found between hyperthyroidism and anxiety episodes.

Compared to males, females are more likely to have thyroid disorder. Clinicians have to be aware of the possible underlying psychiatric disorder in subjects with any thyroid disorder. Neuropsychiatric symptoms may be the first symptoms of impaired thyroid function.

CONTACT: amila.muhic@hotmail.com

Executive functions and learning disabilities in children with mild intellectual disability

Katarina Matić, Marija Milošević
University of Belgrade, Faculty of Special Education and Rehabilitation, Belgrade, Serbia

Executive functions represent a complex set of functions such as inhibition, shifting and working memory. All of these functions are a part of prefrontal brain cortex, and they develop from early childhood trough the adolescence. They represent an important factor of learning and memory. Deficits in executive functioning can cause learning disabilities and difficulties in academic performance.

The aim of this study was to determine the correlation between executive functioning and learning disabilities in children with mild intellectual disabilities.

Executive functions were assessed with Behaviour Rating Inventory of Executive Function (BRIEF) which consists of Behavioural Regulation Index and Metacognition Index; while learning disabilities were assessed by Teachers questionnaire. The research included 30 children with mild intellectual disability, aged 9 to 11 with an equal number of female and male examinees. All of the assessing material was filled out by their teachers.

Research results have shown that Global Executive Composit highly and statistically significant correlates with reading/writing disabilities ($r=-0.652$, $p=0.00$); mathematics ($r=-0.624$, $p=0.00$); attention/memory/organisation ($r=-0.751$, $p=0.00$); nonverbal learning disabilities ($r=-0.710$, $p=0.00$).

These results have shown a significant correlation between executive functioning and learning disabilities in children with mild intellectual disability.

CONTACT: matick992@gmail.com

Aphasiology: towards the interdisciplinary approach to language disorders

Aleksandra Krstić
University of Novi Sad, Faculty of Philosophy, Novi Sad, Serbia

Aphasia is a speech-language disorder caused by a certain damage to the brain. The severity of aphasia varies, it is not a mental disability, it is treatable and manageable.

Word order perception and production is often impaired in aphasia. Thus, seven aphasic subjects (3 female and 4 male individuals) participated in the research on word order in aphasia, all of which are native Serbian speakers, involved in speech therapy at least 3 months after stroke.

The aim of this research was the linguistic analysis of spontaneous speech in two individuals with Broca's aphasia, focusing on the word order production, as well as testing the word order abilities in five individuals with Wernicke's aphasia through controlled linguistic tasks.

Word order was examined at the sentence level (always with a context provided), following the treatment programme Verb Production at the Word and Sentence Level (Bastiaanse, Jonkers, Quak, & Varela, 1997), and using three syntactic tests (i.e. sentence anagrams, sentence-picture matching and paraphrasing). Spontaneous speech was elicited and analysed with respect to verbs, nouns, and utterance length.

All subjects showed certain level of difficulty with the word order perception in different contexts. The production was controlled with more ease. Subjects with Broca's aphasia showed problems with both verb perception and production.

Putting the linguistic knowledge about the aphasic speech into practical use in treatment is the main goal of the initial research questions. Using language for the localization of the issues in the brain, for further classification of aphasia in Serbian, as well as for developing speech therapy apps available for a wider audience might serve a stepping stone in the cross-field neuroscientific research.

CONTACT: krstic.aleksandra018@gmail.com

Poster Session

What do we need to know about migraine?

Marija Krpina, Andrej Belančić
University of Rijeka, Faculty of Medicine, Rijeka, Croatia

Migraine is a common and highly disabling primary headache affecting 14.7% of the population. Episodic migraine is defined as a recurrent headache disorder manifesting in attacks lasting 4 to 72 hours and fulfilling at least two of the following criteria: unilateral location, pulsating quality, disabling intensity, nausea and/or photophobia and phonophobia. Furthermore, chronic migraine is defined as a complication of episodic migraine with the patient suffering from at least 15 headache days per month for more than 3 months, bearing the features of migraine on at least 8 days per month (Headache Classification Committee of the International Headache Society 2013).

There are several theories that describe the pathogenesis of migraine. Vascular theory is associated with abnormal vasodilatation due to reduced concentration of serotonin. Neural theory points out the activation of the contralateral nucleus raphe and locus ceruleus as the possible trigger for the migraine attack. The most accurate of all is neurovascular theory that connects the neural and vascular elements and brings them into connection with a reduced concentration of serotonin. 5-HT 1d and 5-HT 1b receptors are mostly located in the cerebral arteries and they control presynaptic serotonin secretion. In a migraine attack serotonin is released into plasma from the platelets and its degradation products are eliminated through urine. Consequently, it leads to abnormal vasodilatation, the occurrence of painful stimuli (release of substance P and calcitonin gene related peptide-CGRP) and to their transmission among the trigeminal system.

Migraine treatment includes both preventive therapy and acute therapy for aborting attacks. Abortive therapy can be classed as non-specific (NSAIDs) and specific (ergot derivatives, triptans-serotonin 1d/1b receptor agonists). Moreover, migraine pharmacology field has experienced few advances recently and several new agents are nearing or have already entered the clinical trial phase (CGRP antagonists, serotonin 5-HT 1f agonists, glutamate receptor antagonists, nitric oxide synthase inhibitors).

CONTACT: mkrpina1102@gmail.com

Role of oxidative stress in behavioral sensitization to psychostimulants in Drosophila

Sabina Al-samarai, Josipa Kolobarić, Ana Filošević,
Rozi Andretić Waldowski
University of Rijeka, Department of Biotechnology, Rijeka, Croatia

Psychostimulants affect aminergic transmission causing neuroadaptive changes in brain function, commonly known as neural plasticity. Sensitivity (acute response) and sensitization (chronic response) are two behavioral phenotypes that can be objectively measured and are relevant for the understanding of neuroplastic changes induced by drug taking.

Here we present new high-throughput assay for measuring sensitivity and behavioral sensitization in Drosophila, with significant advantages over the previously described method. This assay allows us to compare population and individual locomotor responses using Drosophila activity monitoring system (DAMS) before and after administration of volatilized psychostimulants cocaine (COC) and methamphetamine (METH). We show that fly's sensitivity to acute dose of METH and COC differs in the range of concentrations that induce dose-dependent increase in locomotion. Likewise, METH and COC differ in the range of time intervals for development of locomotor sensitization. Two administrations of 75 μg of volatilized COC will induce behavioral sensitization when given more than 3 but less than 12 hours apart, while for METH time between two exposures must be between 8 and 12 hours. We show that the mechanisms regulating oxidative stress interact both with mechanisms of sensitivity and sensitization to psychostimulants. Oxidative stress increases sensitivity to COC and METH and extends duration of their activating effects while blunting the response to the second dose.

Interaction between reactive oxidative species production and changes in sensitization to psychostimulants would suggest potential new venues for dietary interventions to combat addictive effects of drug taking.

CONTACT: sabina.alsamarai@gmail.com

Cross-sectional study: Stereotypes and prejudice against people suffering from schizophrenia among young people and adults

Andrijana Mišković[1], Krešimir Šantić[1], Marta Okružnik[1], Dunja Degmečić[1,2]
[1]Josip Juraj Strossmayer University of Osijek, Faculty of Medicine, Osijek, Croatia
[2]University Hospital Center Osijek, Department of Psychiatry, Osijek, Croatia

Stigma is a perceived negative attribute that causes someone to devalue or think less of the whole person.

There were three lectures in three institutions (Medical Faculty of Osijek, The Faculty of Economics Osijek and Medical School Osijek) with an aim to destigmatize mental illness, in our case, schizophrenia. We did an anonymous survey on 143 participants aged 18 to 41 years. In order to compare the empathy and attitudes of participants, if there is any difference, the survey of 12 questions (the answer was noted from 1 to 5 point scale) was conducted before and after the lecture.

In thesis do participants empathize with the current state of the patient with schizophrenia, the most common answer was that they do not care (grade 3) 34.97% (N = 50), while after the lecture empathy showed (grade 5) 30.07% (N = 43) of
participants.

"People with mental illness are unable to achieve and keep their job", they neither agree nor disagree (grade 3), 48.95% (N = 70), while the evaluation survey shows the most common answer was fully "I do not agree" (score 1) 36.36% (N = 52). "People with mental illness can be significant for the society", the most common answer in the first survey is "Agree" (grade 4) 42.66% (N = 61), while in the second answer was "Strongly agree" (grade 5) 39.86% (N = 57). "People with mental illness can perform tasks as good as most people", an answer was generally "Agree" (score 4) 40.56% (N = 58), while in the second survey answer was "I completely agree" (grade 5) 59.44% (N = 85).

By comparing the results, we conclude that the today´s high school and academically educated society is open to learn and change their attitudes about the stigmatization of vulnerable groups, in our case, people with schizophrenia.

CONTACT: andrijana.miskovic1@gmail.com

Parkinson plus syndrome (Corticobasal degeneration)

Robert Rončević, Vedran Vizler, Svetlana Tomić
Josip Juraj Strossmayer University of Osijek, Faculty of Medicine, Osijek, Croatia

Parkinson plus syndromes compose of a group of neurodegenerative diseases that are characterised by parkinsonian symptoms with additional features and reduced response to dopaminergic drugs. There are several subtypes of Parkinson plus syndrome: progressive supranuclear palsy (PSP), multiple system atrophy (MSA) and corticobasal degeneration (CBD).

Corticobasal ganglionic degeneration is a rare neurological disorder that involves cerebral cortex and basal ganglia. Prevalence of CBD is estimated at 4.9 to 7.3 per 100 000 people. Disorder is characterised by marked unilateral parkinsonism, aphasia, apraxia and alien hand syndrome. MRI of CBD typically shows unilateral brain and brain stem atrophy. Diagnose is mainly clinical based on the pattern of symptoms and MRI.

We report a case of a 63-year old female patient that was admitted with symptoms of left hemidystonia started 2 weeks before hospital admission. Brain MRI showed pronounced generalized atrophy of the brain tissue. The therapy of anticholinergic biperidin showed slight therapeutic response. Further examination excluded Wilson's disease. Patient was discharged with diagnosis of nonspecific dystonia and underwent physical therapy with some improvement.

After three months, patient reported increased left extremities stiffness and involuntary arm movements. Based on anamnesis and clinical examination ''alien limb'' was diagnosed. Moreover, within clinical examination motor apraxia of both arms, as well as oromandibular dyskinesia were diagnosed. SPECT scintigraphy showed reduced accumulation of radiopharmacs in right putamen with normal accumulation in left putamen and both nuclei caudatus. Levodopa agents and dopaminergic agonists were administered, however no therapeutic response was observed. Specific clinical presentation (significant unilateral rigidity, ''alien limb'' and apraxia), SPECT finding with poor treatment response lead to obvious diagnosis of Parkinson plus syndrome type corticobasal degeneration.

Therefore, we emphasize the importance of thorough physical examination and additional imaging diagnostics of neurodegenerative diseases, especially when they are rare for they can be easily overlooked.

CONTACT: robert.roncevic27@gmail.com

School phobia as a prodromal symptom of psychotic disorders

Nadija Gačo[1], Daniela Petrić[2]
[1]University of Rijeka, Faculty of Medicine, Rijeka, Croatia
[2]University Hospital Center Rijeka, Department of Child and Adolescent Psychiatry, Rijeka, Croatia

School phobia is an irrational neurotic fear that is caused by school activities and is manifested by avoidance of daily school duties and attendance. The incidence of the disease is 0.4% to 1.5% in ages of 5 to 17 years old. It most commonly appears in single children, which are spoiled and over-protected. The overwhelming feeling in these children are helplessness, low self-esteem and fear of failure, which all lead to an avoidance of risky situations. This state causes a so-called vicious circle of anxiety, as the fear keeps increasing with each exposition to these risky situations (e.g. going to school).

We present a case report of a 13-year-old girl that had clear neurotic and psychotic symptoms which required medicament and psychotherapeutic treatment. Her clinical symptoms were dominated by separation anxiety and school avoidance, along with psychotic symptoms like derealisations, elementary auditory hallucinations and paranoia. It is important to note that the patient had positive heredity for schizophrenia, which puts her at a greater risk of psychotic diseases. The treatment consisted of atypical antipsychotic risperidone and sertraline, a selective serotonin reuptake inhibitor (SSRI), along with individual, family and art psychotherapy. This combination led to a complete withdrawal of symptoms within two months of starting treatment.

Even though the symptoms subsided, the patient still has occasional mild psychotic episodes, which signifies the importance of following such patients throughout their development to prevent further complications.

CONTACT: nadija.gaco@gmail.com

Add-on Bevacizumab in treatment of newly diagnosed Glioblastomas

Katharina Marić
University of Rijeka, Department of Biotechnology, Rijeka, Croatia

Glioblastoma (GBM) is the most frequent malignant lethal brain cancer with an incidence of 2-3 new cases per 100 000 people/year in Europe. Causes are unknown and although there's no specific symptoms, signs might be headaches, personality changes, etc. Options for patients are now limited but better treatment is expected in near future due to progress with molecular targeting methods in drug development. Bevacizumab (Avastin) is humanized monoclonal antibody; a tumor-starving drug. Normal cells make VEGF but GBM cells have an increased expression of VEGF. Bevacizumab specifically binds VEGF and prevents its interaction VEGFR-1 and VEGFR-2 on the surface of endothelial cells, thus preventing growth of blood vessels and stopping blood flow to the tumor.

In 2016 a group of scientists in Japan conducted AVAglio study to research effects of Bevacizumab on 69 newly diagnosed patients by analysing the progression-free survival (PFS) and overall survival (OS) using the Kaplan-Meier method. Study was made on three groups of patients by type of treatment. Patients from all three groups underwent standard temozolomide treatment and concurrent radiotherapy along with partial surgical removal of the tumor for the first two groups and gross total removal for third. Additionally, first group was given Bevacizumab. PFS rate of type I patients was notably higher than that of type II patients, but similar to that of type III patients. OS median in type I patients was ~8 months higher than that of type II patents. Type I patients lived 17.4 months on average while type II patients lived around 9.8 months.

In conclusion, add-on Bevacizumab can prevent early clinical deterioration of both pr-GBM and nd-GBM patients. The goal of the research was to prolong survival and quality of patients lives which suffer from this rapidly progressive disease.

CONTACT: katharinamaric5@gmail.com

Immunohistochemical analysis of pleomorphic xanthoastrocytoma: case report and literature review

Sajra Vinčević[1], Ilhana Šestić[1], Nurija Bilalović[2]
[1]University of Sarajevo, Faculty of Medicine, Sarajevo, Bosnia and Herzegovina
[2]University Clinical Center Sarajevo, Department of Clinical Pathology and Cytology, Sarajevo, Bosnia and Herzegovina

Pleomorphic xanthoastrocytoma (PXA) is an uncommon tumour of the central nervous system (CNS). It occurs in less than 1% of all central nervous system (CNS) neoplasms. PXA typically develops in children and young adults, with no predilection for males or females. It usually develops in the superficial cortex, especially in the temporal lobes and meningeal involvement.

A 49-year-old male presented with headache, nausea and cognitive affliction. MRI showed a tumour in the left hemisphere of the brain in the temporal-occipital region with the characteristics of high-grade glioma. A sample of tumour tissue was extracted. It was 5x5x3 mm in size, irregular in shape, of medium to soft consistency and light grey in colour.

After the initial pathohistological analysis, differential diagnosis included diffuse astrocytoma, rhabdoid glioblastoma and epithelioid glioblastoma. Immunohistochemical staining showed positivity to GFAP, Olig-2, INI-1, p53 and Ki67 was positive in 2% of the cells. Further immunohistochemical analysis also showed positivity to CD34, S100, Vimentin and BRAF V600E mutation. Gomori staining showed reticulin fibers.

Based on the initial examination of the patient and morphology of the tumour found during the pathohistological analysis, the first impression was that of an epithelioid glioblastoma. However, due to the presence of reticulin fibers, strong CD34 immunoreactivity as well as the very strong positivity of BRAF V600E mutation, the tumour was interpreted in first line as pleomorphic xanthoastrocytoma.

CONTACT: sajra.vin@gmail.com

Pathological gambling in Parkinson's disease – case report

Ante Prpić[1], Andrea Radolović[1], Matija Sošić[2,3], Olivio Perković[2,3]
[1]University of Rijeka, Faculty of Medicine, Rijeka, Croatia
[2]University of Rijeka, Faculty of Medicine, Department of Neurology, Rijeka, Croatia
[3]University Hospital Center Rijeka, Clinic for Neurology, Rijeka, Croatia

Pathological gambling (PG) is a behavioral disorder characterized by persistent and recurrent maladaptive gambling. PG is considered as an impulse control disorder (ICD) that combines impulsive and compulsive features, namely repetitive gambling and impaired inhibition of this negative behavior.

ICDs like pathological gambling are recently being increasingly recognized in patients affected by Parkinson's disease (PD). In PD patients, PG occurs in relation to the use of mainly dopamin agonists and to a lesser extent levodopa. The risk for developing PG is increased when accompanied with other risk factors like male gender, young age of onset of PD, previous personal or family history of gambling, alcohol and/or substance abuse.

Several studies suggest that the dysfunction of the orbitofrontal cortex, anterior cingulate cortex amygdala, insula and ventral striatum are often found in PG and that the alteration of dopaminergic stimulation might impact individuals' vulnerability for impulsivity and increase the risk for development of PG in PD. The largest prospective study on PD patients demonstrated that point prevalence of PG can be as high as 5% and, nonetheless, PG is still frequently under-reported as many patients have reduced insight into social consequences of their behavior.

We present the case of a 68-year-old man with later-stage PD, characterised by abundant motor and non-motor symptoms, who developed drug induced pathological gambling as a complication of PD treatment with dopamin agonists.

Even though the reduction of dopamin agonist dosage has shown to improve this abnormal behaviour, several therapeutic approaches have left our patient resistant to the alleviation of this specific and potentially devastating symptom for the patient and the patient's family.

CONTACT: ap.prpic@gmail.com

Legal status and position of persons with psychiatric disturbances who have committed a felony

Nikolina Grbavac[1], Sanja Zagrajski[2]
[1]University Hospital Centre Zagreb, Zagreb, Croatia
[2]Osijek County Court, Osijek, Croatia

Most persons with mental illnesses can't decide for themselves and this can violate persons human rights or even their patients rights and adequate health care. That is why there is a saying that the measure of democratism in a society is the society's relation to persons with psychiatric disturbances. The delicate matter, in this case, is also the legal action taken against persons with psychiatric disturbances after they committed a felony in an insane state. Society realizes and accepts that persons in an insane state can't be guilty of their actions and therefore the sentence can't be stated. Simultaneously the society is well aware that there is a great danger of committing a same or similar felony. Also, we have to consider the needs of persons that were harmed in any way with this action. On the other hand, these persons that have committed this action are in a state of insanity and they need the protection and help from the society and most important appropriate medical attention.

The care for persons with psychiatric disturbances that have committed a felony has to consider medical field as much as law and justice system, therefore the cooperation between these experts is essential. The case described is a case of a person in an insane state caused by acute psychosis who committed a felony. Expert analysis concluded that there is a high possibility of repeating the same or worse actions. Nevertheless, the patient was during the whole legal procedure in freedom and with no medical attention. In the end, there is a question is there any legislative regulation that enables adequate and prompt medical care for this part of the population and is there any possible and probable improvement in this field.

CONTACT: nikolina.grbavac91@gmail.com

Workshops

Infections of the Central Nervous System

Đurđica Cekinović
University Hospital Center Rijeka, Clinic for Infectious Diseases, Rijeka, Croatia

Infections of central nervous system (CNS) are caused by viruses, bacteria, fungi and protozoa. Clinical presentation of infection can be acute, subacute and chronic, depending on the pathogen and localization of the inflammatory process. Clinical syndromes which result from CNS infection include acute meningitis (aseptic or bacterial), subacute/chronic meningitis, acute or chronic encephalitis, space-occupying lesion syndrome, toxin-mediated syndromes, encephalopathies accompanied by systemic infections, post-infectious disease syndrome and slow viral infections. Symptoms of CNS infections vary depending on the exact syndrome, but most significant are fever, headache, altered mental status, positive meningeal signs and focal neurological deficits. Diagnosis is based on biochemical, cytological and microbiological analysis of cerebrospinal fluid (CSF). Yet, nowadays more helpful in diagnosing specific clinical syndromes in CNS infections are imaging studies such as magnetic resonance and computerized tomography. Etiological diagnosis includes cerebrospinal fluid culture, indirect serologic testing of serum or CSF fluid and molecular analysis. Clinical outcome of CNS infection significantly relies on appropriate antimicrobial and supportive therapy. Antimicrobial therapy includes broad spectrum antibiotics, antiviral therapy, and antiparasitic chemotherapeutics, while supportive measures are directed primarily toward intracranial pressure reducement and preventing brain edema. Nevertheless, complications are still very frequent and death outcome remains unexpectedly high. Therefore CNS infections still represent medical emergency and their prompt diagnosis and adequate treatment affect notably the disease outcome.

CONTACT: durdica.cekinovic@medri.uniri.hr

Psychiatric emergencies

Igor Salopek
General Hospital Karlovac, Department of Psychiatry, Karlovac, Croatia

Among many medical emergencies, psychiatric emergencies are mostly known as casuistries. Medical professionals that are part of outpatient or inpatient rapid response teams have to deliver appropriate emergency psychiatric care. Psychiatric emergencies are defined as conditions that threaten the psychophysical integrity of the individual or their surrounding and they are caused by acute exacerbation or exacerbation of chronic psychiatric disorders. Primarily this considers suicidal tendencies, auto- and hetero-aggressive behavior and crisis situations that include serious mood, thought or behavior disturbances. Treatment of these conditions requires pharmacological and psychotherapeutic approach, in some cases even an involuntary psychiatric hospitalization. In these cases, patient's dignity has to be considered and their rights can't be violated. Persons with a history of psychological disturbances are often stigmatized by society or even medical professionals and that can lead to inadequate medical care.

CONTACT: igor.salopek@gmail.com

Acknowledgements

ORGANIZED BY

FOSS MedRi
Braće Branchetta 20
HR-51000 Rijeka

CO-ORGANIZED BY

MEDICINSKI FAKULTET SVEUČILIŠTA U RIJECI

University of Rijeka, Faculty of Medicine

PSIHIJATRIJSKA BOLNICA RAB

Rab Psychiatric Hospital

SUPPORTERS

We would like to thank the following supporters for their generosity and support during the
7th Student Congress of Neuroscience – NeuRi 2017

MEDICINSKI FAKULTET SVEUČILIŠTA U RIJECI

Under sponsorship of the President of the Republic of Croatia, Kolinda Grabar-Kitarović

SPONSORS

We would like to thank the following sponsors for their generosity and support during the
7th Student Congress of Neuroscience – NeuRi 2017

WEB: www.neuri.uniri.hr

E-MAIL: neuri@foss.hr