

The International Stress and Behavior Society (ISBS)
Centre for Physiology and Biochemical Research (CPBR)
Institute of Experimental Medicine (IEM RAMS)

Proceedings

**22nd Multidisciplinary ISBS International
Neuroscience and Biological Psychiatry
“Stress and Behavior”
Conference**



*St-Petersburg, Russia
May 16-19, 2015*

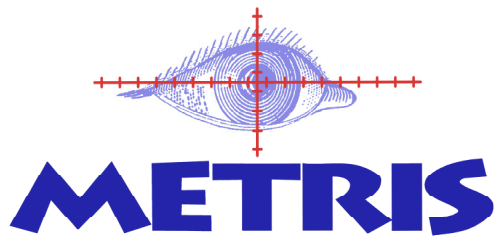
IN PARTNERSHIP WITH:

The Russian Society for BioPsychiatry (RSBP)

The Ukrainian Society for Biological Psychiatry (USBP)

Journal STRESS, BRAIN AND BEHAVIOR

The International Zebrafish Neuroscience Research Consortium (ZNRC)



CONFERENCE PROGRAM

Day 1. Sat, May 16, 2015

Oktiabrskaya Hotel, Grand hall (2nd floor), 10 Ligovsky Prospect, St-Petersburg, Russia

09.00-18.00 **Conference registration**

Morning Session

10.00-10.15 **OPENING CEREMONY AND WELCOMING ADDRESSES.** AV Kalueff (Conference Chair and ISBS President), VM Klimenko (Program Committee Chair)

10.15-10.55 **OPENING PLENARY LECTURE: INTERACTION BETWEEN STRESS AND NEUROINFLAMMATION IN DEPRESSION AND NEURODEGENERATION.** C Song, Institute for Marin Drugs and Nutrition, Guangdong Ocean University, Zhanjiang, China; China Medical University Taichung, Taiwan, Dalhousie University, Halifax, Canada

10.55-11.15 **ISBS PRESIDENTIAL LECTURE: NEUROBIOLOGY OF GROOMING DISORDERS - PUTTING A COMPLEX PATTERNED BEHAVIOR IN TRANSLATIONAL BIOPSYCHIATRY CONTEXT.** AV Kalueff, ISBS Fellow, ZENEREI Institute, New Orleans, LA, USA; Guangdong Ocean University, Zhanjiang, China

11.15-11.30 *Coffee Break and Exhibition*

11.30-16.40 **SYMPOSIUM I. ADVANCES IN DOPAMINE NEUROTRANSMISSION – THE INSTITUTE OF TRANSLATIONAL BIOMEDICINE SPBU SYMPOSIUM**
Chair: R Gainetdinov (Italy, Russia), presentations 30 min

11.30-12.00 **SELECTIVE DISRUPTION OF DOPAMINE D2-RECEPTORS/ARRESTIN SIGNALING BY MOOD STABILIZERS.** JM Beaulieu, Departments of Psychiatry and Neuroscience, Faculty of Medicine, Universite Laval-CRULRG, Quebec, Quebec, Canada

12.00-12.30 **DOPAMINE RECEPTORS: FROM THE DUAL CONCEPT TO HETERODIMERIC COMPLEXES.** C Missale, P Savoia, F Bono, L Bontempi and C Fiorentini, Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy

12.30-13.00 **DRUGS, ALCOHOL AND ACCUMBAL DOPAMINE TRANSMISSION: FROM CORRELATES TO THE CAUSALITY.** EA Budygin, ISBS Fellow, Wake Forest School of Medicine, Winston-Salem, NC, USA

13.00-14.00 *Lunch Break and Exhibition*

Afternoon Session

- 14.00-14.30** **TAAR1 MODULATES CORTICAL GLUTAMATE NMDA RECEPTOR FUNCTION.** S Espinoza, I Sukhanov, RR Gainetdinov, ISBS Fellow, Department of Neuroscience and Brain Technologies, Istituto Italiano di Tecnologia, Genova, Italy; Skolkovo Institute of Science and Technology (Skoltech), Skolkovo, Faculty of Biology and Soil Science, St. Petersburg State University, St. Petersburg, Russia
- 14.30-15.00** **THE ROLE OF TRANSIENT DOPAMINE RELEASE EVENTS IN CONDITIONED AVOIDANCE AND CONDITIONED FEAR.** EB Oleson, Department of Psychology, University Colorado Denver, Denver, CO, USA
- 15.00-15.30** **STRESS, THE DOPAMINE SYSTEM, AND THE PATHOPHYSIOLOGY OF PSYCHIATRIC DISORDERS.** AA Grace, University of Pittsburgh, Pittsburgh, PA, USA
- 15.30-16.00** **PRESENTATION: THE INSTITUTE OF TRANSLATIONAL BIOMEDICINE, SPBU.** RR Gainetdinov, ISBS Fellow, St. Petersburg State University, St. Petersburg, Russia
- 16.00-16.30** *Coffee Break and Exhibition*
- 16.30-17.00** **PHENOTYPICAL, BEHAVIORAL AND PHARMACOLOGICAL CHARACTERIZATION OF A NOVEL KNOCKOUT RAT MODEL LACKING THE DOPAMINE TRANSPORTER.** D Leo, P Illiano, I Sukhanov, L Mus, S Espinoza, TD Sotnikova, M Hoener and RR Gainetdinov, ISBS Fellow, Department of Neuroscience and Brain Technologies, Fondazione Istituto Italiano di Tecnologia, Genoa, Italy; Neuroscience Research, Pharmaceuticals Division, F. Hoffmann-La Roche Ltd, Basel, Switzerland; Skolkovo Institute of Science and Technology (Skoltech), Skolkovo, Faculty of Biology and Soil Science, St. Petersburg State University, St. Petersburg, Russia
- 17.00-17.40** **STELLAR TELEMTRY TECHNOLOGY AS A NOVEL TOOL FOR THE WHOLE SET OF POSSIBLE COMBINED EXPERIMENTAL PARADIGMS IN BEHAVIOR, PHYSIOLOGY AND PHARMACOLOGY RESEARCH.** E Wenzler, TSE Systems GmbH, Bad Homburg, Germany

SOCIAL EVENTS

- 17.40-19.00** **Welcoming Concert
Induction of 2015 ISBS Fellows**
- 19.00-22.00** **City Tour (admissions)**

Day 2. Sun, May 17, 2015

Oktiabrskaya Hotel, Grand hall (2nd floor), 10 Ligovsky Prospect, St-Petersburg, Russia

08.30-18.00 Conference registration

Morning Session

09:00-09:30 **BEHAVIOR STUDY OF ANIMALS AND MULTI-DIMENSIONAL MEASUREMENT SYSTEMS (LABORAS, SONOTRACK, DSI).** L Bachdasarian, R Bulthuis, E Molenwijk, M Boscaro, Metris B.V., Hoofddorp, Netherlands, Data Sciences International, St. Paul, USA

09.30-10.00 **BEHAVIOR AND METABOLISM: ARE YOU SEEING THE WHOLE PICTURE.** T Smith, Sable Systems International, Las Vegas, NV, USA

10.00-10.40 **SPECIAL ISBS/IBNS LECTURE: ANIMAL MODELS OF GENE-ENVIRONMENT INTERACTION IN PSYCHOTIC DISORDERS: A DIMENSIONAL PERSPECTIVE.** M Pletnikov, ISBS Fellow, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, MD, USA

10.40-11.00 **EFFECT OF BISPHENOL A ON *DROSOPHILA MELANOGASTER* BEHAVIOR - A NEW MODEL FOR THE STUDIES ON NEURODEVELOPMENTAL DISORDERS.** A Chauhan, K Kaur, A Simon, V Chauhan, New York State Institute for Basic Research in Developmental Disabilities, Staten Island, New York, City University of New York Graduate Center, New York, USA, Western Ontario University, Ontario, Canada

11.00-11.30 *Coffee Break and Exhibition*

11.30-13.00 **SYMPOSIUM II. ANTI-PSYCHOTICS**
Chair: XF Huang (Australia), presentations 30 min

11.30-12.00 **HISTAMINE H1 RECEPTORS AND ANTIPSYCHOTIC-INDUCED WEIGHT GAIN: UNDERLYING MECHANISMS AND IMPLICATIONS FOR INTERVENTION.** C Deng, School of Medicine and IHMRI, University of Wollongong, Wollongong, NSW, Australia

12.00-12.30 **REVERSAL OF ATYPICAL ANTI-PSYCHOTIC DRUG-INDUCED OBESITY AND ITS RELATED METABOLIC DISORDERS.** XF Huang, Centre for Translational Neuroscience, School of Medicine, University of Wollongong and Illawarra Health and Illawarra Health and Medical Research Institute, Wollongong, NSW, Australia

12.30-13.00 **BARDOXOLONE METHYL: A POTENTIAL THERAPEUTIC FOR THE PREVENTION OF ANTI-PSYCHOTIC DRUG-INDUCED OBESITY?** D Camer, CJ Bell, Y Yu, A Szabo, F Fernandez, CHL Dinh, and XF Huang, Centre for Translational Neuroscience, School of Medicine, University of Wollongong and Illawarra Health and Illawarra Health and Medical Research Institute, Wollongong, ANSTO LifeSciences, Australian Nuclear Science and Technology Organisation, NSW, Faculty of Social Sciences, University of Wollongong, Wollongong, NSW, Australia, Schizophrenia Research Institute, Sydney, NSW, Australia

13.00-14.00 *Lunch Break and Exhibition*

Afternoon Session

- 14.00-14.30** **RSBP LECTURE: THE CORRELATIONS BETWEEN CHANGES OF NEUROACTIVE AMINO ACIDS IN HIPPOCAMPUS AND SPATIAL ALTERNATIONS BEHAVIOR OF RATS AT EXPERIMENTAL MODEL OF ALZHEIMER'S DISEASE.** KB Yenkovyan, VA Chavushyan, MI Aghajyanov, Yerevan State Medical University, Physiology Institute NAS RA, Yerevan, Armenia
- 14.30-16.45** **SYMPOSIUM III. ZUKOWSKA SYMPOSIUM ON NEUROSCIENCE**
Chairs: AV Kalueff (USA, China), MI Aghajyanov (Armenia), C Song (China, Canada), presentations 15 min
- 14.30-14.45** **GSK3B EXPRESSION IN PREFRONTAL CORTEX CORRELATES WITH INDIVIDUAL DIFFERENCES IN FLOATING BEHAVIOR IN THE MODIFIED MOUSE SWIM TEST.** NA Markova, EF Shevtsova, OE Zubareva, BH Cline, AN Trofimov, JP Costa-Nunes, EA Veniaminova, HW Steinbusch, SO Bachurin, KP Lesch, TV Strelakova, ISBS Fellow, Institute of Physiologically Active Compounds RAS, Chernogolovka, Institute of General Pathology and Pathophysiology RAS, Moscow, Institute of Experimental Medicine RAS, St. Petersburg, Russia; University de Strasbourg, Strasbourg, France; University of Wurzburg, Wurzburg, Germany; Institute for Hygiene and Tropical Medicine, New University of Lisbon, Lisbon, Portugal; Department of Neuroscience, School for Mental Health and Neuroscience, Maastricht University, Maastricht, EURON, European Graduate School for Neuroscience, Maastricht, Netherlands
- 14.45-15.00** **USEFULNESS OF FORENSIC PRACTICE OF THE HASSALL'S CORPUSCLES IN THE THYMUS AND INTRA-THYROIDAL ECTOPIC THYMUS TO ESTIMATE STRESS SITUATION.** S Furukawa, Department of Legal Medicine, Shiga University of Medical Science, Japan
- 15.00-15.15** **KNOCKDOWN OF CORTICOTROPIN-RELEASING FACTOR RECEPTOR 1 IN THE VENTRAL TEGMENTAL AREA FACILITATES CONDITIONED FEAR.** JH Kim, DE Ganella, S Layfield, R Bathgate, A Chen, AJ Lawrence, NA Chen, Florey Institute of Neuroscience and Mental Health, University of Melbourne, Parkville, Australia; Department of Neurobiology, Weizmann Institute of Science, Rehovot, Israel
- 15.15-15.30** **A DECREASE OF HEAT SHOCK PROTEINS EXPRESSION IN THE BRAIN AGGRAVATES THE NEUROPATHOLOGICAL SYMPTOMS OF PRECLINICAL PARKINSON'S DISEASE STAGE IN RATS.** DV Plaksina, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry Russian Academy of Sciences, St. Petersburg, Russia
- 15.30-15.45** **INTERACTIONS BETWEEN STRESS HORMONES AT THE INSULAR CORTEX MODULATE AROUSAL-INDUCED RELUCTANCE TO NOVELTY (NEOPHOBIA), STRESS AND ANXIETY.** J Stehberg, Laboratorio de Neurobiologia, Centro de Investigaciones Biomedicas, Universidad Andres Bello, Santiago, Chile
- 15.45-16.15** *Coffee Break and Exhibition*

- 16.15-16.30** **EARLY-LIFE STRESS CHANGES REACTIVITY OF REWARD SYSTEM IN THE RATS: THE ROLE OF THE DYNORPHIN/KAPPA-OPIOID SYSTEM.** VN Mukhin, A Kozlov, I Abdurasulova, V Liudyno, KI Pavlov, A Lebedev, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia
- 16.30-17.15** **MODERATED ROUND TABLE DISCUSSION: SYSTEMATIC OVERESTIMATION OF PERCEIVED OCCUPATIONAL STRESS.** Ph Fauquet-Alekhine, J Berton, L Rouillac, Th Geeraerts, JC Granry, Nuclear Power Plant of Chinon, Laboratory for Research in Energy, University Hospital of Angers, Angers, University Hospital of Toulouse, Toulouse, France; Department of Social Psychology, LSE, UK
- 17.15-17.35** **ISBS SPECIAL FOCUS TALK: STRESS - THE PEPTIDE PECULIARITIES OF COMPENSATING THE EMOTIONAL AND BEHAVIORAL DISTURBANCES AND ADAPTING TO DIFFERENT EXTREME INFLUENCES IN MAMMALS.** TN Sollertinskaja, ISBS Fellow, MV Shorokhov, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia
- 17.35-18.00** **PRESENTATION: ISBS AND ISBS JOURNAL PRESENTATION: STRESS, BRAIN AND BEHAVIOR.** AV Kalueff, Editor-in-Chief, USA

SOCIAL EVENT

- 20.00-22.00** **Neva River and Canals Boat Trip (admissions)**

Day 3. Mon, May 18, 2015

Oktiabrskaya Hotel, Grand hall (2nd floor), 10 Ligovsky Prospect, St-Petersburg, Russia

09.00-18.00 Conference registration

Morning Session

09.45-13.00 **SYMPOSIUM IV: LAPIN SYMPOSIUM ON BRAIN RESEARCH**

Chairs: I Ekimova (Russia), VM Klimenko (Russia), presentations 15 or 20 min

09.45-10.00 **DIRECT AND INDIRECT MENTAL HEALTH CORRELATES OF INTERIOR ENVIRONMENTAL SPATIAL QUALITIES.** AE Lawrence, University of Nevada, USA

10.00-10.15 **CASE REPORT: SEVERE PSYCHOSIS WITH DEPRESSION AFTER SUBTHALAMIC NUCLEUS DEEP BRAIN STIMULATION.** ZR Zhao, SM Chua, Institute of Mental Health, Singapore

10.15-10.30 **ON A RELATION BETWEEN NONVERBAL AND EMOTIONAL INTELLIGENCE IN CHILDREN AGED 8 TO 11 YEARS.** MN Anderson, Academy of Postgraduate Pedagogical Education, St. Petersburg, Russia

10.30-10.50 **MODELING BRAIN CONNECTIVITY FROM POSITRON EMISSION TOMOGRAPHY DATA: APPLICATIONS IN NORMAL AND PATHOLOGICAL COGNITION.** I Yakushev, Department of Nuclear Medicine, Klinikum Rechts Der Isar, Technische Universitat Munchen, Munich, Germany

10.50-11.10 **EFFECT OF THE STRESS OF HIGH ALTITUDE HYPOXIA ON COGNITIVE FLEXIBILITY AND ANXIETY STATE.** L Xu, Y Wu, T Zhao, S-H Liu, L-L Zhu, M Fan, Institute of Basic Medicine, Beijing, China

11.10-11.40 *Coffee Break and Exhibition*

11.40-12.00 **CONVENTIONAL AND ADVANCED NEUROIMAGING MODALITIES IN DETECTION OF BRAIN INFECTIOUS DISORDERS AND THEIR CONSEQUENCES.** D Kozic, University of Novi Sad Faculty of Medicine, Novi Sad, Serbia

12.00-12.20 **THE IMPORTANCE OF SUPPORT TO PATIENTS DURING CHEMOTHERAPY - OUR EXPERIENCE.** N Boskov, B Korovljević, General Hospital Djordje Joanović Zrenjanin, Serbia

12.20-12.40 **PERCEIVED STRESS, ANXIETY, DEPRESSION AND RISKY BEHAVIOR IN ADOLESCENTS.** AS Rakhimkulova, VA Rozanov, Odessa State University, Odessa, Ukraine

12.40-13.00 **THE BIOCHEMICAL ASPECTS OF MENTAL HEALTH IN CHILDREN WITH DOWN'S SYNDROME.** AV Nevoia, SN Garaeva, AI Leorda, TS Beshetea, GV Redkozubova, GV Postolati, NV Kovarschaia, MI Sula, The Institute of Physiology and Sanocreatology ASM, Chisinau, Moldova

13.00-14.00 *Lunch Break and Exhibition*

Afternoon Session

- 14.00-14.25** **USBP LECTURE: STRESS, EPIGENETICS AND PATHWAYS TO SUICIDE.** VA Rozanov, AS Rakhimkulova, Odessa National Mechnikov University, Odessa, Ukraine
- 14.25-15.00** **ISBS SPECIAL FOCUS TALK: EMOTIONS, MENTAL WORKLOAD, STRESS RECOGNITION - FROM EEG TO HUMAN ABILITIES/BEHAVIOR ASSESSMENT.** O Sourina, Cognitive Human-Computer Interaction Laboratory, Nanyang Technological University, Singapore
- 15.00-15.20** **INDIVIDUAL FEATURES OF HYPOTHALAMIC-PITUITARY-ADRENAL AXIS STRESS RESPONSIVENESS IN OLD MONKEYS.** ND Goncharova, Federal Research Institute of Medical Primatology, Sochi, Russia
- 15.20-15.35** **PSYCHOLOGICAL AUTOPSY- UNRAVELLING THE MYSTERY OF DEATH.** JR Padubidri, Kasturba Medical College, Manipal University, Mangalore, India
- 15.35-15.50** **MURDER-SUICIDE: REMORSE OR STRESS?** P Rastogi, Department of Forensic Medicine and Toxicology, Kasturba Medical College, Manipal University, Mangalore, India
- 15.50-16.10** **ASSOCIATIONS OF CYTOKINES AND CLINICAL STATUS IN SCHIZOPHRENIA.** WT Chen, HL Kuo, LC Huang, Zuoying Branch of Kaohsiung Armed Forces General Hospital, Kaohsiung, Taiwan

16.10-16.30 *Coffee Break and Exhibition*

- 16.30-18.00** **GUIDED POSTER SESSION:** Posters are on display for the whole day; presenters should be available for mini-presentations (10 min) and questions during the poster session. Moderators will be guiding delegates through the posters.

POSTERS:

BIOACOUSTIC CORRECTION OF POST-STRESS BEHAVIOR DISORDERS AND LIPID METABOLISM IN RATS. NK Apraksina, TV Avaliani, NN Klueva, KV Konstantinov, SG Tsikunov, Institute of Experimental Medicine, Saint Petersburg, Russia

CAN BATH ANKYLOSING SPONDYLITIS DISEASE ACTIVITY INDEX (BASDAI) BE AFFECTED BY ACCOMPANYING FIBROMYALGIA OR DEPRESSION? L Altan, Y Sivrioglu, I Ercan, Uludag University Medical Faculty, Bursa, Turkey

DYKE-DAVIDOFF-MASSON SYNDROME: A CASE REPORT. I Kutluer, Çubuk Government Hospital, Clinic of Neurology, Ankara, Turkey

OLFACTORY REFERENCE SYNDROME: A CASE REPORT. BE Demiryurek, O Korucu, ME Cinik, Bagcilar Training and Research Hospital Neurology Clinic, Istanbul, Kecioren Training and Research Hospital Neurology Clinic, Ankara, Agri State Hospital Psychiatry Clinic, Agri, Turkey

DEPRESSION, SEXUAL DYSFUNCTION AND CHILDHOOD TRAUMA IN PATIENTS WITH POST-TRAUMATIC STRESS DISORDER. ED Demiryurek, O Korucu, ME Cinik, Bagcilar Training and Research Hospital Neurology Clinic, Istanbul, Kecioren Training and Research Hospital Neurology Clinic, Ankara, Agri State Hospital Psychiatry Clinic, Agri, Turkey

THE ASSOCIATION BETWEEN POSTTRAUMATIC STRESS DISORDER AND CPK LEVELS IN TRAFFIC ACCIDENTS. SI Siameli, K Bonotis, SE Karaoulanis, Department of Psychiatry, University of Thessalia, Larissa, Greece

STRESS: AN IMPORTANT PRECIPITATING FACTOR IN CHILDHOOD HEADACHE. D Gokkurt, D Yilmaz, A Tayfur, Polatlı Duatepe Hospital, Department of Neurology, Kecioren Education Hospital, Department of Pediatric Neurology, Department of Pediatric Nephrology, Ankara, Turkey

EMOTIONAL MODULATION OF NEGATIVE MASS MEDIA AFFECTS THE RESPONSE TO ATROCIOUS EVENTS IN THE PAST: EVIDENCE FROM EVENT-RELATED POTENTIALS. S Tukaiev, I Zyma, J Grimm, Y Havrylets, A Enzlinger, V Rizun, MYu Makarchuk, N Plakhotnyk, A Vasylichenko, National Taras Shevchenko University of Kyiv, Educational and Scientific Centre (The Institute of Biology), Institute of Journalism, Kyiv, Ukraine; University of Vienna, Faculty of Social Sciences, Vienna, Austria

STRESS, STRESSORS AND THEIR EFFECT AMONG MEDICAL AND DENTISTRY STUDENTS. I Bogomilov, E Yankova, M Duglova, N Geshev, Medical University of Sofia, Sofia, Bulgaria

STUDY OF FLUCTUATING ASYMMETRY, AN EPIGENETIC MEASURE OF STRESS, IN AN ANIMAL MODEL. JL Campo, SG Davila, MG Gil, MT Prieto, Animal Genetics Department, National Institute Agricultural Research, Madrid, Spain

ON THE DIMENSIONS OF TEST ANXIETY AND FOREIGN LANGUAGE LEARNERS. A Nemati, Department of English Language Teaching, Jahrom Branch, Islamic Azad University, Jahrom, Iran

THE LIPOPOLYSACCHARIDE PARKINSON'S DISEASE ANIMAL MODEL: THE CALPAIN SYSTEM STUDIES. VA Schukina, MN Karpenko, NS Pestereva, IS Oblamskaya, MS Tikhomirova, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine RAN, St. Petersburg State Polytechnic University, St. Petersburg, Russia

ASSOCIATION BETWEEN CORTICAL ACTIVITY AND DIFFERENT METEOROLOGICAL AND PHYSICAL FACTORS OF THE COSMOS. KI Pavlov, VN Mukhin, VG Kamenskaya, VM Klimenko, ISBS Fellow, Pavlov Department of Physiology, Institute of Experimental Medicine, St. Petersburg, Russia

EARLY-LIFE CHRONIC LPS ADMINISTRATION MODULATES STRESS-REACTIVITY AND NMDA RECEPTOR SUBUNITS GENE EXPRESSION IN THE RAT BRAIN. AY Rotov, EA Veniaminova, K Fomalont, OE Zubareva, Institute of Experimental Medicine, St. Petersburg, Russia

DISTURBANCE OF SLEEP STRUCTURE IN THE MODEL OF PARKINSON'S DISEASE PRECLINICAL STAGE IN RATS. VV Simonova, MA Guzeev, YF Pastukhov, ISBS Fellow, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia

THE EFFECTIVENESS OF A TRAINING PROGRAM USING NEURO-LINGUISTIC PROGRAMMING (NLP) TO REDUCE TEST ANXIETY IN CONSIDERATION TO THE BIOLOGICAL FEEDBACK OF THE STUDENTS AT THE COLLEGE OF SPORT AND PHYSICAL EDUCATION AT KING SAUD UNIVERSITY. M Fakehy, M Haggag, College of Sport Sciences and Physical Activity, Department of Biomechanics and Motor Behavior, Riyadh, Saudi Arabia

ENRICHED ENVIRONMENT REVERTS DELETERIOUS EFFECTS OF PRENATAL RESTRAINT STRESS ON GLUCOCORTICOID RECEPTORS AS WELL AS ANXIETY BEHAVIOR OF ADULT MICE. MA Zorrilla-Zubilete, MR Larreche, JE Pivoz-Avedikian, M Ramborger, CEFYBO-CONICET, Department of Pharmacology, Faculty of Medicine, UBA, Buenos Aires, Argentina

EFFECT OF STRESS IN FIRST OR SECOND HALF OF GESTATION, IN COMPARISON TO POSTNATAL STRESS, ON ANXIETY OF YOUNG RATS WISTAR. ECBP Guirro, BA Beber, FC Puntel, AL Carvalho, Federal University of Parana, Parana, Brazil

MAJOR STRESS AND ITS CONSEQUENCES: SERBIAN EXPERIENCE. B Pejuskovic, D Lecic-Tosevski, Belgrade University School of Medicine, Institute of Mental Health, Serbian Academy of Sciences and Arts, Belgrade, Serbia

SOCIAL EVENT

20.00-22.00 Conference Dinner (admissions)

Day 4. Tue, May 19, 2015

Oktiabrskaya Hotel, Grand hall (2nd floor), 10 Ligovsky Prospect, St-Petersburg, Russia

9.00-11.00 **Conference registration**

09.40-11.15 **SYMPOSIUM V: TRANSLATIONAL BIOPSYCHIATRY**

Chairs: AV Kalueff (USA), T Strekalova (Netherlands), presentations 20 min

09.40-10.00 **MODELING CHRONIC STRESS IN ZEBRAFISH.** AV Kalueff, ISBS Fellow, Y Liu, S Li, P Chen, L Yang, JJ Wang, C Song, Guangdong Ocean University, Zhanjiang, China; ZENEREI Institute and the International Zebrafish Neuroscience Research Consortium (ZNRC), New Orleans, USA; Dalhousie University, Canada; National University of Taiwan, Taiwan

10.00-10.20 **ANXIETY-LIKE BEHAVIOR IN THE MODEL IMITATING PRECLINICAL STAGE OF PARKINSON'S DISEASE IN RATS.** MV Chernyshev, KV Lapshina, OA Sapach, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia

10.20-10.40 **EXPOSURE TO METHYLMERCURY INDUCES OXIDATIVE STRESS AND AFFECTS THE BEHAVIOR OF *DROSOPHILA MELANOGASTER*.** V Chauhan, A Chauhan, New York State Institute for Basic Research in Developmental Disabilities, Staten Island, New York, USA

10.40-11.00 **COMPOSITION OF INTESTINAL MICROBIOTA IN PATIENTS WITH MULTIPLE SCLEROSIS AND IN RATS AT EAE MODEL CHANGES QUALITATIVELY AND QUANTITATIVELY.** EA Tarasova, IN Abdurasulova, AV Matsulevic, EI Ermolenko, GN Bisaga, YI Zitnukhin, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, Military Medical Academy, St. Petersburg, Russia

11.00-11.15 **ADOLESCENT DRINKING: UNDERSTANDING A NEUROBIOLOGY OF DANGER.** TA Shnitko, DL Robinson, University of North Carolina, Chapel Hill, NC, USA

11.15-11.45 ***Coffee Break and Exhibition***

11.45-12.45 **SYMPOSIUM VI: CLINICAL PSYCHIATRY**

Chair: VM Klimenko (Russia), presentations 15-20 min

11.45-12.00 **METABOLIC SYNDROME IN SERBIAN WAR VETERANS.** Z Spiric, R Samardzic, S Radjen, Z Stojanovic, M Djokic, B Zivic, G Mandic-Gajic, Faculty of Medicine of the Military Medical Academy, University of Defense, Belgrade, Serbia

12.00-12.15 **FEAR OF CANCER RECURRENCE – REPORT FROM PATIENTS WITH THREE MAJOR TYPES OF CANCERS IN TAIWAN.** YH Lai, YR Chen, YY Fang, YJ Hung, CP Wang, PJ Lou, JS Chen, College of Medicine, National Taiwan University (NTU), Department of Head and Neck Oncology, Department of Thoracic Surgery, NTU Hospital, Taipei, Taiwan

12.15-12.30 **STRESS, ANXIETY AND DEPRESSION IN NURSES IN SERBIA.** Z Krivokapic, V Dordevic, College of Health Studies, Cuprija, Clinic of Mental Health, Nis, Serbia

12.30-12.45 **PSYCHOLOGICAL AUTOPSY; AN INVESTIGATIVE TOOL IN DETERMINING DEATH – A CASE REPORT.** BSK Shetty, Department of Forensic Medicine and Toxicology, Kasturba Medical College, Mangalore, Manipal University, Mangalore, Karnataka, India

12.45-13.00 CLOSING CEREMONY. ANNOUNCING THE 2016 ISBS “STRESS AND BEHAVIOR” CONFERENCES AND SYMPOSIA

10.00-13.00 SATELLITE SYMPOSIUM (IN RUSSIAN) S1: HISTORY OF MEDICINE AND IEM
Venue – Museum of the Institute of Experimental Medicine IEM RAN, St. Petersburg
Chair: YuP Golikov (Russia)

SOCIAL EVENT

19.00-22.00 Theatre (admissions)

POST-CONFERENCE EVENTS

Wed, May 20, 2015

Institute of Experimental Medicine (12 Pavlov Street, St-Petersburg)

10.15-15.00 Visit to Pavlov Department of Physiology of the Institute of Experimental Medicine

The ISBS bus to IEM leaves at 10.15 sharp from main entrance of Oktiabrskaya Hotel, and will return to Hotel by 15.00 (FREE for all delegates, but tour pre-registration is required)

SOCIAL EVENT

10.00-16.00 Suburban Royal Peterhof Palace Tour (admissions)

ABSTRACTS

Day 1. Sat, May 16, 2015

OPENING PLENARY LECTURE: INTERACTION BETWEEN STRESS AND NEUROINFLAMMATION IN DEPRESSION AND NEURODEGENERATION. C Song, Institute for Marine Drugs and Nutrition, Guangdong Ocean University, Zhanjiang, China; Graduate Institute of Neural and Cognitive Sciences, China Medical University Hospital, Taichung, Taiwan

Classic hypotheses of depression or neurodegeneration were based on neurotransmitter deficits, dysfunction of hypothalamic-pituitary-adrenal (HPA) axis and neurotoxic deposition. However, current treatments according to above hypotheses are most ineffective but with many side-effects. In the past 25 years, we have demonstrated that increased innate inflammatory response may play crucial roles in the onset and progress of depression and neurodegenerative diseases. It is well known that stress is a trigger of depression. Chronic and severe depression is often associated with neurodegeneration, such as Alzheimer's disease or dementia. However, the relationship between stress and inflammation is unclear. Results from studies of animal models have shown interactions between inflammation and stress, which may trigger or exacerbate depression or AD. The interactions include 1) proinflammatory cytokines stimulate the HPA axis release glucocorticoids (GCs) by combining their receptors in the hypothalamus; 2) stress-induced glucocorticoids secretion may suppress or enhance inflammatory response, depending on stress period and severity as well as the activation of different GC receptors; 3) stress, specially chronic stress-induced glucocorticoid secretion may suppress another glial astrocytes functions, which causes neurotrophin deficit; 4) inflammation damage neurons via glucocorticoid GR receptors on glial cells; 5) effective antidepressant treatments attenuate the inflammatory changes and hypercortisolaemia by reducing the release of the pro-inflammatory cytokines from activated microglia, and by sensitizing the glucocorticoids receptors in the HPA axis. Furthermore, GC receptor antagonist microglial inhibitor, anti-inflammatory cytokines and COX2 inhibitors have been found to improve anxiety or depression-like behavior, restore neurotransmission and protect neurons. Thus, the new generation of treatments for depression and neurodegeneration may be developed from anti-inflammatory, immune modulatory and GC receptor antagonist substances.

ISBS PRESIDENTIAL LECTURE: NEUROBIOLOGY OF GROOMING DISORDERS - PUTTING A COMPLEX PATTERNED BEHAVIOR IN TRANSLATIONAL BIOPSYCHIATRY CONTEXT. AV Kalueff, ISBS Fellow, ZENEREI Institute, New Orleans, USA; Guangdong Ocean University, Zhanjiang, China

Self-grooming is a commonly occurring, complex innate behavior frequently observed in various species, including laboratory rodents and humans. Serving multiple functions in the organism (hygiene maintenance, de-arousal, social communication, temperature regulation), this behavior also has a clear, evolutionarily conserved rostro-caudal sequencing pattern, and a combination of stereotyped 'inflexible' (approx. 10%) and less stereotyped, flexible grooming actions (approx. 90%). Here, I will review the neurobiology of self-grooming behavior, focusing on its CNS circuitry, genetic mechanisms, pharmacological modulation, and novel approaches to behavioral and physiological analyses. This lecture will also highlight studies of grooming behavior in rodents as a valuable asset for clinical and translational neuroscience research, especially in the field of neuropsychiatric disorders associated with behavioral regulation, such as basal ganglia disorders, OCD, stress-related (affective) disorders, as well as autism and neurodegeneration. Collectively, such studies foster the identification of the neural circuits controlling grooming, and provide potential models for a range of neurologic and neuropsychiatric disorders.

SYMPOSIUM I. ADVANCES IN DOPAMINE NEUROTRANSMISSION

Chair: R Gainetdinov (Italy, Russia), presentations 30 min

SELECTIVE DISRUPTION OF DOPAMINE D2-RECEPTORS/ARRESTIN SIGNALING BY MOOD STABILIZERS. JM Beaulieu, Departments of Psychiatry and Neuroscience, Faculty of Medicine, Université Laval-CRULRG, Quebec, Quebec, Canada

Mood stabilizers are a heterogeneous class of drugs having antidepressant and anti-manic effects in bipolar disorders, depression and schizophrenia. Despite wide clinical applications, the mechanisms underlying their shared actions and therapeutic specificity are unknown. Here we examine the effects of the structurally unrelated mood stabilizers lamotrigine, lithium and valproate on G protein and beta-arrestin dependent components of dopamine D2 receptor signaling and assess their contribution to the behavioral effects of these drugs. When administered chronically to mice lacking either D2 receptors or beta-arrestin 2 lamotrigine, lithium and valproate failed to affect Akt/GSK3 signaling as they do in normal littermates. This lack of effect on signaling resulted in a loss of responsiveness to mood stabilizers in tests assessing "antimanic" or "antidepressant"-like behavioral drug effects. This shows that mood stabilizers lamotrigine, lithium and valproate can exert behavioral effects in mice by disrupting the beta-arrestin 2 mediated regulation of Akt/GSK3 signaling by D2 dopamine receptors, thereby suggesting a shared mechanism for mood stabilizer selectivity.

DOPAMINE RECEPTORS: FROM THE DUAL CONCEPT TO HETERODIMERIC COMPLEXES. C Missale, P Savoia, F Bono, L Bontempi, C Fiorentini, Department of Molecular and Translational Medicine, University of Brescia, Brescia, Italy

Dopamine controls different functions in the central nervous system, including locomotor activity, attention, motivation and positive reinforcement, by interacting with five different G protein-coupled receptors (GPCR). DA receptors have been divided into two subfamilies: D1-Like (D1 and D5) and D2-like (D2, D3 and D4) on the basis of their structural, pharmacological and transduction characteristics. GPCR have been classically thought to exist as monomeric entities and the canonical paradigm of their activation and signaling involves the sequential activation of G-proteins and specific enzyme or channel effectors. However, evidence accumulated in recent years makes this model too simplistic to explain the functional flexibility of these receptors. The current view of GPCR organization assumes that they interact with other receptors and regulatory proteins to form heteromers with peculiar pharmacological, signaling and trafficking properties. Heteromerization, raising different combinatorial possibilities, thus underlies an unexpected level of diversity within GPCR. On this line, it has been reported that DA receptors interact not only with member of the same family, but also with structurally and functionally divergent receptors to form heteromers with peculiar properties and this finding further increases DA receptor heterogeneity. For example, D1R and D3R that are co-localized in specific neuronal populations in the striatum and nucleus accumbens, regulate rewarding and motivated behavior, emotional and cognitive processes and locomotor activity by extensive cross-talk mechanisms. By using different experimental approaches the existence of D1R-D3R heteromers, in both transfected cell systems and in the striatum, has been reported and functional studies pointed to peculiar pharmacological, signaling and functional properties of these receptor complexes. The putative role of the D1R-D3R heteromer in the physiological regulation of striatal function and in the development of motor dysfunctions will be discussed.

DRUGS, ALCOHOL AND ACCUMBAL DOPAMINE TRANSMISSION: FROM CORRELATES TO THE CAUSALITY. EA Budygin, ISBS Fellow, Wake Forest School of Medicine, Winston-Salem, NC, USA

It is commonly believed that dopamine transmission in the nucleus accumbens plays an essential role in mediating the reinforcing and stimulating effects of alcohol and addictive drugs. However, little was known about the temporal relationship of behavioral and neurochemical changes. Moreover, until recently it has been impossible to explore the causal role of accumbal dopamine release in addictive behaviors. These studies were designed to clarify the sequential association between dopamine changes and patterns of drug self-administration, using fast-scan cyclic voltammetry in vivo and optogenetics. In the first experiment, cocaine (0.75 mg/kg) was intravenously infused into rats, according to inter-infusion intervals obtained from self-administering animals, and dopamine uptake changes (apparent K_m) were assessed. The data demonstrated that cocaine-induced dopamine uptake inhibition accounts for accumbal dopamine dynamics, which are associated with the cyclic regularity of cocaine intake. Furthermore, dopamine uptake inhibition

thresholds corresponding to self-administration behavior shifted upward following an escalation in cocaine-taking behavior. In the second experiment a viral technology was applied to restrict the expression of channelrhodopsin-2 (ChR2) to dopamine cells in the rat VTA, driving ChR2-EYFP expression by a tyrosine hydroxylase promoter. We were capable to mimic both tonic and phasic patterns of dopamine release in rat nucleus accumbens using a low (5 Hz) and high (50 Hz) frequency stimulation of the VTA. Rats were habituated to a modified intermittent two-bottle choice procedure in which subjects had access to 20% ethanol and water, three days per week. We found a significant delay to the first ethanol lick and a decrease in the total amount of ethanol consumption when dopamine cell bodies were stimulated at a low frequency during the first 5-10 min of a two-bottle choice session. Similar stimulation had no effect when delivered in the home cage during the 10 min preceding an ethanol drinking session. In addition, when low frequency stimulation was applied at the first onset of alcohol consumption, licking behavior was immediately terminated and most rats moved away from the ethanol sipper tube. We hypothesize that this optogenetic stimulation pattern may mimic ethanol-induced dopamine-elevating effects in the rat nucleus accumbens, therefore decreasing ethanol intake through the engagement of negative feedback mechanisms. A high frequency stimulation had no effect on ethanol consumption in the two-bottle choice procedure. Therefore, the results of these studies provide the first documentation of the causal relationship between specific patterns of dopamine transmission within elements of the mesolimbic circuitry and addictive behaviors. This research was supported by NIAAA grant AA022449.

[ABSTRACT COMMUNICATION] STRESS DIFFERENTIALLY MODULATES NOREPINEPHRINE SIGNALING IN RATS WITH VARIED HPA AXIS FUNCTION. RM Wightman, Department of Chemistry and Neuroscience Center, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA

INTRODUCTION: Previous work has demonstrated the importance of genetic factors and stress-sensitive circuits in the development of affective disorders. Furthermore, anxiety and numerous psychological disorders are comorbid with substance abuse, and noradrenergic signaling in the bed nucleus of the stria terminalis (BNST) is thought to be a source of this convergence. **METHODS:** We examined the effects of different stressors on behavior and norepinephrine dynamics in the BNST of rat strains known to differ in their HPA-axis function. Norepinephrine dynamics were monitored with cyclic voltammetry. The effects of acute morphine dependence and social-isolation in non-anxious Sprague Dawley (SD) rats, and a depression model, Wistar-Kyoto (WKY) rats. **RESULTS AND DISCUSSION:** We found a shared phenotype in drug-dependent and singly housed SD rats, characterized by slowed norepinephrine clearance, decreased autoreceptor function, and elevated anxiety. WKY rats exhibited changes in anxiety and autoreceptor function only following morphine dependence. To ascertain the influence of LC inhibition on this plasticity, we administered the LC-terminal selective toxin DSP-4 to SD and WKY rats. DSP-4 treated SD rats demonstrated a dependence-like phenotype, whereas WKY rats were unchanged. Overall, our findings suggest individuals with varying stress susceptibilities have different noradrenergic signaling changes in response to stress. These changes may establish conditions that favor stress-induced reinstatement and increase the risk for addiction. **RESEARCH SUPPORT:** This research was supported by an NIH grant to RMW NS 015841.

TAAR1 MODULATES CORTICAL GLUTAMATE NMDA RECEPTOR FUNCTION. S Espinoza, I Sukhanov, RR Gainetdinov, ISBS Fellow, Department of Neuroscience and Brain Technologies, Istituto Italiano di Tecnologia, Genova, Italy; Skolkovo Institute of Science and Technology (Skoltech), Skolkovo, Faculty of Biology and Soil Science, St. Petersburg State University, St. Petersburg, Russia

INTRODUCTION: Trace Amine-Associated Receptor 1 (TAAR1) is a G protein-coupled receptor expressed in the mammalian brain and known to influence subcortical monoaminergic transmission. Monoamines, such as dopamine, play also an important role within the prefrontal cortex (PFC) circuitry, which is critically involved in high order cognitive processes. TAAR1 selective ligands have shown potential antipsychotic, antidepressant and pro-cognitive effects in experimental animal models; however, it remains unclear if TAAR1 can affect PFC-related processes and functions. **METHODS:** We used a multidisciplinary approach to evaluate TAAR1 role in PFC functions by using biochemical, electrophysiological and behavioral assays. **RESULTS AND DISCUSSION:** In this study, we document distinct pattern of expression of TAAR1 in the mouse PFC, as well as altered subunit composition and deficient functionality of the glutamate N-methyl-D-aspartate (NMDA) receptors in the pyramidal neurons of layer V of PFC in mice lacking TAAR1. The dysregulated cortical glutamate transmission in TAAR1-KO mice was associated with aberrant behaviors in several tests, indicating a perseverative and impulsive phenotype of mutants. Conversely, pharmacological

activation of TAAR1 with selective agonists reduced premature impulsive responses observed in the fixed-interval conditioning schedule in normal mice. Our study indicates that TAAR1 plays an important role in the modulation of NMDA receptor-mediated glutamate transmission in the PFC and related functions. Furthermore, these data suggest that development of TAAR1-based drugs could provide a novel therapeutic approach for the treatment of disorders related to aberrant cortical functions. **RESEARCH SUPPORT:** RRG's work has been partially supported by the research award from F. Hoffmann La-Roche, Basel, Switzerland. Other authors declare no potential conflict of interest

THE ROLE OF TRANSIENT DOPAMINE RELEASE EVENTS IN CONDITIONED AVOIDANCE AND CONDITIONED FEAR. EB Oleson, Department of Psychology, University Colorado Denver, Denver, CO, USA

INTRODUCTION: Survival is dictated by an organism's fitness in approaching positive stimuli and avoiding harm. While a rich literature outlines a role for mesolimbic dopamine in reward and appetitive behaviors, dopamine's involvement in aversion and avoidance behaviors remains controversial. **METHODS:** Here, we used fast-scan cyclic voltammetry to investigate whether subsecond dopamine release events in the nucleus accumbens are time-locked to conditioned stimuli predicting the avoidance of electrical footshock. During conditioned avoidance, rats can initiate an avoidance response by pressing a lever within a warning period, preventing footshock. Alternatively, once footshocks commence, animals can initiate an escape response by pressing the lever, terminating footshock. This design allows us to assess subsecond dopamine release events during the presentation of a warning signal, safety periods, and two distinct behavioral outcomes. We additionally employed chemogenetic and optogenetic technology to assess the causal role of dopamine in avoidance. **RESULTS AND DISCUSSION:** We found that release consistently increased upon presentation of the warning signal in a manner that reliably predicted successful avoidance. Chemogenetic and optogenetic facilitation of dopamine neuronal activity facilitated avoidance behavior, suggesting a causal role for dopamine in avoidance. We also observed subsecond dopamine release during the safety period, as occurs following the receipt of reward. Conversely, we observed a decrease in release at the warning signal during escape responses. Because of this finding, we further assessed dopamine release in a conditioned fear model. As seen during escape responses, we observed a time-locked decrease in dopamine release upon presentation of a cue conditioned to inescapable footshock. These data, along with other reports, support a considerably more nuanced view of dopamine neuron function, wherein accumbal dopamine release is differentially modulated by positive and negative affective stimuli to promote adaptive behaviors. **RESEARCH SUPPORT:** Brain and Behavior Research Foundation NARSAD award.

STRESS, THE DOPAMINE SYSTEM, AND THE PATHOPHYSIOLOGY OF PSYCHIATRIC DISORDERS. AA Grace, University of Pittsburgh, Pittsburgh, PA, USA

INTRODUCTION: Stress plays a role in everyday life, it can help us to avoid reckless behavior and achieve wanted goals. However, when stress is extreme or dysregulated, it can lead to pathological changes in brain function that can precipitate major psychiatric disorders. We examine the impact of peripubertal and adult stressors on the hippocampus, amygdala, and dopamine system, and report that the timing and nature of the stressor can lead to pathological changes commensurate with psychiatric disorders in humans. **METHODS:** Rats were exposed to stressors peripubertally (PD 31-40) or as adults (chronic mild stressors), and the impact on dopamine neuron activity assessed. Dopamine neurons were recorded in the ventral tegmental area of adult rats, and three parameters were assessed: The number of neurons firing, the average firing rate, and the firing pattern. The locomotor response to amphetamine was also examined. **RESULTS AND DISCUSSION:** Rats exposed to either a mitotoxin (MAM) or peripubertal stress showed hyperactivity within the amygdala, a loss of hippocampal parvalbumin interneurons, and an increase in the number of dopamine neurons firing spontaneously, leading to a hyper-responsivity to incoming stimuli and abnormally high locomotor response to amphetamine. The increase in dopamine neuron activity was primarily in the neurons projecting to associative striatum. These characteristics, along with others, are consistent with the pathophysiology of schizophrenia. Moreover, MAM treated rats that were administered an anti-anxiety agent peripubertally did not develop the schizophrenia phenotype. In contrast, adult rats exposed to 6 weeks of chronic mild stressors exhibited anhedonia and behavioral despair consistent with depression. This was associated with a decrease in the number of dopamine neurons firing, primarily in the reward-related medial ventral tegmental area. Therefore, the timing of the stressor can significantly impact dopamine system function, leading to pathophysiological changes consistent with schizophrenia (for

peripubertal intervention) or depression (for adult stressors). Such information can provide important data with respect to treatment and even prevention of the onset of psychiatric disorders.

PHENOTYPICAL, BEHAVIORAL AND PHARMACOLOGICAL CHARACTERIZATION OF A NOVEL KNOCKOUT RAT MODEL LACKING THE DOPAMINE TRANSPORTER. D Leo, P Illiano, I Sukhanov, L Mus, S Espinoza, TD Sotnikova, M Hoener and RR Gainetdinov, ISBS Fellow, Department of Neuroscience and Brain Technologies, Fondazione Istituto Italiano di Tecnologia, Genoa, Italy; Neuroscience Research, Pharmaceuticals Division, F. Hoffmann-La Roche Ltd, Basel, Switzerland; Skolkovo Institute of Science and Technology (Skoltech), Skolkovo, Faculty of Biology and Soil Science, St. Petersburg State University, St. Petersburg, Russia

The major function of Dopamine Transporter (DAT) is the reuptake of dopamine (DA) from the synaptic cleft into presynaptic nerve terminals. Wistar Han rats in which the gene encoding the DAT (SLC6A3, belonging to the family of Solute Carrier Transporter genes) has been disrupted, were produced by means of Zinc Fingers Nucleases technology. DAT homozygous knockout rats (DAT^{-/-}) do not show any pre- and postnatal impairment, since they feed, develop and reach adult stage as their wildtype (DAT^{+/+}) and heterozygotes littermates (DAT^{+/-}). Nevertheless, (DAT^{-/-}) show an impaired weight gain during developmental stage; naïve homozygotes have a pronounced Spontaneous Locomotor Activity, as detected throughout development up to adulthood, at different ages and over different periods of observation. Preliminary tissue content and fast scan cyclic voltammetry analysis suggest that the increase in the spontaneous locomotor activity is a direct consequence of the extended length of time that DA spends in the extracellular space following release. Preliminary pharmacological characterization of (DAT^{-/-}) with amphetamine and a Tyrosine Hydroxylase reversible inhibitor show further support for the hyperdopaminergic functional state induced by the knockout of DAT, key protein for the homeostasis of dopaminergic terminals. The DAT knockout rats should be an excellent and improved tool for the study and development of drugs used in the management of dopaminergic disfunctions. Our goal is to provide a complex and translational model for several human diseases involving aberrant DA function or mutations affecting DAT or altered DAT regulatory mechanisms in vivo such as schizophrenia, ADHD and newly discovered Dopamine Transporter Deficiency Syndrome (DTDS). **COI:** MH is an employee of F. Hoffmann La-Roche, Basel, Switzerland. Other authors declare no potential conflict of interest

CONFERENCE PRESENTATIONS

STELLAR TELEMETRY TECHNOLOGY AS A NOVEL TOOL FOR THE WHOLE SET OF POSSIBLE COMBINED EXPERIMENTAL PARADIGMS IN BEHAVIOR, PHYSIOLOGY AND PHARMACOLOGY RESEARCH. E Wenzler, TSE Systems GmbH, Germany

TSE Systems Stellar Telemetry for all animal models ranging from mice to bears and even aquatic animals is an absolutely unique and new telemetry product with distinct innovative features in the wireless market for measurements and transmission of key physiological body functions. Featuring internal memory, variable protocol execution via built-in microprocessor and scheduled upload of data, the animal gains the freedom to move, change environment, be group housed, or temporarily be involved in other activity while still recording data. Data from basic behavioral tests or comprehensive automated phenotyping tools like PhenoMaster, PhenoWorld, IntelliCage, Multi Conditioning or MotoRater can be now combined with physiological parameters such as blood pressure, temperature, activity, heart rate, biopotentials including ECG, EEG, EMG. PhenoMaster for behavioral and metabolic phenotyping of single animals, IntelliCage for cognitive analysis of group-housed animals, Multi Conditioning system for all standard rodent conditioning paradigms for evaluation of learning, memory, emotion and stress-related behaviors in mice and rats can be used together with Stellar telemetry system. These unique technology and diverse approach open new horizons for a large variety of high quality in-vivo research in biomedical and preclinical science.

Day 2. Sun, May 17, 2015

CONFERENCE PRESENTATIONS

BEHAVIOR STUDY OF ANIMALS AND MULTI-DIMENSIONAL MEASUREMENT SYSTEMS (LABORAS, SONOTRACK, DSI). L Bachdasarian, R Bulthuis, E Molenwijk, M Boscaro, Metris B.V., Hoofddorp, Netherlands, Data Sciences International, St. Paul, USA

Current trends in pharmaceutical industry require new translational approaches for pre-clinical testing. This can be achieved by animal experiments in which not only one variable (e.g., behavior) at a time is analyzed, but rather a multidimensional approach (physiology + behavior + Ultra Sounds Vocalization) is applied. Therefore, automation and integration of different measuring technologies become the crucial aspects in this process. Behavior = function {internal stimuli / external stimuli}; Behavior = function {dynamic internal stimulus /from drug effects}; if external factors = constant. For example, by Laboras system: freezing behavior is not immobility behavior; Hindlimb licking behavior is not Scratching; Wet Dog Shakes (WDS) behavior is not Head shakes; Head twitches behavior is not Head shakes. **PTSD study and Fear Conditioning Protocol.** In this protocol, mouse models are very important. There are two way of measuring fear responses in mice: Startle response and Freezing behavior. Metris BV proposes two special algorithms for automated Startle and Freezing detection. Having an automated detection system is not sufficient at the behavioral level for excluding false results (e.g. sleeping phases -> less movement confounded as freezing). Therefore, the behavioral response needs to be integrated and synchronized with physiological parameter (e.g. EEG, ECG, BP, Datasciences Int., The best way to do so would be using Laboras system (for behavioral study), DSI (for Physiological parameter) and Sonotrack (for ultrasounds vocalization study). LABORAS is the system for fully automatic recognition, recording and analysis of the behavior and tracking of small laboratory rodents (rats, mice), based on the analysis of force and energy. SONOTRACK is the system for recording, playback and visualization of ultrasounds vocalizations in laboratory animals (15KHz-125Khz). DSI - system for measuring physiological parameters remotely (without wire measuring pressure, temperature, ECG, EEG, EMG, identification, activity, respiration). Data Sciences is the leading manufacturer for implantable monitoring devices used in preclinical studies. The devices acquire cardiovascular, CNS and respiratory data from freely moving animals in a stress free environment. **Metris** BV is a leading manufacturer of advanced systems for animal behavior analysis (in-vivo experiments) that are sold globally. Main products are: LABORAS, SONOTRACK and SMARTCHAMBER. LABORAS is an innovative system that automates behavior scoring-and analysis of small laboratory animals. The system tracks the XY-position and simultaneously identifies more than 18 validated stereotypical and normal behaviors in mice and rats. Laboras does not use video or infrared beams! There are over 300 publications about the use of Laboras by several leading researchers, pharmaceutical companies, CRO's and leading universities from around the world. SONOTRACK is an advanced system to record, analyze and playback ultrasound vocalizations. The system is highly valued for research in Pain, Stress, Anxiety, Fear, Memory, Learning, Developmental (Neuro) Toxicity and Social Interaction tests. Sonotrack is the best ultrasound vocalization system on the market today because of its full spectrum USV recording (15 kHz to 125 kHz) characteristics, extremely low noise, long duration recording capability and reliable fully-automatic detection of rodent calls. SMARTCHAMBER provides a sound isolated, ventilated and light controlled environment to perform high performance ultrasonic vocalization experiments. The chamber includes an ultrasonic microphone and the interior of the chamber effectively removes sound echo's, external noise and sounds and magnetic fields. SmartChamber can be seamlessly integrated with our product Sonotrack. DSI Data Sciences International is the leading manufacturer for implantable monitoring devices used in preclinical studies. The devices acquire cardiovascular, CNS and respiratory data from freely moving animals in a stress-free environment. In the CIS countries Metris sells modular vivariums and laboratory cabins and various vivarium and laboratory equipment, including cages, Individual Ventilated Cages (IVC racks), workstations, washing machines, wireless equipment for animal identification and temperature registration, systems for wireless measurement of physiology parameters (ECG, EEG, EMG, Blood pressure, Temperature, Respiration) and Sleep Analysis software. Metris is exclusive distributor for DataSciences International (DSI-telemetry), LabProducts, Bio Medical Data systems (BMDS), Instech, Buxco and Kissei Comtec.

SPECIAL ISBS/IBNS LECTURE: ANIMAL MODELS OF GENE-ENVIRONMENT INTERACTION IN PSYCHOTIC DISORDERS: A DIMENSIONAL PERSPECTIVE. M Pletnikov, ISBS Fellow, Department of Psychiatry and Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore, MD, USA

Schizophrenia is a disorder with multifactorial origins. However, even with the increase of identified risk variants, heritability estimates suggest an important contribution of non-genetic factors. Various environmental risk factors have been proposed to play a role in the etiopathogenesis of schizophrenia. These include season of birth, maternal infections, obstetric complications, adverse events at early childhood, and drug abuse. Despite the progress in identification of genetic and environmental risk factors, we still have a limited understanding of the mechanisms whereby gene-environment interactions (GEI) operate in schizophrenia and psychosis at large. I will critically review current animal models of GEI relevant to psychotic disorders and propose possible ways to advance our understanding of the underlying mechanisms to better treatment options.

EFFECT OF BISPHENOL A ON *DROSOPHILA MELANOGASTER* BEHAVIOR - A NEW MODEL FOR THE STUDIES ON NEURODEVELOPMENTAL DISORDERS. A Chauhan, K Kaur, A Simon, V Chauhan, New York State Institute for Basic Research in Developmental Disabilities, Staten Island, New York, City University of New York Graduate Center, New York, USA, Western Ontario University, Ontario, Canada

INTRODUCTION: Developmental disorders such as autism and attention deficit hyperactivity disorder (ADHD) appear to have a complex etiology implicating both genetic and environmental factors. Bisphenol A (BPA), a widely used chemical in the plastic containers and in the linings of food and beverage cans, has been suggested to play a possible causative role in some developmental disorders. Here, we report behavioral modifications in *Drosophila melanogaster* following early exposure to BPA, which may help identify BPA as an environmental risk factor for the behavioral impairments that are the basis of diagnosis of autism and ADHD. **METHODS:** In an open field assay with perinatally BPA-exposed and vehicle-treated control *Drosophila*, different parameters of locomotion (distance travelled, walking speed, spatial movement, mobility, turn angle, angular velocity and meander) were analyzed using the Ethovision software. We also examined the repetitive and social interaction behaviors in these flies. **RESULTS AND DISCUSSION:** In an open field assay, we identified disturbances in the locomotion patterns of BPA-exposed *Drosophila* that may relate to the decision-making and the motivational state of the animal. An increase in repetitive behavior was observed as an increase in the grooming behavior of *Drosophila* following BPA exposure. Furthermore, we also observed abnormal social interaction by the BPA-exposed flies in a social setting. These results demonstrate the effect of the environmentally prevalent risk agent BPA on the behavior of *Drosophila*, and suggest the practicability and the ease of using *Drosophila* as a model in the studies of neurobehavioral developmental disorders. **RESEARCH SUPPORT:** This work was supported in part by funds from the New York State Office for People with Developmental Disabilities, Autism Research Institute and CUNY Graduate Center CSI-CDNDD Program.

SYMPOSIUM II. ANTI-PSYCHOTICS

Chair: XF Huang (Australia), presentations 30 min

HISTAMINE H1 RECEPTORS AND ANTIPSYCHOTIC-INDUCED WEIGHT GAIN: UNDERLYING MECHANISMS AND IMPLICATIONS FOR INTERVENTION. C Deng, School of Medicine and IHMRI, University of Wollongong, Wollongong, NSW, Australia

INTRODUCTION: Atypical antipsychotics such as olanzapine have improved efficacy in controlling schizophrenia symptoms. However, typical antipsychotics causes serious weight gain and obesity side-effects. High antagonistic affinity to histamine H1 receptor (H1R) has been identified as a major contributor for antipsychotic-induced weight gain. Therefore, we conducted a series of experiments in a rat model to investigate the effects of betahistine (a histaminergic H1R agonist and H3 receptor antagonist) in preventing antipsychotic-induced weight gain/obesity and underlying mechanisms. **METHODS:** An established olanzapine-induced weight gain/obesity rat model was used. Betahistine was tested for ameliorating olanzapine-induced weight gain/obesity. Western blot and qPCR techniques were used to analyse protein and mRNA expression. **RESULTS AND DISCUSSION:** Olanzapine-treated rats exhibited significant body weight gain and increased food intake/feeding efficiency. Betahistine co-treatment significantly reduced (~50%) weight gain and feeding efficiency caused by olanzapine. We found that activation of the hypothalamic H1R-AMPK pathway, upregulation of NPY and downregulation of POMC expression are involved in the regulation of olanzapine-induced weight gain/obesity. Consistent with its weight-reducing effects, betahistine co-treatment significantly downregulated the H1R and NPY levels, as well as decreased the AMPK phosphorylation, but no effect on POMC expression. Olanzapine could also reduce thermogenesis and UCP1/PGC-1a protein levels in brown adipose tissue, which could be reversed by betahistine co-treatment. It is important that betahistine co-treatment does not affect the therapeutic binding sites of antipsychotics on dopamine D2 and 5-HT2A receptors. Our results provide the neuroendocrinological mechanisms underlying the effects of betahistine co-treatment on reducing olanzapine-induced weight gain, which supports further clinical trials in betahistine for controlling weight gain/obesity side-effects induced by antipsychotic treatment in schizophrenia patients. **RESEARCH SUPPORT:** This study was supported by the Australian National Health and Medical Research Council Project Grants.

REVERSAL OF ATYPICAL ANTI-PSYCHOTIC DRUG-INDUCED OBESITY AND ITS RELATED METABOLIC DISORDERS. XF Huang, Centre for Translational Neuroscience, School of Medicine, University of Wollongong and Illawarra Health, Illawarra Health and Medical Research Institute, Wollongong, NSW, Australia

INTRODUCTION: Antipsychotics can have very significant effects on the neuroendocrine system. Such effects contribute to both therapeutics and side effects during treating mentally ill patients. For example about 42% of patients treated with atypical antipsychotic drugs become overweight, obese and can develop metabolic disorders. Our study aims to develop better anti-psychotic treatment with reduced side effects, including obesity and metabolic disorders. **METHODS:** Both animal models and human studies have been studied to address this question. **RESULTS AND DISCUSSION:** In rodent studies, we have found that the hypothalamus plays an important role in neuroendocrine regulation. Anti-psychotic drugs alter hypothalamic histamine H1 receptors, which in turn via signal transduction alters changes in neuropeptide expression. These neuropeptides include NPY, AgRP and POMC. The alteration of hypothalamic regulation affects both energy intake and expenditure. We also found brown adipose tissue and white adipose tissue invasion. We have removed the H1 receptor antagonist site of olanzapine. As a consequence, the olanzapine derivate no longer causes obesity. We have also shown that intracranial injection of H1 agonists can block olanzapine-induced excessive food intake. In human studies, we found that metabolic syndrome is frequently occurring in patients treated with atypical anti-psychotic drugs. We found that metabolic syndrome can significantly worsen cognitive function compared to patients without metabolic syndrome. Therefore, a combination therapy is required for treating those patients. Those patients may be prescribed with atypical anti-psychotic drugs in combination with glucose lowering compounds, such as metformin, and natural compounds such as triterpenes. **RESEARCH SUPPORT:** This project was funded by a grant from National Health and Medical Research Council (NHMRC), Australia APP1027493 "Schizophrenia: Reversal of Anti-psychotic drug-induced obesity and its related metabolic disorder".

BARDOXOLONE METHYL: A POTENTIAL THERAPEUTIC FOR THE PREVENTION OF ANTI-PSYCHOTIC DRUG-INDUCED OBESITY? D Camer, CJ Bell, Y Yu, A Szabo, F Fernandez, CHL Dinh, and XF Huang, Centre for Translational Neuroscience, School of Medicine, University of Wollongong and Illawarra Health and Medical Research Institute, Wollongong, ANSTO LifeSciences, Australian Nuclear Science and Technology Organisation, NSW, Faculty of Social Sciences, University of Wollongong, Wollongong, NSW, Australia, Schizophrenia Research Institute, Sydney, NSW, Australia

INTRODUCTION: Antipsychotic drug treatment is known to cause obesity in psychiatric patients. Recently, a derivative of oleanolic acid, bardoxolone methyl (BM) has been shown to have therapeutic benefits in reducing inflammation, a key contributing factor to the development of obesity. However, effects of BM on the development of obesity and associated comorbidities have not been studied. **METHODS:** C57BL/6J male mice were fed a lab chow (LC) (5% of energy as fat), HF (40% of energy as fat), or HF diet supplemented with 10 mg/kg/day BM orally for 21 weeks. Novel object recognition testing was performed to assess recognition memory. Signaling molecules including inflammatory mediators were examined via western blotting in the hypothalamus and prefrontal cortex of mice. **RESULTS AND DISCUSSION:** BM administration prevented HF diet-induced obesity by preventing increases in food intake, body weight, hyperleptinemia, and hyperinsulemia in mice fed a HF diet ($p < 0.05$). In the hypothalamus, BM administration prevented HF diet-induced impairments to leptin signaling by modulating energy balance regulation molecules involved in downstream JAK2-Akt-FOXO1 signaling and prevented increases in inflammatory mediators such as TNF α and PTP1B. In addition, BM treatment prevented HF diet-induced decline in recognition memory ($p < 0.001$). In the prefrontal cortex of HF diet fed mice, BM administration improved downstream BDNF-TrkB-Akt signaling and prevented HF diet-induced increases in the protein levels of inflammatory molecules, pJNK and PTP1B ($p < 0.05$). These results identify a potential novel application for BM in preventing HF diet-induced obesity and associated comorbidities. Furthermore, preliminary testing in antipsychotic-treated rats indicates a potential therapeutic capacity of BM to prevent antipsychotic-induced obesity. **RESEARCH SUPPORT:** This research was supported by Diabetes Australia.

RSBP LECTURE: THE CORRELATIONS BETWEEN CHANGES OF NEUROACTIVE AMINO ACIDS IN HIPPOCAMPUS AND SPATIAL ALTERNATIONS BEHAVIOR OF RATS AT EXPERIMENTAL MODEL OF ALZHEIMER'S DISEASE. KB Yenkovyan, VA Chavushyan, MI Aghajanov, ISBS Fellow, Yerevan State Medical University, Physiology Institute NAS RA, Yerevan, Armenia

INTRODUCTION: The progressive cognitive decline is the main clinical manifestation in dementia-linked disorders like Alzheimer's disease. Here, we attempted to find interrelations between changes in spatial alternation and neuroactive aminoacids content in memory-related brain structure like hippocampus. **METHODS:** Rats were divided into two groups: the control group consisting of vehicle-treated animals, and the amyloid-treated group injected icv with aggregated A β 25-35. All animals were tested behaviorally immediately prior to injections, and then after a recovery period (on the 30th, 60th and 90th days). Spontaneous alternation behavior (short-term memory) was tested in a Y-maze. Determination of glutamate and GABA was performed in rat hippocampus using HPLC. **RESULTS AND DISCUSSION:** Repeated measures ANOVA testing revealed the interrelations of independent factor (day) and the dependent factor (spatial alternation behavior). Post hoc revealed (after icv injection of Ab25-35 on the first tested point, 30th day) no significant changes in spontaneous alternation compared to baseline levels; tendency to reduced alternation was registered on the 60th day and was 18% on the 90th day. On 90th day of study, the levels of glutamate and especially taurine were significantly lower after icv injection of Ab25-35 vs. control rats. Notably, the concentration of GABA did not change; the glycine was the only amino acid among all of the above-mentioned, the concentration of which increased vs. control. The down-regulation of glutamate in hippocampus is a possible result of destruction of glutamatergic neurons, of which hippocampal cells mainly consist. The stability of GABA in case of glutamate deficiency could specify the buffer role of it, which together with glycine were able to prevent the progress of neurodegeneration possibly in early stages of neuronal loss. We can conclude that progressive cognitive decline in A β 25-35-induced neurodegeneration is accompanied by loss of glutamatergic neurons, dramatic decrease of taurine and adaptive protective increase in glycine and glutamate/GABA ratio.

SYMPOSIUM III. ZUKOWSKA SYMPOSIUM ON NEUROSCIENCE

Chairs: AV Kalueff (USA, China), MI Aghajyanov (Armenia), C Song (China, Canada), presentations 15 min



INTRODUCTION: PROF. ZOFIA M. ZUKOWSKA. This regular ISBS symposium is dedicated to Professor Zofia Zukowska (1949-2012). Professor Zukowska received her M.D. and Ph.D., trained in cardiovascular medicine at the Warsaw Medical Academy (Poland). She pursued post-doctoral training at the NIH, working with such renowned scientists as Irwin I. Kopin, Scientific Director of NINDS, and Julie Axelrod, Nobel Laureate. It was during this research period when her interest in stress and neuropeptides became galvanized. For the last 25 years, she was a professor (and, recently, Chair) of the Department of Physiology and Biophysics at Georgetown University, before moving to the University of Minnesota as the Director of Stress Physiology Center. Her research examined how stress affects cardiovascular and metabolic health and diseases, and the role of peptides, in particular neuropeptide Y (NPY), a sympathetic neurotransmitter and a stress mediator. She was the first to determine that NPY mediates stress-induced prolonged vasoconstriction and vascular mitogenic and pro-atherosclerotic effects (via Y1 receptors) and potent angiogenic actions (via Y2 receptors), establishing the role of NPY in ischemia, retinopathy, tumors and obesity. Professor

Zukowska was a strong supporter of the ISBS and a regular plenary speaker at our conferences. Her scientific vision, extraordinary creativity, kindness to colleagues, and the talent to be daring, continue to inspire all her ISBS colleagues and their research.

GSK3B EXPRESSION IN PREFRONTAL CORTEX CORRELATES WITH INDIVIDUAL DIFFERENCES IN FLOATING BEHAVIOR IN THE MODIFIED MOUSE SWIM TEST. NA Markova, EF Shevtsova, OE Zubareva, BH Cline, AN Trofimov, JP Costa-Nunes, EA Veniaminova, HW Steinbusch, SO Bachurin, KP Lesch, TV Strekalova, ISBS Fellow, Institute of Physiologically Active Compounds RAS, Chernogolovka, Institute of General Pathology and Pathophysiology RAS, Moscow, Institute of Experimental Medicine RAS, St. Petersburg, Russia; University de Strasbourg, Strasbourg, France; University of Wurzburg, Wurzburg, Germany; Institute for Hygiene and Tropical Medicine, New University of Lisbon, Lisbon, Portugal; Department of Neuroscience, School for Mental Health and Neuroscience, Maastricht University, Maastricht, EURON, European Graduate School for Neuroscience, Maastricht, Netherlands

An increasing body of evidence implicates altered neuroplasticity in depression. Molecular mechanisms of this link are difficult to dissect experimentally, and there are not effective models to address this aspect. The forced swim test is widely used in translational research on depression, but is criticized for poor etiological relevance and validity. We tested a hypothesis that the modification of a classical protocol of the forced swim test (with an additional session 120 h post the initial exposure) may potentially mimic the plasticity element of depressive state modelling, which is missing in the currently available short tests. In C57BL/6, SERT- and TPH2-deficient mice exposed to the modified swim test, GSK3 β expression were assessed in prefrontal cortex and hippocampus. C57BL/6 mice were treated with imipramine (7.5 mg/kg/day), thiamine (200 mg/g/day) or benfotiamine (200 mg/kg/day) for 2 weeks before testing with drinking water. In our study, the mouse floating behavior was further increased during the postponed swim session, and this response was prevented by antidepressant treatments with imipramine, as well as thiamine or benfotiamine. Mice deficient in serotonin transporter (SERT) or tryptophan hydroxylase 2 (TPH2) are valid models of human depression, displayed an increase of floating behavior in the third swim session in the modified swim test, but not in its classical test variants. Recent experiments with the same modification of tail suspension test also revealed similar phenomenon of elevated depressive-like behavior in mice. Glycogen synthase kinase 3 beta (GSK3 β) is an established marker of depressive state which is included in mechanisms of neuroplasticity. Gene expression of GSK3 β was increased in mice exposed to the modified swim test, and were prevented by the above-mentioned antidepressant pharmacotherapies. These genomic changes in the prefrontal cortex, but not in hippocampus, were correlated with inter-individual differences in

floating. Moreover, a reminder of an aversive context instead of an additional swim session induced the same change in gene expression of GSK3 β in the prefrontal cortex of mice. Taken together, this suggests that the modified protocols implement the elements of learned helplessness and neuroplasticity, which may underlie individual susceptibility to a depressive syndrome of mice. **RESEARCH SUPPORT:** This research was supported by RFBR 15-04-03602 and European Community (EC: AGGRESSOTYPE FP7/No).

USEFULNESS OF FORENSIC PRACTICE OF THE HASSALL'S CORPUSCLES IN THE THYMUS AND INTRA-THYROIDAL ECTOPIC THYMUS TO ESTIMATE STRESS SITUATION. S Furukawa, Department of Legal Medicine, Shiga University of Medical Science, Japan

INTRODUCTION: The tissues located inside the mandibular arch and have large number of lymphocytes and scattered mastoid cells but no Hassall's corpuscle. The thymus has traditionally has been considered to be composed of a cortex and a medulla, which contain developing thymocytes within a network of thymic epithelial and stromal cells, and has been shown to be a sensitive target organ following exposure to immunotoxicants and a decreasing in size or weight is often occurred by the effects of stress including child abuse and neglect, and aging. **METHODS:** The thymus tissues were collected at autopsies, Department of Legal Medicine, Shiga University of Medical Science and Osaka Medical Examiner's Office. We encountered three cases of the intra-thyroidal ectopic thymus and five cases of cervical ectopic thymus at autopsy in the last few years. We also performed autopsies of several cases in which mothers and her children died in attempting suicide or accidents. Additionally, we performed several abused cases and accidental case in which young boys died to starvation or through brain death. Conventional HE staining was performed. **RESULTS AND DISCUSSION:** The results indicate that ectopic thymuses have no affect by the thyroidal hormone. We also indicate that morphology of Hassall's corpuscles may be hereditary since the morphology of the Hassall's corpuscle from mothers and children also resemble each other. The number of Hassall's corpuscles increase in medulla of the thymus from boys and girls who died due to abuse or accident. From a boy who died due to starvation we could not find any thymus tissue and find small amount of lymphoid cells in the anterior mediastinal cavity, indicating severe involution of the thymus in serious abuse case. The ratio of the Hassall's corpuscles with calcification may also indicate the degree and time of stress that inflicted the healthy situation of children. These results show that Hassall's corpuscle is not degenerative changes of the epithelial component of the thymus and intra-thyroidal ectopic thymus, and play an important role in biology and the immune system in human.

KNOCKDOWN OF CORTICOTROPIN-RELEASING FACTOR RECEPTOR 1 IN THE VENTRAL TEGMENTAL AREA FACILITATES CONDITIONED FEAR. JH Kim, DE Ganella, S Layfield, R Bathgate, A Chen, AJ Lawrence, NA Chen, Florey Institute of Neuroscience and Mental Health, University of Melbourne, Parkville, Australia; Department of Neurobiology, Weizmann Institute of Science, Rehovot, Israel

INTRODUCTION: The neuropeptide corticotropin-releasing factor (CRF) has long been implicated in various aspects of anxiety disorders. The overlap between extra-hypothalamic CRF receptor distribution and key structures of the mesocorticolimbic system allows CRF to modulate anxiety-related learning and memory, and central administration of CRF receptor antagonists can reliably inhibit the expression of conditioned fear in animal models. However, the brain structure(s) and receptor subtype(s) that mediate this effect have not been fully elucidated. The ventral tegmental area (VTA) is of particular interest because it has an important role in emotional memories, and CRF receptors are highly expressed in this area. However, there are currently no studies investigating whether they are involved in fear learning. Therefore, we examined the role of CRF receptor type 1 in the VTA in conditioned fear, using a virus-mediated RNA interference approach. **METHODS:** Mice were stereotaxically injected into the VTA with a lenti-virus that contained either shCRF-R1 or a control sequence. They were then examined for acquisition, extinction, and reinstatement of conditioned fear using a tone conditioned stimulus and a footshock unconditioned stimulus. **RESULTS AND DISCUSSION:** Interestingly, mice with CRF-R1 knockdown in the VTA showed increased expression of conditioned fear, although the acquisition was unaffected. This suggests a novel role of VTA CRF-R1 in consolidation and/or expression of conditioned fear. **RESEARCH SUPPORT:** National Health and Medical Research Council and Australian Research Council.

A DECREASE OF HEAT SHOCK PROTEINS EXPRESSION IN THE BRAIN AGGRAVATES THE NEUTOPATHOLOGICAL SYMPTOMS OF PRECLINICAL PARKINSON'S DISEASE STAGE IN RATS.

DV Plaksina, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry Russian Academy of Sciences, St. Petersburg, Russia

INTRODUCTION: Parkinson's disease (PD) is a progressive neurodegenerative disease characterized by the accumulation of toxic α -synuclein aggregates and followed degeneration of the dopamine (DA)-ergic substantia nigra pars compacta (SNpc) neurons. Recent studies have revealed an association of several heat shock proteins (HSPs) with α -synuclein pathology, thus promoting the idea that chaperones are key players in PD pathogenesis. These studies uncover a correlation between levels of HSPs and detergent-soluble α -synuclein. There is also increasing evidence that HSPs could counteract pathological mechanisms that take place during PD: Hsp70 interacts with α -synuclein and suppresses its aggregation, reduces α -synuclein-induced toxicity and extends survival of neurons. However, postmortem SNpc samples of PD patients are characterized by decreased level of different HSPs (Hsp27, Hsp40, Hsp70, Hsc70, Grp78 and Hsp90). It remains unclear whether a decrease of HSPs in the brain causes PD progression. This work aims to study the influence of decreased HSPs content in the SNpc on motor behavior and neurodegenerative process in nigrostriatal pathway in the model of preclinical PD stage in rats. **METHODS:** Experiments were carried out in male Wistar rats. To create the model of preclinical PD stage, the inhibitor of proteasome activity lactacystin (LC) was bilaterally injected into the SNpc. To decrease the level of inducible Hsp70 in the SNpc neurons, a technology of microRNA in vivo based on lentiviral delivery of shRNA-Hsp70 gene to the SNpc neurons was used. To decrease the HSPs level in the SNpc and other brain structures animals were pretreated i.p. with HSPs expression inhibitor quercetin before LC treatment. The number of survived DA-ergic (tyrosine hydroxylase TH)-immunoreactive) neurons of the SNpc was estimated by immunohistochemical assays. To assess disturbances in rat motor behavior, we tested gait and postural balance, ability to hang on the grid and manipulation abilities of forelimbs and tongue in the sunflower seed test. **RESULTS AND DISCUSSION:** The model of preclinical PD stage is characterized by degeneration of 33% of DA-ergic SNpc neurons and no change in motor behavior. The local decrease of Hsp70 level within 75-80% in the SNpc neurons in the preclinical PD model enhances (1.5-fold) the number of the lost SNpc DA-ergic neurons and induces the appearance of motor disorders; time of grid hanging and the amount of eaten sunflower seeds decrease 1.5 times, the severity of gait and coordination disturbances increases twice compared with the LC animals. The decrease of HSPs level in the SNpc and other brain structures by quercetin in the preclinical PD model was accompanied by greater motor behavior deficits; the time of grid hanging is significantly diminished by 5 times in comparison with animals, receiving lentiviral construction and LC. **CONCLUSION:** Our data reveal an association between levels of several HSPs in the SNpc and PD progression. The decrease of HSPs in the rat brain accelerates the transition from preclinical (premotor) to clinical (motor) stage of PD. **RESEARCH SUPPORT:** The study was supported by the RFFR grant 14-04-00478.

INTERACTIONS BETWEEN STRESS HORMONES AT THE INSULAR CORTEX MODULATE AROUSAL-INDUCED RELUCTANCE TO NOVELTY (NEOPHOBIA), STRESS AND ANXIETY.

J Stehberg, Laboratorio de Neurobiologia, Centro de Investigaciones Biomedicas, Universidad Andres Bello, Santiago, Chile

Interest in the Insular cortex has increased recently for its potential role in anxiety. Here, using a combination of systemic and intra-insular manipulations of adrenergic activity and glucocorticoids in rodents, we show that interactions between stress hormones mediate the effects of arousal in taste neophobia. Moreover, interactions between these stress hormones at the Insula appear to modulate anxiety and responses to stress, suggesting that the Insula is an important cortical site modulating anxiety. **RESEARCH SUPPORT:** Funded by the FONDECYT grant 1130724.

EARLY-LIFE STRESS CHANGES REACTIVITY OF REWARD SYSTEM IN THE RATS: THE ROLE OF THE DYNORPHIN/KAPPA-OPIOID SYSTEM.

VN Mukhin, A Kozlov, I Abdurasulova, V Lioudyno, KI Pavlov, A Lebedev, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia

INTRODUCTION: Early life exposure to stress is associated with CNS diseases such as major depression, post-traumatic stress disorder, migraine, suicide, and addictions including alcoholism. However, the underlying mechanisms of such association are poorly understood. It can be assumed that such mechanisms are stress-induced, evoking long-lasting changes in functioning of the brain systems, mainly

due to epigenetic regulation. Such changes are well studied in relation to the hypothalamic-pituitary-adrenal system, although their pathogenesis role is not clear. The probable role of the brain reward system and the dynorphin/kappa-opioid system, which downregulates other systems within the stress reaction, also remains poorly understood. For example, we do not know the sensitive periods when these systems are vulnerable to stress and are there any sex differences in the stress induced changes. The aim of this study was to investigate whether early life stress influences the reactivity of brain reward system, and whether the dynorphin/kappa-opioid system plays a role in this modulation. **METHODS:** Three series of experiments were carried out. In Experiment 1, rat pups were stressed at the age of 22-26 days PN every day with simultaneous presentation of two stressors, social isolation and odor of an unfamiliar anesthetized adult male rat. In Experiment 2, the stressors were changed to pharmacological stimulation of kappa-opioid receptors. In the both series we used several experimental approaches to investigate functional state of the reward system. In Experiment 1 the rats, when they reached the age of 70-90 days, were alcoholized and their two-bottle alcohol consumption test was carried out. In Experiment 2, the rat reward system was tested using intracranial self-stimulation of the mesocorticolimbic dopaminergic pathway before and after acute cold stress. In Experiment 3, enzyme-linked immunosorbent assay of dynorphin level in the nucleus accumbens after stress (electrical foot shock) was performed. In this series, reinforcing effect of the kappa-opioid receptor stimulation in non-stressed rat pups was assessed using the administration of the selective kappa-opioid agonist U-62,066, followed by testing learning of conditioned place preference. **RESULTS AND DISCUSSION:** In contrast to males, the mode of action of the reward system in female rats was sensitive to stress they experienced at 22-26 days PN. When they reached the age of 70-90 days, these rats had lower tendency to the formation of alcohol dependence, as being alcoholized they consumed less alcohol. However, these rats did not show stress-induced increase of lever pressing in the intracranial self-stimulation conditions. As the dynorphin/kappa-opioid system downregulates neuronal activity during stress, it may be a part of the physiological mechanism of the reward system reactivity modulation. First, we found that adult female rats stressed at 22-26 days PN, in contrast to males, do not show stress-induced dynorphin level rise in the nucleus accumbens. Second, pharmacological stimulation of the kappa-opioid receptors at 22-26 days PN mimics the effects of stress on alcohol consumption and self-stimulation described above. Third, all these effects may be due to the fact that female rats have a special sensitivity of the reward system to kappa-opioid receptor stimulation at the age of 22-26 days. In contrast to males, female pups demonstrated aversive learning in response to pharmacological stimulation of kappa-opioid receptors. **RESEARCH SUPPORT:** This research was supported by the Russian Foundation for Basic Research (RFBR) grant 12-04-01188.

MODERATED ROUND TABLE DISCUSSION: SYSTEMATIC OVERESTIMATION OF PERCEIVED OCCUPATIONAL STRESS. Ph Fauquet-Alekhine, J Berton, L Rouillac, Th Geeraerts, JC Granry, Nuclear Power Plant of Chinon, Laboratory for Research in Energy, University Hospital of Angers, Angers, University Hospital of Toulouse, Toulouse, France; Department of Social Psychology, LSE, UK

INTRODUCTION: Previous studies (Fauquet-Alekhine et al. 2012) undertaken with mechanical engineers ($N=18$, 25-35 year) submitted to short term occupational stress under controlled conditions (low and high level of stress), as well as studies carried out with anesthetist residents ($N=18$, 25-33 years, no previous experience of simulation training) trained in stressful conditions on simulator (Fauquet-Alekhine et al. 2014) showed that for high level of stress, subjects tended to overestimate the perceived stress through the Post Disorder Inventory (PDI) questionnaire (Brunet et al. 2001) when compared to objective physiological assessment of stress. This was already observed elsewhere for surgeons (Aminazadeh et al. 2012). On the basis of additional experiments and deepened analysis, we tried to characterize this phenomenon in detail. **METHOD:** Data were completed by 1) experiments with anesthetist residents trained on simulator in similar conditions than the previous study; subjects' profile was similar ($N=8$); 2) self-assessment of stress using an additional questionnaire, Appraisal of Life Event scale (ALES; Fergusson et al. 1999) in order to evaluate whether or not overestimation was inherent to a bias of the PDI questionnaire ($N=44$). First, the results obtained with questionnaires were compared. Second, objective vs. subjective (over)evaluation was characterized through correlation coefficient. Third, overestimation was characterized through the questionnaire items which significance was rated by Student t-test. Finally, the nature of the overestimation was confronted to occupational personality traits. **RESULTS AND DISCUSSION:** The ALES questionnaire items regarding constrain significantly correlated with the PDI questionnaire ($r=0.70$, $p<0.001$) allowing to reject the hypothesis of questionnaire bias explaining overestimation. Data regarding all occupational types of subjects (mechanical engineers and anesthetist residents) which were not concerned by overestimation (mainly low level of stress) were fitted with linear curve giving a high value of correlation coefficient $r=0.79$ ($p<0.001$). Data showed that overestimation was different according to the subjects' professions. Engineers

significantly overestimated autonomy (+20%, $p < 0.05$) and emotion (+17%, $p < 0.05$), both in terms of being unable to reach the expected goal of the test; yet the experiment did not involve them in safety concerns. Anesthetist residents significantly overestimated emotion (+26%, $p < 0.05$) and safety (+34%, $p < 0.05$), both patient-oriented. We compared these findings with recent works assessing occupational personality traits (Hardigan and Cohen, 2003; Kazt et al. 2007 for anesthetists; Bannerot, 2006, McLening and Buck, 2010; and Yan et al. 2013 for engineers). We found out that overestimation amplified the main personality traits identified for each profession. **RESEARCH SUPPORT:** EDF.

ISBS SPECIAL FOCUS TALK: STRESS - THE PEPTIDE PECULIARITIES OF COMPENSATING THE EMOTIONAL AND BEHAVIORAL DISTURBANCES AND ADAPTING TO DIFFERENT EXTREME INFLUENCES IN MAMMALS. TN Sollertinskaja, ISBS Fellow, MV Shorokhov, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia

INTRODUCTION: The problem of the neuropeptide regulation and compensation of the disturbed emotional reactions, especially negative factors causing emotional and posttraumatic stress, due to increasing exposure to stress globally, are one of the most actual problems of modern neurophysiology and medicine. One of the main roles in the formation of the emotional and motivated states belongs to the limbic brain structures, especially Hypothalamus (Hyp). The correction of emotional deficits in parallel to testing cognitive activity using objective indicators of Higher Nervous Activity in mammals of the different phylogenetically level development, has not been studied in depth. The role of the Hippocampus (Hipp) and Hyp structures in modulating cortical activity is poorly understood. The present work focused on comparative analyses of peptide drugs Semax (Sem), Selank (Sel) and ACTH6-9 in the compensation of emotional and cognitive functions disturbances, and on studying the role Hipp and Hyp structures in these effects on the neocortex activity in several mammalian species. **MATERIALS AND METHODS:** The experiments were performed in the ascending row of mammals (insectivores, rodents and primates) using the food exposure model. The experiments carried out under the conditions of free behavior as well as in special primatological chair (monkeys) with the multiparameter computer registration and analysis of EEG, vegetative and motor indices of Higher Nervous Activity. Sem, Sel and ACTH6-9 drugs were administered intranasally or intramuscularly in doses 0.1-5, 30-100 and 0.2-0.4 $\mu\text{g}/\text{animal}$ (hedgehogs, rats). **RESULTS AND DISCUSSION:** The compensatory role of Sem and Sel in hedgehogs is more significant in restoring the inherent forms of behavior and vegetative reactions. The compensatory drugs' effect was similar. In drug-treated animals, the food motivation was restored and increased, whereas the emotional disturbances and fear reaction disappeared. Prior administration of Sel and ACTH6-9 prevented the development of the hibernation in hedgehogs, the inherent forms of behavior increased, the conditioned reflexes (CR) remained preserved. ACTH6-9 exerted dose depending influence on the hedgehogs functional state, adaptation-trophic character. The influence of Sel on the functional state of the hedgehogs was more significant. In rodents, we observed the tendency for differentiation of the cerebroprotective Sel and Sem effects of the memory processes disturbance: Sel administration induced behavioral changes, such as increased self- and hetero-grooming. This grooming was different during stress, and Sel exerted anxiolytic effect and the neurotic disturbances, fear reactions and brake reaction disappeared. After Sel, the reproductive function was increased. In rodents, the role neuropeptide drugs in reducing stresses of different genesis has an expressed tendency to differentiation. The Sel action after immobilization stress was more pronounced. Sem effects during swimming in cold water with dressing of the *arteria carotis* from one side, at the early stage of the operative intervention, restored disturbed innate behaviors, but only partially. Analyzing Sem and Sel effects on restoring brain functions and Hipp damage reveals distinct compensatory effect. The stimulation of the CA3 field exerted more significant effect on the EEG parameters, while the stimulation of the CA1 field more strongly affected the vegetative measures. The stimulation of Hyp exerted the facilitatory effect on the Higher Nervous Activity. The prior Sel injection potentiated the Hyp stimulation effect. At the primate level, the compensatory effects of the Sem and Sel differentially affected the disturbed brain functions. The spectrum of compensatory Sel effect was especially widespread and prolonged. The prior injection of small doses (30 $\mu\text{g}/\text{kg}$) of Sel prevent the development of emotional stress, while the compensatory Sem effect was more expressed at the excitatory type of neurosis, with the vegetative indicators of the memory lasting longer time. Sem also exerted antioxidant action in the cold stress model. **RESEARCH SUPPORT:** Russian Foundation for Basic Research Grand № 15-08-0635315.

Day 3. Mon, May 18, 2015

SYMPOSIUM IV: LAPIN SYMPOSIUM ON BRAIN RESEARCH

Chairs: IV Ekimova (Russia), VM Klimenko (Russia), presentations 15 or 20 min



INTRODUCTION: PROF. IZYASLAV P. LAPIN. This regular ISBS symposium is dedicated to Professor Izyaslav 'Slava' P. Lapin (1930-2012), one of the true pioneers of experimental neuropsychopharmacology and biological psychiatry. Slava Lapin graduated from Pavlov Medical School in St. Petersburg, and shortly after receiving PhD, was invited in 1960 to establish the first psychopharmacology laboratory at the Bekhterev Psychoneurological Institute. The most important scientific contribution of Prof. Lapin was establishing the link between serotonin levels and mood-elevating (thymoleptic) action of antidepressants. He suggested that enhanced central serotonergic tone is essential for the mood-elevating effects of antidepressants. Lapin's serotonin hypothesis of antidepressant action, published in *Lancet* in 1969, became one of the most cited papers published in this journal in the last 50 years. Lapin's studies have contributed greatly to the development of newest serotonergic antidepressants, such as SSRIs, currently representing the most prescribed group of psychotropic drugs in the world. Prof. Lapin was also the first to report the neuroactive effects of kynurenine

and its derivatives – a discovery that opened another rapidly expanding area of glutamatergic psychopharmacology. A talented professional musician, prolific writer, painter, and an enthusiastic athlete, Prof. Lapin was a strong supporter of ISBS, and generously shared his knowledge with colleagues and students at our "Stress and Behavior" conferences and ISBS summer schools. His enthusiasm, friendship, generous support of junior colleagues, and the deep knowledge as both a clinical and experimental neuropharmacologist ('humanists' and 'animalists', as he called them), made a long-lasting impact on his colleagues and students.

DIRECT AND INDIRECT MENTAL HEALTH CORRELATES OF INTERIOR ENVIRONMENTAL SPATIAL QUALITIES. AE Lawrence, University of Nevada, USA

INTRODUCTION: By the year 2050, the number of people age 65 and older with dementia is expected to triple to a projected 14 million. A significant body of medical research findings implicates building interiors as having the potential to be either stressors, or being integral to innovative approaches required to address delivery of healthcare that is one of the key economic, societal and scientific challenges in the United States. A meta-analysis, which combines results from many studies, found the most successful non pharmacological interventions for neuropsychiatric symptoms of dementia were multicomponent, person centered, and delivered in a home environment. The relationship between these research findings and environmental design practices, however, has not been adequately documented. **METHODS:** The goals of this project are to 1) develop a design-research problem-solving methodological paradigm for neuroscience-informed environmental design responses to neurodegenerative disorders often manifesting as stress in problem behaviors; 2) demonstrate an application of this model in a schematic design process intended to optimize interior spatial qualities that support well-being and daily human functions; 3) present a design for a prototype (an "ideal" living environment) that supports independent living in later years; 4) demonstrate the viability of environmental design interventions as one of at least three modalities - pharmacologic, behavioral, and environmental - for improving the quality of human life, health, and behavior; 5) accelerate the development of design methodologies to support the transformation of healthcare from reactive and hospital-centered to focused on well-being rather than disease. **RESULTS AND DISCUSSION:** The Neuropsychiatric Inventory (JL Cummings) commonly used for assessing symptoms in people with neurological disorders served as the conceptual framework for knowledge transfer and translation to inform

the development of environmental design premises and strategies. Of fundamental concern in the development of design strategies were neuropsychiatric disturbances, i.e. delusions, hallucinations, dysphoria, anxiety, agitation/aggression, euphoria, disinhibition, irritability, apathy, aberrant motor activity and sleeping disorders. Drawing on experimental studies, links between problem behaviors and environmental spatial qualities were delineated as design programmatic input. Given that there are no cures for the common dementias caused by progressive neurodegeneration, design concepts were intended to optimize interior spatial qualities to address the management of these problem behaviors and to support well-being and daily human functions. **RESEARCH SUPPORT:** UNLV Research and Economic Development Grant (2014).

CASE REPORT: SEVERE PSYCHOSIS WITH DEPRESSION AFTER SUBTHALAMIC NUCLEUS DEEP BRAIN STIMULATION. ZR Zhao, SM Chua, Institute of Mental Health, Singapore

INTRODUCTION: Deep brain stimulation (DBS) of the subthalamic nucleus (STN) has been proven to be highly effective in relieving symptoms of Parkinson's disease. Even though there are some reports about severe psychiatric side effects (mania or psychosis) after DBS implantation, most of the symptoms are transient and responding well to psychiatric treatment. **METHODS:** To report a case of severe psychosis with depression after bilateral STN DBS which is not responding well to the psychiatric treatment. To describe the potential psychiatric issues after DBS implantation. **RESULTS AND DISCUSSION:** A 50-year-old female patient with advanced Parkinson's disease without significant psychiatric history had undergone implantation with bilateral STN DBS after treatment failure with anti-Parkinson's medications. The operation was uneventful but the patient developed florid psychotic symptoms and depression 2 months after the implantation. The symptoms were severe enough to require 2 hospitalizations. We treated her with oral quetiapine 37.5 mg/day and escitalopram 10mg/day. The patient was discharged with residual symptom. However, she relapsed with more severe behavioral symptoms 2 months later. The medication had been increased to quetiapine 175 mg/day and escitalopram 20 mg/day. A mood stabilizer sodium valproate 200 mg/day was added for mood irritability. The psychotic symptoms had resolved after the second admission, but her depression only remitted 4 months after the second admission. To our knowledge, this is the first report of psychiatric complication of mixed psychosis with depression after DBS, and contrary to previous reports, our patient was not responding well to treatment which raised our concern about psychiatric issues with poor prognosis after DBS. It would be helpful for larger case series to guide future management.

ON A RELATION BETWEEN NONVERBAL AND EMOTIONAL INTELLIGENCE IN CHILDREN AGED 8 TO 11 YEARS. MN Anderson, Academy of Pedagogical Education, St. Petersburg, Russia

INTRODUCTION: Here, we study the relation of nonverbal and emotional intelligence as an essential component of an ability of primary school age children to recognize basic human emotions. The main purpose of the research was to study the dynamics of the relationship between the ability of emotion recognition and non-verbal intelligence in children aged 8-11 years. **METHODS:** Methodical approach of the study included the coding technique facial expressions FAST (P Ekman) to assess the peculiarities of emotion recognition schemes face expression; methods of individual success emotion recognition JACFEE with the aim of studying the peculiarities of emotion recognition from photographs, and G Raven method to assess nonverbal intellectual skills (series A, B, C). **RESULTS:** The relationship between ability of emotional recognition and non-verbal intelligence was studied by factor analysis. First, the age factor models contain a different number of factors. The most informative factor models include the parameters of nonverbal intellect and emotion recognition at the age of 8 and 10, and the least informative one includes the results of the examination of the children aged 9 and 11 years. Total factor loading of the first two models was, respectively, 43.2 and 40.7% of total variance, and for the last two models it was 29.2 and 25.2%, respectively. This data can be explained with results from studying the recognition of human emotion: at the age from 7 to 8 years, at the age of 10 children experienced the greatest rise in the ability to recognize emotions. **CONCLUSIONS:** The role of nonverbal intellect in the development (in children aged 8-10 years) of the ability to recognize emotional pictures was particularly significant for the age groups of 8 and 10 years. This conclusion is confirmed by significantly higher numbers of 8- and 10- (vs. 9-year-old) children successfully recognized basic human emotions.

MODELING BRAIN CONNECTIVITY FROM POSITRON EMISSION TOMOGRAPHY DATA: APPLICATIONS IN NORMAL AND PATHOLOGICAL COGNITION. I Yakushev, Department of Nuclear Medicine, Klinikum Rechts Der Isar, Technische Universität München, Munich, Germany

INTRODUCTION: Positron emission tomography with 18F-fluorodeoxyglucose (FDG-PET) enables non-invasive measurement of brain glucose metabolism in the living human brain. At present, both quantitative and visual analysis of PET images is dominated by univariate statistics. These analyses take into account the magnitude of regional PET measurements, but ignore relationships between them. Given the increasing impact of research on brain connectivity, our aim was to test a few approaches of brain network modeling from FDG-PET data. **METHODS:** In this article we focus on sparse inverse covariance estimation (SICE). SICE is an extension of partial correlation analysis that imposes a “sparsity” constraint on the maximum likelihood estimation of a covariance matrix. This feature makes the method robust to small sample sizes that are usual for PET studies. SICE was used 1) to capture network correlates of healthy verbal working memory (WM) in FDG-PET data from 35 young healthy subjects, and 2) to differentiate between patients with mild Alzheimer’s disease (AD, n=47), frontotemporal lobar degeneration (FTLD, n=52), and healthy elderly subjects (HS, n=45). **RESULTS AND DISCUSSION:** In the first study, network modeling was based on 13 Brodmann areas (BAs) that are known to be implicated in verbal WM according to a meta-analysis. Among them, 6 appeared to be robustly connected. Connectivity within this network was significantly stronger in subjects with above-median WM performance. In the second study, prominent differences in network structure of three groups were found. The obtained connectivity patterns differentiated between the AD and FTLD groups with an overall accuracy of 83%. The linear discriminant analysis and a univariate method provided an accuracy of 74% and 69%, respectively. The results encourage examination of connectivity/covariant patterns in FDG-PET data from both non-neurodegenerative and degenerative populations. The methodology can be extended to capture neurotransmitter networks and their role in stress-related and somatoform disorders. **RESEARCH SUPPORT:** Internal grant program for resident physicians (KKF project B23-13/8764179) of the Technische Universität München, Munich, Germany.

EFFECT OF THE STRESS OF HIGH ALTITUDE HYPOXIA ON COGNITIVE FLEXIBILITY AND ANXIETY STATE. L Xu, Y Wu, T Zhao, S-H Liu, L-L Zhu, M Fan, Institute of Basic Medicine, Beijing, China

OBJECTIVE: To explore the effects of high altitude on cognitive flexibility. **METHODS:** Simulated hypoxia at an altitude of 3,600 m was performed in a hypobaric chamber. Twenty-three volunteers without hypoxic experience were selected and the mean age was about 25.1 years. The physiological parameters (heart rate, blood pressure and oxygen saturation) were measured. Task switch paradigm was used to explore the cognitive flexibility in each phase, the changing anxiety state was evaluated by emotional rating scale and the salivary cortisol was taken as a sample material simultaneously. **RESULTS:** Acute hypobaric hypoxia led to a fall in SpO₂ (99.23±0.77 vs. 89±4.21; p<0.001), heart rate (79.87±10.25 vs. 84.17±11.24; p<0.05). Reaction time (RT) switch cost in hypoxia phase showed a significant increase compared with the baseline. Simultaneously, the levels of salivary cortisol were found increased (37.82±0.41 vs. 38.14±0.32; p<0.05). Anxiety level in hypoxia phase was higher than the adaptation phase, a remarkable negative correlation between anxiety level and RT switch cost was found in adaptation phase, whereas a positive correlation was found in landing phase. **CONCLUSION:** High altitude (3,600 m) affects cognitive flexibility and anxiety state in humans. Anxiety before the hypoxia exposure improves the cognitive flexibility performance, while anxiety after the hypoxia exposure hampers the performance because of the post-hypoxia effect.

CONVENTIONAL AND ADVANCED NEUROIMAGING MODALITIES IN DETECTION OF BRAIN INFECTIOUS DISORDERS AND THEIR CONSEQUENCES. D Kozic, University of Novi Sad Faculty of Medicine, Novi Sad, Serbia

INTRODUCTION: Brain and surrounding structures (skull base and meninges) could become infected by a large spectrum of microorganisms. Bacteria and viruses are the most common infections, while parasites, fungi and others can invade the central nervous system (CNS), although more rarely. Magnetic resonance imaging (MRI) is a method of choice to detect CNS involvement. **METHODS:** MRI was performed in 32 patients with infectious diseases of the brain. Multivoxel MR spectroscopy (MRS) was performed in 58 patients with HIV infection. **RESULTS AND DISCUSSION:** Pachymeningitis and leptomenigitis are clearly seen on MRI, however, the diagnosis is non-specific since neoplastic involvement of meninges may perform very similar radiologic finding. Diffusion weighted imaging is crucial in differentiation between pyogenic and non-pyogenic abscesses. The presence of very high lactate peak on MRS is obvious in patients with

multifocal leukoencephalopathy. Involvement of frontobasal, insular and temporal cortex was evident in patients with herpes encephalitis. Elevated choline:creatine ratio was noted in normal appearing brain parenchyma in patients with HIV infection on several locations in gray and white matter, suggesting the presence of inflammatory process on molecular level ($P < 0.01$). Associated cerebral venous thrombosis was noted in two patients. MRI is a crucial diagnostic modality for CNS infection detection, while MRS may be very useful in detecting alterations on molecular level.

THE IMPORTANCE OF SUPPORT TO PATIENTS DURING CHEMOTHERAPY - OUR EXPERIENCE. N Boskov, B Korovljević, General Hospital Djordje Joanović, Zrenjanin, Serbia

INTRODUCTION: In our institution great attention is paid to improving the quality of patients' life during chemotherapy, especially in the domain of mental support. The objectives of the study were: 1. To evaluate the importance of the support and confidence (by the oncology team, family, friends, chosen doctor) 2. To analyze the suggestions and complaints of the patients and 3. To evaluate the influence of the experience of other patients on the examinee. **METHODS:** The study was conducted in the Oncology Department, General Hospital "Djordje Joanovic" in Zrenjanin between Jan 2008–Oct 2014 in 818 patients. The questionnaires included the questions regarding the awareness of the disease, the impact of the experience of other patients, the importance of support and confidence in the oncology team, family, friends and primary care physicians. Grading system from 1 to 5 was performed. Questionnaires were evaluated on monthly basis. **RESULTS AND DISCUSSION:** The gender structure of examinees was: 82% were female, mean age 53.3 and 18% male, mean age 48. Two thirds of patients stated that the experiences of other patients had a bad influence on them. Positive support of oncological team was mostly noted as the most important in 33% examinees, followed by children, friends, and spouse. Confidence in doctors and nurses were rated with average score of 4.90 (range 1-5), and the importance of support with 4.93 (range 1-5). The most frequent remarks were related to the area in which the treatment was administered (30%) as well as the number of people in the patients' room. Significant percentage of examinees suggested the need for greater intimacy. Proposals for improvement were related to shorter waiting times, increasing the number of doctors and nurses, engraving of department space. Expectations of health care workers and patients are often different. Results of the research impacted everyday routine approach to the patients on chemotherapy treatment.

PERCEIVED STRESS, ANXIETY, DEPRESSION AND RISKY BEHAVIOR IN ADOLESCENTS. AS Rakhimkulova, VA Rozanov, Odessa State University, Odessa, Ukraine

INTRODUCTION: Constant and prolonged stress, whether objective or imagined, has a strong impact on the emotional disfunctioning in adolescents. Even when a teenager is not subject to stressful life events, if he or she perceives the situation as stressful, it can seriously affect their patterns of behavior. On the other hand, it is not clear whether perceived or objective stress has stronger impact on depressive symptoms, anxiety and risky behaviors in adolescents' population in a longer perspective. **METHODS:** The study comprises 607 adolescents aged 12-17 (285 males, 322 females) from different types of schools in Ukraine chosen randomly. The subjects were given a set of questionnaires (116 questions total), aimed to evaluate mental well-being, anxiety, depression, suicidal ideation and attempts, risky behaviors, and specific questions about coping, trauma exposure, bullying, stressful life events, stigma and discrimination, peer and parent-child relations, child physical health. Here some preliminary results of the analysis are presented. **RESULTS AND DISCUSSION:** A certain discrepancy was revealed between the number of stressful life events and the amount of stress teenagers reported – besides regular correlation 'the more frequent the stressful events, the higher the stress level' two more groups of teenagers were clearly identified – those who reported no or few stressful events (2-3) and high levels of stress and those who reported no stress at all accompanied with a considerable number of stressful events in the last 12 months (>7). In general, girls more often than boys tend to experience stress even when there are no or few stressful life events. Teenagers aged 16-18 report their life as stressful at least 1.3 times more often than younger age groups. Among those who feel their life is stressful there are more teenagers who are subject to severe depression (8 vs. 0.93%), anxiety (9 vs. 1.85%) and risky behavior (3 vs. 1.24%). Compared to their stress-free counterparts, 14-15 year olds with high levels of stress see their life as meaningless 8 times more often (19.72 vs. 2.51%), and 16-18 year olds with high levels of stress see their future as bleak 4.6 times more often (16 vs. 3.45%). Under stress, teenage girls tend to feel more helpless than teenage boys (11 vs. 2.70%). Suicide and self-harming behavior, as long as substance abuse, were more typical of teenagers who underwent lots of stressful events but reported no stress levels. Data gathered led to conclusion that

perceived (emotional) stress severely distorts the ways teenagers make judgment about reality and thus their actions.

THE BIOCHEMICAL ASPECTS OF MENTAL HEALTH IN CHILDREN WITH DOWN'S SYNDROME. AV Nevoia, SN Garaeva, AI Leorda, TS Beshetea, GV Redkozubova, GV Postolati, NV Kovarschaia, MI Sula, The Institute of Physiology and Sanocreatology ASM, Chisinau, Moldova

INTRODUCTION: Cognition is a crucial constituent of mental health involving a set of psychic abilities: attention, memory, perception, reasoning or decision-making. Cognitive performance is determined by genetic determinants of structure and functions of the brain, the neurophysiologic integrative state, and neurochemistry of the brain. Our proposal was to investigate psychical status in the Down's syndrome children as a model of defective cognitive performance of mental health. Free amino acids and their derivatives contents evaluation has been established as a relevant and promising method of metabolic disturbances estimation. **METHOD:** Subjects were 26 children aged 2-12 years, diagnosed with the Down syndrome. Amino acids contents were analyzed in blood plasma by liquid ion-exchange chromatography. **RESULTS AND DISCUSSION:** We found differences in plasma free amino acid contents of the Down syndrome and the control healthy children. The total amount of plasma free amino acids in the Down syndrome children was lower vs. control. Comparatively reduced contents were detected for the essential amino acids sum, ketogenic amino acids and S-containing amino acids (1.6, 1.5 and 1.4 fold, respectively). Especially diminished were arginine, isoleucine, leucine, histidine, methionine, threonine, aspartic acid, proline and valine contents (1.5 to 2.2 fold vs. control). Additionally, in the Down syndrome children, plasma samples had imbalanced S-containing amino acids levels. The concentration values of cysteic acid, cysteine and homocysteine were increased (respectively, 6.5, 2.7 and 3.2 fold vs. control). At a higher concentration, we observed gamma-amino-butyric acid and ornitine (2 and 1.5 times higher, respectively). A 1.4-fold raised ratio of inhibitory to excitatory amino acids in also noted. We also detected distinct differences in the urea (1.5 fold lower than control) and the ammonia (4.3 fold higher than control) concentrations in the Down syndrome children. Our results reveal a significant divergence of plasma amino acids contents in the children with the Down syndrome and the control healthy children. A more meticulous investigation is required to examine the impact of this discrepancy on cognitive functions.

USBP LECTURE: STRESS, EPIGENETICS AND PATHWAYS TO SUICIDE. VA Rozanov, AS Rakhimkulova, Odessa National Mechnikov University, Odessa, Ukraine

INTRODUCTION: World suicide statistics shows that suicide rates are growing in many countries, and especially dramatically have affected the younger generation. While suicide is a very complex phenomenon, suicidality and self-harm may be viewed as a stress-related behavior, especially in youngsters. In modern societies, such behaviors are provoked by psychosocial stress, most often inflicted socially. **METHOD:** To integrate biological (genetic and epigenetic), developmental, emotional, cognitive and psychosocial mechanisms that may be relevant for understanding the underlying factors of suicidal behavior and that may help to explain rapid growth of suicides in the adolescents and young adults for the last decades. **RESULTS AND DISCUSSION:** There is growing evidence that social interactions (parenting patterns, early life adversities, and stressful life events) may cause long-lasting changes in reactivity of stress systems of the organism, which may cause behavioral and emotional consequences later in life. In animal models, adversities confronting basic threats (fear of hunger, fear of death and fear of loneliness, abandonment) are known to establish long-lasting abnormal reactivity to stress by producing epigenetic marks that alter functional state of glucocorticoid receptor or other components of HPA. In humans maternal stress or early life stress (largely dependent on macro-, meso- and micro-social factors) can cause a variety of abnormalities of brain development, which, in their turn, may lead to behavioral, emotional and cognitive consequences, including enhanced risky behaviors. Behavioral and mental health consequences of early life stress are modulated by two broad factors – modality and severity of stress (positive, tolerable or toxic) and level of social support. The most damaging situation for the child is emotional, physical and sexual abuse, when both factors reach their extreme negative levels. Recent findings confirm the existence of epigenetic genes regulation, mostly differential methylation of promoters of neuron-specific glucocorticoids receptor, BDNF and its receptor, as well as other factors in brain regions of suicide victims who were subjects to severe abuse in childhood. Negative epigenetic programming is preparing individual to stressful environments and seems to be a mechanism of “incubated vulnerability” which becomes apparent in situations of psycho-social stress later in life. It may be schematized, that predispositions based on inherited genes constellations are supported by epigenetic contextual programming of critical genes, which are

influencing memories and behaviors. This may cause further behavioral genes-to-environment interactions leading to more complex suicide pathways. In summary, there is a growing understanding that rapid global changes in suicidal behavior are linked to psycho-biological phenomena when social signals that affect stress systems are translated in dynamic epigenetic pattern with possible transgenerational (epigenetic or behavioral) transmission.

ISBS SPECIAL FOCUS TALK: EMOTIONS, MENTAL WORKLOAD, STRESS RECOGNITION - FROM EEG TO HUMAN ABILITIES/BEHAVIOR ASSESSMENT. O Sourina, Cognitive Human-Computer Interaction Laboratory, Nanyang Technological University, Singapore

Real-time EEG (electroencephalogram)-based user's stress assessment is a new direction in research and development of human-machine interfaces. It has attracted recently more attention from the research community and industry as wireless portable EEG devices became easily available on the market. EEG-based technology has been applied in anesthesiology, psychology, serious games or even in marketing. As EEG signal is considered to have a fractal nature, we proposed and developed a novel spatiotemporal fractal based approach to the brain state quantification. We discuss real-time algorithms of emotion recognition, mental workload, stress recognition from EEG and its integration in human-machine interfaces including car driving assistant systems, air-traffic controller stress assessment and cadets/captains stress assessment systems. The algorithms of the mental state quantification including emotion recognition and stress recognition would advance research on human machine interaction bringing the quantification methods and algorithms as new tools to medical, industrial and even entertainment applications, and allowing us an integration of the mental state quantification algorithms in the human-machine interfaces and human abilities/behavior assessment tests. EEG-enabled applications (such as psychological tests, serious games, emotional avatar, music therapy or car driving assistant system) are demonstrated.

INDIVIDUAL FEATURES OF HYPOTHALAMIC-PITUITARY-ADRENAL AXIS STRESS RESPONSIVENESS IN OLD MONKEYS. ND Goncharova, Federal Research Institute of Medical Primatology, Sochi, Russia

INTRODUCTION: Stress adaptation is fundamental for health, and the hypothalamic-pituitary-adrenal (HPA) axis is one of its main mechanisms. Several data indicate disturbances in stress adaptation during aging and a regulatory role of arginine vasopressin (AVP) in maladaptation, especially during aging. However, the severity of age-related adaptation disturbances is individual. The purpose was to study individual features of HPA axis responsiveness to acute stress and its vasopressinergic regulation in old monkeys. **METHODS:** Rhesus monkeys, 21-27 years old physically healthy females, 4 with standard (control) adaptive behavior and 3 with maladaptive behavior (2 with depression-like syndrome and 1 with anxiety-like behavior), were evaluated for responsiveness of the HPA axis by four tests: restraint, insulin-induced hypoglycemia, AVP treatment, and corticotrophin releasing hormone (CRH) treatment. In addition, the animal with anxiety-like behavior (showing the highest responsiveness of the HPA axis to stress exposure) was subjected to the insulin test a second time, 30 min after treatment with an antagonist of vasopressin V1b receptors. **RESULTS AND DISCUSSION:** The more pronounced disturbances of the HPA axis under acute stress represent characteristics of old monkeys with depression-like and anxiety-like behavior, apparently caused by the increased tone of vasopressinergic system in regulation of HPA axis stress reactivity. **RESEARCH SUPPORT:** This work was supported by the Russian Foundation for Basic Research project 15-04-07896 A.

PSYCHOLOGICAL AUTOPSY- UNRAVELLING THE MYSTERY OF DEATH. JR Padubidri, Kasturba Medical College, Manipal University, Mangalore, India

INTRODUCTION: Stressful life situations are always associated with suicidal hanging. Age group of 21-30 years, married females, unmarried males, dowry related stress, unemployment, prolonged illness, failure in examinations, relationship and financial problems are associated with suicidal hanging. 71% of suicides in India are by persons <44 years, which imposes a huge social, emotional and economic burden on our society. Differentiation between homicide and suicide may be a difficult task without a thorough death investigation. In addition to a complete medicolegal autopsy, a detailed investigation of the scene, examination of the ligatures, performing psychological autopsies to know the personal history of the

deceased are the key factors to make decision about the manner of the death. Generally in any suicidal hanging it is observed that either one or two loops were found encircling the neck with its oblique pattern. Here we present a rare case documented in forensic literature, where the deceased was determined to die, by encircling multiple ligature turns around his neck, where he doesn't get a minimal chance to escape from his death. The type of mental pressure which he had undergone before this act was revealed by this parents after undergoing psychological autopsy. **METHODS:** Case Report: A 29 years old medical graduate was found in a hotel room hanging from the metallic hook with multiple ligature turns around his neck. Initially the investigating officer established a doubt of homicide by seeing the number of loops around his neck. Forensic surgeon was summoned to the crime scene on the same day by the Investigating officer. At the crime scene: The body of an adult well-built male was found suspended partially with multiple ligature turns around his neck with running knot tied over the right side of the neck just above the right angle of the mandible. The other end of the ligature material was tied to the railing. The body was in a partially sitting posture with knees extended over the cot. A plastic chair was fallen over the cot just to the side of the body. The tongue was protruded, bitten and discolored. The finger tips showed bluish discoloration. Body was cold and stiff all over on flexion of extremities. Postmortem lividity over both upper limbs and lower limbs were fixed. No evidence of struggle marks over the body. No evidence of suicidal note in the crime scene. A medicolegal autopsy was performed. The deceased was 65 kg, 160 cm in length. Evidence of dried salivary dribbling stains from the left corner of the mouth. A ligature material, yellow color thick nylon rope was found encircling the neck with five turns and a running knot present on the right side of neck. The outermost loop around the neck measured 34 cm in circumference and the inner most loop measured 27 cm in circumference. The ligature material was preserved and handed over to Investigating officer. A board ligature mark measuring 30 cm in length and 4.5 cm in width (patterned pressure abrasion of thick yellow nylon rope) with multiple turns found completely encircling the neck, at and above the level of thyroid cartilage, 4 cm below the chin and 6 cm vertically above the suprasternal notch. The ligature mark was dark brownish in color, parchmented, deeply grooved and exhibited rope burns (blisters), where the skin is pinched between the multiple turns of the ligature material. The right limb of the ligature mark runs upwards and backwards along the angle of the mandible, 5.5 cm below the right mastoid process and proceeds backwards completely encircling the nape of the neck. The left limb of the ligature mark runs upwards and backwards along the angle of the mandible, 4.5 cm below the left mastoid process and proceeds backwards to meet the right limb at the nape of the neck. A pressure abrasion with indentation, brownish black in color, 2x1 cm present over the right side of the neck, 3 cm below and lateral to the chin. Neck tissues beneath the ligature mark were dry, white and glistening. Strap muscles, Hyoid bone and thyroid cartilage were intact and unremarkable on blood less dissection of the neck. Based on autopsy findings and circumstantial evidence it was concluded that the deceased died due to asphyxia secondary to constriction of neck structures due to hanging. Later his mobile contacts were traced out, and his father was called to the morgue by the investigating officer for further investigations. The deceased father and close relatives were enquired and later the information was revealed that the deceased was a first year medical graduate pursuing his studies in North Kerala, and was depressed in his life due heavy academic pressure and the inferiority complex which has present in him due to repeated failures in the first year of this medical curriculum. He was never on any psychiatric medications, but used to mention all his feelings in his diary which was recovered from his residence. A suicidal note was also written about the academic pressure which he could not sustain, which made him to take this extreme step. Based on all the circumstantial evidence, psychological autopsy from the deceased relatives and postmortem examination it was concluded that the manner was suicidal in nature. **RESULTS AND DISCUSSION:** Suicide is a major socioeconomic and public health issue worldwide. Hanging is one of the 10 leading causes of death in the world accounting more than a million deaths annually. In India, hanging is second common method of committing suicide after poisoning. Over the past 30 years, the incidence of suicide by hanging is on increase, especially among young adults. Death investigations by forensic surgeons are medicolegal in nature and are constructed for the sole purpose of determining the cause and manner of death to certain extent. Deciding whether the death should be classified as natural, accident, suicide or a homicide is of primary importance. One tool often employed in the investigation of an equivocal death is called a psychological autopsy. Using a series of questions in an interview format, collateral information is gathered from people who knew the deceased. Psychological autopsies attempt to gather sufficient information to reconstruct the event, understand the decedents cognitive functioning, psychological wellbeing, state of physical health, spiritual beliefs and social connectedness. The psychological autopsy is first and foremost an investigative tool and can also function as a first step in the healing process for the survivors, especially when conducted with understanding and empathy. In the present case, although the multiple loops around the neck and the circumstantial evidence observed by the investigating officer initially suggested the manner to be homicidal, only after postmortem examination and the psychological autopsy of the deceased relatives, the manner was finally established as suicidal in nature.

MURDER–SUICIDE: REMORSE OR STRESS? P Rastogi, Department of Forensic Medicine and Toxicology, Kasturba Medical College, Manipal University, Mangalore, India

Murder–suicide is a severe form of interpersonal violence. It is an act in which an individual kills one or more other persons before, or at the same time as, killing oneself. The combination of murder and suicide can include: Driving a car with other passengers off a bridge; suicide bombing; suicide after murder to escape punishment; suicide after murder as a form of self-punishment due to guilt; joint suicide in the form of killing the other with consent, and then killing oneself; murder before suicide with the intent of preventing future pain and suffering of others including family members and oneself, such as a parent killing their children before ending their own life; murder followed by suicide by a mentally unstable person. We encountered a case in which a middle-aged male administered poison to his wife and young daughter before committing suicide by hanging. History shows that the perpetrator, a businessman, was under financial burden, unable to repay his loans and being under continuous threats and calls from his financiers. His inability to repay the money, threat to future of his family and humiliation directed him towards this extreme step. This study emphasizes various aspects and outcomes of mental stress.

ASSOCIATIONS OF CYTOKINES AND CLINICAL STATUS IN SCHIZOPHRENIA. WT Chen, HL Kuo, LC Huang, Zuoying Branch of Kaohsiung Armed Forces General Hospital, Kaohsiung, Taiwan

INTRODUCTION: Schizophrenia is a severe, chronic disorder which influences cognition and social functions. To date, increasing evidence indicates that some cytokines are important in the pathogenesis of neuronal degeneration, and are associated with the progression of schizophrenia (in addition to the dopamine hypothesis). Elevations of serum concentration of Interleukin 6 (IL-6) and tumor necrosis factor alpha (TNF- α) have been suggested as relevant to acute exacerbations of schizophrenia. However, controversial results have also been reported in the literature. In the present study, we aimed to explore the changes in cytokines in chronic schizophrenia patients. **METHODS:** This study was an observation study. A total of 68 in-patients with chronic schizophrenia were enrolled and followed up for 2 months. At the time of enrollment, blood samples were collected for cytokine analysis, and the investigators rated patients on personal and social performance scale (PSP) to assess social functioning. All analyses were performed using SAS. Demographic and clinical information were evaluated using descriptive statistics. The differences in mean between patients were tested by paired t-test. Results are presented as mean \pm SD. **RESULTS AND DISCUSSION:** The mean age of the enrolled patients was 47.8 \pm 10.5 years, and about 54.4% were male (37/68 subjects). The mean cytokine level of IL-6, IL-10 and TNF- α were 2.4 \pm 4.4, 0.8 \pm 1.0 and 6.4 \pm 15.3 pg/mL, respectively. Statistically significant improvements in total score of PSP were observed with p-value less than 0.0001 and for four sub-domains as well. The mean total score was improved from 36.4 \pm 11.0 at baseline to 41.7 \pm 12.7 at the end of 8-week observation. Our results showed that the TNF- α , but not IL-6 or IL-10, in chronic schizophrenia patients was higher than in healthy subjects reported in other studies. This finding was consistent with some previous reports. High TNF- α level indicated chronic inflammatory processes in these patients. Meanwhile, improvements in social and personal functioning were observed in schizophrenia patients with long-term treatments, which suggests that sustained antipsychotic treatment are required. **RESEARCH SUPPORT:** This research was supported by Zuoying Branch of Kaohsiung Armed Forces General Hospital.

GUIDED POSTER SESSION:

Posters are on display for the whole day; presenters should be available for mini-presentations (10 min) and questions during the poster session. Moderators will be guiding delegates through the posters.

BIOACOUSTIC CORRECTION OF POST-STRESS BEHAVIOR DISORDERS AND LIPID METABOLISM IN RATS. NK Apraksina, TV Avaliani, NN Klueva, KV Konstantinov, SG Tsikunov, Institute of Experimental Medicine, Saint Petersburg, Russia

INTRODUCTION: Development of non-drug methods of correction post-stress disorders at women is related to the limited use of drugs that can have a negative impact on the posterity. The bioacoustic correction (BAC) is used for the treatment of depressive disorders of patients. The purpose of this study - to show expediency of application BAC at female rats in a model of vital stress. **METHODS:** Methods. In 5 days after implantation of electrodes in frontal and occipital cortical areas under zoletil anesthesia (0.6 ml/kg) they were tested in the open field (OF) test, and lipid profile was determined in serum of blood and liver. Part of the rats was located in terrarium with a python, where females have experienced stress associated with threat of life. 5 days after a stress for 5 days, BAC sessions were performed twice/day for 10 min. BAC consisted in listening musical sounds that matched tempered scale, and have been linked by a nonlinear law with a long period of ECoG, registered from the right occipital region. Retest in the OF and material sampling for biochemical studies were performed after stress, and after 2 weeks after the procedure BAC. For statistical processing of the results we used Mann-Whitney U test, and cluster analysis to assess the integrity of the OF behavior. **RESULTS AND DISCUSSION:** After the BAC sessions in stressed rats increased the total number of acts (entropy of behavior), the graphs characterizing the integrity of behavior were normalized, decreased emotional tension, and exploratory behavior corresponded to behavior of intact rats. The spectrum of lipids in the blood and liver changes in rats after vital stress corresponded to control indicators after BAC sessions. It should be noted that the reaction of rats to vital stress and BAC sessions were individualized. **CONCLUSIONS:** Acoustic stimulation - listening of the musical sounds, coordinated with own bioelectric brain activity in real time - promotes effective and adequate correction of disorders caused by stress. It is possible that the restoration of disturbed functions of an organism after the endured stress will have no negative effects on the offspring of such mothers.

CAN BATH ANKYLOSING SPONDYLITIS DISEASE ACTIVITY INDEX (BASDAI) BE AFFECTED BY ACCOMPANYING FIBROMYALGIA OR DEPRESSION? L Altan, Y Sivrioglu, I Ercan, Uludag University Medical Faculty, Bursa, Turkey

INTRODUCTION: The aim of this study was to evaluate whether Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) is affected from pathologies such as fibromyalgia and depression which may co-exist in patients with ankylosing spondylitis (AS). **METHODS:** A total of 170 patients aged between 18 and 75 years with fibromyalgia (52), depression (60) and AS (58) were included in the study. All patients were asked to complete BASDAI and Beck Depression Inventory (BDI). Percentage of patients with BASDAI scores of >4 (cut-off value for disease activity) and >5 (cut-off value for reimbursement of biological agents) were calculated and compared between the groups. Individual BASDAI item scores, total BASDAI, and BDI scores were also compared between the groups. **RESULTS AND DISCUSSION:** When individual BASDAI items scores were analyzed separately, scores of all items were found to be significantly higher in FM group compared to AS group. While, Q1 (fatigue) and Q3 (peripheral joint pain and swelling) scores were found to be significantly higher in the depression group compared to AS group, Q5 and Q6 scores (items associated with morning stiffness) were found to be significantly lower in the in the depression group compared to AS group. Percentage of patients with BASDAI score of >4 and >5 in the FM group was significantly higher vs. the other two groups. Significant correlation was noted between BASDAI and BDI scores in AS and FM groups. We suggest that assessment of disease activity in patients with AS, especially by a patient-reported outcome measure (such as BASDAI), must include evaluation of other conditions such as depression, and fibromyalgia which may potentially affect these scores.

DYKE-DAVIDOFF-MASSON SYNDROME: A CASE REPORT. I Kutluer, Çubuk Government Hospital, Clinic of Neurology, Ankara, Turkey

Dyke-Davidoff-Masson Syndrome (DDMS) is characterized with hemiplegia, mental retardation, sensorineural hearing loss, epilepsy, psychiatric disorders, cerebral hemiatrophy in neuroimaging. The disease can be classified into Infantile or Acquired. Prenatal or postnatal infections, congenital disorders, brain tumors, brain trauma, febrile seizures, and vascular diseases of brain are responsible for this syndrome. A 52-year-old woman is seen with right hemiparesia and seizure. In her history, we learned that she had a poliomyelitis infection when she was three years old. After that, she had seizures and spastic hemiparesia later on. Diffuse wave deceleration in left hemisphere, left hemiatrophy were detected in EEG, brain MRI. The patient who received Dyke-Davidoff-Masson Syndrome in the light of clinical findings and imaging data was presented since it is a rare disorder and cause seizures.

OLFACTORY REFERENCE SYNDROME: A CASE REPORT. BE Demiryurek, O Korucu, ME Cinik, Bagcilar Training and Research Hospital Neurology Clinic, Istanbul, Kecioren Training and Research Hospital Neurology Clinic, Ankara, Agri State Hospital Psychiatry Clinic, Agri, Turkey

INTRODUCTION: Olfactory reference syndrome (ORS) is a mental disorder in which the individuals persistently believe that bad odors are emitted from their bodies which offensive to others. In DSM-IV-TR, ORS is described as an example of the somatic subtype of delusional disorder. In this paper, ORS will be discussed on a case. **METHODS:** Case Report of O, a 19 years old single male patient, a senior high school student. He was brought to our clinic by his family due to student absenteeism and reluctance to leave the room. The patient's symptoms began about 3 months ago, after his thoughts that stool odor was emitted from his anal region. The patient said that he didn't smell the odor, but felt that other people detect the smell as he deduced from their facial expressions. It was understood that the patient refuses to go to school and did not leave his room in order to not let other people smell his odor. The patient takes a bath 3-4 times a day to suppress the smell, and frequently changes his underwear. In the family history, his uncle's daughter had a psychotic disorder and hospitalized because of this disorder. Physical and neurological examination showed no pathology. Mental status examination showed a normal self-care and age. The speaking speed and amount were normal. He had depressive mood, and troubled affect. Anhedonia was present. There was somatic and reference delusions and guilt in his thought content. There was no perception disorder or insight. The patient's biochemical, haemogram, thyroid function tests and urine tests were normal. The patient's EEG and cranial MRI examination showed no pathology. In the MMPI assessment of the patient, it was identified that there was a deterioration in thought content and processes in evaluating the facts. The patient had been administered with Sertraline 50 mg/day for treatment by a psychiatrist admitted previously with the present symptoms, and he stated that there wasn't any change in his complaints despite the drugs administered for six weeks. On his admission, the Risperidone 3 mg/day was added to his treatment and the Sertraline dose was increased to 100 mg because of his depressive symptoms. He started to go to school and his delusion was reduced at the end of the second week of this treatment. There was hardly any sense of guilt. His BPRS score was decreased to 12 from 43, and Beck Depression and Beck Anxiety Scores decreased more than twice. **RESULTS AND DISCUSSION:** The onset of ORS symptoms is typically starts in the twenties, however, there are other cases with reported onset in the puberty and adolescence. ORS is about 2 times more prevalent in men. In these patients, the intense distress may be accompanied by depression and suicidal thoughts. Although the smell of flatus, fecal or anal odor, mouth smell and genital smell are widely encountered bad odors, sweat, semen, urine and foot odor has also been reported in some cases. The patients with may feel shame and guilt since they falsely believe they emit an offensive body odor, and therefore may exhibit avoidance behavior and social isolation. This may result in a loss of social functioning in these patients. ORS must be differentiated from schizophrenia, hypochondriasis, body dysmorphic disorder, alcohol or drug abuse disorder, obsessive compulsive disorder, social phobia and epilepsy. In our case, the patient believed that his anal region emits smell of feces and showed intense avoidance behavior. The obsessive-compulsive disorder diagnosis were excluded since this idea of bad smell was a delusion and the patient did not consider this situation as absurd. The schizophrenia diagnosis was excluded due to the absence of bizarre delusions, disorganized speech and behavior, and hallucinations. Having a family history of psychotic disorders, only one somatic delusion in the thought process, failure to change his thought with the antidepressant used previously, and the success of antipsychotic drugs was supportive for the olfactory reference syndrome diagnosis. ORS has not been included in DSM-IV, and its inclusion in the addendum to the DSM-V has been proposed. However, more research is needed to reach a consensus in the definition. **RESEARCH SUPPORT:** This study was supported by Bagcilar Training and Research Hospital management.

DEPRESSION, SEXUAL DYSFUNCTION AND CHILDHOOD TRAUMA IN PATIENTS WITH POST-TRAUMATIC STRESS DISORDER. ED Demiryurek, O Korucu, ME Cinik, Bagcilar Training and Research Hospital Neurology Clinic, Istanbul, Kecioren Training and Research Hospital Neurology Clinic, Ankara, Agri State Hospital Psychiatry Clinic, Agri, Turkey

INTRODUCTION: Objective to observe depression and sexual dysfunction comorbidity and evaluate the effect of childhood trauma in posttraumatic stress disorder (PTSD) patients. **METHOD:** 28 patients, applied to Bagcilar Training and Research Hospital anxiety disorders outpatient clinic between February 2013 and March 2014, who had been diagnosed as PTSD according to DSM-IV-TR were evaluated with SCID-I (The structured Clinical Interview for DSM-IV Axis I Disorders), ASEX (Arizona Sexual Experience Scale), childhood trauma questionnaire and a socio-demographic form. **RESULTS AND DISCUSSION:** Depression ratio in PTSD patients determined as 57.1% (n=16). In PTSD patients with depression, there have been statistically significant higher rates in physical abuse, emotional abuse and emotional neglect, compared to PTSD patients with no depression (respectively $p=0.037$, $p=0.002$, $p=0.024$). On the other hand, there has been no significant difference in physical neglect and sexual abuse between two groups. Also there was no significant difference between the ASEX scores of two groups. **CONCLUSION:** There is at least one childhood trauma in 71.4% of PTSD patients. Also depression is the most frequent comorbid disorder in patients with childhood trauma. Thus, in management of PTSD patients with comorbid depression, childhood trauma should be considered more carefully. **RESEARCH SUPPORT:** This study was supported by Bagcilar Training and Research Hospital management.

THE ASSOCIATION BETWEEN POSTTRAUMATIC STRESS DISORDER AND CPK LEVELS IN TRAFFIC ACCIDENTS. SI Siameli, K Bonotis, SE Karaoulanis, Department of Psychiatry, University of Thessalia, Larissa, Greece

INTRODUCTION: The posttraumatic stress disorder (PTSD) is a psychological reaction to a very stressful incident which threatens physical integrity. It often leads to anxiety, shock, depression and other mental health issues for an extended period of time. Most people experience a traumatic event at some point in their life as in a car accident. In this study we studied the incidence rates of PTSD in road accidents, if the severity of injury plays a role in PTSD, and if the increase in CPK in the blood contributes to the emergence of PTSD. **METHODS:** The research was conducted at the University Hospital of Larissa. The sample population was patients entering ED (Emergency Department) after a traffic accident, totaling 50 people (78% men and 22% women). Gravity and the site of injury were recorded. Then, blood sampling was taken to determine the concentration of CPK in patient's blood and the blood sample was centrifuged immediately at 3500 rpm for 5 min at room temperature. Serum was isolated and frozen at -80°C . The sample of individuals completed the initial Demographic collection questionnaire, the Peritraumatic Distress Inventory and the CAPS questionnaire which records, posttraumatic stress three months after the initial recording. **RESULTS AND DISCUSSION:** The results of the study showed that 26% of individuals experienced high levels of peritraumatic stress and 28% experienced high levels of post-traumatic stress. There is neither statistically significant correlation of peritraumatic and posttraumatic stress between them nor with the CPK. The PTSD incidence for injuries of the abdomen is increased (60%) and the same happens for the PTSD incidence in individuals who have spinal cord injury (75%). Regarding gender, the average score PTSD of men is higher compared to the average score of women. Distributions of rates by age shows that in those aged over 45 the PTSD incidence is increased (41.7%) vs. younger subjects where the percent is 15.4% and by working group shows that in the category of the primary sector the PTSD incidence is increased 50% compared with those of the secondary sector where the percent is 15.4%. Moreover, there is association between peritraumatic stress and education. People with primary education show a higher rate of posttraumatic stress (39%) than those with higher education (16%). Finally, there is a statistically significant positive association of PTSD with the age of onset of alcohol use/drinking.

STRESS: AN IMPORTANT PRECIPITATING FACTOR IN CHILDHOOD HEADACHE. D Gokkurt, D Yilmaz, A Tayfur, Polatlı Duatepe Hospital, Department of Neurology, Kecioren Education Hospital, Department of Pediatric Neurology, Department of Pediatric Nephrology, Ankara, Turkey

INTRODUCTION: Headache is a very common complaint in childhood. Children can develop different types of headache. There are many possible causes of headache in children. Viral or upper respiratory infections, stress, head injury, tumors, pseudo-tumor cerebri, high blood pressure may cause headache. Purpose of this study is to determine the frequency of stress as a possible cause of childhood headache. **METHODS:**

One hundred patients were enrolled in this prospective study, 59 girls and 41 boys. Headaches were classified using the International Headache Society (IHS) criteria. All patients were evaluated to identify the precipitating factors for headache. **RESULTS AND DISCUSSION:** Stress was detected as a precipitating factor in 34 patients. School problems especially school grades were reported as the main causes of stress in these patients. We considered stress with other risk factors in potentially triggering childhood headache reported in this study.

EMOTIONAL MODULATION OF NEGATIVE MASS MEDIA AFFECTS THE RESPONSE TO ATROCIOUS EVENTS IN THE PAST: EVIDENCE FROM EVENT-RELATED POTENTIALS. S Tukaiev, I Zyma, J Grimm, Y Havrylets, A Enzinger, V Rizun, MYu Makarchuk, N Plakhotnyk, A Vasylichenko, National Taras Shevchenko University of Kyiv, Educational and Scientific Centre (Institute of Biology), Institute of Journalism, Kyiv, Ukraine; University of Vienna, Faculty of Social Sciences, Vienna, Austria

INTRODUCTION: Short-term effects of Mass Media are cumulative and lead to profound psychophysiological changes. It is well known that the negatively accented Mass Media causes insusceptibility to aggression and violence. The purpose of this study, a part of the project "Broadcasting History in the Transnational Space", was to identify the impact of TV news on the perception and processing of the emotional frames of a historical documentary. **METHODS:** 38 healthy volunteers (21 women and 17 men) aged 17-20 years, divided into two groups, participated in this study. The first group (23 volunteers) was demonstrated a videoset comprised of 80 negative images, selected from the Holocaust documentary "Night and Fog" (1955, France), and 80 neutral images. The second group (15 volunteers) was presented emotional frames taken from TV news plots (150 images) in order to investigate the pre-stimulus modulations of perception and processing of the emotional frames of historical documentaries. During the exposure, event-related potentials (ERPs) were recorded. We analyzed average signal amplitude of ERPs in the time intervals 40-80, 80-120, 120-220, 220-300, 300-400 and 400-700 ms after the onset of the exposure. At the end of the experiment the participants assessed each set of images on the scales of relaxing-activating and unpleasant-pleasant. **RESULTS AND DISCUSSION:** We noted that the emotional frames taken from TV news plots are relatively weak emotional stimuli compared to the emotional frames of historical documentary. The subjects exposed to the pre-stimulus evaluated the Holocaust pictures as more unpleasant and more activating than those without it. We demonstrated that the ERPs recorded during the presentation of the negative (historical) images had various amplitudes of oscillations due to the preliminary affective impact of TV news frames. The ERP amplitude of P300 in frontal zones was bigger for the group without the preliminary exposure to the emotional TV news frames due to the reduced sensitivity to the content of images. In this case, the historical images demand less attention and less emotional efforts for emotional evaluation of visual information, analysis, retrieval of information from memory and semantic processes, namely search for the meaning of the pictures (occipital P300 and LPP). Thus, short-term media effects include alterations of sensitivity toward the emotional content of visual information.

STRESS, STRESSORS AND THEIR EFFECT AMONG MEDICAL AND DENTISTRY STUDENTS. I Bogomilov, E Yankova, M Duglova, N Geshev, Medical University of Sofia, Sofia, Bulgaria

INTRODUCTION: Stress is a major factor potentiate the development of a huge range of different chronic diseases. Several studies have shown the relationship between reactivity of the immune system and stress as modulation factor of it. By other hand, chronic fatigue is directly related to an imbalance in the activation of hinged roads responsible for the level of stress in the body. A number of studios show the importance and influence of circadian rhythm of many hormones, such as cortisol and melanin, which are extremely important in the regulation of stress systems and stress circuits located in the body, here it leads the conclusion that the time and quality of sleep are extremely important. The aim of the study was to determine the level of stress and stressors among 4th-6th course of medical and dentistry students, depending on the system in which they learn, in relation to whether are they work, are they giving night shifts and the number of hours of sleep during the week and is it usefulness. **MATERIALS AND METHODS:** A total of 300 participants included in the study were the 4th, 5th and 6th-year medical and dentistry students from the Medical and Dental Faculty in the Medical University Sofia, observed for 6 months. The results were subject to statistical analysis ($p < 0.05$). **RESULTS AND DISCUSSION:** Nearly 43.2% of medical students worked and work at night more often suffer from infections and irritability, stress and fatigue, for the period of the study, in compare of 13.8% medical students which have the same symptoms, but do not work. Almost 29.5% of the dental students who are working have the same or similar dependency and less than 11% of

non-working dental students responded that during the study suffered more often from overwork, stress and more frequent infectious diseases. The study showed a statistically significant relationship between workload of the curriculum, working hours and usefulness sleep from one side and the emergence of imbalances in the body, etiological due to high levels of stress and stressors from the other side. The division of students in groups who are working or not and students who are studying in cyclic system and shows how to imbalance can cause chronic sleep deprivation and chronic stress and tension. The study found a statistically significant link between students who are exposed to chronic stress, and the lack of sleep and more frequent infections and depression among them.

STUDY OF FLUCTUATING ASYMMETRY, AN EPIGENETIC MEASURE OF STRESS, IN AN ANIMAL MODEL. JL Campo, SG Davila, MG Gil, MT Prieto, Animal Genetics Department, National Institute Agricultural Research, Madrid, Spain

Fluctuating asymmetry of bilateral traits is a measure of developmental instability that has been reported to reflect resistance against stressors in life and performance of an animal. In humans, it has been related with sexual behavior, attractiveness, intelligence, memory, cognitive aging, and aggressiveness. The effect of several stressors on the fluctuating asymmetry of toe, leg, wing, and wattle lengths, and leg width, was studied using the chicken as animal model. Relative fluctuating asymmetry (arcsin square root transformed) and 2-way factorial analysis of variance were used. Combined relative asymmetry was also considered. Fluctuating asymmetry was significantly larger with: continuous light (toe and wing lengths, combined), indoor housing (leg and wattle lengths, combined), cold (toe length, combined), bad collocation of wing tag (toe length, combined), moist litter (toe length), no perches (wattle length), no droppings pit (leg length), intermingling (toe length), high bird density (toe length), feed restriction (wing length), noise (leg length) or without music (wing length, leg width, combined), vent pecking (toe length, combined), footpad dermatitis (toe length), late sexual maturity (wattle length, combined), less aggressiveness (leg length, combined), pink shells (wing and wattle lengths, combined), brown spots in shells (leg width, wing length, combined), pale shells (wing and wattle lengths, combined), internal blood spots (wattle length), bad flight performance (toe and wing lengths, combined), mixed sex rearing (toe length, leg width), and intruder birds (toe length). Genotype by environment interaction was significant, fluctuating asymmetry being significantly greater in some breeds with: intermingling (leg length), high bird density (leg length), footpad dermatitis (wattle length), bad plumage condition (leg width), pale shells (leg width), internal blood spots (wing length), and mixed sex rearing (combined). There was no significant association between fluctuating asymmetry and: heat, egg specific gravity, sperm quality, physical enrichment, ease of capture, rearing with broody hens, and broodiness. In conclusion, fluctuating asymmetry seems a consistent and reliable stress indicator in chickens, and the analysis based on the combined fluctuating asymmetry may be an even better alternative. **RESEARCH SUPPORT:** This research was supported by the INIA-FEDER grant RZP2012-00001.

ON THE DIMENSIONS OF TEST ANXIETY AND FOREIGN LANGUAGE LEARNERS. A Nemati, Department of English Language Teaching, Jahrom Branch, Islamic Azad University, Jahrom, Iran

INTRODUCTION: Anxiety is one of the most basic human emotions and occurs in every person. In the educational setting anxiety is experienced often by the students when being evaluated such as when taking a test which is called test anxiety. Test anxiety is an apprehension over academic evaluation. This anxiety is also available in foreign language learning. **METHOD:** This study examined the relationship between age, gender, discipline and foreign language test anxiety specifically. The participants of the present study consisted of 323 Iranian undergraduate and post graduate university males and females students from different disciplines. Sarason Anxiety Scale (1975) was given to the students before the foreign language final exam. **RESULTS AND DISCUSSION:** The results indicated that there was not a significant correlation between age and anxiety ($r = -0.024$, $P = 0.664$). The result of the independent t-test also established that *males* and *females* were equally affected by *test anxiety*, $t(321) = 5.24$, $P = 0.601$. An ANOVA with pair wise comparisons of the means revealed that pre-university subjects had the highest level of test anxiety ($M = 20.25$) comparing the students of other disciplines. Exploratory factor analysis found out 3 main factors with the more items loading on them regarding worry and emotional feeling before the exam. Some recommendations can be presented to language teachers to help students reduce test anxiety.

THE LIPOPOLYSACCHARIDE PARKINSON'S DISEASE ANIMAL MODEL: THE CALPAIN SYSTEM STUDIES. VA Schukina, MN Karpenko, NS Pestereva, IS Oblamskaya, MS Tikhomirova, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, St. Petersburg State Polytechnic University, St. Petersburg, Russia

INTRODUCTION: Research in the last two decades has unveiled an important role for neuroinflammation in the degeneration of the nigrostriatal dopaminergic pathway that constitutes the pathological basis of the prevailing movement disorder, Parkinson's disease (PD). Neuroinflammation is characterized by the activation of brain glial cells, primarily microglia and astrocytes. The bacterial endotoxin, lipopolysaccharide (LPS), has been the most extensively utilized glial activator for the induction of inflammatory dopaminergic neurodegeneration. So the aim of the present study was to evaluate the consequences of animals injected with 1 mg/kg LPS for the different parts of the CNS. We were particularly interested in the study of calpains (calcium-dependent intracellular proteases), which modulate a number of physiological functions including synaptic transmission). **METHODS:** Wistar rats were divided into two groups (n=15): injected with saline and LPS (1 mg/kg). The levels of mRNA IL-1beta, TNF-alpha, IBA-1, mu- and m-calpain in hippocampus and striatum were evaluated using real-time RT-PCR in six month after LPS injection. The activity of calpain and its production were determined by casein zymography and immunoblotting analyses correspondingly. HPLC was used to measure the levels of dopamine (DA) and its metabolites (DOPAC and HVA). **RESULTS:** Two-fold decrease of dopamine in striatum of rats suspected to LPS was observed, which was followed by two-fold increase in HVA level. The same samples showed that the level of mRNA IBA-1 was increased by 9-12 times while the levels of mRNA TNF-alpha, mu- and m-calpain were increased by 2-3 times. The production and activity of mu-calpain was increased too. There were no changes revealed in hippocampus. The possible site for proteolytic cleavage by calpain was predicted in COMT, moreover band having corresponding electrophoretic mobility was immunoreactive to anti-COMT. The change in COMT activity can lead to abnormality of behavioral functions such as sensorimotor deficit which was present in experimental animals. **CONCLUSION:** LPS-induced DA degeneration is accompanied with upregulation of calpain activity in striatum, while COMT is its potential substrate. **RESEARCH SUPPORT:** The work was supported by the RFBR grant № 14-04-00587.

ASSOCIATION BETWEEN CORTICAL ACTIVITY AND DIFFERENT METEOROLOGICAL AND PHYSICAL FACTORS OF THE COSMOS. KI Pavlov, VN Mukhin, VG Kamenskaya, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, Pavlov Department of Physiology, St. Petersburg, Russia, Bunin Yelets State University, Russia, Yelets

INTRODUCTION: The urgency of our research is caused by experimental works of studying of physiological reactions to various factors of terrestrial and space weather. The aim of our research is to study the relationship between the level of activation of the cerebral cortex and meteorological and cosmophysical characteristics of terrestrial and space weather. **METHODS:** The cortical activity was assessed by detecting of the level of EEG desynchronization. EEG was recorded in 10 females sitting at rest with their eyes closed. There were 4 series of brain activity recording which were made from February to June of the same year. The level of desynchronization measured in each of the EEG leads was correlated with the geocosmic and meteorological factors: temperature of air, cloudiness, speed of the wind, cosmic rays (stream of protons with high energy), sunspot numbers, observed daily solar flux 2800 MHz, indexes of geomagnetic activity (Dst, Ap, Ae). Factor analysis (by Eqimax) and Spearman's rank R correlation test were performed with SPSS 15.0. **RESULTS AND DISCUSSION:** It's shown that the time of registration in four points of six-month period have an effect on cortical activity. Low level of geomagnetic activity increases level of cortical activity in left occipital lobe and decreases activity of motor and sensory cortex in right central lead of EEG in February and March. Atmospheric conditions of lowered cloudiness in March promotes reduction of cortical activity in frontal and central leads of EEG. The center of decreasing of desynchronization is the associative fields of the left frontal lobe. Incising of air temperature and Solar activity in April-May activates decreasing of activity in occipital lobe of right hemisphere and stimulates delta-1 and theta rhythms in this brain region. The high level of geomagnetic activity in May and June causes of cortex activation of right hemisphere in frontal and central EEG's leads. The increasing of Solar activity in this period decreases cortical activity of associative fields in right frontal lobe. Studying of central relationship in all periods of registration showed that high temperature of air, low speed of the wind and low energy of cosmic rays promote decreasing of level of cortical activity in the right occipital lobe.

EARLY-LIFE CHRONIC LPS ADMINISTRATION MODULATES STRESS-REACTIVITY AND NMDA RECEPTOR SUBUNITS GENE EXPRESSION IN THE RAT BRAIN. AY Rotov, EA Veniaminova, K Fomalont, OE Zubareva, Institute of Experimental Medicine, St. Petersburg, Russia

INTRODUCTION: Long-lasting emotional and cognitive impairments and changes of stress-reactivity can emerge not only due to genetics, but may also be evoked by negative environmental factors in early development period – perinatal hypoxia, birth injuries, infections, etc. The mechanisms of these disorders may involve changes of N-Methyl-D-aspartate receptor (NMDAR)-mediated neurotransmission in the hippocampus, which is implicated in cognitive and emotional disturbances during stress. The aim of the present work was to investigate delayed stress reactivity and expression of genes encoding NMDA receptor subunits (NR1, NR2A, NR2B, NR2C, and NR2D) in various structures of adult rat brain after bacterial lipopolysaccharide (LPS) administration during early-life period of postnatal development. **METHODS:** Male Wistar rats were injected i.p. with LPS three times at P15, 18, 21 (critical period for the NMDAR formation) at 25 and 50 µg/kg. Control animals were treated with apyrogenic saline; a group of rats was left intact (without injections and handling). The mRNA expression level of NR1, NR2A, NR2B, NR2C, and NR2D subunits of NMDA receptors in medial prefrontal cortex, dorsal and ventral hippocampus of 90-day-old rats was assessed using qRTPCR. The level of corticosterone in the blood was assessed in normal condition and 30 and 120 min after stress (foot-shock). **RESULTS AND DISCUSSION:** The adult rats, treated by LPS in early postnatal ontogenesis, showed higher NR2D mRNA level in dorsal hippocampus and dose-dependent increase of NR2B/NR2A ratio in ventral hippocampus. In other brain structures no significant changes in NMDAR subunits mRNA level were revealed. The rats from experimental group displayed lower corticosterone levels in blood than animals from the intact group in all experimental conditions. LPS-treated rats (at 25 µg/kg) did not show significant increase of corticosterone level in 30 min after stress which was observed in intact rats. This study showed that the bacterial infection challenge in early life can lead to long-term changes in stress-reactivity and mRNA production of specific NMDAR subunits. These changes in turn may influence the stress-related emotional and cognitive impairments development.

DISTURBANCE OF SLEEP STRUCTURE IN THE MODEL OF PARKINSON'S DISEASE PRECLINICAL STAGE IN RATS. VV Simonova, MA Guzeev, YF Pastukhov, ISBS Fellow, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia

INTRODUCTION: The clinical diagnosis of Parkinson's disease (PD) is mostly based on the identification of the motor symptoms related to dopamine (DA) deficiency. Motor disturbances become evident when 60-70% of the neurons of the substantia nigra pars compacta (SNpc) are degenerated and the striatal DA content is reduced by 80%. PD still has no cure due to commonly late diagnosis and symptomatic treatment. Neuroprotective treatment would be the most effective in the preclinical stage of the disease. Therefore, identification of an effective complex of early non-motor markers of PD is a target of outstanding importance for researchers. The majority (80-90%) of PD patients suffers from sleep disorders, and the disturbances of normal sleep-wake cycle could be the preclinical symptom of PD. This research aimed to investigate sleep disturbances in the new model of the preclinical stage of PD based on intranasal administration of the specific inhibitor of proteasome system lactacystin (LC). **METHODS:** Intranasal (i.n.) administration of the LC and vehicle was performed in male Wistar rats kept on a 12:12-hour light-dark cycle with free access to food and water. Electrophysiological data (EEG, EOG, and EMG) were recorded during 24 h under conditions of free behavior of animals using telemetry system. Identification of sleep-wake states was made by visual and automatic analysis. **RESULTS AND DISCUSSION:** Earlier it was shown that 16-31% DA-ergic neurons in the peri-glomerular layer of the olfactory bulb and 13-22% neurons in the SNpc had degenerated by the 21st day after i.n. administration of the LC. In the present study, the LC was found to disturb sleep structure from the 14th to the 21st days after its administration. This period was characterized by a progressing increase in the total time of drowsiness in both dark and light phases of a day. Although no significant changes in the total time of wake, slow wave (SWS) and rapid-eye-movement sleep were detected, the structure of SWS was disturbed by the 21st day after i.n. infusion of the LC. Mainly in the light phase of a day, SWS bouts increased in number and decreased in duration compared to the control, that was accompanied by the augmentation of microactivations occurred during SWS. At the same period, spectral analysis of the EEG showed the decrease in delta activity by 20% in the dark phase of a day and by 18% in the light one. Thus, prevailing symptom of sleep-wake cycle disturbances in a rat model of the preclinical stage of PD induced by i.n. LC is fragmented superficial sleep, with many more periods of drowsiness during light time. We consider this model to be applied in studying of the pathophysiological basis of PD sleep disturbances in the preclinical stage and for testing new therapeutic strategies of PD as well.

THE EFFECTIVENESS OF A TRAINING PROGRAM USING NEURO-LINGUISTIC PROGRAMMING (NLP) TO REDUCE TEST ANXIETY IN CONSIDERATION TO THE BIOLOGICAL FEEDBACK OF THE STUDENTS AT THE COLLEGE OF SPORT AND PHYSICAL EDUCATION AT KING SAUD UNIVERSITY. M Fakehy, M Haggag, College of Sport Sciences and Physical Activity, Department of Biomechanics and Motor Behavior, Riyadh, Saudi Arabia

This research aims to study the influence of NLP training program in reducing test anxiety, and this can be conducted by analyzing the biological feedback. This empirical study depended upon the assessment of pre and posttests of a study sample consisting of 30 students diagnosed with a high test anxiety. The students were divided into an experimental group and a control group; each of them comprised 15 students. The experimental group had been trained on 24 units of NLP strategies for 3 months, i.e. 2 units per week, and each unit lasted for 40-60 min. Anxiety test scale had been applied on a par with observing vital biological changes (heart rate and blood pressure); the results showed statistically significant differences in the average scores of test anxiety before and after applying the aforementioned program, for the post-test results were better than the pre-test results. Moreover, there were statistically significant differences between the experimental and control groups indicating better results achieved by the experimental group when they took the post-test. In summary, NLP program had a highly positive influence in reducing test anxiety and the undesirable biological changes when applied on the experimental group.

ENRICHED ENVIRONMENT REVERTS DELETERIOUS EFFECTS OF PRENATAL RESTRAINT STRESS ON GLUCOCORTICOID RECEPTORS AS WELL AS ANXIETY BEHAVIOR OF ADULT MICE. MA Zorrilla-Zubilete, MR Larreche, JE Pivoz-Avedikian, M Ramborger, CEFYBO-CONICET, Department of Pharmacology, Faculty of Medicine, UBA, Buenos Aires, Argentina

INTRODUCTION: Previous work has shown that during neurodevelopment, mice have an increased susceptibility to the deleterious effects of prenatal, which has an impact on memory, learning and anxiety behavior. Some of these changes are associated with alteration in the HPA axis response. We aim to evaluate the effect of enriched environment (EE) on impairment induced by prenatal restraint stress. **METHODS:** For this purpose, pregnant female Balb/c were individually restrained for 2 h/day since the 14th day of gestation until delivery. Offspring were divided into different groups: prenatal stress (PS), no prenatal stress (C), in turn each group was treated with chronic stress (CS or PS+CS) or enriched environment (EE, PS+EE and PS+CS+EE). The offspring were then analyzed 90 days after birth. **RESULTS AND DISCUSSION:** Balb/c mice subjected to PS showed impairment in habituation memory to an Open Field Test, and this was reverted meaningfully by the EE. In addition, PS mice showed less grooming behavior than the matched control group, which was also reverted by EE. Furthermore, an increase in anxiety behaviors was observed in male PS mice that was reverted by EE in elevated plus maze test. An increase in glucocorticoid receptors (GR) in PS mice was found both in hippocampus and lymphoid cells, which was significantly reverted by EE, up to control levels. Corticosterone plasma levels were increased in acute stress mice and in PS+acute stress mice, the first showing higher levels. EE has proven successful in reversing this effect in the PS group. In conclusion, data show that PS resulted in a diminished learning capacity and impaired memory, as well as an increase in anxiety behavior, coupled with higher levels of GR in the hippocampus and lymphatic ganglia. These changes were reverted by enriched environment (EE). Animals which were not subjected to prenatal stress (CS), manifested behavioral alterations when exposed to chronic stress during their adulthood. In contrast, the PS+CS group showed the same alterations that PS mice in behavioral test. These results support the idea that prenatal stress induces an alteration of the HPA axis, with a subsequent altered response to chronic stress exposure in the adult life. PS mice showed less grooming than the matched control and this is reverted by the EE. In both hippocampus and lymphoid cells there were an increase of glucocorticoid receptors in PS mice and this is significantly reverted by EE up to control levels. The enrichment environment counteracts deleterious effects induced by prenatal stress. **RESEARCH SUPPORT:** This research was supported by ANCyPT, Fondo para la Investigación Científica y Tecnológica PICT 2011-1015 and Universidad de Buenos Aires-UBACyT 2002010010633.

EFFECT OF STRESS IN FIRST OR SECOND HALF OF GESTATION, IN COMPARISON TO POSTNATAL STRESS, ON ANXIETY OF YOUNG RATS WISTAR. ECBP Guirro, BA Beber, FC Puntel, AL Carvalho, Federal University of Parana, Parana, Brazil

INTRODUCTION: The stress affects welfare and can cause behavioral, immunological and hormonal changes. Some studies have evaluated the effects of stress suffered during intrauterine life or in early postpartum life on cubs anxiety, but literature is unclear on phase the stress is most deleterious. Thus, this study evaluated the effects of stress during pregnancy and early postpartum on anxiety in rats Wistar until 90 days of life. **METHODS:** 22 pregnant rats were allocated according to handling: no stress (G1); stress management in first (G2) or second (G2) half of pregnancy; stress during breast-feeding (G4) or stress during whole gestation and breast-feeding (G5). Of each birth, eight puppies were used to assess anxiety, four in elevated plus maze (EPM) and four in dark/light box (DLB), at 30 (T1), 60 (T2) and 90 (T3) days of life. **RESULTS AND DISCUSSION:** In both apparatus, the results were similar and animals from G2 and G5 were more anxious and stayed less time in open arm and in the light side. In EPM, rats from G1 stayed in open arms along 140 ± 12 , 115 ± 7 and 81 ± 8 , respectively at T1, T2 and T3, while in G2 the values were 103 ± 9 , 70 ± 9 and 38 ± 5 and in G5 were 93 ± 11 , 63 ± 8 and 29 ± 8 . In DLB, animals stayed on the light side during 135 ± 3 , 128 ± 3 and 121 ± 3 , respectively at T1, T2 and T3, while in G2 the values were 74 ± 2 , 66 ± 3 and 61 ± 2 and in G5 were 67 ± 2 , 61 ± 3 and 57 ± 3 . Rats from G3 and G4 were similar to G1. The G2 and G5 groups were under neural formation when their mothers faced an adverse situation. Among other functions, hippocampus is intimately related to anxiety and its embryonic development is in the beginning of pregnancy. Moreover, hippocampus has a high density of receptors for glucocorticoids and, hence, is very sensitive to the action of these hormones that are released in stressful situations. Thus, glucocorticoid released from the mother interferes on development of fetal hippocampus, generating more anxious offspring potentially. In conclusion, stress suffered in the first half of gestation is more harmful to anxiety in young Wistar rats.

MAJOR STRESS AND ITS CONSEQUENCES: SERBIAN EXPERIENCE. B Pejuskovic, D Lecic-Tosevski, Belgrade University School of Medicine, Institute of Mental Health, Serbian Academy of Sciences and Arts, Belgrade, Serbia

OBJECTIVES: Studies of the psychological sequelae of disasters have shown that those caused by human intent might cause severe mental health problems in communities such as short-term as well as the long-term mental disorders. Posttraumatic stress disorder (PTSD) is the most frequently reported psychiatric consequence of traumatic events and of human-made disasters in particular but other mental disorders, such as depression, phobias, and addictive behaviors frequently follow stressful experiences, either in combination with specific symptoms of posttraumatic stress or on their own. **METHODS:** To assess prevalence rates of mental disorders in the general adult Serbian population. The sample consisted of 640 subjects chosen by random walk technique in five regions of the country affected by major trauma. Prevalence rates of mental disorders were assessed using the Mini-International Neuropsychiatric Interview. **RESULTS:** Our findings have shown a high level of current (18.8%) as well as life-time PTSD (32.3%). The prevalence rate of major depressive episode was 26.2%, the suicide rate 13%, generalized anxiety disorder 23.6% and of panic disorder was 10%. **CONCLUSIONS:** Several years after the end of the traumatic experiences, the prevalence rates of mental disorders among war-affected people were generally high. Long-term policy to meet the mental health needs of war-affected population is required. **RESEARCH SUPPORT:** This study was a part of the international research project "Components, Organization, Costs, and Outcomes of Health Care and Community Based Interventions for People with Posttraumatic Stress Following War and Conflict in the Balkans" (CONNECT), as part of the 6th Framework Program supported by the European Union.

Day 4. Tue, May 19, 2015

SYMPOSIUM V: TRANSLATIONAL BIOPSYCHIATRY

Chairs: AV Kalueff (USA), T Strekalova (Netherlands), presentations 20 min

MODELING CHRONIC STRESS IN ZEBRAFISH. AV Kalueff, ISBS Fellow, Y Liu, S Li, P Chen, L Yang, JJ Wang, C Song, Guangdong Ocean University, Zhanjiang, China; ZENEREI Institute and the International Zebrafish Neuroscience Research Consortium (ZNRC), New Orleans, USA ; Dalhousie University, Canada; National University of Taiwan, Taiwan

Zebrafish (*Danio rerio*) are rapidly becoming a useful alternative 'non-rodent' model organism in neuroscience and biological psychiatry research. For example, possessing a substantial physiological and genetic homology to humans, larval and adult zebrafish assays are currently widely used to model brain disorders, screen genetic mutations and small molecules/drugs, as well as examine the role of various environmental factors in CNS functioning. Stress is able to potently affect zebrafish behavior, resulting in prominent anxiety-like behavior, elevated systemic cortisol levels, and increased expression of brain early oncogenes (e.g., *c-fos*). While the effects of acute stress exposure on zebrafish behavior and physiology have been relatively well studied recently, the impact of long-term, chronic stress on zebrafish phenotypes is only beginning to be clarified. The importance of modeling *in-vivo* neurobehavioral effects of chronic stress is emphasized by the fact that most commonly occurring affective disorders, such as chronic pathological anxiety and depression, are stress-related and most frequently caused by chronic stressors. It is therefore necessary to develop models of chronic stress in zebrafish. Here, we developed a very rigorous chronic unpredictable stress (CUS) battery, consisting of 5-week daily exposures to varying (mostly strong) stressors, including exposure to predators, alarm substance, bright light, novelty, shallow water, shaking, food/light deprivation, social isolation and crowding. The stress group was divided into two groups 8 days before the end of the test battery, and one sub-group was chronically treated with 0.1 mg/l fluoxetine (added to a hometank water). The fish behavior was analyzed using the novel tank diving test. Overall, chronic stress evoked overt stress-related behavioral responses (increased anxiety + hypolocomotion) in zebrafish associated with higher endocrine responses (whole-body cortisol) and neuroplasticity changes, which were all effectively rescued by fluoxetine treatment. Collectively, these findings highlight the developing utility of zebrafish models to study stress-related neurobehavioral changes, to model affective CNS pathogenesis, as well as to evaluate the efficacy of antidepressant drug therapy.

ANXIETY-LIKE BEHAVIOR IN THE MODEL IMITATING PRECLINICAL STAGE OF PARKINSON'S DISEASE IN RATS. MV Chernyshev, KV Lapshina, OA Sapach, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia

INTRODUCTION: The clinical diagnosis of Parkinson's disease (PD) is mostly based on the identification of the motor symptoms related to the profound neurodegeneration in the substantia nigra pars compacta (SNpc). In this case the treatment is not effective and can only compensate dopamine (DA) deficiency. Thus the attention should be focused on the recognition of the non-motor preclinical markers of PD. Many studies have demonstrated that anxiety, depression, hyposmia and other features can precede the classical motor symptoms seen in PD. This research aims to reveal behavioral disturbances in the newly developed model of the preclinical stage of PD based on intranasal administration of specific inhibitor of proteasome system lactacystin (LC). **METHODS:** Intranasal administration of the LC (125 mg/10 ml per each nostril twice with a week interval) was performed in male Wistar rats. The control animals were injected with the same volume of the sterile phosphate buffer. Three weeks after the first injection of LC we examined locomotion, emotionality and anxiety level (elevated plus maze and open field test); motor reactions (inverted grid walk, sunflower seed opening and modified Suok test) and olfactory discrimination. After the behavioral tests, immunohistochemical assays were used to assess a loss of DA-neurons of the olfactory bulb and SNpc. **RESULTS AND DISCUSSION:** The intranasal LC administration evoked an increase in the level of anxiety-like behavior in the elevated plus maze test in rats (scored by the open arm time and open arm entries, and the percentage of open arm entries to total entries). The anxiogenic effect was accompanied by a decrease in locomotion (scored by the closed arm time and closed arm entries) and exploration (scored by head dips). At the same time, no effect was revealed in other behavioral tests, assessing motor activity and olfaction. It allows to consider the alteration in anxiety-like behavior as a

candidate for an early premotor (preclinical) marker in Parkinson's disease. This assumption is in accordance with the immunohistochemical findings that LC injections induced the death of 21% and 23% of DA-neurons in the olfactory bulb and SNpc, respectively. Taken together, these findings indicate that the intranasal LC model used in our experiment replicates some patterns of the early preclinical stage of Parkinson's disease and exhibits anxiety-like behavior as a sensitive marker in this model.

EXPOSURE TO METHYLMERCURY INDUCES OXIDATIVE STRESS AND AFFECTS THE BEHAVIOR OF *DROSOPHILA MELANOGASTER*. V Chauhan, A Chauhan, New York State Institute for Basic Research in Developmental Disabilities, Staten Island, New York, USA

INTRODUCTION: Our recent studies have suggested the use of *Drosophila melanogaster* (flies) as a model for studying neurobehavioral developmental disorders such as autism. Although the cause of autism is not known, the roles of prenatal/postnatal exposure to environmental factors and increased vulnerability to oxidative stress have been implicated in autism. Among all metals, the role of exposure to mercury from consumption of contaminated seafood during pregnancy, dental amalgams and thimerosal in vaccines remains a controversial issue in autism. Here, we report that exposure to methylmercury in flies increases the oxidative stress, and affects the behavior of flies. **METHODS:** The flies were fed various doses of methylmercury included within diet. Oxidative stress markers for free radicals generation (assayed by dichlorofluorescein fluorescence) and total thiol contents were measured. The behavioral tests, i.e., negative geotaxis, phototaxis assay by T-Maze, and social interaction were performed. **RESULTS AND DISCUSSION:** In the flies, exposure to methylmercury increased free radicals generation in a concentration-dependent manner. It also decreased the total thiol content. These results suggest that methylmercury induces oxidative stress in flies. Methylmercury exposure also affected the negative geotaxis in a dose-dependent manner. In the T-Maze assay, when a choice was given to flies to move towards dark arm (covered with aluminum foil) or uncovered arm, the exposure to methylmercury increased the percentage of flies moving towards dark arm in a dose-dependent manner. In a social space assay, distance between an individual fly and its closest neighboring flies was used as a measure of social interaction within the group. Mercury-treated flies were significantly apart from each other in a dose-dependent manner as compared to vehicle-treated control flies, indicating impaired social interaction with mercury exposure. It is suggested that environmental factors may act as trigger for interaction of genetically susceptible alleles in autism, and oxidative stress may serve as a common link between genes and environmental factors leading to behavioral abnormalities. **RESEARCH SUPPORT:** This work was supported in part by funds from the Autism Research Institute and NYS Office for People with Developmental Disabilities.

COMPOSITION OF INTESTINAL MICROBIOTA IN PATIENTS WITH MULTIPLE SCLEROSIS AND IN RATS AT EAE MODEL CHANGES QUALITATIVELY AND QUANTITATIVELY. EA Tarasova, IN Abdurasulova, AV Matsulevic, EI Ermolenko, GN Bisaga, YI Zitnukhin, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, Military Medical Academy, St. Petersburg, Russia

INTRODUCTION: Intestinal microbiota has immunomodulatory effects, is involved in lipid metabolism, and produces antimicrobial factors inhibiting the growth of pathogenic bacteria. Some representatives of the microbiota by the way of stimulating the Th17 cells in multiple sclerosis have potent encephalitogenic ability. On the other hand, up to 70% of patients with multiple sclerosis have impaired functions of pelvic organs, irritable bowel syndrome, which may be the result of intestinal microbiota dysbiosis. There is evidence of involvement of intestinal microbiota in experimental autoimmune encephalomyelitis (EAE), an animal/experimental model of multiple sclerosis, MS (Berer et al., 2011; Ochoa-Reparaz et al., 2009, 2010). The aim of our study was to analyze the composition of intestinal microbiota in patients with MS and in animals with EAE and reveal the structure of dysbiosis. **METHODS:** EAE in animals was induced by a single subcutaneous immunization with homologous homogenate of a spinal cord in complete Freund's adjuvant. The 11 patients diagnosed with MS in stage of deterioration, and in rats at 0, 10, 21 and 28 days after the induction of EAE set of *Lactobacillus spp.*, *Bifidobacterium spp.*, *Enterococcus spp.*, *Escherichia coli*, *Faecalibacterium prausnitzii*, *Bacteroides fragilis*, *Clostridium difficile*, *Staphylococcus aureus*, *Proteus vulgaris*, *Proteus mirabilis*, *Klebsiella*, *Citrobacter diversus* by two independent methods: real-time PCR and bacteriological. **RESULTS:** Analysis of the microbiota composition in rats revealed that animals with high levels of *Enterococcus spp.* before the start of the experiment, after the induction of EAE, amounted to 50% of the rats that have not developed paralysis and paresis. In contrast, 100% of the rats with low content of *Enterococcus spp.* before immunization were among the affected sick animals. All rats with EAE at the peak

of the clinical manifestations have shown a reduction in the number of *Bifidobacterium spp.*, *Lactobacillus spp.*, and *Escherichia coli* with normal enzymatic activity; the increase in the number of enteropathogenic *E. coli* (66.7%), as well as registered contingent-pathogenic microorganisms *Proteus spp.* (66.7%), *Staphylococcus aureus* (66.7%), *Klebsiella pneumonia* (16.7%) and *Citrobacter diversus* (50%). Dysbiosis in 83.3% of rats was characterized by the presence of 3 kinds of contingent-pathogenic bacteria in various combinations. A similar pattern was observed in MS patients. All observed patients showed contingent-pathogenic bacteria: enteropathogenic *E. coli* (50%), *Klebsiella* (20%), *Enterobacter* (60%), *Clostridium perfringens* (10%) and there was a change in the ratio of *Bacteroides fragilis* to *Faecalibacterium prausnitzii* (30%). 60% of patients showed the dysbiosis induced at least by 2-3 of contingent-pathogenic microorganisms. **CONCLUSION:** In rat experiments and in humans, the presence of dysbiosis was observed, resulting from reduced symbiotic bacteria and increased contingent-pathogenic microorganisms. We found high level of *Enterococcus spp.* in the gut of rats before the induction the disease, whereas maintaining high level *F. prausnitzii* correlated with more favorable over EAE.

ADOLESCENT DRINKING: UNDERSTANDING A NEUROBIOLOGY OF DANGER. TA Shnitko, DL Robinson, University of North Carolina, Chapel Hill, NC, USA

INTRODUCTION: Alcohol drinking typically starts in adolescence, and often progresses to binge drinking. This adolescent behavior might be caused by variety of reasons, including sensation seeking, risk-taking or coping with stress and anxiety. In this study, we investigated the effects of adolescent binge-like alcohol on dopamine (DA) neurotransmission in the nucleus accumbens (NAc) of rats. Electrically-evoked DA release and uptake were measured at baseline and after acute alcohol challenge in the NAc of alcohol-naïve rats and animals exposed to adolescent intermittent ethanol (AIE). **METHODS:** Experiments were conducted in Sprague-Dawley rats. Adolescent treatments occurred from postnatal day 25 to 45 (early to mid-adolescence) using intragastric administration with water (WAT) or 4 g/kg alcohol (AIE) every other day. An additional group of rats was designated as unmanipulated controls (UM). Fast scan cyclic voltammetry was used to measure DA in adulthood (postnatal days 75-85) in the NAc of urethane-anesthetized animals. DA release was evoked in the NAc by electrical stimulation of the ventral tegmental area. Evoked [DA]_{max} and velocity of the DA transporter (V_{max}) were measured at a baseline and after cumulative dosing of alcohol (1, 2, 4 g/kg) or saline. **RESULTS AND DISCUSSION:** The data analysis revealed no significant difference in basal measures of DA release and uptake between three groups of rats. Baseline [DA]_{max} was 153±9, 165±22 and 209±26 nM, while V_{max} was 259±21, 279±23 and 355±40nM/s in the UM, the WAT and the AIE groups, respectively. Importantly, the acute alcohol challenge dose-dependently decreased evoked DA release in both the UN and the WAT control groups of rats and had no effect in the AIE rats. Specifically, 2 and 4 g/kg decreased [DA]_{max} by 30% and 35% vs. baseline in the UM control group and by 38% and by 55% in the WAT control group. Acute alcohol decreased V_{max} by 23-32% in the NAc of rats from all three groups, indicating that acute cumulative dosing reduces the rate of DA uptake, independent of the adolescent treatment. These results demonstrate that that adolescent binge-like alcohol alters mechanisms of DA release, potentially by reducing D2-autoinhibition as presynaptic D2 receptors regulate DA release. **RESEARCH SUPPORT:** The National Institute of Alcoholism and Alcohol Abuse NIAAA (U01-AA019972) and the UNC Bowles Center for Alcohol Studies.

SYMPOSIUM VI: CLINICAL PSYCHIATRY

Chair: VM Klimenko (Russia), presentations 15-20 min

METABOLIC SYNDROME IN SERBIAN WAR VETERANS. Z Spiric, R Samardzic, S Radjen, Z Stojanovic, M Djokic, B Zivic, G Mandic-Gajic, Faculty of Medicine of the Military Medical Academy, University of Defense, Belgrade, Serbia

INTRODUCTION: It has been observed in the clinical practice that veterans from the wars during the 1990s in former Yugoslavia have been found to have high blood pressure and high blood glucose and lipid levels. They had more somatic complaints than the general population and they were more likely to develop cardiovascular or metabolic diseases. The aim of this study was to estimate the presence of the components of metabolic syndrome (elevated waist-to-hip ratio, elevated triglycerides, reduced HDL cholesterol, elevated blood pressure, elevated fasting glucose and elevated insulin resistance) in war veterans and the ways in which they relate to the presence and severity of posttraumatic stress disorder (PTSD). **METHODS:** The sample consisted of 123 Serbian Army personnel on active duty which was divided into three groups: war veterans with PTSD (n=40), war veterans without PTSD (n=41), and healthy soldiers without war experience (n=41), all of whom were male. Clinician Administered PTSD Scale (CAPS) was used for measuring the presence and severity of PTSD. Physical measures, including body mass index (BMI), waist-to-hip ratio (WHR), systolic and diastolic blood pressure and laboratory tests (lipids, glucose, insulin, glucose tolerance test) were conducted on each subject. Indexes of insulin resistance and sensitivity (HOMA, QUICKI) were calculated from basal glucose and basal insulin levels. **RESULTS AND DISCUSSION:** Analysis of variance indicated differences between the three groups. Significantly higher values of waist circumference, waist-to-hip ratio, triglycerides, insulin, indexes of insulin resistance, systolic and diastolic blood pressure, and considerably lower values of HDL cholesterol were found in the group of war veterans with PTSD when compared to the other two groups. A significant association between severity of PTSD and components of metabolic syndrome was found. **RESEARCH SUPPORT:** This research was supported by the Military Medical Academy, Belgrade, Serbia.

FEAR OF CANCER RECURRENCE – REPORT FROM PATIENTS WITH THREE MAJOR TYPES OF CANCERS IN TAIWAN. YH Lai, YR Chen, YY Fang, YJ Hung, CP Wang, PJ Lou, JS Chen, College of Medicine, National Taiwan University (NTU), Department of Head and Neck Oncology, Department of Thoracic Surgery, NTU Hospital, Taipei, Taiwan

INTRODUCTION: Fear of cancer recurrence (FCR) is one of the most threatening distresses experienced by cancer patients. However, relatively few studies have explored FCR across several major types of cancer patients. Thus, the purposes of this study were to explore and compare the levels of FCR experiences among three types of disease free cancer patients, including patients with early stage lung cancer (LC), GYN cancers and head and neck cancers (HNC) after major treatments. **METHODS:** This is a cross-sectional study with consecutive sampling to recruit the above mentioned three types of cancer patients in a medical center in Northern Taiwan. We used the Fear of Cancer Recurrence Inventory (FCRI) to examine patients' FCR experiences with multi-dimensions. Institute review board (IRB) permission was obtained before data collection. Descriptive and correlation statistics were applied for data analyses. **RESULTS AND DISCUSSION:** A total of 169 subjects (HNC= 63, LC= 35, GYN=71) were recruited. In general, the results showed that 10-40% of patients reported moderate to severe levels of FCR. Early-stage LC patients reported to have highest FCR concerns, then HNC and GYN cancers, respectively. Majority of patients used "stop thinking about it" to cope with FCR. In conclusion, the results suggest that health care professionals should pay more attention on patients' concerns about FCR and give timely and appropriate supports to help them deal with the fearful distress. **RESEARCH SUPPORT:** Ministry of Science and Technology (MOST) and National Health Research Institute (NHRI) in Taiwan.

STRESS, ANXIETY AND DEPRESSION IN NURSES IN SERBIA. Z Krivokapic, V Dordevic, College of Health Studies, Cuprija, Clinic of Mental Health, Nis, Serbia

INTRODUCTION: Stress and negative emotional states, such as depression and anxiety, in nurses lead to burnout syndrome, health problems and poor quality of patient care. The consequences of these conditions reduce the following: the ability to perform tasks, decision-making, concentration, motivation and job performance. The aim of this study was to detect these conditions in nurses employed in the state hospitals in Serbia. **METHODS:** The sample consisted of 133 nurses working in different hospital departments in

several major cities in Serbia. This study used: the Questionnaire with 12 questions (stress factors affecting, coping mechanisms, etc.), DESS (Depression, Anxiety and Stress Scales) and RSES (Rosenberg Self-Esteem Scale). Arithmetic mean with corresponding standard deviation, frequency and percentage were used for measures of descriptive statistics. Categorical variables were examined using Pearson's χ^2 -test. Pearson correlation coefficient was used to measure the strength of a linear association between two variables. **RESULTS AND DISCUSSION:** The sample consisted of 31 men and 102 women with the average 14.5 years of service. Of all, 92.3% estimated their job as stressful, and only 7.7% did not. Out of 14 factors that can cause stress at work, the following five were rated as the most stressful: human suffering and death, heavy workload, job responsibility, working environment and responses of the patients. 59.2% respondents believed that some of these stress factors could affect, and 40.8% believed they could not. The five most common techniques for resolving stress used by the respondents are the following: walking, talking about the problem, taking a vacation, tolerance and reading. In the studied group, 39.8% are smokers, and 6.8% respondents smoke occasionally. Alcohol is often consumed by 7.5% of nurses, and 25.6% occasionally. Benzodiazepines are used by 12.8% of respondents always, and 16.5% occasionally. The consequences of stress they feel are the following: a loss of concentration, low mood, low energy, loss of tolerance and getting tired easily. DASS registered the presence of depression as follows: normal 66.9%, moderate 24% and serious 9.1%. The presence of anxiety was normal 53.4%, moderate 26.3% and serious 20.3%. The presence of stress was normal 66%, moderate 24.1%, serious 9.9%. Self-esteem measured by RSES was highly expressed ($M=31.18$). There was a significant correlation between depression and anxiety ($r=0.711$, $p=0.00$), depression and stress ($r=0.592$, $p=0.00$), and depression and self-esteem ($r=-0.412$, $p=0.00$). Anxiety showed a significant positive correlation with stress ($r=0.727$, $p=0.00$), and a significant negative correlation with self-esteem ($r=-0.291$, $p=0.00$). Stress showed a significant positive correlation with depression and anxiety, and was not related to self-esteem. Recognizing that the work is stressful, we cannot influence the stress factors, elevated anxiety and decreased efficiency. Recognizing these emotional states may help find strategies and interventions to ensure the efficient and effective work.

PSYCHOLOGICAL AUTOPSY; AN INVESTIGATIVE TOOL IN DETERMINING DEATH – A CASE REPORT. BSK Shetty, Department of Forensic Medicine and Toxicology, Kasturba Medical College, Mangalore, Manipal University, Mangalore, Karnataka, India

Suicide constitutes a major public health problem in developing countries like India. As per the research, it shows India and China are responsible for 30% of all cases of suicide worldwide. Suicide condition creates a crisis state frequently and is not suitably recognized by relatives and friends or by the medical profession. It affects all the age groups and is equally seen in both sexes. Psychological autopsy is one of the most valuable tool of research on completed suicide in which the psychological picture of the dead person is drawn by the experts [medical and investigative] by meticulous collection of essential data from various sources used in situations called 'ambiguous death scenarios' where there is a doubt about the manner of death. This is a procedure of investigating and reconstructing what the person thought, felt, and did, preceding his or her death. This reconstruction is based upon information gathered from relevant data. An attempt is done in one such case where an economically stable young aged person succumbed to this unnatural act with multiple reasons as the fact revealed after performing a psychological autopsy. This tool is generally practiced in western countries and accepted mainly in civil cases. Although there are many flaws, it is a sincere effort by the experts to form scientific evidence in aid and administration of justice.



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THE INTERNATIONAL “STRESS AND BEHAVIOR” SOCIETY (ISBS)

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President: Allan V. Kalueff, PhD (2013-2015)

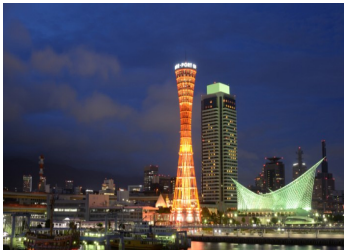
Vice-President: Victor M. Klimenko, MD, PhD (2013-2015)

ISBS is the international society of experts working with in the field of clinical and translational neuroscience, neurobehavioral sciences, biopsychology and biopsychiatry, with a particular focus on stress, stress-related neurobehavioral phenotypes, their neural, molecular and genetic mechanisms, as well as stress-evoked neuropsychiatric disorders. Anyone with an interest in stress-related human or animal behaviors, neurobehavioral disorders and their mechanisms, wishing to join the International Stress and Behavior Society can do so by paying dues of \$100.00 regular member or \$60.00 student member for a three-year term. Payment can be made following sending the e-mail form and payment request to the ISBS Secretariat at info@stressandbehavior.com.

Please join our 2015-2016 ISBS conferences:



5th International Regional Neuroscience and Biological Psychiatry Conference
"STRESS AND BEHAVIOR" (North America)
June 22-24, 2015, Miami, FL, USA



6th International Regional Neuroscience and Biological Psychiatry Conference "Stress and Behavior" (Asia)
July 26-27, 2015, Kobe, Japan



3rd Caribbean Biomedical Research Days CBRD-2016
January 16-18, 2016, Rodney Bay, St. Lucia



23rd International Neuroscience and Biological Psychiatry Conference "STRESS AND BEHAVIOR"
May 16-19, 2016, St. Petersburg, Russia



7th International Regional Neuroscience and Biological Psychiatry Conference
"STRESS AND BEHAVIOR" (North America)
June 22-24, 2016, New Orleans, LA, USA

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