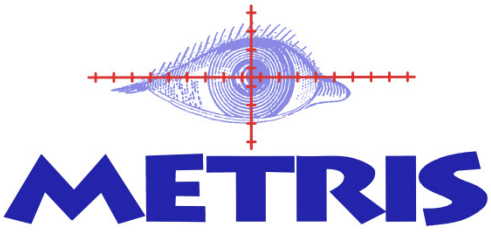
STRESS, BRAIN AND BEHAVIOR

Proceedings of the 23rd Multidisciplinary International Neuroscience and Biological Psychiatry Conference "Stress and Behavior"
St-Petersburg, Russia, May 16-19, 2016

ISSN 2374-3565

IN PARTNERSHIP WITH:

Journal STRESS, BRAIN AND BEHAVIOR
The International Zebrafish Neuroscience Research Consortium (ZNRC)



STRESS, BRAIN AND BEHAVIOR, Vol. 5, 2016, 1-52

The International Stress and Behavior Society (ISBS)
Institute of Experimental Medicine
Institute of Translational Biomedicine (ITBM), St. Petersburg State University
Centre for Physiology and Biochemical Research (CPBR)
The Russian Society for Biopsychiatry (RSBP)
The Ukrainian Society for Biological Psychiatry (USBP)

Proceedings

23rd Multidisciplinary International Neuroscience and Biological Psychiatry Conference
"Stress and Behavior"
ISBS Conference

St-Petersburg, Russia
May 16-19, 2016

Official Journal of the International Stress and Behavior Society (ISBS),

CONFRENCE PROGRAM

Day 1. Mon, May 16, 2016
Oktiabrskaya Hotel, Grand hall (2nd floor), 10 Ligovsky Prospect, St-Petersburg, Russia

10.00-10.20 **OPENING AND WELCOMING ADDRESSES**

10.20-11.00 **CONFERENCE OPENING PLENARY LECTURE: PLASMA MEMBRANE DOPAMINE TRANSPORTER: A TRANSLATIONAL PERSPECTIVE.** RR Gainetdinov, ISBS Fellow, Institute of Translational Biomedicine, St. Petersburg State University, St. Petersburg, Russia

11.00-13.00 **SYMPOSIUM I: STRESS AND LIPID-SYSTEM MEDIATED BEHAVIORS: ENDOCANNABINOIDS, SPHINGOLIPIDS AND BEYOND**
Chair: CP Müller (Germany)

11.00-11.25 **SPHINGOLIPIDS IN STRESS, MEMORY EXTINCTION AND DEPRESSION.** CP Müller, Department of Psychiatry and Psychotherapy, University Clinic, Friedrich-Alexander-University of Erlangen-Nuremberg, Erlangen, Germany

11.25-11.50 **SPHINGOLIPIDS IN DEPRESSION-INDUCED ALCOHOLISM.** L Kalinichenko, Department of Psychiatry and Psychotherapy, University Clinic, Friedrich-Alexander-University of Erlangen-Nuremberg, Erlangen, Germany

11.50-12.10 **COFFEE BREAK**

12.10-12.35 **ROLE OF THE ACCUMBAL ENDOCANNABINOID CB1 RECEPTORS IN CONDITIONED PAIN RELIEF.** M Fendt, M Schneider, JR Bergado Acosta, Institute for Pharmacology and Toxicology, Center of Behavioral Brain Sciences, Otto-von-Guericke University Magdeburg, Developmental Neuropsychopharmacology, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University, Mannheim, Germany

12.35-13.00 **THE ROLE OF CORTICOSTERONE AND GLUCOCORTICOID RECEPTOR FUNCTION IN ALCOHOL CONSUMPTION AND RELAPSE.** V Vengeliene, Institute of Psychopharmacology, Central Institute of Mental Health, University of Heidelberg, Mannheim, Germany

13.00-14.00 **LUNCH BREAK, EXHIBITION AND POSTER SESSION I**

POSTERS ON DISPLAY

1. **AUTONOMOUS NANOSATELLITE BIOIMAGING IN LOW EARTH ORBIT.** M Gaidica, J Cutler, K Weskamp, Neuroscience Graduate Program, Department of Aerospace Engineering, University of Michigan, Ann Arbor, MI, USA
2. **VENLAFAXINE AS AN AUGMENTATION OF ELECTRO-CONVULSIVE THERAPY IN TREATMENT OF RESISTANT DEPRESSION, A CASE REPORT.** A Joshi, M Lal, Institute of Mental Health, Singapore
3. **EFFECTS OF ESCITALOPRAM ON BEHAVIORAL RESPONSES AND CYTOKINE LEVELS CAUSED BY ENRICHED HOUSING AND ISOLATION REARING.** K Benova, D Shtiliyanov, E Angeleska, E Haritov, Department of Pharmacology and Toxicology, Medical Faculty, Medical University of Sofia, Sofia, Bulgaria
4. **COPPER NANOPARTICLES AND THEIR DISTANT INFLUENCE ON COGNITIVE FUNCTION.** KI Pavlov, VN Mukhin, VG Kamenskaya, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Bunin State University, Yelets, Russia
5. **POSTURAL INSTABILITY IN PARKINSON`S DISEASE: PERSPECTIVES OF EARLY DIAGNOSIS.** EV Gracheva, AV Kudrevatykh, TV Sergeev, IV Miliukhina, Institute of Experimental Medicine, St. Petersburg, Russia

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6. **MILD HYPOXIC AND REMOTE ISCHEMIC PRECONDITIONING IN THE PREVENTION AND CORRECTION OF ANXIETY AND DEPRESSIVE DISORDERS IN ANIMAL MODELS.** KA Baranova, Pavlov Institute of Physiology RAS, St. Petersburg, Russia
7. **CHARACTERISTICS OF MUSCLE TONE, ANXIETY AND COGNITIVE FUNCTION ON *IN VIVO* MODELS OF ALIMENTARY HYPERLIPIDEMIA AND OBESITY.** SA Apryatin, NV Trusov, YuS Sidorova, KV Mzhelskaya, AS Balakina, VK Mazo, VA Tutelyan**,** Federal Center of Nutrition and Biotechnology, Moscow, Russia
8. **ANXIOLYTIC PROPERTIES OF TRANQUIRIDINE IN MODELS OF EMOTIONAL BEHAVIOR.** AI Morozov, AA Lebedev, ER Bychkov, PD Shabanov**,** ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia
9. **DIFFERENCES OF STUDENTS' BRAIN ACTIVATION BY DIGITAL MEDIA ADDICTION RISK IN THE DIGITAL LEARNING.** GA Seomun, WJ Noh, Korea University, Seoul, Gachon University, Incheon, Korea
10. **GENDER DIFFERENCES IN PTSD: BOSNIAN EXPERIENCE.** S Bise, Dz Begic, B Kurtovic, O Cemalovic, Cantonal Psychiatric Hospital, Sarajevo, Bosnia and Herzegovina
11. **CALCIUM HOMEOSTASIS AND PROTEIN KINASE/PHOSPHATASE BALANCE IN NICOTINE-INDUCED SHORT- AND LONG-TERM MEMORY EFFECTS IN PASSIVE AVOIDANCE TASK IN MICE.** A Michalak, G Biała, Medical University of Lublin, Lublin, Poland
12. **THE INFLUENCE OF CHRONIC MILD UNPREDICTABLE STRESS ON NICOTINE–INDUCED CONDITIONED PLACE PREFERENCE IN RATS.** K Pękała, B Budzyńska, G Biała, Department of Pharmacology with Pharmacodynamics, Medical University in Lublin, Lublin, Poland
13. **FEAR AND STRESS LEVELS IN CAGED COMMON PHEASANT HENS.** E Voslarova, V Vecerek, I Bedanova, P Hrabcakova, V Pistekova**,** Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences, Brno, Czech Republic
14. **THE RELATION OF THE SKIN POTENTIAL LEVEL TO FORMATION OF EMOTIONAL BURNOUT.** S Tukaiev, S Fedorchouk, L Chikina, I Zyma, Y Havrylets, M Makarchuk, V Rizun, Institute of Biology, Department of Brain Physiology and Psychophysiology, Institute of Journalism, National Taras Shevchenko University of Kyiv, Kyiv, Ukraine
15. **TIMED AQUA-LIGHT THERAPY AS AN AUGMENTATION STRATEGY IN THE TREATMENT OF RESISTANT LETHARGIC DEPRESSION IN A PATIENT WITH BIPOLAR DISORDER: A CASE REPORT.** MM Coetzee, MJ Olckers, Charlotte Behavioral Health Care, PST Global Consultancy, Punta Gorda, Florida, USA

14.00-18.00 **SPECIAL PLENARY SESSION DEDICATED TO THE 85TH ANNIVERSARY OF ACADEMY PROFESSOR BORIS I. TKACHENKO**

14.00-14.20 **ACADEMY PROFESSOR BORIS I. TKACHENKO (1931-2009) - OUTSTANDING RUSSIAN PHYSIOLOGIST: ON HIS 85 BIRTHDAY.** EV Shaidakov, Institute of Experimental Medicine, St. Petersburg, Russia

14.20-18.00 **SYMPOSIUM II: ZOFIA ZUKOWSKA SYMPOSIUM ON TRANSLATIONAL NEUROSCIENCE OF STRESS**
Chair: AV Kalueff (USA, Russia, China)

14.20-14.40 **WHAT CAN BE LEARNED ABOUT HUMAN BEHAVIORAL DISORDERS FROM DOMINANT-SUBMISSIVE INTERACTIONS IN MICE?** A Pinhasov, M Gross, E Nesher, T Tikhonova, M Bairachnaya, I Michaelevski, Department of Molecular Biology, Ariel University, Ariel, Department of Biochemistry and Molecular Biology, Sagol School of Neuroscience, Tel Aviv University, Tel Aviv, Israel

14.40-15.00 **IN QUEST FOR FINDING THE MASTER REGULATORS OF THE MOLECULAR MECHANISMS OF PSYCHIATRIC AND COGNITIVE DISORDERS.** I Michaelevski, N Borovok, E Nesher, A Sheinin, M Reichenstein, A Pinhasov, Department of Biochemistry and Molecular Biology, Sagol School of Neuroscience, Tel Aviv University, Tel Aviv, Department of Molecular Biology, Ariel University, Ariel, Israel

15.00-15.15 **EVALUATION OF PHENOTYPE OF NEUROPEPTIDE S RECEPTOR-DEFICIENT MICE AS A TOOL FOR BETTER UNDERSTANDING THE PATHOLOGY OF POST-TRAUMATIC STRESS DISORDER.** MH Kolodziejczyk, J Germer, E Kahl, M Fendt, Institute for Pharmacology and Toxicology, Center of Behavioral Brain Sciences, Otto-von-Guericke University Magdeburg, Magdeburd, Germany

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15.15-15.30 **REDUCTION OF HSP70 EXPRESSION INCREASES NIGROSTRIATAL PATHOLOGY IN A RAT MODEL OF PROTEASOME INHIBITION.** DV Plaksina, IV Guzhova, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, Institute of Cytology RAS, St-Petersburg, Russia

15.30-15.45 **POSSIBLE MECHANISMS OF PROTECTIVE ACTION OF *ENTEROCOCCUS FAECIUM* STRAIN L-3 IN THE COURSE OF EXPERIMENTAL ALLERGIC ENCEPHALOMYELITIS IN RATS.** E Tarasova, I Abdurasulova, E Ermolenko, A Matsulevich, I Kudrjavtsev, A Suvorov, VM Klimenko, ISBS Fellow, Institute for Experimental Medicine, Saint-Petersburg State Pediatric Medical University, Saint Petersburg State University, St. Petersburg, Russia

15.45-16.00 **COFFEE BREAK**

16.00-16.20 **THE SOCIAL BEHAVIOR IN RATS WITH COMORBID EXPERIMENTAL SCHIZOPHRENIA AND LONG-TERM ALCOHOL DRINKING.** AY Egorov, ISBS Fellow, EO Kucher, NA Chernikova, EV Filatova, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg State University, St. Petersburg, Russia

16.20-17.00 **IEM SPECIAL PLENARY LECTURE: PSYCHOPATHOLOGY OF POSITIVE FIGHTING EXPERIENCE: A NEUROBIOLOGICAL ASPECT.** NN Kudryavtseva, Institute of Cytology and Genetics SD RAS, Novosibirsk, Russia

17.00-17.40 **AUTOMATED BEHAVIORAL STUDY OF RATS AND MICE, LABORATORY ANIMAL BEHAVIOR OBSERVATION REGISTRATION AND ANALYSIS SYSTEM - LABORAS, SONOTRACK, SMARTCHAMBER, DSI.** L Bachdasarian, R Bulthuis, E Molenwijk, M Boscaro, Metris BV, Netherlands, Data Sciences International, St. Paul, USA

17.40-18.00 **IMAGING DISRUPTED NEUROCOGNITIVE NETWORKS WITH SIMULTANEOUS PET/FMRI**. I Yakushev, Technische Universität München, Munich, Germany

18.00-19.20 **INDUCTION OF ISBS FELLOWS**
WELCOMING RECEPTION (SPONSORED BY ITBM) AND CONCERT (SPONSORED BY ISBS)

Day 2. Tue, May 17, 2016

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

9.20-10.00 **ISBS/ITBM SPECIAL PLENARY LECTURE: SINEUPS - A NEW FUNCTIONAL CLASS OF NATURAL AND SYNTHETIC ANTISENSE NON-CODING RNAS THAT ACTIVATE TRANSLATION.** S Gustincich, Department of Neuroscience and Brain Technologies, Italian Institute of Technologies, Genova; Area of Neuroscience, International School of Advanced Studies (SISSA), Trieste, Italy

10.00-14.00 **SYMPOSIUM III (ITBM NEUROSCIENCE SYMPOSIUM): TAAR1 AS AN EMERGING PHARMACOLOGICAL TARGET**
Chairs: RR Gainetdinov (Russia), MC Hoener (Switzerland), M Shahid (UK)

10.00-10.30 **CHARACTERIZATION OF A TRACE AMINE TRANSPORTER IN RAT BRAIN.** MD Berry, A Pryor, S Hart, S Hunter, Department of Biochemistry, Memorial University of Newfoundland, St. John's, Canada

10.30-11.00 **TAARGETING STRESS – DOES TRACE AMINE-ASSOCIATED RECEPTOR 1 HAVE A ROLE TO PLAY?** DK Grandy, Oregon Health and Science University, Portland, OR, USA

11.00-11.30 **SELECTIVE TAAR1 PARTIAL AGONISTS MODULATE DOPAMINERGIC AND SEROTONERGIC NEUROTRANSMISSION AND THEREBY REGULATING REWARD CIRCUITS, THE LIMBIC NETWORK, COGNITIVE PROCESSES, MOOD STATES, BODY WEIGHT AND GLUCOSE LEVELS.** MC Hoener, Neuroscience,

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Ophthalmology and Rare Diseases Discovery and Translational Area, Roche Innovation Center Basel, F Hoffmann-La Roche, Basel, Switzerland

11.30-11.50 **COFFEE BREAK**

11.50-12.10 **TAAR1 DEFICIENCY PRODUCES FRONTOSTRIATAL DYSFUNCTIONS.** S Espinoza, G Lignani, I Sukhanov, L Medrihan, S Maggi, L Mus, L Damiana, M Emanuele, G Ronzitti, E Chieregatti, TD Sotnikova, F Benfenati, V Tucci, F Fumagalli, RR Gainetdinov, ISBS Fellow, Italian Institute of Technology, NBT, Genova, Pharmacology, University of Milan, Milan, Italy

12.10-12.40 **PARTIAL AGONISM OF TRACE AMINE-ASSOCIATED RECEPTOR 1 PROMOTES WAKEFULNESS.** TS Kilduff, SW Black, SR Morairty, MC Hoener, MD Schwartz, Center for Neuroscience, Biosciences Division, SRI International, Menlo Park, CA USA; Neuroscience, Ophthalmology and Rare Diseases Discovery and Translational Area, Roche Innovation Center Basel, F Hoffmann-La Roche Ltd., Basel, Switzerland

12.40-13.10 **TACKLING DRUG CRAVING AND RELAPSE THROUGH TAAR1 ACTIVATION.** JJ Canales, Department of Neuroscience, Psychology and Behavior, University of Leicester, Leicester, UK

13.10-13.30 **THE EFFECTS OF TAAR1 ACTIVATION ON MESOLIMBIC DOPAMINE NEUROTRANSMISSION AND ALCOHOL DRINKING BEHAVIORS.** EA Budygin, ISBS Fellow, Department of Neurobiology and Anatomy, Wake Forest School of Medicine, Winston-Salem, NC, USA

13.30-14.00 **BEHAVIORAL AND ELECTROPHYSIOLOGICAL EFFECTS OF 3-IODOTHYRONAMINE AND RELATED SYNTHETIC TAAR1 ANALOGS.** R Zucchi, University of Pisa, Department of Pathology, Laboratory of Biochemistry, Pisa, Italy

14.00-15.00 **LUNCH BREAK, EXHIBITION AND POSTER SESSION II**

POSTERS ON DISPLAY

1. **AGE-DEPENDENT STRESS INDUCED BY EXPOSURE TO ETHANOL IN BEHAVING MICE AND HIPPOCAMPAL CULTURES.** A Botalova, A Polyanin, O Elkina, O Krotkova, E Korkotian, Department of Biology, Perm State University, Department of Botany, Perm State Pharmaceutical Academy, Russia; Department of Neurobiology, The Weizmann Institute, Rehovot, Israel
2. **DIFFERENCES IN ALEXITHYMIA AND EMOTIONAL AWARENESS IN EXHAUSTION SYNDROME AND CHRONIC FATIGUE SYNDROME.** D Maroti, P Molander, I Bileviciute-Ljungar, ME/CFS-Rehabilitation, Department of Rehabilitation Medicine, Department of Clinical Sciences, Karolinska Institutet Danderyd University Hospital, Stockholm, Department of Medical and Health Sciences, Faculty of Medicine and Health Sciences, Linköping University, Pain and Rehabilitation Center, Anaesthetics, Operations and Specialty Surgery Center, Region Östergotland, Department of Behavioral Sciences and Learning, Linköping University, Linköping, Sweden
3. **EFFECTS OF AN EARLY EXPERIENCE OF HIGH-SUGAR DIET ON ALCOHOL INTAKE IN RATS.** MV Dorofeikova, AY Egorov, ISBS Fellow, EV Filatova, AA Orlov, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg State University, St. Petersburg, Russia
4. **EMOTIONAL MODALITY OF THE INFORMATIONAL INFLUENCE AS A FACTOR OF THE INTERETHNIC PERCEPTION.** MV Baleva, DS Kornienko, SA Shebetenko, Perm State Institute of Culture, Perm State University, Perm, Russia
5. **THE REDUCTION OF PAIN STRESS BY USING MUSIC.** M Tomida, T Furuta, R Uchikawa, I Kawahara, S Sadaoka, K Uchida, T Yagasaki, Department of Social Dentistry, Department of Oral and Maxillofacial Biology, Graduate School of Oral Medicine, Department of Oral Health, Department of Oral and Maxillofacial Radiology, Matsumoto Dental University, Shiojiri, Japan
6. **THE STUDY OF "INTERNAL" HUMAN RHYTHMUS IN UKRAINIAN MENTALY ILL PATIENTS.** V Tarasov, N Orlova, TMA "Psychiatry", Kiev Medical University of UAFM, Kiev, Ukraine
7. **INTRANASAL EXPOSURE TO MANGANESE INDUCES INFLAMMATION, OXIDATIVE STRESS AND ACTIVATION OF CALPAINS IN RAT BRAIN.** IS Oblamskaya, NS Pestereva, MN Karpenko, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia
8. **BEHAVIORAL DISORDERS AND LIPID METABOLISM CHANGES OF RATS AFTER THE VIBRATION NOISE ACTION IN THE REMOTE PERIOD.** NK Apraksina, TV Avaliani, NN

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Klueva, AV Bykova, SG Tsikunov, ISBS Fellow, Institute of Experimental Medicine, St.-Petersburg, Russia

9. **EFFECT OF NEUROFEEDBACK TRAINING ON SIGNS, WORRY, ELECTRICAL ACTIVITY OF BRAIN, AND NEURAL GENERATORS OF GENERALIZED ANXIETY DISORDER PATIENTS: A STUDY BASED ON QEEG.** A Asadollahpour Kargar, Z Bahadori, A Bakhshipour, J Babapour, P Ahmadi**,** Cognitive Neuroscience Group, Tabriz University, Tabriz, Iran
10. **3-IODOTHYRONAMINE RESCUES SYNAPTIC DYSFUNCTION INDUCED BY AMYLOID BETA: A TAAR1-MEDIATED ACTION.** A Accorroni, C Criscuolo, M Sabatini, R Donzelli, A Saba, N Origlia, R Zucchi, Scuola Superiore Sant'Anna, National Research Council, University of Pisa, Pisa, Italy
11. **SHORT TERM OXYTOCIN ADMINISTRATION IS REDUCING MEMORY DEFICITS AND ANXIETY MANIFESTATIONS IN A METHIONINE-RAT MODEL OF SCHIZOPHRENIA.** A Ciobica, R Lefter, M Paulet, I Antioch, R Dobrin, Alexandru Ioan Cuza University, Iasi, Romania
12. **THE EFFECTS OF POSITIVE ALLOSTERIC MODULATOR (PAM) OF MGLUR5 ON THE LOSS OF OBJECT RECOGNITION MEMORY PRODUCED BY CHRONIC ETHANOL ADMINISTRATION IN RATS.** M Marszalek-Grabska, E Gibula-Bruzda, J Filarowska, A Bodzon-Kulakowska, P Suder, JH Kotlinska**,** Department of Pharmacology and Pharmacodynamics, Medical University, Lublin, Department of Biochemistry and Neurobiology, AGH University of Science and Technology, Krakow, Poland
13. **MORPHO-FUNCTIONAL CHARACTERISTIC OF THE OREXINERGIC SYSTEM IN RATS UNDERGOING THE SICKNESS AND PRENATAL HYPOXIA.** IY Morina, EA Aristakesyan, VV Kuzik, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia
14. **COMPARATIVE CHARACTERISTICS OF THE HYPOTHALAMIC VASOPRESSINERGIC STRUCTURES IN WISTAR AND KRUSHINSKII-MOLODKINA RATS.** IY Morina, SI Vataev, VV Kuzik, DM Surzhenko, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia
15. **PSYCHOLOGICAL FACTORS CONTRIBUTING TO DEPRESSION IN PATIENTS ON HEMODIALYSIS TREATMENT**. V Bugarski Ignjatović, V Sakač, Ž Nikolašević, Clinic for Neurology, Faculty of Medicine, Clinic for nephrology and clinical immunology, Department of Psychology, Faculty of Philosophy, University of Novi Sad, Novi Sad, Serbia
16. **BIPOLAR DISORDER OR MAJOR DEPRESSIVE DISORDER?** A Hashorva (Tasho), A Suli, D Ulqinaku, V Alikaj, E Spaho. University Center Hospital "Mother Teresa", Psychiatric Department, Tirana, Albania
17. **HOSPITALIZATION CAUSES ANXIETY.** A Hashorva (Tasho), P Maksuti, University Center Hospital "Mother Teresa", Psychiatric Department, Tirana, Albania
18. **DIFFERENCES OF BEHAVIORAL CHARACTERISTICS OF AUDITORY AND VISUAL EMOTION PERCEPTION AT THE PRIMARY SCHOOL AGE**. MN Anderson, ES Dmitrieva, VYa Gelman, Pushkin Leningrad State University, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, North-West State Medical University, St. Petersburg, Russia

15.00-15.30 **ISBS SPECIAL TALK: STRESS AND NEUROIMMUNE INTERACTIONS**. H Korneva, S Perekrest, S Shanin, Institute of Experimental Medicine, St. Petersburg State University, St. Petersburg, Russia

15.30-16.00 **USBP SPECIAL TALK: MIND-IMMUNE CONNECTION: UNDERSTANDING ITS ROLE FOR NEUROPSYCHIATRIC DISEASES FROM THE SYSTEMS BIOLOGICAL PERSPECTIVE.** L Tian, Academy of Finland, Neuroscience Center, University of Helsinki, Helsinki, Finland

16.00-16.30 **RSBP SPECIAL TALK: MISASSEMBLY OF NON-MUTANT DISRUPTED-IN-SCHIZOPHRENIA 1 (DISC1) PROTEIN IS LINKED TO ALTERED DOPAMINE HOMEOSTASIS AND BEHAVIORAL DEFICITS.** C Korth, Department of Neuropathology, University of Düsseldorf, Düsseldorf, Germany

16.30-17.00 **NEW INSIGHTS INTO BEHAVIORAL PHENOTYPING: PHENOMASTER AND INTELLICAGE WITH STELLAR TELEMETRY.** E Wenzler, TSE Systems GmbH, Bad Homburg, Germany

17.00-17.20 **COFFEE BREAK**

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17.20-18.55 **SYMPOSIUM IV: CLINICAL PSYCHOLOGY AND PSYCHIATRY**
Chairs: VM Klimenko (Russia), BA Rozanov (Ukraine)

17.20-17.40 **LONG HOURS IN CENTER-BASED CARE AND THE HEALTH OF SECOND-GRADE CHILDREN: A LONGITUDINAL STUDY.** T Anme, E Tomisaki, E Tanaka, T Watanabe, University of Tsukuba, Ibaragi, Sophia University, Tokyo, Japanese University of Health Sciences, Saitama, Japan

17.40-17.55 **PATIENTS WITH WORK-RELATED STRESS PROFILE.** P Rebolledo, N Martini, P Valenzuela, Hospital del Trabajador, Chile

17.55-18.15 **TREATMENT OF STRESS RELATED PSYCHOEMMOTIONAL DISORDERS (PED) ASSOCIATED WITH NEUROPATIC PAIN (NPP).** Y Katsnelson, H Backhoff, V Udalov, G Zdanov, Premier Annecto Technologies, PA, USA; Tver Railroad Clinical Center, Tver, Russia

18.15-18.40 **CONVENTIONAL AND ADVANCED IMAGING TECHNIQUES IN DETECTION OF NEURODEGENERATIVE DISORDERS.** D Kozić, ISBS Fellow, University of Novi Sad Faculty of Medicine, Novi Sad, Serbia

18.40-18.55 **THE EFFECT OF PRACTICING PRANAYAMA ON TEST ANXIETY.** A Nemati, Department of English Language Teaching, Jahrom Branch, Islamic Azad University, Jahrom, Iran

Day 3. Wed, May 18, 2016

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

09.00- 09.30 **USBP PLENARY LECTURE: PYCHOSOCIAL STRESS, SOCIAL GENOMICS AND MENTAL HEALTH.** VA Rozanov, Odessa Mechnikov National University, Odessa, Ukraine

09.30-10.10 **INNOVATIVE SOLUTIONS FOR BEHAVIORAL RESEARCH.** A Willemsen, A Biarslanova, Noldus IT, Wageningen, Netherlands

10.10-13.00 **SYMPOSIUM V: IZYASLAV LAPIN SYMPOSIUM ON MENTAL HEALTH AND PSYCHOPHARMACOLOGY**
Chairs: JAK Erskine (UK), Ph Fauquet-Alekhine (France)

10.10-10.35 **THE INTERACTION OF PHYSICAL AND MENTAL HEALTH ACROSS THE ADULT LIFE SPAN – THE IMPACT OF REPRESSIVE COPING.** JAK Erskine, L Kvavilashvili GJ Georgiou, L Myers, S Leggett, S Davies, S Hiskey, J Hogg, S Yeo, St George's, University of London, University of Hertfordshire, Brunel University, North Essex Partnership NHS Foundation Trust, Oxford University Hospitals NHS Trust, Oxford, UK

10.35-11.00 **USE OF A SYNTHETIC CANNABINOID IN A CORRECTIONAL POPULATION FOR POSTTRAUMATIC STRESS RELATED INSOMNIA AND NIGHTMARES AND OTHER INDICATIONS: A RETROSPECTIVE EVALUATION.** C Cameron, D Watson, J Robinson, Integrated Forensic Program - Secure Treatment Unit, Royal Ottawa Health Care Group, Department of Psychiatry, University of Ottawa, Ottawa, Canada

11.00-11.25 **WEIGHING THE EVIDENCE: A SYSTEMATIC REVIEW ON LONG-TERM NEUROCOGNITIVE EFFECTS OF CANNABIS USE IN ABSTINENT ADOLESCENTS AND ADULTS.** F Ganzer, S Bröning, S Kraft, PM Sack, R Thomasius, German Center for Addiction Research in Childhood and Adolescence, University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany

11.25-11.40 **COFFEE BREAK**

11.40-12.05 **DOES INTERNAL SENSING GOVERN LEARNING/MEMORY AND COGNITION? A 250 RECEPTOR STUDY OF THE HIPPOCAMPUS.** R Lathe, G Riedel, Division of

Official Journal of the International Stress and Behavior Society (ISBS),

Pathway Medicine, University of Edinburgh, Edinburgh, Institute of Medical Neuroscience, University of Aberdeen, Aberdeen, UK

12.05-12.30 **STRESS, COGNITION AND DOPAMINE.** TR Norman, TR Letic, A Pisarevsky, JS Olver**,** Department of Psychiatry, University of Melbourne, Austin Hospital, Heidelberg, Victoria, Australia

12.30-12.45 **SUBSTANCE USE DISORDER, MALNUTRITION AND STRESS.** M Saeland, D Jahanlu, Faculty of Health Sciences, Oslo and Akershus University College, Oslo, Norway

12.45-13.00 **ISBS OUTREACH COLLABORATION: AN ARTIST'S LOOK AT MENTAL DISORDERS.** D Raytchev, Daniela Raytchev Art, London, UK

13.00-14.00 **LUNCH BREAK, EXHIBITION AND POSTER SESSION III**

POSTERS ON DISPLAY

1. **INFLUENCE OF ARGININE-VASOPRESSIN ON MOTOR DISORDERS IN PATIENTS AFTER STROKE.** SG Belokoskova, SG Tsikunov**,** ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia
2. **POSTSTROKE COGNITIVE IMPAIRMENT IN BULGARIAN PATIENTS: PROSPECTIVE FOLLOW-UP STUDY.** NS Petrova, Clinic of Neurology, MHAT "Ruse", Ruse, Bulgaria
3. **BRIGHT LIGHT INDUCES FREEZING BEHAVIOR AND STRESS-LIKE CHANGES IN GROOMING IN THE COCKROACH, PERIPLANETA AMERICANA.** ES Novikova, IA Rodionov, MI Zhukovskaya, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia
4. **MOST PROMINENT PEAK OF LACTATE: POTENTIAL KEY MRSPECTROSCOPY FEATURE OF PROGRESSIVE MULTIFOCAL LEUKOENCEPHALOPATHY.** M Bjelan, D Kozić, ISBS Fellow, S Brkić, V Njagulj, J Ostojić; V Turkulov, D Lazarević, A Todorović, University of Novi Sad, Faculty of Medicine, Oncology Institute of Vojvodina, Diagnostic Imaging Centre, Sremska Kamenica, Clinic of Infectious Diseases, Clinical Center of Vojvodina, Center of Radiology, Institute of Cardiovascular Diseases of Vojvodina, Sremska Kamenica, Novi Sad, Serbia
5. **DEVELOPMENT OF A BIOMARKER-BASED DIAGNOSTIC ALGORITHM FOR POSTTRAUMATIC SYNDROME AFTER PHYSICAL INJURY: DESIGN OF THE BIOPTS STUDY.** JW Kim, HJ Kang, KY Bae, SW Kim, IS Shin, JS Yoon, HK Oh, MG Kim, JM Kim, Departments of Psychiatry, Chonnam National University Medical School, Gwangju, Korea
6. **GHRELIN ANTAGONIST [D-LYS3]-GHRP-6 REDUCES THE EXPRESSION AND REINSTATEMENT OF CONDITIONED PLACE PREFERENCE OF ALCOHOL IN RATS.** PM Vinogradov, IYu Tissen, AA Lebedev, ER Bychkov, ND Yakushina, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Institute of Experimental Medicine, St. Petersburg, Russia
7. **THE ROLE OF OREXIN A IN STRESS-INDUCED EMOTIONAL BEHAVIOR IN RATS**. IYu Tissen, SG Tsikunov, ISBS Fellow, AA Lebedev, ER Bychkov, ND Yakushina, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Pavlov Physiological Department, Institute of Experimental Medicine, St. Petersburg, Russia
8. **OREXIN A MODIFIES THE STRESS-INDUCED GAMBLING BEHAVIOR IN RATS.** ND Yakushina, AG Pshenichnaya, SG Tsikunov, ISBS Fellow, AA Lebedev, ER Bychkov, KA Privalov, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Pavlov Physiological Department, Institute of Experimental Medicine, St. Petersburg, Russia
9. **THE EFFECTS OF THE MOTION SICKNESS ON THE SLEEP-WAKEFULNESS CYCLE (SWC) IN THE 30TH DAY- RATS UNDERGOING HYPOXIA ON THE 14TH AND 19TH DAYS GESTATION.** EA Aristakesyan, DV Lychakov, IY Morina, VV Kuzik, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia
10. **AGE AND GENDER DIFFERENCES IN SUSCEPTIBILITY TO STRESS AND COGNITIVE WORKLOAD CAUSED BY MOBILE PHONE USE WHILE DRIVING.** J Bergeron, M Hazel, M Paquette, University of Montreal, Montreal, Canada
11. **STRESS-INDUCED CHANGES IN PLASMA CORTICOSTERONE CONCENTRATIONS IN DOMESTIC POULTRY.** V Vecerek, E Voslarova, I Bedanova, V Pistekova, G Zelinska, P Forejtek**,** Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences, Brno, Czech Republic
12. **ULTRASTRUCTURAL, IMMUNOELECTRON AND MORPHOMETRICAL STUDY OF GAP JUNCTIONS IN THE RAT THALAMIC NUCLEI.** EYu Kirichenko, AK Logvinov**,** Ivanovskiy

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Academy of Biology and Biotechnology, Southern Federal University, Central Research Laboratory, Rostov State Medical University, Rostov, Russia

13. **PSYCHOPHYSIOLOGICAL CHARACTERISTICS OF INSOMNIA PATIENTS MEASURED BY BIOFEEDBACK SYSTEM.** JS Lee, Department of Psychiatry, Pusan National University Yangsan Hospital, Yangsan, Korea
14. **LONGITUDINAL ASSOCIATIONS OF HOMOCYSTEINE AND MTHFR C677T POLYMORPHISM WITH DEPRESSIVE DISORDER IN PATIENTS WITH ACUTE CORONARY SYNDROME.** YS Lee, JM Kim, Department of Psychiatry, Chonnam National University Medical School, Gwangju, Korea
15. **A CASE STUDY EXPLORING THE STRESS LEVELS AND ITS IMPACT ON INDIVIDUAL DURING PREPARATION, EXAMINATIONS AND POST EXAMINATION PERIOD.** N Jarašūnaitė, County Upper School, Bury St Edmunds, UK; Center for Physiology and Biochemical Research (CPBR), Kiev, Ukraine
16. **THE EFFECTS OF L-NAME ON PENTYLENETETRAZOLE-INDUCED CONVULSIONS IN MICE.** A Jelenković, MD Jovanović , ID Stevanović, N Petronijević, University of Belgrade, Institute for Biological Research "Siniša Stanković", Belgrade, Military Medical Academy, Institute for Medical Research, Faculty of Medicine of Military Medical Academy, University of Defense, Belgrade, University of Belgrade School of Medicine, Institute of Medical and Clinical Biochemistry, Belgrade, Republic of Serbia

14.00-15.30 **SYMPOSIUM VI: CNS CHINESE NEUROSCIENCE SOCIETY**
Chairs: S He, Y Wang (China)

14.00-14.20 **OPTOGENETIC INHIBITION OF STRIATAL NEURONS IMPROVES THE SURVIVAL OF IMPLANTED NSC AND NEUROLOGICAL OUTCOMES AFTER ISCHEMIC STROKE.** Y Wang, Y Lu, L Jiang, GY Yang**,** Med-X Research Institute and School of BME, Shanghai Jiao Tong University, Shanghai, China

14.20-14.40 **A DEPRESSIVE-LIKE MOUSE MODEL INDUCED BY 24-HOUR-RESTRAINT.** X Chu, J Lou, T Serdyuk, Y Zhou, W Li, Bio-X Institutes, Brain Science and Technology Research Center, Shanghai Jiao Tong University, Shanghai, China

14.40-15.00 **EMBRYONIC NMDA RECEPTOR BLOCKADE INDUCED ANXIETY BEHAVIOR IN ADULT RATS BY DEVELOPMENTAL NMDA RECEPTOR PLASTICITY CHANGE IN HIPPOCAMPO-PREFRONTAL PATHWAY.** Y Wang, W Ren, Institute of Brain Science, Fudan University, Shanghai, China

15.00-15.15 **LONG-TERM RESCUE OF RAT RETINAL GANGLION CELLS AND VISUAL FUNCTION BY AAV-MEDIATED BDNF EXPRESSION AFTER ACUTE ELEVATION OF INTRAOCULAR PRESSURE.** R Ren, S He, School of Biomedical Engineering, Institute of Natural Science and Bio-X Research Institute, Shanghai Jiao Tong University, Shanghai, China

15.15-15.30 **CEREBRAL ACTIVATIONS IN NIGHTMARE DISORDER REFLECTED BY RESTING-STATE FMRI.** W Wang, C Shen, Q Zhu, Department of Clinical Psychology and Psychiatry, School of Public Health, Zhejiang University College of Medicine, Hangzhou, China

15.30-18.15 **SYMPOSIUM VII: BIOLOGICAL PSYCHIATRY**
Chairs: AV Kalueff (Russia, USA, China), D Kozic (Serbia)

15.30-15.45 **SIMULTANEOUS NEURAL ACTIVITY OF RIGHT AND LEFT MEDIAL FRONTAL CORTEX IN RAT BEHAVIOR.** EV Filatova, AA Orlov, SV Afanasyev, AY Egorov, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry, St. Petersburg Bekhterev Psychoneurological Research Institute, St. Petersburg State University, St. Petersburg, Russia

15.45-16.05 **PHEROMONE-INDUCED GENOME INSTABILITY IS ASSOCIATED WITH NEGATIVE fMRI RESPONSE IN MOUSE MAIN OLFACTORY BULB.** TS Glinin, AV

Romaschenko, VA Shubina, PA Starshova, LS Onopa, AA Bondarev, MP Moshkin, EV Daev, St. Petersburg State University, Institute of Cytology and Genetics SORAS, Novosibirsk, Russia

16.05-16.30 **THE PEPTIDES DRUGS IN THE COMPENSATION OF THE MAMMALS AMNESTIC, ANXIETY AND DEPRESSION DISTURBANCES.** TN Sollertinskaja, ISBS Fellow, MV Shorokhov, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia

16.30-16.50 **COFFEE BREAK**

16.50-17.05 **COMBAT-RELATED PTSD AND ITS CONSEQUENCES: BOSNIAN EXPERIENCE.** G Sulejmanpasic, S Fisekovic, S Ler, University Clinical Centre of Sarajevo, Psychiatric clinic, Sarajevo, Bosnia and Herzegovina

17.05-17.30 **MOTION TRACKING AND ANALYSIS AS INDICATOR OF STRESS AT WORK.** Ph Fauquet-Alekhine, M Veit, A Nieto, S Besse, Nuclear Power Plant of Chinon, Laboratory for Research in School of Energy, HOLO3, Schiltigheim, France; Department of Social Psychology, LSE, London, UK

17.30-18.00 **STRESS RECOGNITION FROM EEG FOR HUMAN ABILITIES/BEHAVIOR ASSESSMENT.** O Sourina, X Hou, Y Liu**,** Nanyang Technological University, Singapore

18.00-18.15 **CHEMIOSMOTIC VS. CONFORMON MODELS OF ENERGY PRODUCTION IN MITOCHONDRIA MEDIATING CELLULAR RESPONSES TO STRESS**. S Ji, Rutgers University School of Pharmacy, Rutgers University, Piscataway, NJ, USA

Day 4. Thur, May 19, 2016

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

09.15-11.20 **SYMPOSIUM VIII: ISBS FELLOWS SYMPOSIUM**
Chairs: VM Klimenko, TN Sollertinskaya (Russia)

09.15-09.30 **EARLY-LIFE LIPOPOLYSACCHARIDE ADMINISTRATION LEADS TO DELAYED CHANGES OF FGF2 AND BDNF mRNA EXPRESSION IN THE RAT BRAIN.** OE Zubareva, EA Veniaminova, AP Schwarz, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Institute of General Pathology and Pathophysiology, Moscow, Russia

09.30-09.55 **OLFACTORY REGULATION OF ADDICTIVE BEHAVIOR.** T Nevidimova, ISBS Fellow, E Masterova, D Savochkina, N Bokhan**,** Mental Health Research Institute, Tomsk, Russia

09.55-10.25 **70 kDa HEAT SHOCK PROTEIN IN MODULATION OF SLEEP AND ANXIETY-LIKE BEHAVIOR.** VV Simonova, MV Chernyshev, MA Guzeev, LY Kochemasova, IV Ekimova, ISBS Fellow, YF Pastukhov, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, Saint-Petersburg, Russia

10.25-10.45 **THE SEARCH FOR NON-MOTOR SYMPTOMS IN A NEW ANIMAL MODEL OF THE PROLONGED PRECLINICAL STAGE OF PARKINSON'S DISEASE.** YuF Pastukhov, ISBS Fellow, MV Chernyshev, VV Simonova, MA Guzeev, TS Shemiakova, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia

10.45-11.00 **INFLUENCE OF METEOROLOGICAL FACTORS ON BEHAVIORAL EFFECTS OF SINGLE INTRACEREBROVENTRICULAR ADMINISTRATION OF AMYLOID-BETA PEPTIDE.** V Mukhin, I Abdurasulova, K Pavlov, K Abdurasulova, V Klimenko**,** ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia

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11.00-11.20 **CHANGES IN THE GHRELIN, OREXIN AND CRF SIGNALING SYSTEMS IN BLOOD AND IN BRAIN STRUCTURES AFTER CHRONIC ALCOHOLIZATION AND ETHANOL WITHDRAWAL IN RATS**. PP Khokhlov, AA Lebedev, ER Bychkov, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Institute of Experimental Medicine, St. Petersburg, Russia

11.20-11.40 **COFFEE BREAK**

11.40-17.00 **SYMPOSIUM IX: 11TH ISBS/ZNRC ONE-DAY ZEBRAFISH BEHAVIORAL NEUROSCIENCE AND NEUROPHENOTYPING WORKSHOP (ZB2N-2016)**
Chair: AV Kalueff (Russia, USA, China)

11.40-12.30 **INNOVATION THROUGH PASSION NEVER STOPS: TECNIPLAST LATEST PRODUCTS FOR ZEBRAFISH HOUSING AND BREEDING.** M Brocca, Aquatic Solutions, Tecniplast, Italy

12.30-13.15 **ISBS PRESIDENTIAL LECTURE: STRESS, BRAIN AND THE IMMUNE SYSTEM: LESSONS FROM ZEBRAFISH, RODENTS AND HUMANS.** AV Kalueff, ISBS Fellow, A Kaluyeva, C Song, International Zebrafish Neuroscience Research Consortium (ZNRC), ZENEREI Institute, Slidell, LA, USA; Institute of Translational Biomedicine, St. Petersburg State University, St. Petersburg, Institute of Chemical Technologies, Institute of Biological Science, Ural Federal University, Ekaterinburg, Russia; Research Institute for Marine Drugs and Nutrition, Guangdong Ocean University, Zhanjiang, China

13.15-14.00 **WORKSHOP SESSION**

14.00-15.00 **LUNCH BREAK AND EXHIBITION**

15.30-17.00 **WORSHOP SESSION**

17.00-17.20 **CONCLUDING REMARKS AND CONFERENCE CLOSING CEREMONY**

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ABSTRACTS

Day 1. Mon, May 16, 2016
Morning Session

CONFERENCE OPENING PLENARY LECTURE: PLASMA MEMBRANE DOPAMINE TRANSPORTER: A TRANSLATIONAL PERSPECTIVE. RR Gainetdinov, ISBS Fellow, Institute of Translational Biomedicine, St. Petersburg State University, St. Petersburg, Russia. **INTRODUCTION:** Monoaminergic neurotransmitter dopamine plays a critical role in the regulation of movement, emotions and reward, and its dysfunction contributes to several brain disorders. A complex homeostatic balance between the amount of dopamine synthesized, packaged in the vesicles, released, re-uptaken via plasma membrane transporter and metabolized, determines overall status of dopaminergic signaling. The plasma membrane dopamine transporter (DAT) provides effective control of both the extracellular and intracellular concentrations of dopamine by re-capturing released neurotransmitter into the presynaptic terminals. This transporter is a primary target of psychostimulants and neurotoxins, such as cocaine, amphetamines and MPTP. **METHODS:** Behavioral, pharmacological, genetic and biochemical studies. **RESULTS AND DISCUSSION:** Mice with dysregulated dopamine transmission due to genetic alterations of DAT function have provided numerous advances in understanding the pathology and pharmacology of dopamine-related brain disorders, such as schizophrenia, ADHD, addiction, Parkinson's disease and bipolar disorder. The use of these animals has significantly advanced our knowledge of the mechanism of action of psychostimulants, antipsychotics, antimaniac and antiparkinsonian drugs. The data on these mice and new genetic rat model of DAT dysfunction and potential gene therapy approach for recently discovered Dopamine Transporter Deficiency Syndrome (DTDS) will be presented. **RESEARCH SUPPORT:** The Russian Science Foundation grant N14-15-00131.

SYMPOSIUM I: STRESS AND LIPID-SYSTEM MEDIATED BEHAVIORS: ENDOCANNABINOIDS, SPHINGOLIPIDS AND BEYOND
Chair: CP Müller (Germany)

SPHINGOLIPIDS IN STRESS, MEMORY EXTINCTION AND DEPRESSION. CP Müller, Department of Psychiatry and Psychotherapy, University Clinic, Friedrich-Alexander-University of Erlangen-Nuremberg, Erlangen, Germany. Together with cholesterol and glycerophospholipids, sphingolipids are the most common lipids in brain membranes. They form lipid domains, which are pre- and postsynaptic membrane compartments that are enriched in ion channel- and G-protein-coupled receptors. Distinct lipid domains such as lipid rafts have been suggested to be specific sites for the action of acid sphingomyelinase (ASM) and subsequent ceramide (Cer) generation from sphingomyelin (SM). Here the crucial mediation of endogenous depression-related behavior by the ASM-Cer pathway is discussed. Mice overexpressing ASM (tgASM) showed higher ASM activity and Cer production in the dorsal hippocampus (DH), accompanied by a decline in neurogenesis, neuronal maturation and survival, as well as depression-like behavior. The latter can be mimicked by application of Cer 16 into the DH. These findings suggested a role of the ASM-Cer pathway in genetically-induced depression. Reward-dependent instrumental behavior must continuously be re-adjusted according to environmental conditions. Failure to adapt to changes in reward contingencies may incur psychiatric disorders like anxiety and depression. When an expected reward is omitted, behavior undergoes extinction. While extinction involves active re-learning, it is also accompanied by emotional behaviors indicative of frustration, despair, anxiety and depression. Here we discuss a new sphingolipid mechanism in the extinction of behavior. Rapid extinction, indicating efficient re-learning, coincided with a decrease in the activity of ASM in the dorsal hippocampus (DH) of rats. The stronger the decline in ASM activity, the more rapid was the extinction. Sphingolipid-focused lipidomic analysis showed that this results in a decline of local ceramide species in the DH. Ceramides shape the fluidity of lipid rafts in synaptic membranes and by that way can control neural plasticity. These data provide evidence for a functional ASM-ceramide pathway in the brain involved in the extinction of no longer rewarded behavior and in depression. These findings extend the known cellular mechanisms underlying behavioral plasticity and accompanying emotional responses to a new class of membrane-located molecules, the sphingolipids, and their regulatory enzymes. **RESEARCH SUPPORT:** The IZKF Erlangen (project E13).

SPHINGOLIPIDS IN DEPRESSION-INDUCED ALCOHOLISM. L Kalinichenko, Department of Psychiatry and Psychotherapy, University Clinic, Friedrich-Alexander-University of Erlangen-Nuremberg, Erlangen, Germany. **INTRODUCTION:** Major depression is a chronic disease with high level of co-morbidity with alcohol dependence (Grant et al., 2007; Lalanne et al., 2015). We suggest the ceramide/acid sphingomyelinase (ASM) system as a crucial mechanism for depression/anxiety-induced alcohol addiction. ASM overexpression or intracranial ceramide injections result in an enhanced anxiety/depression-like behavior and reduced neurogenesis (Gulbins et al., 2013). On the other hand, ethanol induces an increase in ASM activity in cell cultures, which can be blocked by the functional inhibitors of ASM, imipramine and desipramine, widely used as antidepressants (Pascual et al., 2003). Here we investigated interactions between depression and alcohol dependence in animals with dysfunctions of ASM activity. **METHODS:** We used ASMtg and ASM knockout mice (ASMko/wt, ASMko/ko) mice. In the first series of experiments ASMtg mice received ethanol in increasing concentrations (2-16%) on the model of two-bottle free choice drinking. Then anxious/depressive state of animals was estimated in a battery of behavioral tests. In the second series naïve ASMtg, ASMko/wt, and ASMko/ko mice received ethanol injections (i.p., 2 mg/kg) 30 min before each test. **RESULTS AND DISCUSSION:** We found higher alcohol preference on the model of voluntary drinking in ASMtg mice comparing to wt. Free choice ethanol consumption reversed increased depression level in untreated ASMtg mice, but did not affect behavior of wt. Anxiety level was higher in untreated ASMtg mice comparing to wt mice. In ASMtg mice alcohol had anxiolytic effect in the open field and anxiogenic effect in the elevated plus maze. Ethanol induced a significant reduction in ASM activity in the dorsal hippocampus of ASMtg, but not wt. In contrast to voluntary

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drinking, ethanol injections had depressogenic, but anxiolytic effects on the behavior of ASMtg and wt mice. Ethanol induced an increase in depression level of ASMko/wt and ASMko/ko mice. Ehanol injections reversed reduced anxiety in ASMko/wt mice and increased anxiety in ASMko/ko specimens. Ethanol treatment did not affect ASM activity in the dorsal hippocampus of study groups. We conclude that voluntary, but not forced treatment with ethanol reverses depression-like behavior in ASMtg mice. We suggest that ceramide/ASM system can serve as a crucial mechanism for development of depression/anxiety-induced alcohol addiction. **RESEARCH SUPPORT:** The IZKF Erlangen (project E13).

ROLE OF THE ACCUMBAL ENDOCANNABINOID CB1 RECEPTORS IN CONDITIONED PAIN RELIEF. M Fendt, M Schneider, JR Bergado Acosta, Institute for Pharmacology and Toxicology, Center of Behavioral Brain Sciences, Otto-von-Guericke University Magdeburg, Developmental Neuropsychopharmacology, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University, Mannheim, Germany. **INTRODUCTION:** Humans and animals can better cope with aversive, stressful events if they have learnt from previous aversive experiences. Especially, stimuli predicting the onset of an aversive event can be learned (fear learning) but also stimuli that are associated with the absence or with the offset of an aversive event (safety learning or pain relief learning, respectively). It is known that patients with anxiety disorders often have exaggerated, i.e. maladaptive fear learning whereas safety learning is impaired. The neural mechanisms underlying relief learning are poorly understood so far, but it is known that the nucleus accumbens is involved in this type of learning. The present study investigated the role of endocannabinoid CB1 receptors in relief learning. **METHODS:** Guide cannulas aiming to the nucleus accumbens were implanted into male rats. After recovering from the surgery, they were relief conditioned (15 pairings of an electric stimulus with a following light cue, interstimulus interval: 3 s). One day later, a retention test on relief memory was performed. Accumbal endocannabinoid CB1 receptors were blocked by local injection of the CB1 antagonist rimonabant (SR141716). These injections were either performed before relief conditioning or before the retention test. **RESULTS AND DISCUSSION:** First data indicate that a blockade of endocannabinoid CB1 receptors within the nucleus accumbens inhibits the expression of relief memory. Since relief is believed to be a rewarding emotion, this first data are in line with the idea that endocannabinoid signaling in the nucleus accumbens supports appetitive-like behaviors and reduces fear-like behaviors.

THE ROLE OF CORTICOSTERONE AND GLUCOCORTICOID RECEPTOR FUNCTION IN ALCOHOL CONSUMPTION AND RELAPSE. V Vengeliene, Institute of Psychopharmacology, Central Institute of Mental Health, University of Heidelberg, Mannheim, Germany. Numerous preclinical studies have focused on the identification of biological and environmental factors that modulate stress and alcohol interactions but the determinants of stress-induced alcohol consumption and relapse in rodents are not well understood. We therefore carried out a clustered meta-analysis on stress-induced alcohol consumption in 1520 rats. Stress-induced alcohol consumption in rodents is age-dependent, with adults being more sensitive than adolescents; has a high genetic load; and results from an interaction of stress and reward systems. It is hypothesized that corticosterone (CORT), acting on medium spiny neurons within the nucleus accumbens (NAC), is an important mediator of stress effects on alcohol intake. Indeed adrenalectomized (ADX) rats do not show stress-induced alcohol consumption and exhibit a blunted alcohol deprivation effect (ADE). Since the ADX manipulation can be restored by CORT treatment a role of CORT and glucocorticoid receptor (GR) function is implicated in these behaviors. To examine the contribution of GR function in stress-induced alcohol consumption and ADE we subjected mice lacking specifically either GR in dopaminergic (GRDATCre) or dopaminoceptive (GRD1Cre) neurons to different stress procedures but could not find any genotype differences in stress-induced alcohol consumption when compared to wild-type littermates. In terms of relapse-like drinking, mutant mice showed a normal ADE when compared to wild-type controls. These results imply that GR does not play a role in stress-induced alcohol consumption but rather non-genomic CORT effects within the NAC mediate stress-induced alcohol consumption and relapse behavior.

POSTER SESSION I

AUTONOMOUS NANOSATELLITE BIOIMAGING IN LOW EARTH ORBIT. M Gaidica, J Cutler, K Weskamp, Neuroscience Graduate Program, Department of Aerospace Engineering, University of Michigan, Ann Arbor, MI, USA. **INTRODUCTION:** Understanding how biological systems react to the stresses of Low Earth Orbit (LEO) informs safety features of future manned space missions. LEO environments are subject to radiative, thermal, and gravitational stresses that can alter the natural state of living organisms. Assessing how these influence life has remained expensive, and is dependent on enormous ancillary mission support. Recent interest in standardized nanosatellite platforms, known as “CubeSats,” has ushered in a new era of low-cost, easily deployable LEO research tools. Here, we introduce a first-of-its-kind CubeSat design capable of autonomous regulation and imaging of a biological specimen, and show preliminary ground-based data from a potential model organism, the Cyclops copepod. **METHODS:** Our CubeSat is based on a standard “2U” specification (100 x 100 x 270 mm). One half is dedicated to power electronics, sensors, and the flight computer. The other half consists of a novel biocarousel capable of housing and imaging nine individual wells. A Peltier module attached to the biocarousel (used for thermal regulation) was exploited here to modify the thermal properties of a Cyclops microenvironment in a ground-based simulation. Images were synced with temperature data and bioactivity quantified in MATLAB. **RESULTS AND DISCUSSION:** Our results reveal temperature-dependent activity of, and a lethal thermal threshold for, the Cyclops. Furthermore, we prove that precise bio-environment control and bio-well imaging is possible in the form factor of a 2U CubeSat. As imaging becomes more broadly applied to biological investigations (e.g. fluorescent calcium indicators), our CubeSat represents the first step towards a future direction of space research. One of the many challenges faced before orbiting is developing biocarousel wells for cells or organisms that can withstand prelaunch transport and storage. **RESEARCH SUPPORT:** The Neuroscience Graduate Program at the University of Michigan, Ann Arbor.

VENLAFAXINE AS AN AUGMENTATION OF ELECTRO-CONVULSIVE THERAPY IN TREATMENT OF RESISTANT DEPRESSION, A CASE REPORT. A Joshi, M Lal, Institute of Mental Health, Singapore. **INTRODUCTION:** Treatment Resistant Depression has always been a challenge for the Mental Health Providers. Treatment Resistant Depression can be defined as inadequate response to at least one antidepressant trial of adequate doses and duration.

In this case we attempt to describe a patient who was unresponsive to maximum dosage of antidepressant and was started on Electro Convulsive Therapy but, without an expected response. Then we see how starting Venlafaxine actually made her recovery faster. **METHODOLOGY: SINGLE CASE REPORT.** A 62 year old Indian Lady, she was brought by her family for change in her behavior for the past few months. She had become socially withdrawn, was refusing food and had a clingy behavior towards her family. At times, she would get aggressive and physically hit her sister. In January 2013, her family noticed that she was refusing food, water and her medications. Her family pointed out her symptoms to a few events, when she was following up with a doctor for Hyponatremia and was scolded by the doctor a few times that she would die if she does not reduce her water intake. She was reviewed by a Psychiatrist and was started on Mirtazapine. According to the family she responded well to Mirtazapine, but the family defaulted treatment, until she started getting worse. **RESULT:** After her admission, she was noticed to be scared of strangers and wanted her family members to be on her side all the time. She denied any persecutory ideations or suspiciousness towards the strangers. She was noticed to be crying most of the time and was not forthcoming about what was stressing her. She was started on Mirtazapine which was up-titrated over the course of one month to 45 mg/day. She was also started on Quetiapine 200 mg/day. In consideration of her poor response to medications, she was started on Electro Convulsive Therapy. But even after six sessions of Electro Convulsive Therapy she was not responding as was expected. So Mirtazapine was stopped and she was started on Venlafaxine up-titrated to 150mg/day, while the Electro Convulsive Therapy was on. She started responding to this treatment and was discharged stable after 10 sessions of Electro Convulsive Therapy and within 15 days of starting Venlafaxine.

EFFECTS OF ESCITALOPRAM ON BEHAVIORAL RESPONSES AND CYTOKINE LEVELS CAUSED BY ENRICHED HOUSING AND ISOLATION REARING. K Benova, D Shtiliyanov, E Angeleska, E Haritov, Department of Pharmacology and Toxicology, Medical Faculty, Medical University of Sofia, Sofia, Bulgaria. **INTRODUCTION:** Introduction: Experimental and clinical evidences demonstrate that environmental conditions play a crucial in the brain development and in the pathogenesis of affective disorders. It has been shown that enriched rearing conditions improve auditory and visual processing, and neuronal plasticity in rodents. In contrast, isolation rearing is a severe stressor and isolated experimental animals become more vulnerable and exhibit impairment in learning and memory tasks. The effect of SSRIs on individuals exposed to different environmental conditions has been little studied. Contemporary investigations have revealed that depression is linked with neuroinflammation and that SSRI possess anti-inflamatory actions. The aim of the present study is to assess whether the antidepressive-like and antiinflammatory effects of escitalopram are differentially affected by the diverse environmental conditions. **METHODS:** Materials and methods: Wistar rats were assigned to three different groups according to rearing conditions (Standart-SR, Enriched-ER, Isoleted-IR), after weaning at postnatal 22 day. Previously, on postnatal day 5 (PD 5) animals from all groups were administered LPS (50μg/kg, i.p.). SR-rats were housed as a group of 4 rats in regular cages. ER-rats were housed as a group of 12 rats in special cages equipped with different stimulating objects. IR-rats were housed individually in standart size metal cages. 4 weeks later sucrose preference and forced swim tests were applied to all animals. In the next 7 days escitalopram (10 mg/kg) was administered per os via gavage and the behavioral tests were repeated. The rats were decapitated and levels of IL-1beta in the hippocampus were measured by ELISA. **RESULTS:** Escitalopram significantly decreased the diving and immobility time in animals from SR and ER-groups. In socially isolated animals (SR), immobility periods in forced swim test were significantly higher compared to ER-group. Escitalopram increased significantly sucrose preference in ER compared to SR ($p<0.05$) and IR ($p<0.01$). Level of IL-1beta was significantly lower in ER, in comparison with SR and IR-groups. **DISCUSSION:** The present study demonstrated that post-weaning environment conditions affects depressive-like behavior in adulthood. The administration of escitalopram (10 mg/kg) during 7 days differentially influenced behavioral indicators and levels of cytokines. This provides for the first time evidence, that responses to anti-depressive drugs are mediated by the diverse environment and its influence on the immune system. This is important for improvement of depression treatment. **RESEARCH SUPPORT:** Department of Pharmacology and Toxicology, Medical faculty, Medical University of Sofia.

COPPER NANOPARTICLES AND THEIR DISTANT INFLUENCE ON COGNITIVE FUNCTION. KI Pavlov, VN Mukhin, VG Kamenskaya, VM Klimenko**,** ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Bunin State University, Yelets, Russia. **INTRODUCTION:** Many studies point to negative and positive impact of nanoparticles on the organism. The aim of our study was to investigate whether copper nanoparticles have distant influences on electrophysiological characteristics of cognitive process, namely visual and auditory evoked potentials P300. **METHODS:** 10 females (mean age 25.9+3.5) were located near surfaces (a picture and a blank canvas, size of 40 x 60 cm) covered with copper nanoparticles on the distance of 2.5 meters. Duration of exposure was 15 minutes. Similar surfaces without nano-texture were used for comparison. Electroencephalograph "Encephalan-EEGR-19/26" was used for registration of electrophysiological characteristics of evoked potentials P300. Statistical methods were Wilcoxon Z test and two-factor analysis of variances with repeated measures. **RESULTS AND DISCUSSION:** Visual evoked potentials P300. We discovered that copper nanoparticles cause decrease in latencies of the peaks P1 and N2 in the right central lead and the peaks P3 and N3 in the left parietal lead. It means that copper nanoparticles distantly enhance cognitive processes such as perception and recognition, memory and decision-making in response to significant visual stimuli. Analysis of variance showed that environmental factor (which may be natural seasonal changes of terrestrial and space weather) modulates the effect of copper nanoparticles on the amplitude of N2 peak of the right frontal lead and the latency of N2 peak in the right central lead. Thus the most sensitive to the combined effect of nanoparticles and environmental factors were those parameters of the visual evoked potentials P300 which were associated with cognitive function of recognition of visual stimuli. Auditory evoked potentials P300. It was established that copper nanoparticles cause decrease in latency of P1 peak in the both parietal leads and in the left occipital one and decrease in amplitude in the right parietal lead. The amplitude of the peak P3 in the left central lead increases during the demonstration of nano-textures. These results showed that copper nanoparticles distantly intensify perception, memory and decision-making in response to significant auditory stimuli. Analysis of variances showed that seasonal changes of environment factor don't influence on electrophysiological manifestations of cognitive process, namely auditory evoked potentials P300. We assumed that mechanism of the distant influence of nanoparticles on the organism based on the interaction of nanoparticles with natural electromagnetic radiation. Nanoparticles could change the reflective properties of surfaces and therefore cause specific physiological effects. **RESEARCH SUPPORT:** grant 49/12 GZP ZN 4.638.2011.

POSTURAL INSTABILITY IN PARKINSON`S DISEASE: PERSPECTIVES OF EARLY DIAGNOSIS.** EV Gracheva, AV Kudrevatykh, TV Sergeev, IV Miliukhina, Institute of Experimental Medicine, St. Petersburg, Russia. **INTRODUCTION:** Postural instability (PI) is one of the most disabling and hard to treat symptom of Parkinson`s Disease (PD). PI develops in patients at advanced stages of PD and leads to fallings, which dramatically reduce the quality of life. The aim of our study is to find predictors of PI development in patients at early stages. **METHODS: PI analysis was held with the computerized static and dynamic posturography protocol (Diers, Germany). We assessed 105 subjects with PD (Hoehn and Yahr stage 1.0-3.0). A group of 32 patients 1.5-2.0 stages without clinical postural instability was distinguished in order to assess 4 posturological characteristics: «Gravity Center (GC) movement», «GC movement maximum speed», «Oscillation surface square», «Relative frequency». We assessed the Hoehn-Yahr scale, the Unified Parkinson's Disease Rating Scale (UPDRS) total, PIGD subscale. **RESULTS AND DISCUSSION:** Subjects were divided into 3 subgroups: 1st subgroup – subjects with the highest GC movement amplitude, GC movement maximum speed and the biggest oscillation surface square; 2nd subgroup – subjects with average characteristics; 3rd subgroup – subjects with relatively low characteristics. 1st subgroup included mainly patients at 1,5 stage (75%), whereas 2nd and 3rd subgroups consisted of the patients at predominantly 2.0 stage (62% and 67%, respectively). PIGD subscale score was less in the 1st subgroup and higher - in 2nd and 3rd subgroups. The analysis of the obtained data showed that the greatest contribution to PI early diagnosis belongs to «GC movement». Oscillation amplitude and frequency of GC movement Is higher in patients at 1.5 stage, than in patients at 2.0 stage. The more advanced the stage of the disease is, the less the oscillation amplitude and frequency are. We associate this with the increase of ankle rigidity, because the projection of GC goes through ankles. In healthy subjects small oscillatory motions in joints help to maintain balance, which does not happen in subjects with Parkinson`s Disease.

MILD HYPOXIC AND REMOTE ISCHEMIC PRECONDITIONING IN THE PREVENTION AND CORRECTION OF ANXIETY AND DEPRESSIVE DISORDERS IN ANIMAL MODELS. KA Baranova, Pavlov Institute of Physiology RAS, St. Petersburg, Russia. The last decade has been steadily increasing the number of operating upon us acute and chronic stresses, traumatic situations and serious conflicts, which leads to an increase in the prevalence of anxiety and depressive disorders. Thus, the more urgent question is about effective methods of prevention and treatment. Recently it has been found that mild hypobaric hypoxia (hypoxic preconditioning) prevents the development of depression and post traumatic stress disorder (PTSD) in rats. Recent data suggest the possibility of using the hypoxic/ischemic brain tolerance produced by remote ischemic preconditioning to protect against the damaging effect of stress and development of anxiety-depressive pathologies. For the induction of experimental depression the classical model of "learned helplessness" was used - uncontrolled inescapable aversive stress leads to depressive-like state in rats. For PTSD simulations "stress restress" was applied - severe traumatic stress, bearing a threat to life, first acted on animals, and after 7 days mild brief restress, evocative the pathogenic stress and is a trigger for the development of PTSD. The hypoxic pre- and postconditioning - the action of mild hypobaric hypoxia in a pressure chamber (10% O2, 2 hours) three times. Remote ischemic conditioning - threefold five-minute tourniquet on the hind limb with reperfusion. The hypoxic conditioning does not allow forming post-stress anxiety and depressive disorders: completely eliminates the effects of psycho-emotional and traumatic stress, normalizing the behavior of animals and the function of the pituitary-adrenocortical system, triggers mechanisms of adaptive reactions of neurons in the brain by modifying the activity of the genome, involving transcription and neurotrophic factors, neurohormones and their receptors. Remote ischemic conditioning increases brain resistance to stress, it has a pronounced anti-depressant and anxiolytic effects without side effects. The effectiveness of protection created by the remote conditioning quantitatively assessed using behavioral tests and functional hormonal tests. In models of depression and PTSD in animals remote preconditioning prevents violations of orienting-exploratory behavior, reduction of motor activity, an increase in anxiety level, the increase in the basal levels of glucocorticoid hormones in the blood and dysregulation of the pituitary-adrenocortical system. Along with hypoxic, remote ischemic preconditioning seems promising strategy for increasing adaptive capacity of the body in conditions of severe stress. **RESEARCH SUPPORT:** RFBR grant № 16-34-60095.

CHARACTERISTICS OF MUSCLE TONE, ANXIETY AND COGNITIVE FUNCTION ON *IN VIVO* MODELS OF ALIMENTARY HYPERLIPIDEMIA AND OBESITY. SA Apryatin, NV Trusov, YuS Sidorova, KV Mzhelskaya, AS Balakina, VK Mazo, VA Tutelyan**,** Federal Center of Nutrition and Biotechnology, Moscow, Russia. I**NTRODUCTION:** Development of methods for differential diagnosis and personalized dietary treatment of nutrition-related diseases demands establishing of markers that characterize the stage, severity and direction of the pathological process, using in vivo experimental models in rodents. One of the most informative groups of such indicators are behavioral reactions that characterize the state of muscle tone, anxiety, and cognitive function. The aim of the study is investigation of the changes in muscle tone, anxiety and cognitive function in laboratory animals (rats and mice) on in vivo models of alimentary hyperlipidemia and obesity induced by the consumption of diets with increased quota of dietary fat, fructose and cholesterol. **METHODS:** Studies were carried out on 6-8 weeks old females of Wistar rats and C57Black/6 mice. Animals of each species were divided into 6 groups of equal number (N = 8). Within 63 days the animals of the 1st groups received the control balanced diet corresponding to AIN93, 2nd - diet with high fat content (30% fat by weight of dry substances); 3rd - control diet supplemented with 20% fructose solution instead of water, 4th - high fat diet with fructose, 5th - diet with 0.5% cholesterol by weight solids, 6th - the diet with high cholesterol and additional fructose. Assessment of muscle tone was performed by determining the grip force of the front paws. The level of anxiety was assessed in animal test "elevated plus maze". Assessment of cognitive function was performed using a test "passive avoidance" (CRPA). Testing was conducted on days 36 and 57 of experiment. **RESULTS AND DISCUSSION:** In both species surplus cholesterol quota (groups #5 and #6) leads to an increase or, at least, to the preservation of muscle tone level whereas the addition of fructose apparently provided, in these species effects of opposite direction. The level of anxiety in rats decreased as a result of high fat diet consumption (group #2), whereas in mice increased fat quota caused increase of anxiety that has been most noticeable on the background of increased consumption of fructose (group #4). High cholesterol (including in combination with fructose, groups #5 and #6) significantly improved both short-term and long-term memory in rats, whereas in mice a significant increase in short-term memory was due to the additional quota of fructose (including in combination with high fat, groups #3 and #4), and long-term memory - high cholesterol with fructose (group #6). Thus, dietary factors that contribute to the development of dyslipidemia and obesity on in vivo rodent models (increased quota of easily digestible sugar - fructose, fat and cholesterol), may have a significant species-specific impact on studied indicators of functional activity of the central nervous system. **RESEARCH**

SUPPORT: Federal Agency of Scientific Organizations program No 0529-2015-0006 «The search for new molecular markers of nutrition-related diseases: genomic and post-genomic analysis» for 2015 – 2017.

ANXIOLYTIC PROPERTIES OF TRANQUIRIDINE IN MODELS OF EMOTIONAL BEHAVIOR. AI Morozov, AA Lebedev, ER Bychkov, PD Shabanov, ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia. Anxiolytic drugs cover a number of chemical compounds of different structure including derivatives from 3,4-benzodiazepine (worldwide structure of which more than 110 drugs have received), benzimidazol (afobazol), trimetoxybenzoic acid (trioxazine), azapirone (buspirone), bisphenyl derivatives of acetylcholine (benactizine, methamizyl) and other heterocyclic compounds. The derivatives of diazaridine (1,2-diazocyclopropane), containing two nitrogens in the molecule cycle can be consider as potential psychotropic drugs, antidepressants and neuroleptics in particular. Tranquiridine, a derivative of 1,2-diazocyclopropane, was shown to possess a typical anxiolytic effect in behavioral experiments in elevated plus maze, open field, dark/light chamber, conflict situation (punished water intake) in rats and mice, and in rats with active and passive strategy of emotional behavior. Effect of tranquiridine 100 mg/kg was the same as of diazepam 1 mg/kg. Tranquiridine 50 mg/kg acted as a middle, or daily tranquilizer. Tranquiridine 10 mg/kg was ineffective in majority of behavioral tests. Therefore, effects of tranquiridine depended on the dose, its power increased with enhancement of the dose. The tranquilizing effect of tranquiridine was supported with antidopaminic type of its action when tranquiridine 100 mg/kg like as diazepam 1 mg/kg slowed dopamine turnover in the rat striatum (chronic administration of drugs for 5 days). Besides, tranquiridine in a wide range of concentrations (from 10 μM to 10 mM) decreased impulse activity frequency of the isolated neurons of the mollusk lasted on the background of slight hyperpolarization. In the same experimental conditions, tranquiridine slightly inhibited influx sodium currents (without changing calcium currents) and acted biphasically on slow potassium currents: in concentrations of 1•10-6 and 1•10-5 M tranquiridine activated them slightly, and in higher concentrations inhibited them. All supports anxiolytic effect of tranquiridine, mechanism of action of which is functional antidopaminergic effect and direct inhibition of impulse activity of neurons.

DIFFERENCES OF STUDENTS' BRAIN ACTIVATION BY DIGITAL MEDIA ADDICTION RISK IN THE DIGITAL LEARNING. GA Seomun, WJ Noh, Korea University, Seoul, Gachon University, Incheon, Korea. **INTRODUCTION:** Recently, interest regarding digital learning is increasing because of its educational efficacy and convenience. However, potential side effects such as attention deficit are of concern. Because many students have already been exposed to this risk through computers, games, and smart phones in the home, it is necessary to evaluate the effect of digital learning on students' brain activity in relation to their digital media addiction risk. **METHODS:** This study was a quasi-experimental study with a pretest-posttest control group design. Participants included 83 middle school students who engaged in digital learning. We measured brain activation using PolyG-I (LAXTHA Inc.). **RESULTS AND DISCUSSION:** No statistically significant difference existed in all locations in the attention index between the normal and digital media addiction risk groups before and after digital learning. However, we found a statistical difference in the P3, P4, and F4 locations in the relaxation index between the two groups before and after digital learning. These results show that the digital media addiction risk group can experience learning difficulty following exposure to digital media. Therefore, school teachers have to grasp the exact state of their students' digital media addiction risk and develop intervention programs to prevent digital media addiction. Educational institutions are utilizing digital media for learning activities. However, the safety of using these activities in youth already at risk for digital media addiction is unknown. This study found that portions of the brain did not immediately return to a relaxed state after engaging in digital learning activities. **RESEARCH SUPPORT:** Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning(NRF- 2013R1A1A3013229).

GENDER DIFFERENCES IN PTSD: BOSNIAN EXPERIENCE. S Bise, Dz Begic, B Kurtovic, O Cemalovic, Cantonal Psychiatric Hospital, Sarajevo, Bosnia and Herzegovina. **BACKGROUND:** Research on posttraumatic stress disorder (PTSD) has focused primarily on Bosnian War veterans and womens victims of war. There are gender differences in the type of trauma exposure, presentation of illness, and comorbidities. Some of these differences are clearly societal and nonbiologically based, but it is also clear that the biologic systems altered in PTSD may modulate or be modulated by sex hormones. In the normal stress response, a burst of sympathetic nervous system activity constitutes the immediate response. Activation of the hypothalamic/adrenal/pituitary (HPA) axis occurs shortly thereafter. Cortisol is the final mediator of the HPA response, and there is an elevation of cortisol in the normal stress response. In individuals with PTSD, the HPA axis response is dysregulated. Individuals with PTSD have low circulating levels of cortisol. Different types of traumas carry different risks for the development of PTSD.There are also differences between men and women in the presentation of PTSD. **OBJECTIVE** to examine gender differences in exposure to traumatic events, in patients with diagnosis Post-traumatic stress disorder. **METHODS:** Study included 22 patients. Subjects were interviewed to assess history of traumatic events and PTSD using ICD-10 criteria. **RESULTS:** Among patients with PTSD there were 12 man and 10 women. Lifetime prevalence of traumatic events was slightly higher in men than in women. The risk for PTSD following traumatic experiences was higher in women than in men. This gender difference was primarily due to women's greater risk of PTSD following events that involved assaultive violence. Women are more likely to have symptoms of numbing and avoidance and men are more likely to have the associated features of irritability and impulsiveness. Men are more likely to have comorbid substance use disorders and women are more likely to have comorbid mood and anxiety disorders, Duration of PTSD was longer in women than in men. **CONCLUSION:** There are gender differences in the prevalence and comorbidity presentation in PTSD in patients with PTSD. There are difference in the use therapy based on gender and comorbid diseases.

CALCIUM HOMEOSTASIS AND PROTEIN KINASE/PHOSPHATASE BALANCE IN NICOTINE-INDUCED SHORT- AND LONG-TERM MEMORY EFFECTS IN PASSIVE AVOIDANCE TASK IN MICE. A Michalak, G Biała, Medical University of Lublin, Lublin, Poland. **INTRODUCTION:** Memory formation as well as neuroadaptive changes associated with the intake of psychoactive substances, are underpinned by the same phenomenon called neuroplasticity. It is the ability of the brain to be continuously reorganized on a functional and morphological level. The molecular basis of neuroplasticity includes two contradictory processes: long-term potentiation (LTP) and long-term depression (LTD), both of which are dependent on specific Ca2+ influx, however, LTP is linked with activation of protein kinases, while LTD requires activation of protein phosphatase. Hence, the aim of the study was to evaluate the importance of

calcium homeostasis and protein kinase/phosphatase balance in nicotine-induced short- and long-term memory effects. **METHODS:** To assess memory function passive avoidance test (PA test) was used. The test is based on the association formed between an aversive stimulus (a foot shock) and a specific environmental context. The apparatus consists of two-compartment light-dark box. The compartments are separated by a guillotine door. The entrance of animals to the dark box was punished by an electric foot shock. **RESULTS AND DISCUSSION:** The presented results confirm that acute nicotine at the dose of 0.1 mg/kg improves short- and long-term memory in mice. Pretreatment with L-type voltage-dependent calcium channel (VDCC) blockers (amlodipine, nicardipine and verapamil) increased nicotine-induced memory improvement in the context of short- and long-term memory. Pretreatment with FK-506 (a potent calcineurin inhibitor) enhanced short- but not long-term memory effects of nicotine, while SL-327 (a selective MAPK/ERK kinase inhibitor) attenuated both nicotine-induced short- and long-term memory improvement. In conclusion, nicotine influences mechanisms underlying short- and long-term memory sharing similar substrates in cell signaling pathways. Acute nicotine enhances both types of memory via L-type VDCC blockade and via ERK1/2 activation. Only short- but not long-term memory enhancement induced by nicotine is dependent on calcineurin inhibition. **RESEARCH SUPPORT:** Internal Fund of Medical University of Lublin.

THE INFLUENCE OF CHRONIC MILD UNPREDICTABLE STRESS ON NICOTINE–INDUCED CONDITIONED PLACE PREFERENCE IN RATS. K Pękała, B Budzyńska, G Biała, Department of Pharmacology with Pharmacodynamics, Medical University in Lublin, Lublin, Poland. **INTRODUCTIONS:** Nicotine, as the main component of tobacco smoke, acting through central mechanisms, exerts influence on mood and emotional tension, and also contributes to physical and mental dependence. *This alkaloid activates the mesolimbic dopaminergic system*, which is associated *with the reinforcing effects*. *In experimental animal models nicotine causes a conditional place preference in rats.* Additionally, in some experimental animal models it was demonstrated that chronic or acute stress may aggravate both behavioral as well as neuronal effects caused by administration of nicotine. Stress is a very important factor that precipitates and potentiates addictive effects of different drugs of abuse, including nicotine. **METHODS:** In our studies, rats were submitted to the procedure of chronic mild unpredictable stress (CMUS) for 2 weeks, 2 hours per day. There were a total of six following stressors: wet litter or the lack of it, tilted cage at 45 degree, limitation of water or food, lights on overnight, swimming in cold water (24-26 °C) for 10min. To evaluate the rewarding effects of nicotine was used conditioned place preference (CPP) test. The place conditioning experiment consisted of pre-conditioning, conditioning and post-conditioning phases. Nicotine was administered 2 days during conditioning. The present study was designed to investigate the rewarding effect of nicotine (0.175 mg/kg) in rats previously exposed to the CMUS. Additionally, the influences of metyrapone (a corticosterone synthesis inhibitor, 50 mg/kg) and imipramine (an antidepressant, 15 mg/kg) on the development and expression of nicotine-induced CPP in stressed rats were described. **RESULTS AND DISCUSSION:** Results from present study showed that the CMUS potentiated the rewarding effects of nicotine measured in the CPP test. Metyrapone and imipramine also inhibited the expression of nicotine-induced CPP in rats undergoing the CMUS procedure. In total, series of our experiments for the first time described behavioral impact and complex relationship between rewarding effects of nicotine and the CUMS, critical for the development of nicotine dependence. **RESEARCH SUPPORT:** The Medical University of Lublin.

FEAR AND STRESS LEVELS IN CAGED COMMON PHEASANT HENS. E Voslarova, V Vecerek, I Bedanova, P Hrabcakova, V Pistekova**,** Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences, Brno, Czech Republic. **INTRODUCTION:** A substantial number of pheasants kept in captivity for breeding purposes are housed in cage systems during the breeding season. Unlike domestic poultry, little attention is paid to the welfare of pheasants raised in battery cages. Fear and stress levels are important indicators of birds' welfare in commercial breeding systems. Therefore, the aim of the present study was to compare the level of fear measured by a tonic immobility (TI) test and stress measured by heterophil-to-lymphocyte (H/L) ratio in pheasant hens kept in different housing systems during the laying period. **METHODS:** During the laying period, pheasants were housed either in the conventional cages and underwent beak trimming or were fitted with clip-on spectacles or were left with intact beaks and housed in the cages enriched with two perches and a place to hide created by separating one corner of the cage by strips of cloth. After three months of cage housing, 15 hens from each group were exposed to a TI test. Another 45 hens (15 birds from each group) were sampled to assess the H/L ratio. Data were subjected to a Kruskal-Wallis ANOVA and a non-parametric Tukey-type test with ranked sums for pairwise comparisons. **RESULTS AND DISCUSSION:** The shortest TI duration (111.40±21.41 s) was found in pheasant hens housed in enriched cages during laying period. It was lower ($P<0.05$) than in hens kept in conventional cages. The longest TI duration (361.63±40.61 s) was found in pheasant hens fitted with spectacles. However, the difference between debeaked hens and hens fitted with spectacles was not significant. Also the highest H/L ratio (0.10±0.01) was found in spectacles-fitted hens, however it differed ($P=0.001$) only from beak-trimmed pheasant hens (0.05±0.01). No difference was found in the H/L ratio in intact-beak hens kept in enriched cages (0.08±0.01) in comparison to both beak-trimmed and spectacles-fitted pheasant hens. The results show that relatively easy and inexpensive enrichment of the cage environment (two perches, a simple hideout) where breeding groups of common pheasants are housed during laying period can contribute to reduced fear levels. However, when considering H/L ratio as a stress indicator enriched cages had no effect on stress reduction in comparison to conventional cages. Further research is needed to determine the proper housing of pheasants in commercial rearing facilities.

THE RELATION OF THE SKIN POTENTIAL LEVEL TO FORMATION OF EMOTIONAL BURNOUT. S Tukaiev, S Fedorchouk, L Chikina, I Zyma, Y Havrylets, M Makarchuk, V Rizun, Institute of Biology, Department of Brain Physiology and Psychophysiology, Institute of Journalism, National Taras Shevchenko University of Kyiv, Kyiv, Ukraine. **INTRODUCTION:** The skin potential level (SPL) of facial biologically active zones (BAZs) reflects the level of background activation of brain structures and the level of mental stress. The aim of the study was to detect the changes of SPL under looking at emotionally-accented stimuli depending on the level of emotional burnout. **RESEARCH METHODS:** 31 healthy volunteers (women and men) - first-year students aged 17 to 22 years participated in this study. The task of participants was to follow the appearance of a set comprised of 80 negative (selected from the Holocaust documentary "Night and Fog" (1955, France) and 80 neutral images. At the end of the experiment the participants assessed each set of images on the scales of "relaxing - activating" and "unpleasant - pleasant". They regarded the historical images we offered them as unpleasant and activating. Skin potential level was recorded via nonpolarizable silver electrodes from the symmetric biologically active zones of face skin (frontal, superciliary, paranasal, temporal, periotic and postaural). At the end of the

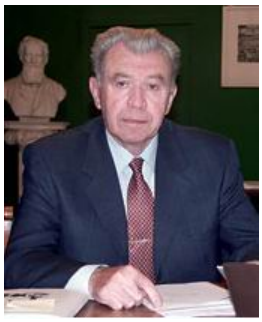
experiment the participants assessed each set of images on the scales of "relaxing - activating" and "unpleasant - pleasant". To determine the stages of burnout we used the test "Syndrome of emotional burnout" by Boyko adapted for students. The Mann-Witney criterion was carried out to compare independent samples. The Speerman rank test was carried out for the correlation analysis. **RESULTS AND DISCUSSION:** Inverse *correlation was found* between the formation of emotional burnout and the skin potential level in right periotic BAZ ($r = -0.43$, $p < 0.05$). We found correlation between the development of the Resistance stage of burnout and background SPL in the right and left frontal BAZ (respectively $r = -0.44$ and $r = -0.47$, $p < 0.05$) and SPL in the left frontal BAZ after the exposure of negative frames of historical documentaries ($r = -0.50$, $p < 0.01$). *It indicates* that the formation of burnout reduced the prestarting initial emotional tension and response strength to "external" negative emotional stimuli. Our data indicate that electrodermal potentials can serve as objective criteria of formation of emotional burnout and subjective evaluation of the emotional content of the stimuli depending on the initial mental state.

TIMED AQUA-LIGHT THERAPY AS AN AUGMENTATION STRATEGY IN THE TREATMENT OF RESISTANT LETHARGIC DEPRESSION IN A PATIENT WITH BIPOLAR DISORDER: A CASE REPORT. MM Coetzee, MJ Olckers, Charlotte Behavioral Health Care, PST Global Consultancy, Punta Gorda, Florida, USA. **INTRODUCTION:** The use of artificial bright light therapy has been proven as an effective method to treat major depressive disorder with seasonal pattern (> 2500 Lux, up to 10000 Lux or more) when applied 1-2 h before dawn on a daily basis. Meta-analyses of bright light therapy in non-seasonal depression (Golden et al 2005 and Pail et al. 2011) suggest possible efficacy as augmentation therapy. Additionally, phototherapy was used to decrease irritability and diminished functioning associated with shift work. However, fatigue, as a residual symptom of depression, persists in 20-30 per cent of depressed patients who are in remission and there is no evidence documented for any psycho-pharmaceutical agent that shows superiority for treating fatigue as a residual symptom of depression. We could find no reports in the literature of the use of bright light therapy and specifically Aqua Light Therapy to treat fatigue as a residual symptom of mood disorder. This case is the first report of the use and efficacy of bright light therapy and specifically Aqua Light Therapy as augmentation to treat residual fatigue in a female patient with a long-standing history of major mood disorder. **Method:** It was decided to construct a light source which could easily be used at a patient's bedside and which could be programmed to activate and deactivate at any time as required. A standard off-the-shelf programmable timer was used for this purpose. For the sake of simplicity, a standard off-the-shelf bedside lamp was modified to accept a higher power LED light source and standard photographic gel color filter sheets. The results of this construction was a time-programmable bedside light source which provided a brightness of 8500 Lux at 30 cm. The color was chosen to be Aqua, which is the complementary color of red. To create this color the filter simply subtracts red from a white light source. The wavelength was 500 nm and color coordinates are – Hex triplet #00FFF, sRGB – 0,255,255. The device was set to activate 40 min before the patient's normal wake-up time. Results Within the span of 3 days after the initiation of Aqua Light Therapy, family members noticed a significant decrease in early morning irritability as well as a "sunnier disposition" of the patient associated with improved communication. The patient noticed a significant improvement in early morning wakefulness, energy level, cognitive improvement and functioning in the work place as well as less irritability on arising and throughout the day. The patient reported accomplishing more work during office hours and more overall enjoyment of activities. Results on the computerized neuro-cognitive testing (CNS Vital Signs) and The Fatigue Associated with Depression (FAsD) Questionnaire supported significant positive outcome findings. Conclusions: We report the first case of successful treatment of fatigue associated with major mood disorder using timed early morning Aqua Light Therapy in the convenience of the patient's natural surroundings without intruding on patient's sleep and usual daily routine. The patient is a passive recipient of this augmentation therapy (while sleeping) and positive outcome is well documented by pre-and post-test FAsD rating and computerized Neurocognitive Test (CNS Vital Signs). This is a very cost-effective and highly effective device to provide augmentation therapy in patients suffering from residual fatigue in major mood disorder as it avoids the use of complex electronics, light sources and construction. Further studies are needed to elucidate whether these findings can be replicated in other subgroups of Major Mood Disorder or whether this finding is specific to the subgroup of patients with a history of seasonal affective tendency and bipolarity.

Afternoon Session

SPECIAL PLENARY SESSION DEDICATED TO THE 85TH ANNIVERSARY OF ACADEMY PROFESSOR BORIS I. TKACHENKO

ACADEMY PROFESSOR BORIS I. TKACHENKO (1931-2009) - OUTSTANDING RUSSIAN PHYSIOLOGIST: ON HIS 85 BIRTHDAY. EV Shaidakov, Institute of Experimental Medicine, St. Petersburg, Russia



Laureate of the USSR State Prize and the Russian Federation Government Award, Honored Worker of Science, Director of the Institute of Experimental Medicine (1990-2009), Member of the Academy of Medical Sciences, Doctor of Medical Sciences, Professor. Born in 1931 in Dnepropetrovsk. In 1955, graduated from the Dnepropetrovsk Medical Institute and enrolled in graduate school in general pathology at the Institute of Experimental Medicine. Worked as researcher at the Department of General Pathology, a senior fellow at the Department of General Physiology, head of the Laboratory of circulation, Deputy Director for research, head of the Department of Physiology of Visceral Systems. In 1990-2009 - Director of the Institute of Experimental Medicine. The focus of his scientific activity was the physiology of visceral systems, mainly circulatory physiology, functional relationships between cardiac output and vascular tone with persistent changes in blood pressure, as well as reflex mechanisms of regional vascular reactions to reflex zones of the heart. The subject of his subsequent research was issues of integration of major vascular organ functions: resistive, capacitive and exchange. Prof. Tkachenko also carried out high-altitude studies of cardiovascular reactivity to environmental factors, including hypoxia and hyper/hypothermia. In addition to addressing the fundamental issues of systemic and organ hemodynamics, he also studied venous reactivity of the coronary, cerebral, pulmonary vessels, critical for clinical practice and development of novel drugs. In addition to his active research and

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scientific administrative duties (as IEM Director and Chairman of the North-West Branch of RAMS), B.I. Tkachenko was a dedicated teacher, author of many scholarly books, guidebooks for foreign students, and manuals. Professor B.I. Tkachenko was a prominent Russian physiologist, a strong supporter of international collaboration in translational biomedicine, and a big friend of ISBS. He passed away suddenly in 2009 and is sorely missed by his colleagues in Russia and around the globe.

SYMPOSIUM II: ZOFIA ZUKOWSKA SYMPOSIUM ON TRANSLATIONAL NEUROSCIENCE OF STRESS
Chair: AV Kalueff (USA, Russia, China)

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 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.

WHAT CAN BE LEARNED ABOUT HUMAN BEHAVIORAL DISORDERS FROM DOMINANT-SUBMISSIVE INTERACTIONS IN MICE? A Pinhasov, M Gross, E Nesher, T Tikhonova, M Bairachnaya, I Michaelevski, Department of Molecular Biology, Ariel University, Ariel, Department of Biochemistry and Molecular Biology, Sagol School of Neuroscience, Tel Aviv University, Tel Aviv, Israel. Personality formation and development, education, family life, as well as career opportunities, all involve social interactions, characterized by hierarchical relationships in which one member of a given pair achieves dominant status, while the other is relegated to submissiveness. The formation of hierarchical relationships between mice allowed us to develop unique animal populations with strong and stable features of dominance (DOM) and submissiveness (SUB). We developed these populations using selective breeding based upon the Dominant-Submissive Relationships (DSR) food competition paradigm. We showed that dominant and submissive mice display heightened vulnerability or resilience, respectively, to physical and environmental stressors, react differentially to antidepressants and mood stabilizing agents; in different ways exhibit aging-related cognitive impairments and demonstrate marked differences in short- and long-term synaptic plasticity. Furthermore, Sub mice display innate anhedonia, as well as heightened activation of the HPA axis, after exposure to chronic mild stress that did not affect their Dominant counterparts. High throughput transcriptomic and proteomic studies identified a central role of synapsin gene family, crucial factors of synaptic transmission, to be a key regulator of submissive behavior. Thus, our accumulating evidences suggest that animals possessing strong dominant and submissive phenotypes represent a valuable tool for studying human behavioral abnormalities. This research was supported by National Institute of Psychobiology in Israel and Ariel University.

IN QUEST FOR FINDING THE MASTER REGULATORS OF THE MOLECULAR MECHANISMS OF PSYCHIATRIC AND COGNITIVE DISORDERS. I Michaelevski, N Borovok, E Nesher, A Sheinin, M Reichenstein, A Pinhasov, Department of Biochemistry and Molecular Biology, Sagol School of Neuroscience, Tel Aviv University, Tel Aviv, Department of Molecular Biology, Ariel University, Ariel, Israel. **BACKGROUND:** Psychiatric conditions, in many cases, arise from social interactions necessary for optimal mental functioning. Phenotypic penetrance of behavioral alterations, including related to the social interactions, are governed by multiple genetic and epigenetic mechanisms. Despite multiplicity of factors standing behind psychiatric disorders, majority of animal models rely on very specific mutations making biased study of the molecular mechanisms. Hence, there is a deep abyssal in understanding how molecular changes affect and modify behavioral phenotypes. Dominance and submissiveness are two opposite poles of behavior, stemming from processes of social interactions between members inside one group or species. Extreme expressions of dominance and submissiveness in humans is accompanied by various mental impairments, including personality disorders, mania, and depression. **METHODS:** In this study, we took advantage of the innate behavioral model of depressive and manic like behavior to disassemble them onto molecular components responsible for phenotypic penetrance. Utilizing high-throughput proteomic study, we assessed protein expression profiles in manic and depressive-like behavior in the context of social interaction. **RESULTS:** We identified 1146 proteins exhibiting expression changes among the general population, presented by the wild type mice, as well as dominant and submissive mice demonstrating manic and depressive-like behavior, respectively. Protein expression profiles showed striking complexity exhibiting multifactorial impact on behavior. Using advanced statistical model, we infer from our proteomic data alteration in protein expression pattern correlating with either manic and depressive-like behavior or impact of social interaction. We identified proteins responsible for innate molecular basics of manic and depressive-like behavior, as well as social and stress-impact on precipitation of these behavioral routines. Using advance bioinformatics analysis, we assembled protein-protein interaction networks, highlighting the major signaling pathways and master regulating proteins orchestrating these pathways, alteration in which is directly involved in phenotypic penetrance of these molecular changes. Among the most enriched functional categories, we found extensive changes in protein sets related to presynaptic release, ion channel regulation, circadian rhythm, MAPK, ErbB, and NF-kB pathways. Using the same approach, we succeeded to decode protein-protein interaction networks and master regulators of memory formation process, using spatial learning paradigm, showing dramatic changes of protein expression profiles at different

stages of memory acquisition, consolidation and maintenance. As proofs of concept, we also validate central role of numerous master regulators in depressive like behavior, as well as in synaptic plasticity, cellular correlate of learning. Identification of the master regulators opens new horizons in understanding of molecular mechanisms of these diseases, as well as in therapeutic targeting of specific protein-protein interaction networks to shut down pathogenetic vicious cycle responsible for the disease penetrance. **RESEARCH SUPPORT:** National Institute of Psychobiology in Israel.

EVALUATION OF PHENOTYPE OF NEUROPEPTIDE S RECEPTOR-DEFICIENT MICE AS A TOOL FOR BETTER UNDERSTANDING THE PATHOLOGY OF POST-TRAUMATIC STRESS DISORDER. MH Kolodziejczyk, J Germer, E Kahl, M Fendt, Institute for Pharmacology and Toxicology, Center of Behavioral Brain Sciences, Otto-von-Guericke University Magdeburg, Magdeburd, Germany. Dysfunctions within the mechanisms underlying fear can lead to anxiety disorders which include panic disorder (PD), generalized anxiety disorder (GAD), phobias (social, specific and agoraphobia), acute stress disorder and posttraumatic stress disorder (PTSD). Currently, the available treatments consist of the combination of psychotherapy, where the gold standard is cognitive-behavioral therapy and pharmacotherapy. However, the established pharmacological anxiolytic treatments are not very optimal due to limited efficiency and negative side-effects. Moreover, the neurobiological underpinnings of most anxiety disorders are as yet not completely understood. Endogenous neuropeptide S (NPS), that has been shown to exert strong anxiolytic effects upon intracerebral injection in rodents, seems to be a promising target for anxiety disorders. Several clinical studies identified a polymorphism in the NPS receptor (NPSR) gene that is associated with an increased incidence of anxiety disorders. In this study, we investigated NPSR-deficient mice in different animal paradigms of PTSD. Female and male NPSR-deficient mice were subjected to two different behavior paradigms for post-traumatic stress disorder: (A) Mice were fear-conditioned with a single intense electric stimulus and expression of contextual fear were tested 1 or 4 weeks later (experiment 1). (B) Mice were fear-conditioned (two intense electric stimuli) with or without systemic injections of corticosterone (2.5 mg/kg, 30 minutes after conditioning) and expression of contextual fear was tested 1-2 days later (experiment 2). In these expression tests, animals were exposed to the original conditioning context, a very similar context and a novel context in order to assess the specificity of contextual fear memory. During different stages of the experiments, blood samples were collected to determine corticosterone levels. Our data show that mice exhibit a PTSD-like fear memory, i.e. a fear generalization, 4 weeks after fear conditioning (experiment 1) or after fear-conditioning in combination with corticosterone injections (preliminary data; experiment 2). In general, high corticosterone levels seemed to be associated with this PTSD-like fear generalization in the two experiments. NPSR-deficient mice have lower baseline corticosterone levels but seemed to have a more pronounced increase in corticosterone levels after the manipulations leading to generalized fear. Further data are currently collected. **RESEARCH SUPPORT:** the Deutsche Forschungsgemeinschaft (DFG).

REDUCTION OF HSP70 EXPRESSION INCREASES NIGROSTRIATAL PATHOLOGY IN A RAT MODEL OF PROTEASOME INHIBITION. DV Plaksina, IV Guzhova, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, Institute of Cytology RAS, St-Petersburg, Russia. **INTRODUCTION:** Parkinson's disease (PD) is neurodegenerative disease characterized by the progressive degeneration of the dopamine (DA)-ergic substantia nigra pars compacta (SNpc) neurons. PD remains an incurable disorder due to a commonly late diagnosis and symptomatic treatment only. Progress in treatment is now associated with the development of new neuroprotective technologies for PD therapy. In turn, the development of neurotechnologies requires a deep understanding of the molecular mechanisms of neurodegeneration in PD. Data on HSP70 involvement in PD pathogenesis, received in last 10 years, cannot answer the question whether the decrease in HSP70 brain expression is one of the reasons for progressive neurodegeneration in PD. The present study aims to find out the influence of the Hsp70 level reduction within the SNpc on the rate of neuronal death and the formation of compensatory mechanisms in a rat model of lactacystin-induced nigrostriatal degeneration, imitating the preclinical PD stage. **METHODS:** Experiments were carried out in male Wistar rats. Proteasome inhibitor lactacystin (LC) have been used to model neuropathological pattern of PD in animals. LC was bilaterally injected into the SNpc. In order to decrease the level of inducible Hsp70 in the SNpc neurons, the intraperitoneal injections of HSPs expression inhibitor quercetin or microinjections of shRNA-Hsp70 into the SNpc were used in the LC-induced model of nigrostriatal degeneration. Methods of immunohistochemistry were applied to assess the features of neurodegeneration. Sunflower seeds test and Syok test were used to estimate motor dysfunctions in rats. **RESULTS AND DISCUSSION:** It was shown for the first time that quercetin pretreatment inhibited the LC-induced expression of Hsp70 in the SNpc neurons and led to the increase of DA-ergic neurons death and striatal DA-ergic axons degeneration comparing with the preclinical PD stage. These changes were accompanied by the depletion of compensatory mechanisms and HSP70 content in the SNpc neurons and appearance of the motor dysfunctions. Similar data were obtained using local microinjections of shRNA-Hsp70. **CONCLUSION:** The reduction of Hsp70 level in the SNpc neurons in a preclinical PD model promotes the progression of neurodegeneration and transition of the neuropathological symptoms from the preclinical to clinical PD stage. The data obtained can be considered as the scientific basis for the development of new molecular technologies for early PD therapy based on HSP70 inducers. **RESEARCH SUPPORT:** RFFR grant 14-04-00478a.

POSSIBLE MECHANISMS OF PROTECTIVE ACTION OF *ENTEROCOCCUS FAECIUM* STRAIN L-3 IN THE COURSE OF EXPERIMENTAL ALLERGIC ENCEPHALOMYELITIS IN RATS. E Tarasova, I Abdurasulova, E Ermolenko, A Matsulevich, I Kudrjavtsev, A Suvorov, VM Klimenko, ISBS Fellow, Institute for Experimental Medicine, Saint-Petersburg State Pediatric Medical University, Saint Petersburg State University, St. Petersburg, Russia. Intestinal microbiota has protective, metabolic and immunological functions. In last years, the influence of probiotic on the central nervous system (CNS) became the center of scientific interests. Commensal, probiotic, and pathogenic bacteria in the gastrointestinal tract can activate neural pathways and CNS signaling systems (Foster et al., 2013). At the same time some intestinal bacteria can stimulate Th17 cells, but others can stimulate T reg cells. First cells population have most encephalitogenic ability in multiple sclerosis, second play role in the period of recovery. Previously we have shown that treatment with probiotic strain E. faecium L-3 reduced the number of rats with illness and decreased the severity of disease in experimental autoimmune encephalomyelitis (EAE) – an animal model of multiple sclerosis (Abdurasulova et al., 2016). The aim of this work was to investigate the mechanisms via probiotic strain E. faecium L-3 ameliorate the course of experimental allergic encephalomyelitis in rats. **MATERIALS AND METHODS:** Female Wistar rats were immunized subcutaneously with homological spinal cord homogenate (HSCH) in complete Freund's adjuvant to induce EAE. The severity of neurological disorders were estimated by

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clinical index from 0 (without disorders) to 6 (mortality). Probiotic strain E. faecium L-3 was administrated gavage (8,0 lg CFU/rat/day) for 14 days (group E) beginning since the inoculation of HSCH. The control group (group C) received saline instead of probiotic. The cell populations in blood were analyzed using Flow Cytometry (FC) method. Expression of IL-10 mRNA in lymph nodes was examined by the reverse transcription polymerase chain reaction (RT-PCR) technique. Serum cytokines (IL-17, IL-10 and TGFβ) were evaluated by ELISA with Bender MedSystems kits (eBioscience, USA) according to the manufacturers' instructions. The fecal samples from animals were collected in the different phases of EAE to study gut microbiota by real time PCR method and bacteriology technique. **RESULTS:** Inoculation of spinal cord homogenate induced paralysis and paresis in 97% of injected rats. The treatment with E. faecium L3 reduced the number of rats with illness and decreased the severity of disease compared with group C. The increase proportion in CD4+ T cells was observed after probiotic administration in the inductive phase of EAE (7th day). At the same time the population of CD4+CD25+FoxP3- T cells (as compared to day 0) in this group increased. It is interesting that only in this phase of EAE we detected increase in IL-10 mRNA expression after the introduction of probiotic, but not detected it by ELISA in serum. At the peak of the disease (14th day) after probiotic treatment the number of CD8+ T cells populations was increased and level of the IL-17 was higher in the blood. In the phase of convalescence (28th day) cellular composition remained almost unchanged compared to 14th day. The ratio of CD4+ and CD8+ T cells was preserved with excess of the latter and IL-17 level still was higher than in the control group. In this period of EAE the analysis of microbiota composition showed increase in the number of Faecalibacterium prausnitzii after treatment with E. faecium L-3 and in animals without any symptoms of the EAE in both groups. **CONCLUSION:** The study results demonstrate the ability of E. faecium L-3 to influence the immune system in MS, directly and indirectly. CD8+ T cells population with affecting production of different cytokines can mediate the probiotic effect. At the same time intestinal microbiota in particular F. prausnitzii can modulate gut immunity and influenced the development of EAE in rats. This fact allows us to consider E. faecium L-3 as a potential tool for immunomodulation in autoimmune, inflammatory and neurodegenerative diseases.

THE SOCIAL BEHAVIOR IN RATS WITH COMORBID EXPERIMENTAL SCHIZOPHRENIA AND LONG-TERM ALCOHOL DRINKING. AY Egorov, ISBS Fellow, EO Kucher, NA Chernikova, EV Filatova, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg State University, St. Petersburg, Russia. **INTRODUCTION:** Modeling of schizophrenia is difficult problem because of the lack of knowledge about the etiology of the disease and, therefore, adequate selection hypothesis. Also, it is difficult to objectively assess the disorder of animal behavior and to find the similarity of clinical symptoms. To date, the dopaminergic models and models of impaired development hyperactivity, stereotypies, a violation of prepulse and latent inhibition were shown. Also impaired memory, deterioration in spatial learning was also found. The aim of this study was to investigate social relations in rats with experimental schizophrenia isolated and during long-term alcohol drinking. **METHODS:** The study was carried out on 60 Wistar adult male rats aged 10-11 weeks. Experimental schizophrenia was modeled by administration of dopamine precursor levodopa in combination with carbidopa (LC) 300/30 mg/kg during 5 days each month for four months of the experiment. The control animals received water. Half of the animals were subjected to half forced intermittent alcoholization throughout the experiment: after the first introduction of the LC. Alcohol preference was determined in the two-bottle test every two weeks of the experiment. The behavioral parameters evaluated in the "open field" and "despair" (Porsolt) tests before the start of the experiment and after four months of welding. The level of social interactions was investigated twice before and at the end of experiment. **RESULTS AND DISCUSSION:** It was found out that in the rats with experimental schizophrenia a significantly higher level of social interaction was observed compared to the control group. The rats with experimental schizophrenia who received alcohol did not differ in the number of interactions compared to the rats who received only alcohol. The two-bottle test has shown that in both groups the animals began to prefer alcohol rather quickly. The difference between the experimental and control groups was observed only in the first week of the experiment. Apparently, this can be explained by the prolonged isolation, which was necessary for the rank determining. We have shown earlier that early social isolation increased the ethanol preference in rats. **RESEARCH SUPPORT:** State Program № 01201351570.

IEM SPECIAL PLENARY LECTURE: PSYCHOPATHOLOGY OF POSITIVE FIGHTING EXPERIENCE: A NEUROBIOLOGICAL ASPECT. NN Kudryavtseva, Institute of Cytology and Genetics SD RAS, Novosibirsk, Russia. According to many authors, aggression is rewarding and, like other basic behaviors, aggressive behavior in animals and humans is strongly influenced by previous experience of aggression. It has been shown in experiments that male mice that had a long positive fighting history developed behavioral psychopathology, which included the demonstration of abnormal aggression, malignancy, strong hostility, enhanced anxiety, disturbances in social recognition, hyperactivity, stereotypic and hyperkinetic reactions among others. Behavioral observations suggested that positive fighting experience provides a permanent reward to the winners, hence a tendency to repeat aggression acts. Hedonic behavior is disturbed in the winners and aggressive motivation becomes generalized and dominates in any situation. Winners kept away from fighting develop an elevated level of aggression as compared to the period before the fight deprivation. It has been suggested that accumulation of the positive fighting effects from day to day is accompanied by significant dynamic changes of brain neurotransmitter activity in animals. These changes arise due to a rearrangement of brain regulation involving (consecutively or simultaneously) the processes of neurotransmitters' synthesis, catabolism, receptors and genes, providing these processes. It has been shown that balance between the activities of the brain's neurotransmitter systems is disturbed in male mice that have had a long positive fighting history. This disbalance is due to a reduced activity of the serotonergic system and an enhanced activity of the dopaminergic systems. As a result, the inhibitory processes become overwhelmed by excitation processes. In these circumstances, a low threshold for aggressive behavior is established in male mice. Pharmacological studies have demonstrated involvement of the opioidergic systems in the effects of repeated aggression: opioid receptors may be desensitized or sensitized depending on the amount of aggression experience. Changes in the brain opioidergic systems in male mice with repeated aggression experience were noticed to be comparable to those in drug addicts. As a consequence, the normal innate mechanisms regulating aggressive behavior are transformed into pathological ones, which are based on neurochemical shifts in the brain appearing as a result of repeated aggression and wins. Medicine treatment used in clinics for correction of enhanced aggression has minor effects. Thus, it is possible that long positive fighting experience leads to development of behavioral psychopathology which changes significantly the many processes of regulation in animal brain. **RESEARCH SUPPORT:** Russian Science Foundation grants 14-15-00063 and 14-14-00269.

AUTOMATED BEHAVIORAL STUDY OF RATS AND MICE, LABORATORY ANIMAL BEHAVIOR OBSERVATION REGISTRATION AND ANALYSIS SYSTEM - LABORAS, SONOTRACK, SMARTCHAMBER, DSI. L Bachdasarian, R Bulthuis, E Molenwijk, M Boscaro, Metris BV, Netherlands, Data Sciences International, St. Paul, USA. Current trends in the Pharmaceutical industry requires new translational approaches for pre-clinical testing. Those aspects can be achieved by animal experiments in which not only one variable (e.g. behavior) at the 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 (constant environment). By Laboras system: freezing behavior is not immobility behavior; Hindlimb licking behavior is not Scratching or Grooming; Wet Dog Shakes (WDS) behavior is not Head shakes; Head twitches behavior is not Head shakes. **Laboras system detects all these behaviors separate and completely automatically. 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 - 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. LABORAS is an advanced system that automates behavior scoring of small laboratory animals. The system tracks positions and identifies more than 18 validated stereotypical and normal behaviors in mice and rats. Laboras does not use video or infra-red beams! The LABORAS system is applied in preclinical research for behavioral study. The Recognition Engine is so flexible that it recognizes random/behavioral short signals from 0.1 seconds and high frequency behaviors 30Hz. The device recognizes records and analyzes animal behavior completely automatically (Head Twitches, Scratching, Grooming, Chewing, Seizure, Eating, Wet Dog Shakes, Drinking, Locomotion and Immobility, Freezing, Startle respond). We consistently develop new behavior detection software for Laboras. There are over 200 publications about the use of Laboras by several leading researchers, pharmaceutical companies, CRO's and leading universities from around the world. You may access these from our website. SONOTRACK-system for recording, playback and visualization of ultrasounds vocalizations in laboratory animals (15KHz-125Khz). Sonotrack is an advanced system to record, analyze and playback ultrasound vocalizations. The system is highly valued for research in Anxiety, Stress, Memory, Learning, Pain, Sexual related, Safety Pharmacology, 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 detection of rodent calls fully automatically! Sonotrack enables you to record multiple animals simultaneously. The System has 4 channels (microphones), which enables researchers to record 4 independent environment/cages simultaneously. There can be more than 1 animal in each cage. In such a situation, multiple animals will be recorded at each channel. This is extremely beneficial in tests involving mother-pup interaction, male-female interaction and others. SmartChamber: SmartChamber is an advanced sound attenuation chamber with integrated video capability (via tablet), light and ventilation. The SmartChamber ensures a standardized environment especially critical for USV experiments. It improves the ultrasonic recordings by creating a measurement environment that eliminates most of the environmental influences, echo's, other disturbances etc. from the laboratory environment. It ensures a stable and more controlled experimental environment. 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. LABPRODUCTS - provides laboratory products (cages, individual ventilated racks, work benches, change stations, washing machine and many other laboratory (vivarium) Accessories). Constant environment: modular vivarium and laboratory individually ventilated racks and cages for animals, GLP standard, constant environmental factors (temperature, humidity, ventilation/airflow, odor, no vibration). A constant environment is essential to build reliable behavioral study and analysis. To enhance the quality of the study and have better statistical probability, it is important to analyze many parameters from the same behavior (i.e. group of parameters or matrix). E-mail: info@metris.nl, web: www.metris.nl. **Metris BV -** a leading manufacturer of advanced systems for animal behavior analysis (in-vivo experiments) that are sold globally. Main products are: LABORAS, SONOTRACK and SMARTCHAMBER.

IMAGING DISRUPTED NEUROCOGNITIVE NETWORKS WITH SIMULTANEOUS PET/FMRI. I Yakushev, Technische Universität München, Munich, Germany. **INTRODUCTION:** Functional magnetic resonance imaging (fMRI) studies have reported disrupted integrity of resting state networks (RSNs) in a number of stress-related conditions, such as posttraumatic stress disorder. At the same time, RSNs are affected in dementing disorders such as Alzheimer's disease (AD) and frontotemporal dementia (FTD). The disease-specificity of these findings remains unclear. As neuronal activity is closely linked to glucose consumption, positron emission tomography (PET) with [18F]fluorodeoxyglucose (FDG) represents an attractive tool for mapping neural networks in vivo, along with fMRI. The aim of this combined fMRI/FDG-PET study was to examine alterations in neurocognitive networks in patients with AD and FTD. At a more global scale, we were interested in examining how disease-specific these alterations are. **METHODS:** A group of patients with AD and FTD, as well as healthy subjects underwent a simultaneous resting state fMRI and FDG-PET on a hybrid PET/MR system. After a standard image pre-processing, data were analyzed using spatial independent component analysis. Thus, a number of networks were extracted in a user-independent manner separately from fMRI and PET data, among them are default mode (DMN), salience (SN), and central executive networks (CEN). For PET, we quantified so-called loading coefficients, a degree of network expression in each subject. For fMRI, a goodness-of-fit of each network to a standard network template was calculated. Thus, fMRI- and PET-based indices of network integrity were derived for each network and subject. **RESULTS AND DISCUSSION:** As compared to healthy subjects, integrity of SN was reduced in FTD, while DMN and CENs were affected in both AD and FTD in fMRI data. In PET data, SN integrity was reduced in FTD, DMN in AD, while CEN was affected in both disease groups. In fMRI data, no significant differences between the AD and FTD groups were found. In PET data, SN integrity was reduced in

FTD relative to AD ($p<0.001$), while DMN integrity was reduced in AD relative to FTD ($p<0.05$). Correlations between PET- and fMRI-based indices of network integrity were low. Our results indicate low disease specificity of neurocognitive networks in general and DMN in particular. Thus, alterations in neurocognitive networks seem to be rather non-specific, even within the spectrum of neurodegenerative dementing diseases. Consequently, we speculate that impaired function of these networks is a non-specific reaction of the brain to – or epiphenomenon of – any neuropsychiatric disorder, including e.g., posttraumatic stress disorder. As a further major contribution, the study highlights the value of multi-modal imaging of the diseased brain. Thus, FDG-PET and fMRI seem to track partly different aspects of network integrity in dementing disorders. The proposed methodology can be easily 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.

Day 2. Tue, May 17, 2016
Morning Session

ISBS/ITBM SPECIAL PLENARY LECTURE: SINEUPS - A NEW FUNCTIONAL CLASS OF NATURAL AND SYNTHETIC ANTISENSE NON-CODING RNAS THAT ACTIVATE TRANSLATION. S Gustincich, Department of Neuroscience and Brain Technologies, Italian Institute of Technologies, Genova; Area of Neuroscience, International School of Advanced Studies (SISSA), Trieste, Italy. **INTRODUCTION:** ENCODE and FANTOM projects have been proving that the majority of the mammalian genome is transcribed generating a vast repertoire of transcripts that includes mRNAs, long non-coding RNA (lncRNA) and repetitive sequences, such as SINEs (short interspersed nuclear element) and LINE (long interspersed nuclear element). **METHODS:** Bioinformatic pipeline; transfection; immunofluorescence; in situ hybridization; western blot. **RESULTS AND DISCUSSION:** Analyzing the non-coding part of the transcriptome, we have identified a group of natural and synthetic antisense non-coding RNAs that activate translation of their sense protein-encoding genes under stress. These molecules have been named SINEUPs since their function requires the activity of an embedded inverted SINEB2 sequence to UP-regulate translation. SINEUPs are thus the first example of gene-specific inducers adding an unexpected layer to post-transcriptional gene regulation and providing a versatile tool to increase protein synthesis of potentially any gene of interest**.** **RESEARCH SUPPORT:** The Italian Ministry of Education, University and Research (FIRB grant prot. RBAP11FRE9) and by intramural IIT grant.

SYMPOSIUM III (ITBM NEUROSCIENCE SYMPOSIUM): TAAR1 AS AN EMERGING PHARMACOLOGICAL TARGET
Chairs: RR Gainetdinov (Russia), MC Hoener (Switzerland), M Shahid (UK)

CHARACTERIZATION OF A TRACE AMINE TRANSPORTER IN RAT BRAIN. MD Berry, A Pryor, S Hart, S Hunter, Department of Biochemistry, Memorial University of Newfoundland, St. John's, Canada. **INTRODUCTION:** We have previously reported that the endogenous TAAR1 agonists p-tyramine (TYR) and 2-phenylethylamine readily diffuse across synthetic lipid bilayers and rat frontal cortex (FCx) and striatum (Str) synaptosome membranes. Further, synaptosome depolarization did not increase, and may even have decreased, trace amine release, indicating a non-exocytotic release that may be regulated by a voltage-dependent transporter. Here we pharmacologically characterize a transporter regulating the release of physiologically-relevant TYR concentrations. **METHODS:** Rat FCx and Str synaptosomes were loaded by incubation with 100nM [3H]TYR x 10mins. TYR conversion was prevented by inhibition of MAO-A, MAO-B, COMT, and dopamine-β-hydroxylase. Release of [3H]TYR under basal and depolarizing conditions, in the absence and presence of selective inhibitors of dopamine (DAT), norepinephrine (NET) or 5HT (SERT) transporters, or inhibitors of various combinations of Organic Cation Transporters (OCT) 1, 2, 3 and Plasma Membrane Monoamine Transporter (PMAT) were determined by liquid scintillation counting for total [3H] release. Release curves were fit to a one-phase exponential function and compared by F-test using GraphPad Prism 6.0. **RESULTS AND DISCUSSION:** Similar results were obtained from both FCx and Str synaptosomes. Consistent with previous studies depolarization did not increase TYR release, confirming release is not exocytotic. Selective inhibition of DAT, NET or SERT did not affect release curves, under either basal or depolarizing conditions. In contrast, decynium-22 (a non-selective OCT + PMAT inhibitor) or quinidine (a non-selective OCT inhibitor) significantly increased ($p<0.001$) TYR release under both conditions. Neither the OCT3 selective inhibitor corticosterone, nor PMAT selective inhibitor lopinavir, affected TYR release. Pentamidine, an OCT1/OCT2 inhibitor, also significantly increased ($p<0.01$) release in both conditions, while the selective OCT1 inhibitor atropine was without effect. These results indicate that a transporter with an OCT2-like pharmacological profile regulates synaptic TYR levels at physiologically relevant concentrations. The kinetics of pentamidine-sensitive TYR uptake are currently being determined. Intriguingly OCT2 knock-out is reported to alter Akt/GSK3β signaling and increase susceptibility to stressful conditions, while TAAR1 agonists decrease Akt/GSK3β signaling and stressor-induced responses. **RESEARCH SUPPORT:** NSERC, RDC, and Memorial University.

TAARGETING STRESS – DOES TRACE AMINE-ASSOCIATED RECEPTOR 1 HAVE A ROLE TO PLAY? DK Grandy, Oregon Health and Science University, Portland, OR, USA. **INTRODUCTION:** The endogenous aryl-ethyl amines are a diverse group of low molecular weight compounds that include the catecholamine transmitters dopamine, norepinephrine and epinephrine; their 'inactive' metabolites 3-methoxy-tyramine, nor-metanephrine and meta-nephrine; the so-called 'trace amines' phenylethylamine, p-tyramine, octopamine, synephrine and tryptamine; and the thyroid hormone like thyronamines. Pharmacological profiling of the metabotropic G protein-coupled receptor (GPCR) activated by all these endogenous compounds – trace amine-associated receptor 1 (TAAR1) – revealed their common pharmacophore is also present in the synthetic psychostimulants amphetamine, methamphetamine, Ecstasy, and mescaline. All of these compounds metabolically stress cells by well-understood enzymatic cascades in addition to provoking profound changes in behavior. What has not been appreciated until recently is that each of these drugs interfers with normal TAAR1-mediated signaling. **METHODS:** The TAAR1-selective antagonist EPPTB was used in in vitro (cell lines) and in vivo (taar1+/+ and taar1-/- mice) experiments designed to test the hypothesis that TAAR1 mediates the effects of trace amines, amphetamines and related compounds. **RESULTS AND DISCUSSION:** The results of our in vitro and in vivo studies are consistent with the

interpretation that TAAR1 is the target and mediator of the cellular and behavioral actions of the classic trace amines and amphetamine psychostimulants, With expression of TAAR1 in brain regions involved in motivation and decision-making this receptor might be the missing link between environmental exposure, cellular stress responses and maladaptive compulsive behaviors. Based on the available evidence a model has been developed to explain how drugs of abuse could co-opt the TAAR1-mediated signaling that normally promotes survival. **RESEARCH SUPPORT:** the National Institute on Drug Abuse.

SELECTIVE TAAR1 PARTIAL AGONISTS MODULATE DOPAMINERGIC AND SEROTONERGIC NEUROTRANSMISSION AND THEREBY REGULATING REWARD CIRCUITS, THE LIMBIC NETWORK, COGNITIVE PROCESSES, MOOD STATES, BODY WEIGHT AND GLUCOSE LEVELS. MC Hoener, Neuroscience, Ophthalmology and Rare Diseases Discovery and Translational Area, Roche Innovation Center Basel, F Hoffmann-La Roche, Basel, Switzerland. Dysregulation of monoaminergic neurotransmission is a hallmark of major neuropsychiatric disorders. The trace amine-associated receptor 1 (TAAR1) is activated by trace amines, endogenous compounds with structural similarity to biogenic amines. Through a medicinal chemistry program potent and selective TAAR1 ligands were identified and further optimized for their physicochemical and pharmacokinetic properties in rat, mouse, Cynomolgus monkey and human. By manipulating TAAR1 activity using these optimized ligands and Taar1 knock-out as well as Taar1 overexpressing mice and rats, we showed that TAAR1 modulated dopaminergic, serotonergic and glutamatergic neurotransmission and thus revealed that TAAR1 activation represents a novel therapeutic option for neuropsychiatric disorders. In rodents, activation of TAAR1 by these compounds blocked psychostimulant-induced hyperactivity. Importantly, TAAR1 agonists did not induce the typical side-effects produced by current antipsychotic drugs such as catalepsy or weight gain in rats. TAAR1 agonism even reduced haloperidol-induced catalepsy and, remarkably, prevented olanzapine from increasing body weight and fat accumulation and controlled glucose levels in rats. Moreover, TAAR1 agonists produced pro-cognitive effects in rodents and monkeys and were active in models indicative for negative symptoms and showed anti-addictive properties in rats. These data suggest that TAAR1 agonists may have future use in the treatment of mental illness and metabolic disorders.

TAAR1 DEFICIENCY PRODUCES FRONTOSTRIATAL DYSFUNCTIONS. S Espinoza, G Lignani, I Sukhanov, L Medrihan, S Maggi, L Mus, L Damiana, M Emanuele, G Ronzitti, E Chieregatti, TD Sotnikova, F Benfenati, V Tucci, F Fumagalli, RR Gainetdinov,' ISBS Fellow, Italian Institute of Technology, NBT, Genova, Pharmacology, University of Milan, Milan, Italy. 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. 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. Moreover, the lack of TAAR1 produced an overexpression and a supersensitivity of the D2 dopamine receptors in the striatum. Our study indicates that TAAR1 plays an important role in the modulation of NMDA receptor-mediated glutamate transmission in the PFC and of the dopamine system in the striatum. These data suggest that development of TAAR1-based drugs could provide a novel therapeutic approach for the treatment of disorders related to aberrant functioning of the cortico-striatal system.

PARTIAL AGONISM OF TRACE AMINE-ASSOCIATED RECEPTOR 1 PROMOTES WAKEFULNESS. TS Kilduff, SW Black, SR Morairty, MC Hoener, MD Schwartz, Center for Neuroscience, Biosciences Division, SRI International, Menlo Park, CA USA; Neuroscience, Ophthalmology and Rare Diseases Discovery and Translational Area, Roche Innovation Center Basel, F Hoffmann-La Roche Ltd., Basel, Switzerland. **INTRODUCTION:** Trace amines (TAs) are endogenous amino acid metabolites that are structurally similar to the biogenic amines. TAs are endogenous ligands for trace amine-associated receptor 1 (TAAR1), a GPCR known to modulate dopaminergic, serotonergic, and glutamatergic activity. Selective TAAR1 full and partial agonists exhibit similar pro-cognitive, antidepressant- and antipsychotic-like properties in rodents and non-human primates, suggesting TAAR1 as a novel target for the treatment of neurological and psychiatric disorders. TAAR1 partial agonists are also wake-promoting in rats, suggesting that TAAR1 is a previously-unrecognized component of an endogenous wake-modulating system. **METHODS:** TAAR1 knockout (KO), TAAR1 overexpressing (OE) and wildtype (WT) mice were instrumented for EEG and EMG recording and implanted with telemetry transmitters for monitoring locomotor activity and core body temperature. Following post-surgical recovery, mice were recorded under 12:12 LD conditions for a 24h baseline followed by 6h sleep deprivation (SD) and 18h post-SD recovery. Vigilance states were classified as Wakefulness, NREM or REM sleep in 10 sec epochs across the 24 h cycle. EEG spectral analysis was conducted by Fast Fourier Transform. For pharmacology studies, mice were administered p.o. the full TAAR1 agonist RO5256390 (1.0-10 mg/kg), the partial agonist RO5263397 (0.1-1.0 mg/kg), caffeine (10 mg/kg) or vehicle (0.3% Tween-80) at ZT6. **RESULTS AND DISCUSSION:** TAAR1 KO mice exhibited increased sleep at lights-on and increased EEG gamma power (30-100 Hz) compared to WT littermates. The TAAR1 partial agonist RO5263397 increased waking and suppressed REM sleep in WT but not KO mice. OE mice, in which TAAR1 is ectopically expressed throughout the brain, exhibited a sleep/wake phenotype complementary to that of KO mice. OE mice spent more time awake over a 24h period compared to WT littermates and exhibited sustained waking during the 6h SD period compared to WT littermates. EEG spectral power was decreased in the theta (4-8Hz) and gamma bands compared to KO mice, with WT EEG spectra intermediate between them. RO5263397- and caffeine-induced waking was potentiated in OE mice compared to WTs. The full agonist RO5256390 suppressed REM sleep while fragmenting wake and NREM sleep in WT mice. In summary, elevating TAAR1 tone via overexpression or pharmacology tends to increase wakefulness and decrease high-frequency EEG activity, whereas TAAR1 deletion has the opposite effect. TAAR1 partial agonism promotes wakefulness with greater

efficacy than full agonism. Studies to evaluate the effects of these compounds on sleep-wake regulatory brain populations are ongoing. **RESEARCH SUPPORT:** NIH R01NS082876 and R21NS083639.

TACKLING DRUG CRAVING AND RELAPSE THROUGH TAAR1 ACTIVATION. JJ Canales, Department of Neuroscience, Psychology and Behavior, University of Leicester, Leicester, UK. **INTRODUCTION:** Psychomotor stimulant abuse is associated with risk of dependence and mental health problems, including neurotoxicity, psychosis, depression, cognitive problems, and a range of potential social harms, not to mention the catastrophic effects on society. Whilst several forms of non-specific pharmacology are currently in use, there are no specific medications to safely facilitate detoxification and promote quicker recovery from chronic abuse of stimulants such as cocaine. The discovery of the trace amine-associated receptor (TAAR1), due to its unique pharmacology and association with ascending dopaminergic projections, has emerged as one of the most promising targets for the treatment of neuropsychiatric disorders, especially addiction. **METHODS:** We will discuss recent studies that demonstrate the remarkable therapeutic potential of TAAR1 agonists in well-validated animal models of drug addiction, including stimulant sensitization, intra-cranial self-stimulation, drug self-administration, and relapse to drug seeking, and we will explore the underlying neurobiology of these effects. **RESULTS AND DISCUSSION:** Collectively, this evidence will show that TAAR1 activation decreases stimulant-induced brain reward, reduces the motivation to self-administer stimulant drugs, blocks relapse to drug seeking after chronic self-administration and prevents stimulant-induced changes in dopamine transmission, thus strongly supporting the candidacy of TAAR1-based medications as potential substitute treatments in drug addiction. **RESEARCH SUPPORT:** Hoffmann-La Roche LTD, Switzerland; Ministry of Internal Affairs, New Zealand.

THE EFFECTS OF TAAR1 ACTIVATION ON MESOLIMBIC DOPAMINE NEUROTRANSMISSION AND ALCOHOL DRINKING BEHAVIORS. EA Budygin, ISBS Fellow, Department of Neurobiology and Anatomy, Wake Forest School of Medicine, Winston-Salem, NC, USA. It is well known that the ventral tegmental area (VTA)-nucleus accumbens dopamine (DA) circuitry plays a critical role in alcohol addictive behaviors. However, it is still unclear if/how dopaminergic transmission plays a causal role in the initiation and suppression of alcohol drinking, and if so, which patterns of DA release are responsible for these behaviors. This knowledge is crucial for the development of effective pharmacotherapies aimed to treat alcohol addiction. In this work, we applied a new viral technology to restrict the expression of ChR2 to DA cells in the VTA of Long Evans rats, driving ChR2-EYFP expression by a tyrosine hydroxylase promoter. The level of ChR2 expression was sufficient to allow us to optically mimic tonic and phasic patterns of accumbal DA release. Therefore, we further explored the causal relationship between these patterns and ethanol drinking behaviors in operant drinking paradigm. Using extinction probe trials, in which subjects had 20 min to lever press in a non-reinforced session, phasic activation significantly increased in the number of lever presses. In addition, forcing accumbal DA transmission into a tonic pattern dramatically decreased ethanol seeking. We hypothesize that phasic DA in this brain area may signal motivation to obtain ethanol. In contrast, sustained tonic stimulation of these terminals may prevent phasic release through a DA autoreceptor-mediated feedback mechanism, thus decreasing ethanol seeking behavior. Furthermore, we explored the effects of a partial TAAR1 agonist, RO5263397, on tonic and phasic DA release in the rat nucleus accumbens. The experiments indicated a significant effect of RO5263397 (10 mg/kg, i.p.) on the amplitude of the optogenetically-induced DA signal ($P<0.0001$). Notably, the compound differentially affected phasic and tonic patterns of DA release. Thus, the drug preferentially decreased phasic DA release, while tonic DA efflux was weakly affected. Finally, the effects of the compound on ethanol drinking behaviors were studied using the operant self-administration procedure. The rats were trained to press a lever 30 times daily for 20 min access to 10% ethanol. After subjects displayed stable appetitive and consummatory behaviors (≈6 weeks), the effect of RO5263397 (5 or 10 mg/kg, i.p.) or saline were evaluated. Pretreatment with the TAAR1 agonist significantly suppressed lever press behaviors at both doses tested ($P < 0.001$). Importantly, when access to ethanol was provided, no significant changes in consummatory measures (e.g. number of licks, ethanol intake) were observed. In conclusion, these results suggest that the TAAR1 agonist tested selectively suppresses ethanol seeking behaviors, presumably through the inhibition of phasic DA release in the nucleus accumbens. This proposes the fascinating possibility that TAAR1 agonists may be considered as promising candidates for the treatment of alcohol addiction. **RESEARCH SUPPORT:** The grant from F. Hoffmann La-Roche, Basel, Switzerland.

BEHAVIORAL AND ELECTROPHYSIOLOGICAL EFFECTS OF 3-IODOTHYRONAMINE AND RELATED SYNTHETIC TAAR1 ANALOGS. R Zucchi, University of Pisa**,** Department of Pathology**,** Laboratory of Biochemistry, Pisa, Italy. 3-iodothyronamine (T1AM) is an endogenous thyroid hormone derivative that represents a high affinity agonist of TAAR1. Biochemical assays based on HPLC coupled to tandem mass spectrometry showed that T1AM can be detected in rat and mouse brain homogenate at concentrations on the order of a few pmol/g. Administration of exogenous T1AM in mouse cerebral ventricles produced significant behavioral effects: food assumption was either increased or decreased, depending on the dose; the object recognition test showed increased curiosity; the passive avoidance test revealed a pro-learning and anti-amnestic effect; the hot plate test showed reduced pain threshold. Pharmacological experiments suggested that these effects are mediated at least in part by interference with other aminergic systems, particularly the histaminergic system. Stimulation of pain threshold and curiosity were also observed after administration of novel synthetic T1AM analogs (SG compounds) that showed nanomolar affinity for mouse TAAR1 in vitro. At electrophysiological level, T1AM was able to modulate the response of adrenergic neurons in locus coeruleus and to rescue long-term potentiation in mouse enthorinal cortex exposed to the toxic fragment of beta amyloid. In the enthorinal cortex, the specific TAAR1 antagonist EPPTB abolished long-term potentiation and removed the protective effect of T1AM.

POSTER SESSION II

AGE-DEPENDENT STRESS INDUCED BY EXPOSURE TO ETHANOL IN BEHAVING MICE AND HIPPOCAMPAL CULTURES. A Botalova, A Polyanin, O Elkina, O Krotkova, E Korkotian**,** Department of Biology, Perm State University, Department of Botany, Perm State Pharmaceutical Academy, Russia; Department of Neurobiology, The Weizmann Institute, Rehovot, Israel. **INTRODUCTION:** Alcohol addiction is a major medical burden in modern world as it affects large populations of different ages, is not prohibited by law, and has severe consequences to quality and longevity of human life. In our previous studies we have found that alcohol increases rather than decreases the spontaneous neuronal

activity, creating seizure-like patterns at physiological concentrations. Similarly, alcohol at first enhances and then dramatically decreases the holding time of behaving animals in rotarod locomotor test. There is as common assumption that younger subjects are more sensitive to exposure of alcohol. Nevertheless, very little is known on the age-dependence of convulsive behavior patterns and imbalanced neuronal activity, including the lack of pharmacological knowledge on age-dependent effects. Using dissociated cultures of central neurons and freely behaving animals, a diversity of somewhat contradictory morphological, chemical and behavioral consequences of age-dependent exposure to ethanol have been reported. Few if any studies combined observations on the changes in activity of the tested neurons with the morphological and behavioral observations. Some of these questions are addressed in our present study. **METHODS:** We studied the effects of exposure to low or moderate concentrations of ethanol on network activity of cultured hippocampal neurons at different number of days after plating using calcium imaging and confocal microscopy assay and on behavior of mice of different age using rotarod. **RESULTS AND DISCUSSION:** Network activity, assessed by imaging of calcium variations, was markedly enhanced following exposure to 0.1, 0.25, 0.5% ethanol. This was associated with an increase in rate of action potentials and bursts. The increase in network activity was correlated with a significant reduction in the length of mature dendritic spines, without an effect on dendritic arborization. The sensitivity of younger, 5-15 days-old cells to ethanol was significantly higher than for older ones being 25-35 days in cultures. The time spent by alcohol-treated mice on the rotarod, compared to the control group was mainly dependent on the concentration of ethanol and the age of animals. The concentration of 0.05 and 0.1% measured in blood caused a more pronounced shortening of the holding time for 20 days-old mice that for 35 days-old animals. These results indicate that ethanol causes a complex age and dose dependent effects on excitatory drive, preferentially affecting the younger subjects at lower concentrations accompanied by morphological changes in cultured neurons, as well as changes in animal locomotor control revealed by the rotarod test. **RESEARCH SUPPORT:** Perm regional Ministry of Education (MIG).

DIFFERENCES IN ALEXITHYMIA AND EMOTIONAL AWARENESS IN EXHAUSTION SYNDROME AND CHRONIC FATIGUE SYNDROME. D Maroti, P Molander, I Bileviciute-Ljungar, ME/CFS-Rehabilitation, Department of Rehabilitation Medicine, Department of Clinical Sciences, Karolinska Institutet Danderyd University Hospital, Stockholm, Department of Medical and Health Sciences, Faculty of Medicine and Health Sciences, Linköping University, Pain and Rehabilitation Center, Anaesthetics, Operations and Specialty Surgery Center, Region Östergotland, Department of Behavioral Sciences and Learning, Linköping University, Linköping, Sweden. Symptoms of Exhaustion Syndrome (ES) and Chronic Fatigue Syndrome (CFS) are overlapping, creating difficulties of differential diagnosis. Empirical studies comparing ES and CFS are scarce. This cross-sectional study compared self-reported alexithymia and observer-rated emotional awareness in patients with ES (n=31), CFS (n=38) and healthy controls (HC) (n=30). Self-reported alexithymia was measured with Toronto Alexithymia Scale-20 (TAS-20) and emotional awareness with a observer-rated performance test, Level of Emotional Awareness Scale (LEAS). Additionally, depression and anxiety was scored by Hospital Anxiety and Depression Scale (HADS). Results show that patients with ES expressed higher self-reported alexithymia in TAS-20 compared to both ES and HC but had a similar emotional awareness capacity as HC in the observer-rated performance test LEAS. Patients with CFS expressed more difficulties in identifying emotions compared to HC and performed significantly worse in LEAS-total and spend more time in completing LEAS as compared to HC. Correlation and multiple regressions analysis revealed that depression and anxiety positively correlated with and explained a part of variances in alexithymia scores, while age and disability influenced emotional awareness in an opposite way. Findings of this study indicate that emotional status is different in patients with ES and CFS in respect to both self-reported alexithymia and observer-rated emotional awareness. Emotional parameters should be considered both in clinical investigation and psychotherapy.

EFFECTS OF AN EARLY EXPERIENCE OF HIGH-SUGAR DIET ON ALCOHOL INTAKE IN RATS. MV Dorofeikova, AY Egorov, ISBS Fellow, EV Filatova, AA Orlov, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg State University, St. Petersburg, Russia. **INTRODUCTION:** Alcohol use and associated alcohol-related harm are among the most prevalent and important public health problems. Prospective longitudinal studies have attempted to identify the premorbid antecedents of the alcohol-use disorders, especially alcohol dependence (Penick EC et al. 2010). There is overlap between brain regions regulating seeking and self-administration of substances of abuse and those regulating motivational and reinforcing aspects of foraging and intake of natural reinforcers (Steensland P et al. 2010). The aim of this study was to investigate the impact of an early experience of high-sugar diet in adolescent rats on alcohol preference. **METHODS:** 36 male Wistar rats were used for this study. After acclimation, at the age of 2 months they were divided into sucrose-drinking group and water-drinking group (18 per group). 3 months later each group was divided into two subgroups with alcohol or water available ad libitum. Open field test was used to measure general locomotor activity, willingness to explore and anxiety. Two bottle test sessions were used for assessing alcohol preference. **RESULTS AND DISCUSSION:** There were no significant differences between groups in the open field and two bottle test parameters at baseline. 3 months after the start of experiment the intake of ethanol solution was greater in rats that consumed sucrose ($F=7.72$, $p=0.010$). Two months after the division into alcohol- and water-consuming subgroups a significant effect of subgroup was found. Rats that drank alcohol solution preferred it in the two-bottle test (14.8 s vs 3.2s, $F=14.56$, $p=0.001$). Subjects with the history of sucrose intake demonstrated more pronounced anxiety ($F=4.81$, $p=0.035$) and preferred insignificantly more alcohol (30.3±41.3% vs 21.7±37.7%, $F=3.13$, $p=0.58$). Final tests results 6 months after the start showed that ethanol preference differed significantly among 4 subgroups ($F=3.499$, $p=0.029$). This was due to the differences between sucrose+alcohol and water+water subgroups ($F=47.23$, $p=0.043$). Only 1 of 18 water-consuming rats preferred ethanol. In summary, reward system dysfunction achieved by easily accessed palatable food consumption in adolescence served as a trigger of initial alcohol preference. Eventually its main predictor turned out to be habitual alcohol consumption. **RESEARCH SUPPORT:** State Program № 01201351570.

EMOTIONAL MODALITY OF THE INFORMATIONAL INFLUENCE AS A FACTOR OF THE INTERETHNIC PERCEPTION. MV Baleva, DS Kornienko, SA Shebetenko**,** Perm State Institute of Culture, Perm State University, Perm, Russia. **INTRODUCTION:** The study has examined the patterns of perception of immigrants into Russia by the ethnic majority group (Russians) under the conditions of emotionally positive and emotionally negative information influence. As a theoretical background the terror management theory has been used (Greenberg, Solomon, & Pyszczynski, 1997; Pyszczynski, Greenberg, & Solomon, 1999). It describes the function of the protective mechanism, which runs through the

actualized thoughts of death in the consciousness. Its rational is in the compensatory preference of people and ideas that are consistent with the subject's usual, well-established picture of the world. In particular, as such act stereotypic (negative) images of members of the "out-group" (Schimel et al., 1999). However, similar effects are found not only in the actualization of the thought of death. Study by Burris and Rempel (2004) shows that the perception regarding the members of out-groups depends on the feeling of threat by any "identity marker" of a man. Florian and Mikulincer (1998) have shown that a key role in the activation of protective mechanisms is played not by the thought of death itself, but the negative emotions associated with these thoughts such as anxiety, fear and horror. The aim of our study was to reveal the effects of varying content of informational influence touching the "identity markers" of the respondents on their attitude to immigrants into Russia presented by stereotypical or counter-stereotypical patterns. **METHODS:** The study has involved 112 and 127 young man and women of Russian ethnicity, the students of Perm high schools aged from 17 to 21 years (M = 19.00, SD = 1.17). Ethnicity was determined by students' self-reports. Statistical analysis of the results was carried out using ANOVA 3 (informational impact: emotionally positive, negative or neutral) x 2 (ethnicity: Georgian, Moldavian) x 2 (the stereotypical of the immigrant: stereotypical or counter-stereotypical). As a dependent variable, the additive index of the scale related to the image of immigrant has been taken. **RESULTS AND DISCUSSION:** It has been found that the exposure of the emotionally neutral information leads to more positive attitude to stereotypical rather than counter-stereotypical image of immigrants ($p < .001 \div .05$). This difference disappears in both emotionally positive and emotionally negative influences. In other words, information influence, causing emotions, leads to a less differentiated perception of the immigrant images. The emotional impact of negative information leads to a more negative perception of the images of immigrants than the impact, causing a positive emotional state ($p < .05 \div .09$). In our view, these facts can be explained by the phenomena of cognitive heuristics: (1) simplification of the judgment in situations where the information-rich environment comes into conflict with the limited amount of attention and (2) simplification of thought in a state of good mood (Mackie and Worth, 1989). The facts discovered indicate that the relation of Russians to immigrants into Russia might be dependent on the emotional coloration of the informational influence, affecting the markers of identity. **RESEARCH SUPPORT:** the Russian Humanitarian Science Foundation, project number 06-06-82602 a/У.

THE REDUCTION OF PAIN STRESS BY USING MUSIC. M Tomida, T Furuta, R Uchikawa, I Kawahara, S Sadaoka, K Uchida, T Yagasaki, Department of Social Dentistry, Department of Oral and Maxillofacial Biology, Graduate School of Oral Medicine, Department of Oral Health, Department of Oral and Maxillofacial Radiology, Matsumoto Dental University, Shiojiri, Japan. **INTRODUCTION:** Pain plays a crucial role in transmitting hazard signals to the body, but it causes stress. Various studies have shown that pain stress is reduced when we are concentrating on something such as sports. In this study, we examined the reduction of the pain stress by using music. **METHODS:** Forty-five subjects were investigated for pain thresholds on the forearm and oral area by using pain vision PS-2100 (Nipro) while the subjects were listening to popular music, ballads and classical music. Furthermore, the blood oxygenation level-dependent (BOLD) signals in the cingulate cortex were analyzed using functional magnetic resonance imaging (fMRI), when eight subjects were given electrical stimulation of 80μA on their ankles while listening to music. These data were compared with those without music. **RESULTS AND DISCUSSION:** The thresholds of pain on all areas were significantly higher when the subjects were listening to ballads or classical music than those without music. In the fMRI study, BOLD signals were attenuated by listening to popular music (2 subjects), ballads (1 subject) and classical music (2 subjects). Listening to slow music might reduce the pain stress on all areas of the body. However, the neural activity in the cingulate cortex induced by pain may not be restrained by listening to music. **RESEARCH SUPPORT:** Public scientific research funds.

THE STUDY OF "INTERNAL" HUMAN RHYTHMUS IN UKRAINIAN MENTALY ILL PATIENTS. V Tarasov, N Orlova, TMA "Psychiatry", Kiev Medical University of UAFM, Kiev, Ukraine. **INTRODUCTION:** Internal rhythm is important for human daily life. An example in biology and medicine may have different circadian rhythms - sleep-wake, daily fluctuation of the hormonal profile, etc. In psychiatry, special attention given to mood swings, activity, as well as the presence of so-called psychological compatibility. Since Klage's day's concept of rhythm in a certain narrow sense contrasted measure. Rhythm - is a living, moving endlessly expressive, while the tempo - mechanical, arbitrary repeatability. **AIM AND METHODS:** Studied the "internal rhythm" of healthy and mentally ill person with the possibility of identifying "the rhythm of the disease." We used a metronome. **RESULTS:** Were studied 51 healthy control average age 32.2 years. Average "inner rhythm" was 83.7 beats per minute, which corresponds to the normal heartbeat. Most often healthy control attributes his rhythm with health - as heartbeat and breathing (17 pers.); then the music's rhythm (9 pers.), and a lesser degree with a heels and wheels clatter (6 pers.); with the life's rhythm (5 pers.), the metronome or hours (4 pers.); water droplets (4 pers.) and quiet (3 pers.). 3 persons could not give a description of their feelings. During 6 months were examined 116 inpatients in general psychiatric department with middle age 36.3 years. The average rate of the patient's rhythms was 101 points. Nosologically patients were divided (on ICD 10): F 00-09 - 12 persons (98.3 beats); F10-19 -2 persons (77 beats); F20-29 - 91 persons (98.4 beats); F30-39 - 6 persons (123.2 beats); F60-69 - 4 persons (116, 5 beats); F70-79 - 1 person (220 beats). Patients had difficulties in describing their feelings, which had psychopathological saturation and absurdity. Among the patients were individuals with suicidal attempts and high rhythm (137.3 beats). That binds to sports or walking. In catamnesis in two suicidents were registered completed suicide. **DISCUSSION:** Based on preliminary studies in patients and healthy can be concluded that: 1."Inner" rhythm may be: Low - 59 and less; Normal 60-90; Higher - 91 or more. 2."Inner" rhythm is different in healthy and mentally ill patients. 3. Different psychopathology has a different rhythm. 4. High "internal" rhythm may indicate suicidal patient. **RESEARCH SUPPORT:** Kiev Medical University.

INTRANASAL EXPOSURE TO MANGANESE INDUCES INFLAMMATION, OXIDATIVE STRESS AND ACTIVATION OF CALPAINS IN RAT BRAIN. IS Oblamskaya, NS Pestereva, MN Karpenko, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia. **INTRODUCTION:** Manganese (Mn) and its compounds are toxic to the CNS, and producing a wide variety of neurotoxic effects. Inhalation of Mn results in an increase in the brain Mn content and leads to a depletion of dopamine in the extrapyramidal brain region, which in turn causes slowly progressive deterioration of motor function. Removal of the Mn source does not lead to recovery. Such prolonged toxicity of Mn has not been explained by now. However, recent evidence suggests that the mechanism of Mn toxicity involves uncontrolled activation of microglia and astrocytes as a consequence neuronal injury. Thus, the goal of this study was to assess possible mechanisms and factors involved in Mn-modulated, glia-derived neuroinflammation in early-stage of disease. **METHODS:**

Adult male Wistar rats, 220–250 g, were used in this study. Mn-exposed rats received intranasal injections 20 µl/rat in total 1mg MnCl2 once per day, for 10 consecutive weeks. Control animals received the same volume of sterile saline. Mn levels were measured in the olfactory bulb, temporal lobe, hippocampus and striatum by atomic absorption spectrometry. mRNA protein levels were measured by real-time PCR. To determine oxidative stress SOD and CP activity levels were measured in gel, followed by incubation in the NBT and o-dianisidine solution, respectively. **RESULTS AND DISCUSSION:** In this study we showed that Mn was significantly elevated in Mn-exposed rats than in controls (2-fold for olfactory bulb, temporal lobe, hippocampus and 4-fold for striatum). Levels of manganese in circulating blood were not changed. However, we found time-dependent decrease in SOD level and increase in blood oxidase activity of experimental rats, indicating the obvious induction of inflammation and oxidative stress. Also our data suggests that prolonged exposure to high Mn concentrations results in 2,5-fold increased IL-1β, TNF-α mRNA expression, because a large number of microglial cells located in striatum, which are activated by manganese encephalopathy, and 5-fold increased IBA-1 mRNA in the rat striatum indicating again the induction of neuroinflammation. In addition, we found about 10-fold increase in NFκB protein level, in m-/µ-calpains mRNA, protein and activity levels in the rat striatum indicating the neurodegeneration. We did not detect such changes in the hippocampus. **RESEARCH SUPPORT:** RFBR grant 14-04-00587.

BEHAVIORAL DISORDERS AND LIPID METABOLISM CHANGES OF RATS AFTER THE VIBRATION NOISE ACTION IN THE REMOTE PERIOD. NK Apraksina, TV Avaliani, NN Klueva, AV Bykova, SG Tsikunov, ISBS Fellow, Institute of Experimental Medicine, St.-Petersburg, Russia. The intense vibration and sound are stress factors for animals and humans and can lead to pathological changes in the body. The purpose of this study was to characterize the behavior and indicators of lipid metabolism in rats after the action of vibration noise. Methods: the study was performed on adult male rats of Wistar (weight 300-330 g, n=30).The rats were examined before and three weeks after the termination of vibration noise (30-250 Hz, for 2.5 hours for 5 days). The structure and integrity of behavior for 3-minute period were analyzed in the test "open field"(OF). The non-parametric Mann-Whitney test was applied in the analysis of locomotor, emotional and exploratory behavior. The cluster analysis was used for the selection of homogenous groups on probabilistic characteristics of coherent behavior. The blood sampling for the analysis of lipid parameters was performed after the last test. In the serum was determined the total cholesterol (TC), triglycerides (TG) and cholesterol of high density lipoproteins (HDL cholesterol). Lipid content was determined by enzymatic method using sets of Randox company (England). The intact rats were used as a control group in the biochemical studies. Results and discussion. The behavior integrity of male corresponded to the norm three weeks after vibration exposure, but the structure behavior has changed in the test OF. On the average, the total number of acts has decreased by 40%. The number of acts increased considerably in some rats (by 30-40% compared to control). These behavioral abnormalities reflect a change of transitions of some other acts. The reduction HDL cholesterol and the increase in the ration of atherogenicity were shown for the rats with the agitated behavior. The significant reduction level of HDL and the increase TG in blood serum were shown for the rats with depressive behavior. Thus, the deviations of behavior and changes in lipid metabolism in male rats were detected 3 weeks after the termination of the vibration noise action. It was identified two types of behavioral reactions to such stress: depression behavior, accompanied by a decrease HDL cholesterol and agitated behavior, lowered total cholesterol and increased triglycerides content in the serum.

EFFECT OF NEUROFEEDBACK TRAINING ON SIGNS, WORRY, ELECTRICAL ACTIVITY OF BRAIN, AND NEURAL GENERATORS OF GENERALIZED ANXIETY DISORDER PATIENTS: A STUDY BASED ON QEEG. A Asadollahpour Kargar, Z Bahadori, A Bakhshipour, J Babapour, P Ahmadi, Cognitive Neuroscience Group, Tabriz University, Tabriz, Iran. **INTRODUCTION:** Generalized Anxiety Disorder (GAD) is one of the most prevalent anxiety disorders which has behavioral, emotional and cognitive serious negative effects on patients life. Due to this, lots of attempts have been done to find out its etiology, treatment, biological and neurological mechanisms in the last two decades. So this researchs main aim is investigation of Effect of Neurofeedback training on signs, worry, electrical activity of brain, and neural generators of GAD patients with QEEG. **METHODS:** 12 GAD patients assessed with Quantitative Electroencephalography (QEEG), Penn State Worry Questionnaire (PSWQ), and Generalized Anxiety Disorder Questionnaire (GADQ) before and after 20 neurofeedback sessions which performed 3 times per week with protocols on Pz and F3 sites. Dependent t-test was used to analyze data with SPSS, and Neuroguide. **RESULTS AND DISCUSSION:** Results show that neurofeedback can decrease worry and signs of GAD significantly. Also QEEG analyses show that High Beta frequency band (21-30 Hz) power decreases significantly after neurofeedback in T3, Fz and Pz sites. **CONCLUSION:** Decrease of High Beta power in three sites show decrease of neural activity in those sites and positive effects of neurofeedback on regulating brain. T3 is correlated with language processing and based on Borkovec(1994) theory, excessive language processing is the main cause of GAD. Pz is the main region of anxiety and decrease of its excess activity is correlated with decrease of total anxiety. Fz is the main region in concentration and its maintenance which is involved in concentration on worry processing. So this research is confirmation of Borkovec theory on GAD processing in brain and positive effect of neurofeedback in modulating those processes. **RESEARCH SUPPORT:** Cognitive Science and Technologies Council (CSTC) of I.R. Iran.

3-IODOTHYRONAMINE RESCUES SYNAPTIC DYSFUNCTION INDUCED BY AMYLOID BETA: A TAAR1-MEDIATED ACTION. A Accorroni, C Criscuolo, M Sabatini, R Donzelli, A Saba, N Origlia, R Zucchi, Scuola Superiore Sant'Anna, National Research Council, University of Pisa, Pisa, Italy. **INTRODUCTION:** Thyroid hormones (TH) have been demonstrated to be altered in Alzheimer's disease (AD) and they may also play a role in the pathogenesis of this disease. Memory loss represents one of the first symptoms of AD and its electrophysiological correlate, long-term potentiation, is altered in the entorhinal cortex (EC) early in the course of the disease. 3-iodothyronamine (T1AM), a derivative of TH, has been shown to stimulate learning and memory acquisition in mouse. Therefore, we investigated if the administration of exogenous T1AM has any effect on LTP in EC of wild type mice exposed to amyloid beta (Aβ) and in a transgenic model of AD (hAPP-J20 mouse) and if these effects are mediated by trace-amine associated receptor 1 (TAAR1), the putative T1AM receptor. **METHODS:** Extracellular in vitro recordings were performed in EC slices: field potentials were evoked in layer II after stimulation of the same layer and LTP was elicited by high frequency stimulation, consisting of three trains of 100 pulses at 100 Hz. T1AM (5 µM) and EPPTB (a selective inhibitor of TAAR1, 5 nM) were administered for 10 minutes, starting 5 minutes before the delivery of high frequency stimulation. In some experiments, Aβ was infused with T1AM, or T1AM and EPPTB, at a concentration of 200 nM. **RESULTS AND DISCUSSION:** In wild type EC, T1AM that did not

affect either basal synaptic transmission or LTP induction and maintenance. Exposure to Aβ inhibited LTP, but T1AM perfusion restored LTP in Aβ-treated EC (98±6% vs 123±10%, P<0.05). In EC from 2 month-old APP-J20 mice LTP could not be elicited, but it was rescued in the presence of T1AM (90±7% vs 120±9%, P<0.05). To evaluate the role of TAAR1, the specific receptor antagonist, EPPTB, was used. In wild type EC slices exposed to EPPTB, LTP was impaired, and the protective effect produced by T1AM vs Aβ toxicity was abolished. Finally the assay of EC homogenates by mass spectrometry coupled to HPLC revealed the presence of endogenous T1AM, whose average concentration was in the pmol/g range. Our results suggest that T1AM plays a neuroprotective effect, rescuing Aβ-induced neuronal dysfunction and that this effect may involve the interaction with TAAR1. Further insight into the physiological, pathophysiological or pharmacological role of T1AM and TAAR1 might open new perspectives in the study of AD. **RESEARCH SUPPORT:** Consiglio Nazionale delle Ricerche and University of Pisa.

SHORT TERM OXYTOCIN ADMINISTRATION IS REDUCING MEMORY DEFICITS AND ANXIETY MANIFESTATIONS IN A METHIONINE-RAT MODEL OF SCHIZOPHRENIA. A Ciobica, R Lefter, M Paulet, I Antioch, R Dobrin, Alexandru Ioan Cuza University, Iasi, Romania. **INTRODUCTION:** Lately, there is increased interest in understanding the roles of oxytocin in the main neuropsychiatric disorders such as Alzheimer's disease, anxiety, depression, schizophrenia or autism and the variety of behaviors exhibited by both the administration of intransal or peripheral oxytocin on the developed animal models for the aforementioned disorders. In this way, here we present some of our preliminary data regarding the administration of oxytocin for 9 days in some specific behavioral tasks used to assess working memory and anxiety behavior in a methionine-induced rat model of schizophrenia. **MATERIAL AND METHODS:** Male Wistar (n=21) rats were used and divided in 3 groups: control, methionine and methionine+oxytocin group. The model of schizophrenia was induced in methionine and methionine+oxytocin group through the subcutaneous administration of methionine for 2 weeks (5.2 mmol/kg). After that, oxytocin was intraperitoneally injected in the methionine+oxytocin group in a dose of 10 mg/kg/body weight for 9 consecutive days. The treatment began 7 days before the behavioral testing. Memory functions were tested through Y-maze, while anxiety behavior was evaluated by elevated plus maze, both performed during the last 2 days of treatment (8th and 9th, respectively). **RESULTS AND DISCUSSION:** Our initial data is showing facilitatory effects on immediate working memory for the oxytocin administration in Y-maze test, as showed by the significant increase of the spontaneous alternation behavior in the methionine+oxytocin group, as compared to methionine alone. Moreover, the administration of oxytocin resulted in a significant increase in the time spent in open arms of the elevated plus maze in the methionine+oxytocin group, as compared to methionine, suggesting some possible anxiolytic effects. This could be relevant in the context of the increased interest in understanding the degree and nature of the cognitive neuropsychological abnormalities in schizophrenia. In conclusion, it seems that short term administration of intraperitoneally oxytocin in a methionine-induced rat model of schizophrenia could exert some facilitatory effects on the in the hippocampal-dependent working memory Y-maze test and anxiolytic behavior in elevated plus maze test. **RESEARCH SUPPORT:** a PN-II-RU-TE-2014-4-1886 grant "A complex study regarding the relevance of oxytocin administration in some animal models of neuropsychiatric disorders", number 120 from 01/10/2015.

THE EFFECTS OF POSITIVE ALLOSTERIC MODULATOR (PAM) OF MGLUR5 ON THE LOSS OF OBJECT RECOGNITION MEMORY PRODUCED BY CHRONIC ETHANOL ADMINISTRATION IN RATS. M Marszalek-Grabska, E Gibula-Bruzda, J Filarowska, A Bodzon-Kulakowska, P Suder, JH Kotlinska**,** Department of Pharmacology and Pharmacodynamics, Medical University, Lublin, Department of Biochemistry and Neurobiology, AGH University of Science and Technology, Krakow, Poland. **INTRODUCTION:** Drugs of abuse have been shown to alter synaptic plasticity and related neuronal functions, and such damage is particularly important in case of ethanol. mGluR5 and mGluR2 play an important role in acute and chronic ethanol effects and these receptors are also involved in recognition memory. The aim of the present study was to estimate the influence of PAM mGluR5, Vu-29 on cognitive processes of memory impaired by chronic ethanol treatment in the novel object recognition test (NOR test). The level of mGluR5 and mGluR2 was evaluated in brain structures associated with recognition memory as the prefrontal cortex, hippocampus and striatum. **METHODS:** Experiments were performed in male Wistar rats. Ethanol (2.0 g/kg, 20% w/v, i.g.) was administered once a day for 7 days. A short-term memory in the NOR test was conducted 90 min after Vu-29 administration at the dose of 30 mg/kg, i.p., on the 1 day of abstinence. A long-term memory test was conducted 24 h later (day 2 abstinence). The prefrontal cortex, hippocampus and striatum were isolated from rat brains on day 2 or 7 of abstinence. **RESULTS AND DISCUSSION:** Our results showed that Vu-29 increased recognition scores in ethanol-treated rats in the NOR test. This effect was significant 24 h and 48 h after ethanol administration. Chronic ethanol increased mGluR5 and mGluR2 concentration in the cortex, hippocampus and striatum on day 2 of abstinence. This effect was decreased by Vu-29 administered 24 h earlier. After 7 days of ethanol abstinence, the concentration of glutamate receptors returned to control level. The present results suggest that activation of mGluR5 improved ethanol-impaired recognition memory. Vu-29 administration induced changes in mGluR5 and mGluR2 expression especially in the hippocampus on the abstinence day 2. **RESEARCH SUPPORT:** Medical University of Lublin (DS 22/15).

MORPHO-FUNCTIONAL CHARACTERISTIC OF THE OREXINERGIC SYSTEM IN RATS UNDERGOING THE SICKNESS AND PRENATAL HYPOXIA. IY Morina, EA Aristakesyan, VV Kuzik, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia. **METHODS:** The influence of the sickness on lateral hypothalamus orexinergic system activity in rats in norm and after exposure to hypoxia were investigated. For immunohistochemical studies 24 rats on the 30 day of life were divided into 4 groups: first group – the intact rats, second – the rats exposed to the sickness at the age of 30 days, third - the rats subjected to prenatal hypoxic exposure on 19th day of the gestation, the fourth — rats subjected to prenatal exposure to hypoxia and 2-hours sickness at the age of 30 days. Immunohistochemical reaction for the detection orexin A was performed on paraffin sections (5-6 microns). To assess the functional activity of the orexinergic system optical density of lateral hypothalamus (LH) immunoreactive fibers were measured. **RESULTS AND DISCUSSION:** In the intact rats on 30th day of life orexinergic LH system was fully formed and presented a well-developed network diffusely located immunoreactive fibers, the content of orexin A in which amounted 0,023±0,0045. In intact rats undergoing sickness at 30 days of age the increase of the orexinergic system functional activity was noted, the optical density of immunoreactive material in the fibers of LH was 0,104±0,0320. In rats exposed prenatal hypoxia the content of the orexin A in the LH fibers were 0,105±0,0380. In rats subjected to prenatal exposure to hypoxia and

2-hours sickness the number of immunoreactive orexin A increased to 0,203±0,0400.e. Thus, sickness in intact animals caused a marked activation of the LH orexinergic system. Hypoxia on the 19th day of embryogenesis made the same effect, thus damaging effect of prenatal hypoxia persisted to 30 days of age.

COMPARATIVE CHARACTERISTICS OF THE HYPOTHALAMIC VASOPRESSINERGIC STRUCTURES IN WISTAR AND KRUSHINSKII-MOLODKINA RATS. IY Morina, SI Vataev, VV Kuzik, DM Surzhenko, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia. **METHODS:** Comparative morpho-functional characterization of the hypothalamus vasopressinergic (VP) structures was given in Wistar strain rats and Krushinsky-Molodkina strain rats (KM) with genetic predisposition to audiogenic seizures. Studies were conducted on 8 intact animals: 4 rats of Wistar strain rats and 4 KM strain rats. For immunohistochemical researches the hypothalamus areas were fixed in a Buen liquid. For the detection vasopressinergic structures biotin-streptavidine method immunohistochemical reaction was made on paraffin sections (5-6 μm). Optical density of VP was determined in cells of the paraventricular (PVN), suprachiasmatic (SHN) and supraoptic nuclei (SON), and in the fibers of the median eminence (ME). **RESULTS AND DISCUSSION:** In Wistar rats group processes of synthesis and excretion in the VP-ergic cells were in a state of dynamic equilibrium. In the SON cell nucleus were large, neurosecretory material (NSM) was located at the cell periphery, a lot of fibers, the content of immunoreactive material in the cells was- 0,30±0,06. In the PVN we observed a lot of fibers, cells with a large nucleus and NSM on the periphery, the optical density of the VP-ergic material in the cells was -0,37±0,06. There were many immunoreactive fibers in the SCN, in the SCN cell content of the VP was 0,28±0,04. In ME fibers the content of VP reached 0,43±0,02. In KM rats group in the cells of the neurosecretory centres distribution of the VP-ergic material was uneven. In SON fibers were less, the VP density in the cells was 0.39±0,05. In the PVN cells content of the NSM reached 0,32±0,01. In the SCN a lot of fibers were identified, cells were with large nucleus and VP content 0,33±0,03. In the ME a dense network of fibers with the content of the VP 0,37±0,03 was shown. Thus, the morpho-functional state of the hypothalamus VP-ergic structures shown that the structures in the KM rats group were in a state of active synthesis and excretion compared with the Wistar rats group.

PSYCHOLOGICAL FACTORS CONTRIBUTING TO DEPRESSION IN PATIENTS ON HEMODIALYSIS TREATMENT. V Bugarski Ignjatović, V Sakač, Ž Nikolašević, Clinic for Neurology, Faculty of Medicine, Clinic for nephrology and clinical immunology, Department of Psychology, Faculty of Philosophy, University of Novi Sad, Novi Sad, Serbia. **INTRODUCTION:** Depression is the most frequent psychiatric disorder in chronic kidney disease patients (CKD). The prevalence of depression in CKD patients on hemodialysis treatment, even those in the predialysis stages, is higher than that reported for general population and individuals with other chronic diseases. The aim of the study was to assess whether symptoms of the depressive syndrome are present in patients on hemodialysis, and if they are, to determine which factors are associated with depression in these patients. **METHOD:** The study comprised 93 subjects, aged 24 to 78 years, from all educational backgrounds, who were undergoing hemodialysis treatment due to terminal stage of chronic renal insufficiency. Beck's Depression Inventory was used to assess depression, Kidney Disease Quality of Life scale was used to assess the quality of life, Big Five Inventory for personality traits, Mini Mental State Examination Test for cognitive status, Multidimensional scale for Perceived Social Support for social support, Brief Santa Clara Strength of Religious Faith Questionnaire for faith and religiosity. A series of multiple regression analyses was applied. **RESULTS AND DISCUSSION:** Depressive symptoms were found in two thirds (65.6%) of the study sample. Gender, level of education, cognitive status, social support, religious beliefs, personality traits, such as neuroticism and openness, emotional and social aspects of one's quality of life and own perception of illness were found to be significant predictors of depression. Among these, emotional and social aspects of one's quality of life (β=-0.24; p=0.01), own perception of illness (β=0.24; p=0.00), and neuroticism (β=0.25;p=0.00) showed the strongest correlation with depression. The results of the study emphasize the important role of psychological factors in development of the depressive syndrome in patients on hemodialysis treatment.

BIPOLAR DISORDER OR MAJOR DEPRESSIVE DISORDER? A Hashorva (Tasho), A Suli, D Ulqinaku, V Alikaj, E Spaho. University Center Hospital "Mother Teresa", Psychiatric Department, Tirana, Albania. **INTRODUCTION:** Background: Bipolar disorder is complex and it can be difficult to diagnose. Hypo mania is considered normal and not diagnosed, so bipolar II disorder often it is misdiagnosed as recurrent major depressive disorder. Therefore bipolar II disorder is often mistreated. How much of major depressive disorder is actually bipolar disorder? This is in fact the question that this study raises. The concept of bipolar spectrum will help in reducing un diagnosed bipolarity. Disclose of hypo mania is a important factor for the identification of bipolar II disorder. Bipolar spectrum disorder is a continuum from pure depression to symptoms of mania along a horizontal and vertical plan. **AIM:** This study aims to examination major depression according to a new view of the bipolar spectrum and provide to answer the question: What part of major depression is in fact bipolar depression? **METHOD:** Were interviewed 190 patients adult with major depressive disorder, first episode or recurrent depression. Used the Hypo mania Checklist -32 (HCL-32) and Mood Disorder Questioner (MDQ) to identify symptoms of hypo mania which will show us bipolar disorder hidden between major depressive disorder. Patients underwent a detailed psychiatric assessment using categorical criteria of DSM-IV for bipolar disorder and dimensional criteria (tolerant criteria) of Zurich study (2005). Interviews were taken over a one year period February 2013 to February 2014. **RESULTS AND DISCUSSION:** Results: The tests HCL-32 and MDQ showed that about 20% (1/5) of depressive patients meet criteria for hypo mania according to DSM-IV criteria. These patients are in fact bipolar disorder, treated as major depressive disorder. Refereed dimensional criteria, 24-39% (1/4-1/3) are in fact bipolar disorder. **CONCLUSION:** A major part of MDD is in fact BD and should be treated as such.

HOSPITALIZATION CAUSES ANXIETY. A Hashorva (Tasho), P Maksuti, University Center Hospital "Mother Teresa", Psychiatric Department, Tirana, Albania. **INTRODUCTION:** Background: The fact remains that anxiety is a frequent concomitant of somatic illness or that it may masquerade as somatic disorder. Studies in different countries and clinics have shown that most patients accompany their disease with strong emotions especially when they go to the doctor. Potentially of hospitalization, is a strong reason to justify higher level of anxiety. **MATERIALS AND METHODS:** Were interview 100 patents with different diagnosis that have received service at primary care and 100 people without any diagnosis as a group control (May-October 2013). The Hospital Anxiety and Depression Scale (HADS) was used like a clinical instrument to quantify anxiety severity. **RESULTS AND DISCUSSION:** From the patients involved 23%of them had a high anxiety level

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(potential cause for concern). 31% moderate anxiety. Only 6% in group control had a high anxiety level and 9% cases in the limits. This considerable difference shown that hospitalization strongly influences the development of anxiety. The level of anxiety is influenced by the type of the disease. The patents with oncologic and cardiologic diagnosis had a higher level of anxiety than others. There's a close connection between the anxiety and age, but it is not related with the sex, marital status and academic level of the person. **CONCLUSIONS:** The opportunity of hospitalization is a strong reason to justify the height level of anxiety, tested by HADS. The physician will be helped and will make is job easier if knows the anxiety of hospitalization level in patients, that why HADS requires a validation study in the Albanian version.

DIFFERENCES OF BEHAVIORAL CHARACTERISTICS OF AUDITORY AND VISUAL EMOTION PERCEPTION AT THE PRIMARY SCHOOL AGE. MN Anderson, ES Dmitrieva, VYa Gelman, Pushkin Leningrad State University, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, North-West State Medical University, St. Petersburg, Russia. Abstract Ability to identify emotions (as a component of emotional intelligence) is assumed to be one of the factors influencing people's resistance to stressful situations and human behavior in the whole. The research on adults' identification of emotions when cues were presented either auditory or visually showed specific features of relationship between psychophysiological parameters of perception of these two stimuli modalities. The developmental aspect of the problem was less investigated. Our study considers the comparison of behavioral characteristics of emotions' identification by the primary schoolchildren depending on the type of emotion and the sensory modality used for stimulus presentation. Objectives Research is devoted to studying the problem of recognition of emotions examinees in the age range from six to eleven years. In the course of the execution of quantitative and qualitative analysis of the results were taken into account age and sex characteristics: each age subgroup included the subjects of both sexes.Methods: Methodical apparatus of the study included methods of individual success emotion recognition JACFEE with the aim of studying the peculiarities of emotion perception from photographs [1] and presentation of two neutral content sentences of the different emotional intonation with the aim of studying specifics of emotion perception in auditory modality [3]. To determine the effect of factors of presentation modality, type of emotion and sex on the success of emotion perception we performed two-factor analysis of variance; the correlation analysis was used in order to identify the relationship between the efficiency of emotion perception in auditory and visual tests; Mann-Whitney test verified the accuracy of the pairwise differences. Results: Identification of nonverbal emotions by 8-9-year olds was shown to have both general features and peculiarities of perception depending on emotion's type and stimulus modality. Recognition accuracy of visually presented emotions on average was significantly higher ($p< 0.05$) as compared to acoustically presented ones. Children identified only one emotion (sadness) with similar accuracy under both conditions of presentation (p.0.05). The results of high accuracy scores for emotion of happiness in both presentation modalities confirm the conception that children develop perception of positive emotions earlier than negative in age course. The results of variance analysis showed that, although the factor "presentation modality" has a significant impact on the recognition of emotion recognition ($F1,1008 =30,673$; $p<0,0005$), the "type of emotion" has been determined as the first most important factor in this sphere ($F3,1008=62,417$, $p<0,0005$). The interaction between the factors of «modality of presentation» and «gender» was not significant; the same we can say about the interaction between the factors of "type of emotion" and "sex". Conclusions: The study identified both General characteristics and peculiarities of the perception of nonverbal emotional information of different valences under two modalities of presentation – visual and auditory- at the age of 8-9 years old. The identification of emotions is carried out with a higher detection rate and lower a posteriori probability errors in visual perception in comparative with an auditory one. Moreover, a higher efficiency of recognition in the visual modality is achieved through emotions of "joy" and "anger", and the efficiency of perception of emotions "sadness" and "fear" is almost equal for both modalities.

Afternoon Session

ISBS SPECIAL TALK: STRESS AND NEUROIMMUNE INTERACTIONS. H Korneva, S Perekrest, S Shanin, Institute of Experimental Medicine, St. Petersburg State University, St. Petersburg, Russia. Stress is well known to affect functions both of nervous and immune systems that modulates development of different diseases and treatment effectiveness. However, the mechanisms of these processes remain unclear. **METHODS:** immunohistochemical detection of c-Fos protein — the marker of cell activation, and orexin-containing neurons in hypothalamus; qPCR analysis of preproorexin and orexin receptors genes expression; reaction of blast transformation and analysis of cell cytotoxicity; intensity of IL-1β signal transduction was assessed by specific activity ofN-SMase according to method by B.G. Rao and M.W. Spence. Mild stress stimuli potentiate and severe ones suppress the functions of immune system, though glucocorticoids and IL-1β levels change in the same manner. The reaction of lymphoid cells to the key regulating cytokine IL-1β alters as follows: stimulating stress enhances the intensity of lymphocyte proliferation and IL-1β signal transduction via sphingomyelin pathway; suppressing stress, on the opposite, inhibits these processes. These changes likely result from alterations in ligand-receptor interactions on lymphoid cell membrane. Electric pain stimulation alters pattern of brain cells activity, suppressing the immune response. The algorithm of brain reactions to antigen application under these conditions is changed. Psycho-emotional stress was shown to alter LPS-induced reactions of hypothalamic orexin-containing neurons. Restraint stress caused an increase of the quantity of hypothalamic orexin-positive neurons. LPS injection decreased their quantity, and pretreatment with movement restriction altered this reaction, leading to increment of this quantity. The showed alterations indirectly evidence changes in orexin contents in neurons resulting from the imbalance between its synthesis and utilization. To clarify these processes preproorexin mRNA levels in hypothalamus were studied. There was a decrease 2 hours after restraint stress application. No difference was revealed between saline and LPS groups, but preliminary stressed animals responded to LPS injection with higher levels of preproorexin mRNA. The study of orexin receptors gene expression showed no changes in hypothalamic mRNA levels. Few alterations were revealed in adrenals: the mRNA level of both receptors was diminished after restraint stress and there was a decrease in gene expression of the first receptor after LPS injection.Stress-induced alterations of nervous and immune systems functioning are restored by EHF-irradiation of skin and injection of peptide or nucleotide drugs. **RESEARCH SUPPORT:** Richard J. Fox Fund and Institute for Bioinformation Research, Wayne, Pennsylvania, USA.

USBP SPECIAL TALK: MIND-IMMUNE CONNECTION: UNDERSTANDING ITS ROLE FOR NEUROPSYCHIATRIC DISEASES FROM THE SYSTEMS BIOLOGICAL PERSPECTIVE. L Tian, Academy of Finland, Neuroscience Center, University of Helsinki, Helsinki, Finland. Accumulating evidence suggests that abnormal

proinflammatory activation of innate and adaptive immune cells can be detrimental for neurogenesis and affect synaptic formation and neurotransmission. Animal studies have provided convincing evidence on the role of immune genes in regulating synaptic neurotransmission and plasticity, metabolism of neurotransmitters and neural growth factors, neurogenesis, and connectivity of brain circuits that underlie cognition and emotion. And new therapies based on the anti-inflammatory strategy to treat these diseases have started to emerge in clinics. Such progress encourages for a more intensive and deeper research on the immune-mediated mechanism at the molecular levels that underlie neuropsychiatric diseases. The advent of the cutting-edge sequencing technology allows us to systemically identify susceptibility genes that contribute to pathogenesis of diseases and to evaluate responses of treatments. Furthermore, genetic and gene expression studies, in humans and animal models of psychiatric disorders, are becoming increasingly integrated. My group has the expertise in studying the mechanisms of immune activation in animal models of neuropsychiatric and neurological diseases by molecular and cellular biological approaches. We focus on studying the role of immune activation in controlling the brain development, behaviors and in neuropsychiatric diseases with both schizophrenic patients and animal models, and use the cutting-edge systems biological and laboratorial approaches to holistically evaluate the role of immune-related genes in neuropsychiatric diseases in both clinical and preclinical aspects. The results of our studies potentially allow a deeper understanding of the immune-mediated mechanisms in the pathophysiology of neuropsychiatric diseases and help develop novel mechanism-based prognostic tools for a more efficacious treatment for the cognitive deficits in schizophrenic patients.

RSBP SPECIAL TALK: MISASSEMBLY OF NON-MUTANT DISRUPTED-IN-SCHIZOPHRENIA 1 (DISC1) PROTEIN IS LINKED TO ALTERED DOPAMINE HOMEOSTASIS AND BEHAVIORAL DEFICITS. C Korth, Department of Neuropathology, University of Düsseldorf, Düsseldorf, Germany. Translating the clinical diagnosis of chronic mental illnesses such as schizophrenia or recurrent affective disorders into biological markers has been difficult due to the heterogeneity of biological causes, the small effect size of the investigated traits in comparison to the high intersubject variability. Genetics has identified genes linked to disease in families but association studies have so far not provided clear paths to disease models or therapies. **HYPOTHESIS:** Since in many other chronic brain diseases protein pathology plays a major role beyond genetics, our idea is that identifying protein pathology in chronic mental illnesses will be more revealing in terms of biological mechanisms and provide a potential pharmacological target early on. **METHODS:** We investigated candidate proteins and performed proteomics on post mortem brains of patients with schizophrenia, recurrent depression or bipolar disorder, as well as healthy controls. For those proteins found to to be misassembled in human post mortem brains, we created transgenic rat models for extensive characterization and biomarker identification. These biomarkers are then reverse-translated into patients in order to identify corresponding biologically defined subgroups. **RESULTS:** We identified several proteins to be misassembled in chronic mental illness: DISC1, dysbindin, CRMP1, TRIOBP1, and NKCC1. For DISC1, we created a transgenic rat model modestly overexpressing human full length non-mutant DISC1 to mimick misassembly. This rat, termed tgDISC1 rat exhibited a subtle neuropathological phenotype with perinuclear DISC1 aggregates accentuated in the striatum, a slightly shrunk dopaminergic system and shifted interneuron positioning. Furthermore, there was an increase in high-affinity D2 receptors in the dorsal striatum as well as mislocalized dopamine transporter. On the behavioral level, hyperexploratory behavior and amphetamine supersensitiity was prominent. **CONCLUSIONS:** Investigating protein pathology as a phenotype in chronic mental illness is a promising avenue in characterizing these diseases. In the specific case of DISC1 misassembly we could demonstrate association to aberrant dopamine homeostasis on neuroanatomical and behavioral analysis. More profound investigation on biomarkers in this tgDISC1 rat may lead to the identification of a subset of patients by reverse translation, and offer a face valid model for pharmacotherapy.

NEW INSIGHTS INTO BEHAVIORAL PHENOTYPING: PHENOMASTER AND INTELLICAGE WITH STELLAR TELEMETRY. E Wenzler, TSE Systems GmbH, Bad Homburg, Germany. Characterization of animal models of human diseases often faces substantial problems due to data variability caused by unpredictable changes in lab environment, experimenter interference, animal stress, and suboptimal equipment. To combat these problems and create ideal conditions for high quality research TSE Systems has pioneered a number of highly controlled and standardized modular test systems comprising integrated hardware and software platforms for metabolic and behavioral phenotyping and neuroscience, as well as drug screening and toxicology. Our systems are designed to maximize animal welfare, reduce experimenter interference and increase throughput. Fully automated systems phenotype individual animals (PhenoMaster system) or groups of animals (IntelliCage) over days or weeks without stress or interference. The novel implantable wireless Stellar telemetry system allows parallel measurements of vital physiological parameters such as blood pressure, heart rate as well as ECG, EMG and core temperature in single or group housed animals. Besides home cage testing systems, which cover a large range of parameters, TSE Systems offers the first multi-purpose conditioning platform on today's market accommodating nine behavioral paradigms for the evaluation of learning, memory, emotion and stress-related behaviors in mice and rats. The TSE Multi Conditioning System is designed for: Fear Conditioning, Panic Response, Active and Passive Avoidance, Learned Helplessness, Conditioned Place Preference, Latent Inhibition, Light-Dark Test and Open Field Test / Locomotor Activity. All-in-one. In conclusion, these unified approaches open new horizons for a large variety of high-quality in-vivo research in biomedical and preclinical science.

SYMPOSIUM IV: CLINICAL PSYCHOLOGY AND PSYCHIATRY
Chairs: VM Klimenko (Russia), BA Rozanov (Ukraine)

LONG HOURS IN CENTER-BASED CARE AND THE HEALTH OF SECOND-GRADE CHILDREN: A LONGITUDINAL STUDY. T Anme, E Tomisaki, E Tanaka, T Watanabe, University of Tsukuba, Ibaragi, Sophia University, Tokyo, Japanese University of Health Sciences, Saitama, Japan. Childcare quality is essential for parents who join the extended-hour workforce. But few studies focused on the longitudinal effects of length and quality of the childcare. What is the effect of prolonged hours in center-based care on children's mental and physical health? To answer this question from a longitudinal perspective, data were collected from 159 children, their guardians, and the government-authorized childcare professionals responsible for overseeing them. A Japanese adaptation of the Home Observation for Measurement of Environment questionnaire was administered to guardians in order to assess their respective child-rearing environments; guardians also completed a survey containing items regarding socioeconomic status, family composition, and the amount of

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time spent by their children in childcare. The childcare professionals supplied details pertaining to the children's preschool-age development. Upon reaching the second-grade, the children responded to questions concerning their physical and mental health. A multiple regression analysis revealed that children's social skills, such as high self-control at the preschool age reduced their anxiety, depression, and anger upon reaching the second grade. Likewise, children with high cooperation skills exhibited less difficulty in anger control upon reaching the second grade. Similar effects were found between assertion skills and reduced depression. About parenting, lack of punishment during preschool reduced children's anxiety and anger on someone, less difficulty in completing schoolwork upon reaching the second grade. Adding that, children who used childcare long hours felt less depression than others upon reaching the second grade. Hence, if quality childcare is combined with an appropriate home environment, the amount of time spent in childcare should not negatively impact mental or physical health upon reaching the second grade. **RESEARCH SUPPORT:** The Grants-in-Aid for Scientific Research (21653049, 23330174).

PATIENTS WITH WORK-RELATED STRESS PROFILE. P Rebolledo, N Martini, P Valenzuela, Hospital del Trabajador, Chile. **INTRODUCTION:** Work-related stress is an important topic of the occupational health field. Anxiety and depression contribute to reduced work performance, productivity and absenteeism from work. The aim of this investigation is to describe the profile of patients in workers following stress and conflicts on their working place. **METHODS:** The Mental Health Department of Hospital del Trabajador de Santiago de Chile provides medical attention to patients who have suffered any occupational psychiatric disorder resulting from employment. Patients undergo a psychiatric and psychological assessment and evaluation of the job at the working place. This is a descriptive study. Universe was constituted by 310 patients who were diagnosed with occupational psychiatric disease, and treated after job conflict during 2008-2009. We reviewed clinical records, which included demographic data, jobs characteristics, psychiatric diagnoses and causes of conflicts. We use classic statistical for analysis. **RESULTS AND DISCUSSION:** Most of the Patients are women, between 30 and 44 years, married, with higher education. 56% of patients work in administrative areas and 28% supervised others. 60% work in full workday and 10% with shift system.70 % work in private companies and 53 % work in companies with more than 500 workers. 70% of patients worked in companies that provide services. Main occupational psychiatric disorders were Adjustment disorders (66%) and Depression (28%).Labor qualitative and quantitative overload and harassment at work constituted main risk psychosocial factors. Do not exist gender differences in relation to risk factors. Conclusions: Patients with work-related stress profile included: Women, younger, married, with higher level of education, fulltime work day, in private companies that provide services. Most important diagnosis was adjustment disorder and depression. Mayor risk psychosocial factors were overload work and harassment at work. No gender differences in accordance with risk factors. Employers have to considerer that risk management is essential to improve working conditions and workplace has to be continuously monitored for stress problems. **RESEARCH SUPPORT:** Hospital del Trabajador.

TREATMENT OF STRESS RELATED PSYCHOEMMOTIONAL DISORDERS (PED) ASSOCIATED WITH NEUROPATIC PAIN (NPP). Y Katsnelson, H Backhoff, V Udalov, G Zdanov, Premier Annecto Technologies, PA, USA; Tver Railroad Clinical Center, Tver, Russia. **INTRODUCTION:** Introduction: Low concentration of serotonin and endorphins and changes of their correlation in the brain structures are pathogenomic for PED and NPP. Transcranial electrostimulation (TES) in elaborated regime activates endorphinergic and serotoninergic systems of the brain. The evaluation of effectiveness of new non-invasive Transcranial electrostimulator "TESA-HB" for treatment of PED associated with NPP is essential. **METHODS:** 30 patients with NPP with a pain history > 3 months, and pain level (PL) >=4 received two cycles of 5 daily 50 minutes treatments with 2 days interval. Evaluation included PL, Beck Depression Inventory (BDI), mathematical analysis of cardiac rhythm (MACR) for evaluation of processes of regulation and adaptation, Roland Morris Disability Inventory, physician's and self- assessment scale. Assessments were completed 1 week prior to treatment, immediately after each cycle, and 2, 4, 8 and 12 weeks after treatment. **RESULTS AND DISCUSSION:** BDI and PL decreased ($p<0.05$) after 5 treatments were stable during following treatments and follow up period. There were noted: Decreasing ($p<0.05$) of uneasiness (FU), direct correlation ($P<0.05$) between PL and BDI and PL and FU; increasing ($p<0.05$) of MACR's parameters (adaptation, vegetative regulation, central regulation, psycho-emotional conditions) after 5th treatments, tendency of increasing ($P>0.05$) until the end of TES and stabilization of MACR during follow up period. During and upon completion of TES there were an improvement ($p<0.05$) of patient's general condition and a decrease in the severity of disability associated with NPP. No serious adverse events were noted. "TESA-HB" in elaborated regime is effective method for treatment of stress related psycho-emotional disorders associated with Neuropathic Pain. **RESEARCH SUPPORT:** Premier Annecto Technologies, Doylestown, PA, USA.

CONVENTIONAL AND ADVANCED IMAGING TECHNIQUES IN DETECTION OF NEURODEGENERATIVE DISORDERS. D Kozić, ISBS Fellow, University of Novi Sad Faculty of Medicine, Novi Sad, Serbia. **INTRODUCTION:** The debate over normal brain aging and unexpected or premature neuronal death has consumed a huge number of pages in neurological and neuroradiological literature and numerous sessions on international meetings have been devoted to this topic. However, neurodegenerative diseases still encompass enormous number of disorders that currently have no known cause and are characterized by gradual progressive partial or global disintegration of the central nervous system. **METHODS:** Conventional techniques in detection of neurodegenerative disorders are computerized tomography and magnetic resonance imaging, while magnetic resonance spectroscopy and molecular imaging are more advanced diagnostic modalities. **RESULTS AND DISCUSSION:** Neurodegenerative disorders are in usual neuroradiologic practice divided into followig groups: 1) dementia (including Alzheimer disease, vascular dementia, Pick's disease, Creutzfeldt-Jacob disease and normal pressure hydrocephalus; 2) degenerative diseases of the extrapyramidal nuclei (including Huntington's diseases, Hallervorden-Spatz syndrome, Leigh disease, mitochondrial encephalopathies and Wilson disease); 3) diseases of the substantia nigra (including Parkinson disease, progressive supranuclear palsy and multisystem atrophy); 4) degeneration of the cerebellum, brain stem spinal cord and 5) diseases of the motor system (including amyotrophic lateral sclerosis and Wallerian degeneration). Conventional imaging techniques usually detect pathology when the patients are markedly symptomatic, while molecular imaging may detect the neurodegenerative process even in pre-symptomatic stage. **RESEARCH SUPPORT:** the Ministry of Science of the Republic of Serbia, projects 175090 and 175022 (project period 2010-2016).

THE EFFECT OF PRACTICING PRANAYAMA ON TEST ANXIETY. A Nemati, Department of English Language Teaching, Jahrom Branch, Islamic Azad University, Jahrom, Iran. **INTRODUCTION:** Teacher's observation and the related literature indicate that for many students the idea of taking a test can cause waves of panic and fear. As a result it can negatively impact the student's function. This study intends to investigate the effect of doing pranayama on test anxiety and test performance. **METHODS:** The participants consist of 107 MA students who were randomly assigned to control and experimental group. The students of the experimental group practiced pranayama for one full semester before starting teaching. Sarason's (1980) test anxiety scale was given to both control and experimental groups in the final session before taking the exam. The gathered data were analyzed statistically. **RESULTS AND DISCUSSION:** It was revealed that due to practicing pranayama 33% of the participants of experimental group fall in the high test anxiety category while this percent is nearly twice for the control group (66.7%). Furthermore, the result of the t-test for test anxiety and test performance showed that there was a significant difference between the student of control and experimental groups and based on the mean the students of experimental group had lower test anxiety (M= 16.00) comparing the students of control group (M=19.31). Similarly, males and females of the experimental group had lower test anxiety comparing their males and females in control group. The result can be helpful for teachers and students to lower test anxiety.To know how to use the strength of our own breath to calm and regulate anxiety is valuable information and something to consider when we work with the students who exhibit test taking or language related anxiety (Poppleton, 2011).

Day 3. Wed, May 18, 2016
Morning Session

USBP PLENARY LECTURE: PYCHOSOCIAL STRESS, SOCIAL GENOMICS AND MENTAL HEALTH. VA Rozanov, Odessa Mechnikov National University, Odessa, Ukraine. **INTRODUCTION:** While we more or less know what is mental illness or mental disorder, there is still a lot of debate what is mental health. On the other hand mental health is a separate concept which means much more than absence of mental disorder or illness. Recent advances in this field and existing measurements of mental health make it possible to discuss how it is related to modern types of stress in the society and how genetic and epigenetic factors contribute to stress-resilience and well-being which is central for mental health. **METHODS:** To integrate knowledge in the field of psycho-social stress, stress of modernization and mental health, its components and determinants. To elucidate role of genetic and epigenetic mechanisms that underlie negative and positive influences on mental health in modern society. **RESULTS AND DISCUSSION:** Mental health is a central concept in a modern society; it is a prerequisite of prosperity and wealth of nations. Though mental health is very culturally dependent, stress-resilience, coping and well-being are thought to be its main and unified components. Well-being itself is heterogeneous, having hedonic and eudemonic essence. Mental health is relatively independent from mental disorders. Psycho-social stress is the main threat to mental health. Today psycho-social stress may be understood as stress of modernization, which is chronic, cyclic and is based on inequalities and injustice. Its main features are feeling of being trapped and cognitive evaluation of ones' vague perspectives in future. The source of this stress is liberal economic model and consumerism; it is enhanced globally by modern information technologies and urbanicity. There are several lines of evidence that prove that modern psycho-social stress has specific biological consequences. One of them is conserved transcriptional response to adversities and its activation through cognitive appraisal due to everyday worries and social anxiety. Another is epigenetic response to socio-economic inequalities which results in programming of mental health problems, inflammation and metabolic disturbances. In both cases genes of HPA, inflammation and antiviral response are involved which reflects existing links between immune system and mental health. Sources of resilience and coping are associated with stress-inoculation, availability of social support and behavioral coping based on awareness and understanding of meaning and goals of life. Much more studies are needed to better understand interaction of genetic and epigenetic mechanisms with personal and social factors to build resilience and deliberate stress-coping.

INNOVATIVE SOLUTIONS FOR BEHAVIORAL RESEARCH. A Willemsen, A Biarslanova, Noldus IT, Wageningen, Netherlands

SYMPOSIUM V: IZYASLAV LAPIN SYMPOSIUM ON MENTAL HEALTH AND PSYCHOPHARMACOLOGY
Chairs: JAK Erskine (UK), Ph Fauquet-Alekhine (France)

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 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.

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THE INTERACTION OF PHYSICAL AND MENTAL HEALTH ACROSS THE ADULT LIFE SPAN – THE IMPACT OF REPRESSIVE COPING. JAK Erskine, L Kvavilashvili GJ Georgiou, L Myers, S Leggett, S Davies, S Hiskey, J Hogg, S Yeo**,** St George's, University of London, University of Hertfordshire, Brunel University, North Essex Partnership NHS Foundation Trust, Oxford University Hospitals NHS Trust, Oxford, UK. **INTRODUCTION:** Repressive coping is an automatic tendency to avoid negative and personally threatening information that roughly 20% of people employ. Three studies investigated the possibility that repressive coping is more prevalent in older than younger adults, and that the increase in repressive coping seen in older adults represents a developmental progression that protects against poor mental health, but potentially worsens physical health. **METHODS:** Cross sectional and longitudinal methods over a 7-year period were used to examine the relationship between physical and mental health and the prevalence of repressive coping across the adult lifespan. **RESULTS AND DISCUSSION:** Study 1 – Mental health was significantly improved in the older compared to younger adults. However more older adults (41%) were repressive copers than the younger adults (11%). Increased repressive coping in older adults explained much of their improved mental health. Study 2 – The older adults were followed over 7-years. Between average ages 73 and 80 mental health remained good and repressive coping rose from 41% to 56.4%. Therefore, the increase in repressive coping seems to represents developmental progression. Study 3 – A new sample including middle age compared repressive coping across the lifespan. 10 % of young adults were repressive copers, 14% of middle aged adults and 42% of older adults. Repressive copers were protected from mental health issues with lower scores on depression, unhappiness, hopelessness and suicidal thoughts. However repressive copers showed no difference in physical health to non-repressors. While physical health declined with age for all participants mental health improved across the lifespan in repressive copers but declined with age in non-repressors. **RESEARCH SUPPORT:** a British Academy grant (SG-49431) and a University of London central research fund grant to James Erskine.

USE OF A SYNTHETIC CANNABINOID IN A CORRECTIONAL POPULATION FOR POSTTRAUMATIC STRESS RELATED INSOMNIA AND NIGHTMARES AND OTHER INDICATIONS: A RETROSPECTIVE EVALUATION. C Cameron, D Watson, J Robinson, Integrated Forensic Program - Secure Treatment Unit, Royal Ottawa Health Care Group, Department of Psychiatry, University of Ottawa, Ottawa, Canada. **INTRODUCTION:** Cannabis and its derivatives have been reported to have medicinal benefits going back thousands of years. In recent decades, there has been increasing evidence supporting the use of cannabinoids for a variety of indications, and more and more is becoming understood about the endocannabinoid system. PTSD research is now showing an association with endocannabinoid dysregulation, and there is now an increased interest in the potential for cannabinoids in treatment. Nabilone is a synthetic cannabinoid that has shows promise in the treatment of posttraumatic stress disorder (PTSD)–related insomnia and nightmares as well as efficacy in the management of chronic pain. It has also been proposed for harm reduction in cannabis dependence. Its effectiveness for management of PTSD and concurrent disorders in seriously mentally ill correctional populations has not been looked at, and this is what we attempt to look at in this study. **METHODS:** This study involves a retrospective chart review of all STU patients who were prescribed a single dose or more of nabilone for any indication from January 1, 2010, to July 31, 2013 (n = 104), as identified by the institutional pharmacy. We specifically looked at the indications, and efficacy and safety indicators for its use. Medications discontinued with the initiation of nabilone were also reviewed. Repeated measure t Tests were used to compare pretreatment and posttreatment sleep hours per night, nights with nightmares per week, Posttraumatic Checklist–Civilian version (PCL-C) and Global Assessment of Functioning (GAF) (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision [DSM-IV-TR], 2000). **RESULTS AND DISCUSSION:** The results showed nabilone targeting a mean of 3.5 indications per patient, thus likely reducing polypharmacy risk. The mean final dosage was 4.0 mg. Results indicated significant improvement in PTSD-associated insomnia, nightmares, PTSD symptoms, and Global Assessment of Functioning and subjective improvement in chronic pain. Medications associated with greater risk for adverse effects or abuse than nabilone were often able to be discontinued with the initiation of nabilone, most often antipsychotics and sedative/hypnotics. There was no evidence of abuse within this high-risk population or reduction of efficacy when nabilone was given in powder form with water rather than as a capsule. This study supports the promise of nabilone as a safe, effective treatment for concurrent disorders in seriously mentally ill correctional populations. Prospective, randomized controlled trials are required to confirm our preliminary results. Follow-up in the community will be required to confirm effectiveness in harm reduction. **RESEARCH SUPPORT:** This research was funded by the authors exclusively and received no external funding. Study is now published and available open source on-line (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4165471/). The research received approval by the Research and Ethics Board of the Royal Ottawa Health Care Group.

WEIGHING THE EVIDENCE: A SYSTEMATIC REVIEW ON LONG-TERM NEUROCOGNITIVE EFFECTS OF CANNABIS USE IN ABSTINENT ADOLESCENTS AND ADULTS. F Ganzer, S Bröning, S Kraft, PM Sack, R Thomasius**,** German Center for Addiction Research in Childhood and Adolescence, University Medical Center Hamburg-Eppendorf (UKE), Hamburg, Germany. Findings on neurocognitive effects of sustained cannabis use are heterogeneous. Previous work has rarely taken time of abstinence into account. In this review, we focus on understanding true sustained effects of cannabis, which begin when clinical symptoms of the drug have worn off after at least 14 days. We conducted a search between 2004 and 2014 and found 35 studies with such a prolonged abstinence phase. Evidence levels proved to be similar. Studies found some attention or concentration deficits in cannabis users. There is evidence that chronic CU might experience sustained deficits in memory function. Findings are mixed regarding impairments in inhibition, impulsivity and decision making for CU, but there is a trend for worse performance. Three out of four studies found evidence that motor function remains impaired even after a time of abstinence, while no impairments in visual spatial functioning can be concluded. Functional imaging demonstrates clear differences in activation patters between CU and controls. Structural differences are found in cortical areas, especially the orbitofrontal region and the hippocampus. 20 studies (57%) reported data on outcome effects, leading to a mean overall effect size of rmean = .395. Heavy use is found to be more consistently associated with effects in diverse domains than early age of onset.

DOES INTERNAL SENSING GOVERN LEARNING/MEMORY AND COGNITION? A 250 RECEPTOR STUDY OF THE HIPPOCAMPUS. R Lathe, G Riedel**,** Division of Pathway Medicine, University of Edinburgh, Edinburgh, Institute of Medical Neuroscience, University of Aberdeen, Aberdeen, UK. The hippocampus is involved in multiple aspects

of higher brain function, including learning and memory, physiological regulation, and complex processes such as decision making. Our studies 20 years ago investigated the role of the hippocampus by looking at gene expression profiles. The hippocampus was discovered to express an unusual density of cell surface receptors, meshing with its evolutionary orgin from a chemosensory ('olfactory'-type) epithelium, and suggesting that endocrine sensing of internal body status (enteroception) is the ancestral function of the hippocampus. To address this systematically we have now interrogated the Allen Brain Atlas for the expression patterns of 250 receptors in mouse brain that respond to blood-borne ligands (neurotransmitter receptors thus excluded). Of these, 17% were widely expressed and a further 17% were selectively expressed in the hippocampal formation, confirming our previous estimate that 35% of all 'endocrine-type' receptors are expressed in the formation. Of note, an unexpected pattern of bimodal expression emerged. (1) Receptors for ligands that signal adversity are selectively expressed in dentate gyrus (DG). (2) Receptors for ligands that signal sufficiency predominate in CA regions. To illustrate, receptors for sufficiency (e.g., androgens, estrogens, thyroid hormone) are present in CA regions, whereas receptors for adversity and challenge (e.g., interleukins, tumor necrosis factor, angiotensins) occur in DG. Receptors for classical 'stress' hormones (glucocorticoids), prominently enriched in the hippocampus, are mixed in their targeting, consistent with their disparate roles as both stimulators and suppressors. This bimodality maps onto clinical correlates of activity, mood, and behavior. These data instruct that the hippocampus acts as an integrator of blood-borne signals: one that not only anchors context-dependent memory but also underpins and resolves differential motivations for ongoing behaviors. We surmise: what our body says guides our thoughts and our actions (including hungry vs replete; sick vs hale and hearty; depressed vs elated), and that the DG–CA circuit of the hippocampus is the hub that integrates these inputs, thus orchestrating rational goal-seeking behaviors, guided by internal body status.

STRESS, COGNITION AND DOPAMINE. TR Norman, TR Letic, A Pisarevsky, JS Olver**,** Department of Psychiatry, University of Melbourne, Austin Hospital, Heidelberg, Victoria, Australia. **INTRODUCTION:** The role of prefrontal dopamine in cognitive performance has been well established. In particular, the effect on spatial working memory has been elucidated in non-human primates as well as in clinical studies. Central dopamine production is dependent on enzymatically catalysed synthesis from tyrosine (and phenylalanine) derived from the diet. Modulating dopamine indirectly either through dietary manipulation or by psychosocial stress has been associated with decreased cognitive performance in general and spatial working memory deficits in particular. The present evaluation aimed to determine if supplementary tyrosine administration could enhance cognitive performance, particularly spatial working memory. **METHODS:** The study was conducted as a randomised, double-blind, placebo-controlled, crossover trial in sixteen healthy male volunteers. Each subject received placebo, L-tyrosine 50, 100 or 200mg/kg according to a Latin squares design in blocks of 4 subjects. Doses were separated by a minimum wash-out period of 1 week. Written informed consent to participate in the study obtained from all subjects. The study was approved by Austin Health Medical Research and Human Ethics Committee. Following evaluation of cognitive function at baseline on each day subjects received the test substances as an oral solution dissolved in orange juice. Repeated cognitive testing was performed at 2, 4 and 8hours after the dose. Subjects were tested on a battery of computerised tests which included the Groton Maze test, Spatial Woking memory (two back task), simple and choice reaction time as well as delayed and verbal memory recall. Data was analysed by repeated measures ANOVA using SPSS (version 22). **RESULTS AND DISCUSSION:** Tyrosine supplementation was unable to enhance cognitive function in this study. There were large inter-individual differences in performance on all tasks investigated and while there were some changes over time in the individual tasks, the large variance precluded demonstration of a statistical difference between treatments. The results stand in contrast to others which demonstrated enhanced cognitive performance with tyrosine supplementation. Several factors may have influenced the negative outcome in this study. Cognitive performance was likely at maximal achievable levels for the individuals and could not be further enhanced. The doses of tyrosine employed may have been too high to differentially affect central dopamine concentrations i.e., tyrosine hydroxylase activity may have been saturated from the lowest dose. The cognitive test employed may not have been capable of detecting small differences. **RESEARCH SUPPORT:** a grant from the National Health and Medical Research Council of Australia.

SUBSTANCE USE DISORDER, MALNUTRITION AND STRESS. M Saeland, D Jahanlu, Faculty of Health Sciences, Oslo and Akershus University College, Oslo, Norway. **INTRODUCTION:** Substance use disorder (SUD) often relates to unstable housing, poor dietary habits, infections and metabolic disturbances. Depression and anxiety, common symptoms of stress in SUD typically attributed to substance use or abstinence, may also be caused by a persistent inadequate diet. The aim of this study was to assess different kind of stress in people on the street with SUD in Oslo, Norway, with attention to depression and anxiety, and dietary inadequacy and malnutrition. **METHODS:** In total 195 participants took part in a cross sectional study that included demographic data, housing, dietary intake and self-reported depression and anxiety, assessed through interviews. Substance use, nutritional status, metabolic status and infection status were determined through anthropometric measurements and biochemical blood analyses. **RESULTS AND DISCUSSION:** The mean age was 35.6 (SD 7.5) and 34.2 (SD 7.4) years for men and women (36.2% of sample), respectively. All were under influence of substances at the time of examination, and the majority were homeless: 50% staid in hospices, lodgings and night shelters, and only 20% had their own housing. Those living in hospices did not prepare warm meals in spite of having access to a fridge and cooking facility. 64% reported limited access to food, and 6% reported no food intake in the past 24 hours. Probably there was a huge day-to-day variation in energy intake. Intake of healthy foods as fruit, berries, vegetables and fish was generally very low. The mean intake of added sugar corresponded to 30% (SD 23) of the daily energy intake for both genders. This large amount of added sugar displaces the intake of essential nutrients and promotes malnutrition and metabolic disturbances; and discomfort that was probably relieved through heavier substance use. Concentrations of vitamin B6 below reference values were detected in 62.5% of the women and 37.5% of the men (P=0.04). Both depression (80.6% vs. 64.2%, P=0.01) and anxiety (87.5% vs. 73.8%, P=0.02) were significantly higher in women. Vitamin D or vitamin B6 deficiency were related to self-reported depression; significantly higher in women (P=0.04). Metabolic disturbance (HAc1>5.7%) also related more to depression in women than in men (P=0.03). Substance use and infections were not related to self-reported depression or anxiety. History of suicidal attempt (women 70.5% vs. men 57.0%, P=0.058) correlated positively with anxiety and starting substance use before the age of 17. However, living with own parents and getting psychological help during age 10-16 years, probably correlated negatively with attempting suicide. It is not unlikely that living with parents implies less stress, including regular meals. Earlier and persistent inadequate diet and malnutrition cannot be excluded to cause depression and anxiety in people on the street with SUD, probably mostly in women.

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ISBS OUTREACH COLLABORATION: AN ARTIST'S LOOK AT MENTAL DISORDERS. D Raytchev, Daniela Raytchev Art, London, UK

POSTER SESSION III

INFLUENCE OF ARGININE-VASOPRESSIN ON MOTOR DISORDERS IN PATIENTS AFTER STROKE. SG Belokoskova, SG Tsikunov**,** ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia. **INTRODUCTION:** Motor disorders is the most frequent complication of stroke. Such disorders are observed in 85% of patients. However, of these only 14% of patients completely recovered, 30% — restored partially, 56% slightly or absolutely not restored (Ramos-Murguialday A., et al. 2015). Previously, it was found that the 1-dezamino-8-D-arginine-vasopressin, DDAVP, restores motor function in animals and humans after focal brain damage (Odes L.N., 1996). The results of this study have not been published. So far, the problem of the treatment of motor disorders after stroke remains valid, the aim of this research was conduct their own study influence of DDAVP on motor disorders in patients after stroke. **METHODS:** It was surveyed 15 patients with hemiparesis in the remote period of stroke, from them 11 men and 4 women with an average age of patients 54.6 ± 1.9 years with average prescription stroke 4.5 ± 1.3 years. Thus, the study included patients in most cases with remote consequences of stroke. The 13 patients had ischemic strokes, the 2 patients — hemorrhagic. In each case, we have conducted comprehensive neurological research. The motor disorders identified using standard neurological methods. Muscle strength was assessed using a scale, where full muscle strength was 5 points, light paresis — 4 points, moderate paresis — 3 points, pronounce paresis — 2-1 points, hemiplegia — 0 points (Skoromec et al., 2007). The Modified Ashworth Scale of Muscle Spasticity was used to assess muscle tone, according to which 5 points — segment is fixed, 4 points — a significant increase of tone in limbs, 3 points — moderate increase, 2 points — small grade, 1 — light enhancement, 0 points — tone has not changed (Bohannon, Smith, 1987). The severity of the violations of the strength and muscle tone was evaluated in patients on the upper and lower limbs. There was pronounced spastic hemiparesis in 4 patients, moderate hemiparesis — in 1 patients and easy hemiparesis — in 10 patients. All patients received intranasal, 1-dezamino-8-D-arginine-vasopressin, DDAVP, with a course of treatment within 2 weeks. Single dose was $1 \cdot 10^{-7}$g, dose on course of treatment – $1 \cdot 10^{-6}$g. The placebo effect was evaluated in the same patients with strokes before taking a course of therapy of neuropeptide. A follow-up study conducted in individual patients through 0.5-1 year after completion of the first course of treatment neuropeptide. **RESULTS AND DISCUSSION:** DDAVP was effective in 67% of cases. We analyzed the dynamics of violations of motor function in 10 patients with strong and light motor disorders, in which neuropeptide was effective. Neuropeptide was effective in 7 patients with light motor disorders ($p < 0.01$). It was found that in certain patients decreased pathologically increased muscle tone. We found that saving the obtained results in follow-up study. The results reflect the high therapeutic potential of neuropeptide.

POSTSTROKE COGNITIVE IMPAIRMENT IN BULGARIAN PATIENTS: PROSPECTIVE FOLLOW-UP STUDY. NS Petrova, Clinic of Neurology, MHAT "Ruse", Ruse, Bulgaria. **INTRODUCTION:** There are few longitudinal studies with controversial results examining delayed changes in cognition after ischemic stroke and predictive values of neuropsychological and neuroimaging markers. Aim: The objectives of this study were to determine a quick cognitive screening test and neuroimaging markers measured in the acute poststroke phase which can accurately predict delayed cognitive and functional decline in poststroke patients. **MATERIAL AND METHODS:** Eighty-five consecutive first-ever stroke inpatients, aged 50–80 years (mean age 65.6±5.6) without previous cognitive complaints were prospectively evaluated with a comprehensive neuropsychological battery on the 5-th day, 1-st, 6-th, 12-th, and 24-th month. A wide range of clinical, radiological and neuropsychological variables were examined. We composed a control group of 25 normal control subjects (NCs), matched to the patients' group according to their age and educational level. **RESULTS AND DISCUSSION:** Patients had significantly lower scores on all measures of verbal learning. Their performance was characterized by reduced short-term memory, slow learning and lowered level of recollection from long-term memory. The most significantly impaired were all timed on tests of executive functioning. All patients at baseline were cognitively slow, had non-effective set shifting and reduced semantic generation. Executive functioning deficit appears to have a predictive power for cognitive impairment progression. Our results showed that among all neuropsychological measures, only the IST test at the 2-year follow-up showed significant decline reaching the baseline level impairments in comparison with the results at 12-th month. The medial temporal lobe (MTL) atrophy showed its high impact on the performance on all neuropsychological tests, even after 2 years post stroke. In addition, the MTL atrophy increased significantly two years after stroke compared with the baseline. Moreover, the data strengthened the important role of the initial assessment of MTL atrophy, and the follow-up IST examinations as a neuropsychological quick, easy and reliable tool for delayed poststroke cognitive impairment. The findings may set the stage for better poststroke management.

BRIGHT LIGHT INDUCES FREEZING BEHAVIOR AND STRESS-LIKE CHANGES IN GROOMING IN THE COCKROACH, PERIPLANETA AMERICANA. ES Novikova, IA Rodionov, MI Zhukovskaya, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia. **INTRODUCTION:** Pattern and intensity of grooming indicate if an animal is stressed or not. Mammals are known to increase frequency of grooming, interrupt bouts and shorten duration of strokes and lickings under stressful conditions (File et al., 1988; Kalueff and Tuohimaa, 2004, 2005; Smolinsky et al., 2009). Sparse invertebrate observations, including insects, show similar changes in behavior being treated with octopamine, insect stress neurohormone (Fussnecker et al., 2006; Even et al., 2012; Zhukovskaya, Novikova, 2014). Our recent data show stress-like changes in grooming pattern following placing into novel surrounding, oral administration of octopamine and stimulation with near-threshold doses of sex pheromone (Zhukovskaya, 2014; Novikova, Zhukovskaya, 2015). Novelty is a mild stressor for adult male cockroaches, thus, in order to cause stronger stress response, sudden bright light stimulation was applied during the dark phase of 24 hour cycle. Compact fluorescent cold white lamp was chosen to interact with short wavelength sensitive photoreceptor cells in cockroach eyes. Ultraviolet light is known to be a sign of open sky for insects, highly aversive for cryptozoic creatures. **METHODS:** Freshly moulted imago males of P.americana were transferred from the stock colony to experimental setup at least two weeks before experiments. Insects were kept under 12:12 LD inverted photoregime at 25±1°C. Water and food were provided ad libitum. Experimental setup consisted of a plastic cage (300*450*300 см3) where food and water were placed, constantly darkened shelter, and exchangeable test chamber both

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separated from the cage with plastic doors. The experiments were started at the first half of a dark phase. Cockroach entered to the clean test chamber and was immediately separated from the main cage.After 10 min of adaptation period 30 min session of video recording was performed under dark red light. The second session of recording was started following 10 min break, during which the light stimulus was applied by turning on the cold light compact fluorescence 6400K lamp. **RESULTS AND DISCUSSION:** Experiments clearly show stress-like changes in the animal behavior, namely, grooming sequences were interrupted similarly with described previously effect of novelty. Passive avoidance reaction was observed as complete freezing lasting from tenth of seconds to tenth of minutes. This behavior is likely caused by short wavelength light, perceived by UV sensitive 365 nm photoreceptor cells. Anthropogenic light pollution may case similar behavioral disturbances in nocturnal species. **RESEARCH SUPPORT:** State budget for 2013-2017 (project 01201351571).

MOST PROMINENT PEAK OF LACTATE: POTENTIAL KEY MRSPECTROSCOPY FEATURE OF PROGRESSIVE MULTIFOCAL LEUKOENCEPHALOPATHY. M Bjelan, D Kozić, ISBS Fellow, S Brkić, V Njagulj, J Ostojić; V Turkulov, D Lazarević, A Todorović, University of Novi Sad, Faculty of Medicine, Oncology Institute of Vojvodina, Diagnostic Imaging Centre, Sremska Kamenica, Clinic of Infectious Diseases, Clinical Center of Vojvodina, Center of Radiology, Institute of Cardiovascular Diseases of Vojvodina, Sremska Kamenica, Novi Sad, Serbia. **INTRODUCTION:** Progressive multifocal leukoencephalopathy (PML) is a rare, frequently fatal opportunistic infection, associated with demyelinating process, caused by JC polyomavirus, predominantly involving the patients with HIV disease or other immunocompromized conditions. The purpose of the report was to determine the role of magnetic resonance spectroscopy (MRS) in establishing the diagnosis of PML. **METHODS:** MRS in the sequences with both long and short echo time, was performed in two patients with PML associated with human immunodeficiency virus (HIV) infection and in one patient with PML associated with chronic lymphocytic leukemia. **RESULTS AND DISCUSSION:** The most prominent peak on the obtained spectra was lactatethat showed 2-3 times higher concentration compared to choline, almost 4-6 times compared to creatine and 4-11 times in comparison to N-acetyl aspartate. All patients showed almost identical spectrum pattern. Best of our knowledge, this is a new finding in PML, that might be useful in earlier diagnosis of this disorder. This could be important since PML need not be fatal, especially in non-HIV patients, if early detected. MRS could also be useful in "tumefactive" forms of PML associated with immune reconstitution inflammatory syndrome, in order to exclude neoplastic process.

DEVELOPMENT OF A BIOMARKER-BASED DIAGNOSTIC ALGORITHM FOR POSTTRAUMATIC SYNDROME AFTER PHYSICAL INJURY: DESIGN OF THE BIOPTS STUDY. JW Kim, HJ Kang, KY Bae, SW Kim, IS Shin, JS Yoon, HK Oh, MG Kim, JM Kim, Departments of Psychiatry, Chonnam National University Medical School, Gwangju, Korea. **INTRODUCTION:** Severe physical injury is a leading cause of posttraumatic syndrome (PTS), which is associated with depression, anxiety disorders, and posttraumatic stress disorder (PTSD). Only a few evidence-based options are currently available for the diagnosis and prediction of PTS cases, and most previous studies have included primarily Caucasian populations. Thus, the present Korean study, which is known as the biomarker-based diagnostic algorithm for posttraumatic syndrome (BioPTS) study, was designed to develop a biomarker-based diagnostic algorithm for PTS after severe physical injury. **METHODS:** This investigation is a 2-year longitudinal cohort study assessing patients who suffered a severe physical injury; it includes patients with a current diagnosis of PTS, patients with subthreshold PTS, and healthy controls. Participants were consecutively recruited from among patients who were hospitalized beginning in 2015 at Chonnam National University Hospital in Gwangju, South Korea, after experiencing severe physical injuries. Baseline evaluations were made during the acute phase (within 1 month) of the physical injury and included extensive information on sociodemographic and clinical variables as well as a list of biomarkers from medical examinations, blood samples, and electrophysiological tests. All participants will be followed up for 2 years after their physical injury, and the diagnostic and predictive validities of various biomarkers for PTS will be estimated. **RESULTS AND DISCUSSION:** The BioPTS study aims to develop the most accurate models for the diagnosis and prediction of PTS using a biomarker-based diagnostic algorithm. It is our hope that the study findings will significantly contribute to existing research regarding the complex relationships between severe physical injury and psychological issues. **RESEARCH SUPPORT:** grant of National Research Foundation of Korea Grant (NRF-2015M3C7A1028899) to J.-M. Kim.

GHRELIN ANTAGONIST [D-LYS3]-GHRP-6 REDUCES THE EXPRESSION AND REINSTATEMENT OF CONDITIONED PLACE PREFERENCE OF ALCOHOL IN RATS. PM Vinogradov, IYu Tissen, AA Lebedev, ER Bychkov, ND Yakushina, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Institute of Experimental Medicine, St. Petersburg, Russia. **INTRODUCTION:** Ghrelin is peptide hormone synthesized and secreted by the stomach into the bloodstream. Ghrelin acts as a kind of hunger hormone, it gets the information in the brain about the lack of energy and is included in the organization of intracerebral mechanisms of eating behavior control through activation of hypothalamic structures and lower parts of the trunk. Ghrelin not only initiates a meal, but also increases the motivational behavior and achievement of food reinforcement. The greatest attention of neuroscience research is devoted to investigate of acylated form of ghrelin, which is a specific ligand for the receptor subcortical nuclei of the brain. The aim of this study was to analyze the action of ghrelin and its antagonists on conditioned place preference (CPP) of ethanol. **METHODS:** To develop CPP we used a two-chamber apparatus. Wistar male rats were injected ethanol 0.5 g/kg, i.p. or intranasally ghrelin 20 µl (1 mg/ml) and put into the chamber (in nonpreferable chamber) for 4 days. On the 5th day animals got ghrelin antagonist **[**D-Lys3]-GHRP-6 intranasally 20 µl (1 mg/ml) and were tested in CPP apparatus. After a week extinction period, the rats were injected with ethanol 0.5g/kg, i.p. or **[**D-Lys3]-GHRP-6 with ethanol 0.5 g/kg, i.p. and were tested in CPP apparatus as well. **RESULTS AND DISCUSSIONS:** Rats spent 74% of time experiment in chamber associated with alcohol ($p \leq 0.05$). The rats receiving receptor ghrelin antagonist **[**D-Lys3]-GHRP-6 intranasally (20 µg) reduced the time in the chamber associated with alcohol for 46% ($p \leq 0.05$). The rats treated with ghrelin intranasally spent 60% of time in the chamber, associated with alcohol. After testing of CPP in 7 days without administration of any substances, the preference of a chamber was not observed. But after administration of ethanol, CPP was reinstated. The animals received receptor ghrelin antagonist **[**D-Lys3]-GHRP-6 (20 µg) and ethanol spent 50% of time in chamber associated with the administration of ethanol, i.e. CPP was not reinstated. The rats treated with ghrelin, demonstrated a range of reactions from a sharp preference to avoid the place of ethanol. **CONCLUSION:** Thus, the present study shows the important role of ghrelin in the mechanisms of the reinforcing

effects of alcohol and demonstrates the prospect for using of ghrelin antagonists in the correction of pathological craving in addictive disorders.

THE ROLE OF OREXIN A IN STRESS-INDUCED EMOTIONAL BEHAVIOR IN RATS. IYu Tissen, SG Tsikunov, ISBS Fellow, AA Lebedev, ER Bychkov, ND Yakushina, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Pavlov Physiological Department, Institute of Experimental Medicine, St. Petersburg, Russia. **INTRODUCTION:** Orexins A and B are hypothalamic neuropeptides involved in the regulation of circadian rhythms, energy metabolism and reward behavior. Projections of orexin neurons have found in different brain structures such as the amygdala, the medial prefrontal cortex, hippocampus, locus coeruleus and bed nucleus of stria terminalis. These structures are involved in the formation, consolidation and extinction of aversive memory. **METHODS:** This study examined the role of orexin A in regulation of stress-induced behavior in two behavioral tests: elevated plus maze and resident-intruder test. Each group of animals was at least 8-10 rats. We used a single acute psychotraumatic exposure. The group of rats was placed in the cage to the tiger python. One of the animals died as a result of its food needs, the rest rats experienced the situation of the partner's death. Orexin A and OX1R antagonist SB-408124 (Sigma, USA) were administered intranasally in dose of 20 µl (1mg/ml), for 7 days after psychotraumatic exposure. Testing was beginning at 8th day. **RESULTS AND DISCUSSIONS:** In the elevated plus maze, the time in the light arm in the control group was 92.2 ± 28.1 sec. In the group of animals after psychotraumatic exposure, this index was decreased up to 19.0 ± 6.8 sec. In the group of animals after psychotraumatic exposure and intranasal orexin administration, the time in the light arm was 28.5 ± 14.2 sec. In the group of animals after psychotraumatic exposure and intranasal SB-408124 administration, the time in the light arm was 53.2 ± 19.7 sec. In the "resident-intruder" test, we registered 12.2 ± 3.2 communicative acts in the control group. The same index was revealed in the group of animals after psychotraumatic exposure (13.6 ± 3.3 communicative acts). intranasal orexin administration decreased this index in the group of animals after psychotraumatic exposure up to 6.0 ± 1.2 communicative acts. The aggressive behavior was not registered in this study. In the elevated plus maze, orexin antagonist SB408124 reduced anxiety in rats after psychotraumatic exposure. **CONCLUSION:** The anxiogenic effect of orexin A and anxiolytic effect of SB-408124 was revealed in the elevated plus maze test. Besides, the anxiogenic effect of orexin A administration on communicative activity was shown in the "resident-intruder" test. Orexin A significantly reduced a number of communications and increased the freezing behavior, in particular. SB408124 had no effect in this test.

OREXIN A MODIFIES THE STRESS-INDUCED GAMBLING BEHAVIOR IN RATS. ND Yakushina, AG Pshenichnaya, SG Tsikunov, ISBS Fellow, AA Lebedev, ER Bychkov, KA Privalov, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Pavlov Physiological Department, Institute of Experimental Medicine, St. Petersburg, Russia. **INTRODUCTION:** Animal models of gambling behavior could make a significant contribution to improving our understanding the neural and neurochemical basis of gambling. Serotonin and dopamine play the important roles in impulsivity and addiction and they also contribute to gambling behavior (Zeeb et al., 2009). Orexins A and B are hypothalamic neuropeptides involved in the regulation of circadian rhythms, energy metabolism and reward behavior. Projections of orexin neurons have found in different brain structures such as the amygdala, the medial prefrontal cortex, hippocampus, locus coeruleus and bed nucleus of stria terminalis. These structures are involved in the formation, consolidation and extinction of aversive memory and reinforcing properties of environmental events. **METHODS:** This study examined the role of orexin in regulation of stress-induced gambling behavior. To evaluate gambling behavior we used “marble test”. A rat buried glass balls (1 cm in diameter) in test cage for 30 min. A number of buried balls was evaluated. We used a single acute psychotraumatic exposure as a stressor. The group of rats was placed in the cage to a tiger python. One of the animals died as a result of its food needs, the rest of the rats experienced the situation of the partner's death. Orexin and OX1R antagonist SB-408124 were administrated intranasal in dose 20 µl (1 mg/ml), for 7 consequent days after psychotraumatic exposure. **RESULTS AND DISCUSSIONS:** A number of buried balls was decreased after psychotraumatic exposure (5.67±3.34). For 7 days after psychotraumatic exposure, a number of buried balls was increased up to 13.2±3.2. At the same time, a number of buried balls was significantly decreased in group with orexin administration (7.9±1.2, $p \leq 0.05$) and had no effect in the OX1R antagonist SB-408124-treated group of rats. In additional experiments, the anxiogenic effect of orexin administration was shown in the elevated plus maze. In the control group, the time in the light arm was 92.2 ± 28.1 sec. In the group of animals after psychotraumatic exposure, the time in the light arm was 19.0± 6.8 sec, in the group with orexin – 28.5 ± 14.2 sec, in the SB-408124-treated animals – 53.2 ± 19.7 sec. In the elevated plus maze, orexin antagonist SB408124 reduced anxiety in rats after psychotraumatic exposure. **CONCLUSION:** This data are congruent with previously established experimental findings showed that the marble burying test could serve as a useful behavioral paradigm for not only estimating the gradual progression of the anxiogenic impact of stress over time, but also raises the possibility of using the temporal delay after stress to test the potential efficacy of post-stress interventions with anxiolytic drugs (Kedia and Chattarji, 2014). Thus, anxiogenic effects of orexin and anxiolytic effects of OX1R antagonist SB-408124 can influence gambling behavior in rats.

THE EFFECTS OF THE MOTION SICKNESS ON THE SLEEP-WAKEFULNESS CYCLE (SWC) IN THE 30TH DAY- RATS UNDERGOING HYPOXIA ON THE 14TH AND 19TH DAYS GESTATION. EA Aristakesyan, DV Lychakov, IY Morina, VV Kuzik, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia. **INTRODUCTION:** Adverse factors acting during antenatal period, although typical for this period, the high plasticity of the CNS, can have a serious damage of the morphological and functional development of the brain. Among the most important damaging factors that lead to the pathological development of the nervous system include acute and chronic hypoxia. It should be emphasized that the degree of CNS damage depends on the gestation time in which hypoxic exposure is performed on the fetus. During antenatal development it can be distinguish two critical periods of brain development that are associated with regulation of SWC: the 1st – 14 th day of gestation – the period of development of the evolutionary more ancient stem-hypothalamic-hippocampal integrative system of SWC and the 2nd - 19-20 th days - the critical period for differentiation of cortical elements and development of thalamic nuclei, the formation of evolutionarily young thalamo-cortical integrative system of SWC, and slow-wave sleep in particular. By this time embryogenesis hypothalamic nuclei is largely complete. **TECHNIQUE:** In the present work the analysis of CBS in intact rats and rats undergoing hypoxia for 14 and on day 19 in/in development (H14 and H19, respectively) before and after 2-hour rocking on fourrod swings was carried out. For this purpose the intact rats 30 days of age (n=6), H14 (n=7) and Г19 (n=5) of the same age it was inserted into

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occipital, parietal cortex, dorsal hippocampus under nembutal anesthesia (40mg/kg). Then the SWC was registrated on computer electroencephalograph "Neurospector" before and after the sickness. **RESULTS:** In intact animals the sickness was caused by halving the representation of wakefulness since 40.6+1.27% to 20.6+5.6% and increasing the share of paradoxical sleep since 9.2+1.4% to 31.4+0.7% / The representation of slow-wave sleep was changed slightly. In animals H13 group baselines indicators of SWC differed a little from those of SWC of intact animals, and a two-hour motion sickness caused nearly the same changes in the structure of SWC as that of the intact animals with the exception of wake representation. The quantity of wakefulness in animals of H13 group before motion sickness was 42.8+2.9% of the total tome of SWC (it was only 2-5% more than in intact awake rats). It was reduced to 14.7+ 3.8%, and it was on 5-8% lower then representation of wakefulness in intact animals after sickness. As well as in intact, H13 rats sharply increased the time of paradoxical sleep cince 8.0+1.4% to 29.9+1.6%. Dynamics of changes in the temporal structure of SWC after sickness in H19 rats differed little from that of intact animals. The wakefulness was decreased. At the same time, the sickness in these animals caused a significant increase in the proportion of not only the phase of the paradoxical sleep facility, but also shares a deep slowe-wave sleep with 8.7+ 2.0% to 19.7+ 3.9%. It should be noted that the increasing of paradoxical sleep facility after the sickness was due to prolonged episodes of this sleep phase, but not at the expense of their number, while the increasing share of slow-wave sleep was due to an increasing the frequency of appearance of that phase, but at the expense of increasing its duration. **CONCLUSIONS:** The results obtained demonstrate that hypoxia performed on 19thday gestation has greater damaging effects on SWC structure in particular on thalamo-cortical sleep-regulating structures compared with hypoxia, carried out on the 13th day of gestation, when damaged of hypothalamic-hippocampal system of SWC regulation already be partially restored. While rocking stress suppresses the working of the activating system of the brain, ensuring the maintenance of wakefulness (apparently, this system VRAS) and enhances the working of those systems (mainly hypothalamic-hippocampal system), which carry out regulation of the paradoxical sleep and contribute to the activation of the brain during sleep.

AGE AND GENDER DIFFERENCES IN SUSCEPTIBILITY TO STRESS AND COGNITIVE WORKLOAD CAUSED BY MOBILE PHONE USE WHILE DRIVING. J Bergeron, M Hazel, M Paquette, University of Montreal, Montreal, Canada. **INTRODUCTION:** As both the normal aging and the automatization of skills have impact on cognitive workload and on the availability of cognitive resources for a given task, it would be germane to evaluate the differential relationship between the underlying cognitive abilities and age of drivers, and their resultant susceptibility to stress and cognitive workload caused by cell phone use during driving. Moreover, as women have been largely shown to outperform men on verbal tasks, it could be predicted that female drivers would outperform male drivers on drives that require simultaneous participation in mobile cell phone conversations. **METHODS:** We recruited 100 drivers (ranging in age from 23-83 years) to participate in an experiment in a full-car driving simulator, under two counterbalanced conditions: driving without engaging in cell-phone conversations and driving while responding to questions on a hands-free cell phone. Across both driving conditions, participants were instructed to maintain an average driving speed of 100 km/h, and were additionally required to complete a peripheral detection task as this task is widely acknowledged to reliably index stress and cognitive workload. **RESULTS AND DISCUSSION:** The peripheral detection task revealed a significant interaction between gender and driving conditions, confirming that female drivers had superior performance relative to male drivers under distracting driving conditions ($F(1,94) = 5.51$, $p < .05$, $\eta 2 = .06$). This relationship was independent from driver age. Elderly drivers were more susceptible to cognitive workload caused by hands-free cell phone use relative to the younger drivers ($F[1,94] = 9.05$, $p < .01$, $\eta 2 = .09$), but the correlation between age and individual distraction effect was null across the older drivers group taken separately ($r = -.04$, n.s.). One could conclude from the present results that age in itself is not sufficient as a predictor of susceptibility to stress and cognitive workload during driving. The normal aging process is likely very heterogeneous across individuals. Additionally, the current female drivers displayed a higher level of performance under distraction than their male counterparts in the present driving paradigm; this further suggests that a stereotypical view of women as poor drivers would be incorrect. Clearly, the age and gender differences founded in this preliminary study would need other confirmations and other means of estimations. **RESEARCH SUPPORT:** A grant from the CAA-Quebec Foundation.

STRESS-INDUCED CHANGES IN PLASMA CORTICOSTERONE CONCENTRATIONS IN DOMESTIC POULTRY. V Vecerek, E Voslarova, I Bedanova, V Pistekova, G Zelinska, P Forejtek**,** Faculty of Veterinary Hygiene and Ecology, University of Veterinary and Pharmaceutical Sciences, Brno, Czech Republic. **INTRODUCTION:** Blood analysis plays an important role in evaluating stress in birds, but there is little evidence of changes in blood indices due to blood sampling per se. The importance of collecting blood samples very fast after capture when assessing baseline corticosterone concentrations has been emphasized by various authors. However, data on the time period before circulating corticosterone concentrations begin to increase varies among animal species. The aim of this study was to determine the effects of varying pre-sampling handling time on the levels of corticosterone in broiler chickens, domestic turkeys and guinea fowl. **METHODS:** The effects of varying durations of pre-sampling handling were monitored in broiler chickens, domestic turkeys and guinea fowl that reached slaughter weight. The duration of restraint (including the collection of blood) varied among six groups of 10 birds (30 sec, 60 sec, 90 sec, 120 sec, 150 sec or 180 sec), i.e. 60 birds were sampled in each species. The plasma corticosterone concentration was measured using a commercial Corticosterone EIA Kit. The results were analyzed using the statistical package Unistat 5.1 (one-way ANOVA and Tukey-HSD test, Spearman rank correlation). **RESULTS AND DISCUSSION:** In all monitored species, the duration of handling (capture, restraint, and blood sampling) of birds was positively correlated with plasma corticosterone concentrations ($P<0.001$). In turkeys, prolonged handling induced a significant ($P<0.05$) elevation of plasma corticosterone concentrations in the 120 sec, 150 sec and 180 sec groups when compared to the 30 sec group. In broiler chickens and guinea fowl, no significant changes due to varying handling duration were found till 150 sec. The results suggest that samples taken within 90 seconds of capture in domestic turkeys and 120 sec in broiler chickens and guinea fowl will likely reflect unstressed concentrations of plasma corticosterone concentrations.

ULTRASTRUCTURAL, IMMUNOELECTRON AND MORPHOMETRICAL STUDY OF GAP JUNCTIONS IN THE RAT THALAMIC NUCLEI. EYu Kirichenko, AK Logvinov**,** Ivanovskiy Academy of Biology and Biotechnology, Southern Federal University, Central Research Laboratory, Rostov State Medical University, Rostov, Russia. **INTRODUCTION:** Recent studies have demonstrated the importance of direct intercellular communication via gap junctions (GJ) for different behaviors including learning and memory, brain reward and reinforcement, anxiety and motor performance (Frisch et al., 2005, Zlomuzica et al.,2010, Dere et al., 2008a, Dere et al., 2003, Zheng-Fischhofer et al.,

2007a,b, Frisch et al., 2003). Despite a growing interest in gap junctions (GJ) of mammalian brain, their distribution and role in cell ensembles of thalamus remains unknown. The aim of this work was ultrastructural and immunoelectron study of glial and neuronal gap junction in ventral posteromedial (VPM) and posteromedial (POM) thalamic nuclei and thalamic reticular nucleus (RTN) of rats. **METHODS:** GJ were identified by standard techniques of transmission electron microscopy and by pre-embedding immunohistochemistry protocol using anti-connexin-43 antibodies with Dako EnVision System + Peroxidase (DAB) detecting system. **RESULTS AND DISCUSSION:** We found that glial cells surround thalamo-cortical axons and axo-spiny synapses and form numerous elongated gap junction plaques located near chemical synapses. A single axon-spiny chemical synapse can be surrounded by several (up to 4) gap junctions that seem to form peculiar networks of glial cells united by GJ. Closely adjacent gap junctions disposed at an angle from 30° to 140° to each other were revealed. Due to the formation of intercellular glia-glial gap junctions astroglia may acquire a function of spatial buffer to regulate extracellular concentration of potassium and other ions, providing intracellular and extracellular ion homeostasis. We believe that astroglial processes joined into a network by gap junctions play a key role in the circulation of information and can modulate subcortical neuronal ensembles. We suggest that tight spatial localization of astroglial gap junctions and asymmetrical chemical synapses is reflected in the features of the functional organization of specific and nonspecific thalamic nuclei, which are the main centers of the afferent and efferent inputs of the cerebral cortex. In addition to glial GJ in thalamic nuclei the cases of the formation of electrical synapses on the dendrites and axons were identified. Morphometric (quantitative) study at the ultrastructural level of area 200 mm2 in each nuclei revealed the following quantitative distribution: RTN-30 GJ, VPM nucleus-41 GJ, the VPL- 48 GJ, POM -30 GJ. At the same time, the number of neuro-neuronal GJ is 7% of the total number of GJ (n = 149) identified in the VPM, VPL, Pom, RTN nuclei on the area 800 mm2 area. Obviously, for the operation of the thalamic nuclei is sufficiently the elongation of identified contacts, facilitates the transfer of large amounts of information between astrocytes surrounding chemical synapses. Identified axonal electrical synapses in the thalamic nuclei promote the presynaptic synchronization of subthreshold rhythm and its implementation through the vertical axon collaterals to stellate neurons of upper and lower layers of the cortex cortical column. Localized around chemical synapses network of astrocyte processes joined via GJ, as well as neuro- neuronal GJ are the modulatory and synchronization basis for behavioral correlates of learning and memory processes, brain reward and addiction, as well as emotional and motor performance. **RESEARCH SUPPORT:** RFBR research project № 15-04-03035.

PSYCHOPHYSIOLOGICAL CHARACTERISTICS OF INSOMNIA PATIENTS MEASURED BY BIOFEEDBACK SYSTEM. JS Lee, Department of Psychiatry, Pusan National University Yangsan Hospital, Yangsan, Korea. **INTRODUCTION:** Insomnia is the most prevalent sleep disorder in the general population and is considered to be a disorder of hyperarousal. The aim of this study was to measure the psychophysiological responses in insomnia patients using a biofeedback system, and to compare them with results from normal healthy subjects. **METHODS:** Eighty patients with primary insomnia (35 males and 45 females, average age 49.71 ± 12.91 years) and 101 normal healthy controls (64 males and 37 females, average age 27.65 ± 2.77) participated in this study. Electromyography (EMG), heart rate (HR), skin conductance (SC), skin temperature (ST), and respiratory rate (RR) were recorded using a biofeedback system during 5 phases (baseline, stress 1, recovery 1, stress 2, recovery 2) of a stress reactivity test, and average values were calculated. Difference in values between the two groups in each corresponding phase was analyzed with independent t-test, and change in values across phases of the stress reactivity test was analyzed with paired t-test (all two-tailed, $p<0.05$). **RESULTS AND DISCUSSION:** Compared to normal controls, insomnia patients had higher EMG in all 5 phases (baseline : 7.72 ± 3.88 μV vs. 4.89 ± 1.73 μV, t = -6.06, $p<0.001$; stress 1 : 10.29 ± 5.16 μV vs. 6.63 ± 2.48 μV, t = -5.84, $p<0.001$; recovery 1 : 7.87 ± 3.86 μV vs. 5.17 ± 2.17 μV, t = -5.61, $p<0.001$; stress 2 : 10.22 ± 6.07 μV vs. 6.98 ± 2.98 μV, t = -4.37, $p<0.001$; recovery 2 : 7.88 ± 4.25 μV vs. 5.17 ± 1.99 μV, t = -5.27, $p<0.001$). Change in heart rate across phases of the stress reactivity test were higher in normal controls than in insomnia patients (stress 1-baseline : 6.48 ± 0.59 vs. 3.77 ± 0.59, t = 3.22, p = 0.002 ; recovery 1-stress 1 : -5.36 ± 0.0.59 vs. -3.16 ± 0.47, t = 2.91, p = 0.004 ; stress 2-recovery 1 : 8.45 ± 0.61 vs. 4.03 ± 0.47, t = 5.72, $p<0.001$; recovery 2-stress 2 : -8.56 ± 0.65 vs. 4.02 ± 0.51, t = -5.31, $p<0.001$). Psychophysiological profiles of insomnia patients in a stress reactivity test were different from those of normal healthy controls. These results suggest that the sympathetic nervous system is more highly activated in insomnia patients.

LONGITUDINAL ASSOCIATIONS OF HOMOCYSTEINE AND MTHFR C677T POLYMORPHISM WITH DEPRESSIVE DISORDER IN PATIENTS WITH ACUTE CORONARY SYNDROME. YS Lee, JM Kim, Department of Psychiatry, Chonnam National University Medical School, Gwangju, Korea. **INTRODUCTION:** Homocysteine and the methylenetetrahydrofolate reductase (MTHFR) C677T polymorphism have been investigated as risk factors for depression and ACS separately, but not for depression comorbid with ACS. This study aimed to investigate whether homocysteine and MTHFR gene are associated with occurrence and treatment response of depressive disorder in ACS. **METHODS:** A sample of 969 patients with recent ACS were recruited and 711 followed1 year later. Depressive disorder was diagnosed according to DSM-IV criteria, and classified as baseline prevalent, and follow-up incident or persistent disorder according to status at the two examinations. In addition, of 378 baseline participants with depressive disorder, 255 were randomized to a 24-week double blind trial of escitalopram (N=127) or placebo (N=128). Plasma homocysteine concentration and the MTHFR C677T polymorphism were assayed, and a range of demographic and clinical characteristics evaluated as covariates. **RESULTS AND DISCUSSION: Results:** A higher homocysteine concentration was independently associated with prevalent depressive disorder at baseline irrespective of MTHFR genotype; and with both incident and persistent depressive disorder at follow-up only in the presence of TT genotype. MTHFR genotype was not itself associated with depressive disorder after ACS. No associations were found with 24-week antidepressant treatment responses. **CONCLUSIONS:** Plasma homocysteine could be a biomarker for depressive disorder particularly in the early phase of ACS. Focused interventions for those with higher homocysteine level and MTHFR TT genotype might reduce the risk of later depressive disorder. **RESEARCH SUPPORT:** grants of the Korea Health 21 R&D, Ministry of Health and Welfare, Republic of Korea (HI10C2020 and A120004), Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT and future Planning (NRF-2013R1A2A2A01067367) to J-M Kim.

A CASE STUDY EXPLORING THE STRESS LEVELS AND ITS IMPACT ON INDIVIDUAL DURING PREPARATION, EXAMINATIONS AND POST EXAMINATION PERIOD. N Jarašūnaitė, County Upper School, Bury St Edmunds, UK; Center for Physiology and Biochemical Research (CPBR), Kiev, Ukraine. **BACKGROUND:** Before,

during and after Winter examinations, the subject (a 16-yo white female high school student) became aware of her high stress levels. This study aimed to explore this case in detail, in order to establish how winter examinations influenced the subject's heightened stress levels. **METHODS:** A self-report to compare and analyze stress levels before, during and after high school examinations. To create a visual representation of her report, the subject utilized the 1-10 scale and visualized data using line graph. **RESULTS:** Overall, the days where the subject's stress levels were at a peak, were the days with two examinations in one day. This proved our working hypothesis regarding the link between the number of exams and the levels of stress experienced. In addition, subjects which the reporter found most challenging, increased her subjective stress levels even more (e.g., Mathematics and Business Studies examinations). **CONCLUSION:** An overload in examinations increases students' stress levels, which may cause them to under-perform in their examinations, due to the excessive workload. Therefore, the examination timetables should be monitored more carefully and arranged in a longer time period, with one examination a day, in order to improve students' health and performance.

THE EFFECTS OF L-NAME ON PENTYLENETETRAZOLE-INDUCED CONVULSIONS IN MICE. A Jelenković, MD Jovanović , ID Stevanović, N Petronijević**,** University of Belgrade, Institute for Biological Research "Siniša Stanković", Belgrade, Military Medical Academy, Institute for Medical Research, Faculty of Medicine of Military Medical Academy, University of Defense, Belgrade, University of Belgrade School of Medicine, Institute of Medical and Clinical Biochemistry, Belgrade, Republic of Serbia. **INTRODUCTION:** Epilepsies represent a significant medical, as well as economic burden. Accumulating evidence indicates that nitric oxide (NO) is involved in multiple physiological and pathophysiological processes in the brain, including the neuronal hyperexcitability and the pathophysiology of epilepsy. NO has been demonstrated to have both proconvulsant and anticonvulsant effects, but it can be ineffective, as well. Thus, the aim of this study was to investigate dependence of convulsions in mice on their age and on the dose of a nitric oxide synthesis modulator. **METHODS:** Convulsions were induced by a single dose of pentylenetetrazole (PTZ) applied intraperitonealy on four and 16-week-old inbred male mice belonging to C56 black/6 strain. Other groups, before PTZ administration, were pretreated with 100 mg/kg b.w. and 200 mg/kg b.w. of N-nitro-L-arginine methyl ester (L-NAME), a non-specific antagonist of NOS. Clinical responses to PTZ were followed up for 30 minutes after its application. **RESULTS AND DISCUSSION:** There were no differences between ages in the incidence and latent time of generalized clonic convulsions (GCC), generalized clonic-tonicconvulsions (GCTC) and death as the consequence of PTZ-induced convulsions. However, the higher dose of L-NAME prolonged the latent time to death in youngermice, as well as the death incidence, while the lower dose was without effects. Higher dose of L-NAME produced no effect in the older group, while the lower dose decreased latent time to GCTC and increased the incidence of GCTC and death (borderline significance). It was demonstrated that the effects of NO in PTZ-evoked convulsions are not uniform. They were, primarily, the consequences of experimental conditions, as well as of the dose of the applied substance that could modify NO synthesis. **RESEARCH SUPPORT:** the Ministry of Science (contract 175058) and the Ministry of Defense of the Republic of Serbia (contract MMA/06-10/B.3).

Afternoon Session

SYMPOSIUM VI: CNS CHINESE NEUROSCIENCE SOCIETY
Chairs: S He, Y Wang (China)

OPTOGENETIC INHIBITION OF STRIATAL NEURONS IMPROVES THE SURVIVAL OF IMPLANTED NSC AND NEUROLOGICAL OUTCOMES AFTER ISCHEMIC STROKE. Y Wang, Y Lu, L Jiang, GY Yang**,** Med-X Research Institute and School of BME, Shanghai Jiao Tong University, Shanghai, China. **INTRODUCTION:** Neural stem cell (NSC) transplantation is a promising treatment to improve the recovery after brain ischemia. However, how the survival and the migration or the differentiation of implanted NSC is influenced by endogenous neuronal activity remains unclear. Using optogenetics technique, we investigated how the striatal neuronal activity affects NSC survival and overall neurological outcome. **METHODS:** Adeno-assosiated virus carrying ChR2 or ArchT gene under the control of promoter CaMKII was injected into mice striatum two weeks before the surgery of 60 minutes transient middle cerebral artery occlusion (tMCAO). NSCs cultured from transgenic mice expressing fluorescent protein or isometric phosphate buffer saline was transplanted into peri-infarct region at striatum at 4 days after tMCAO. The striatal neurons were stimulated 15 minutes daily by 473nm pulse or 530nm constant laser. Neurological severity score was assessed at day 3 and 14. Brain infarct volume was measured with cresyl violet staining. The diffused area of implanted NSC was calculated to evaluate the survival of NSC. **RESULTS AND DISCUSSION:** Mice received NSC transplantation and optogenetic inhibition showed smaller infarct volume compared to that only received NSC transplantation or PBS administration ($p<0.05$). The diffuse area of fluorescence from transplanted NSC in mice with optogenetic inhibition was larger than that without optogenetic inhibition ($p<0.05$). The diffuse area of transplanted NSC in mice with optogenetic excitation was smaller than that without optogenetic excitation ($p<0.05$). Inhibition of striatal neuronal activity at sub-acute phase after ischemia can improve the treatment of implanted NSC. In contrast, excitation of striatal neuronal activity can reduce the NSC treatment. **RESEARCH SUPPORT:** National Natural Science Foundation of China, Grant 81371305.

A DEPRESSIVE-LIKE MOUSE MODEL INDUCED BY 24-HOUR-RESTRAINT. X Chu, J Lou, T Serdyuk, Y Zhou, W Li, Bio-X Institutes, Brain Science and Technology Research Center, Shanghai Jiao Tong University, Shanghai, China. Stress is known to be a potential risk factor of mood disorders such as depression. Over the past decades, a great number of animal models of depression have been developed to accelerate drug design and deepen our understanding of the biological mechanism of depression. However, most animal models need to repeat subjecting animal to stressor to enhance the depressive symptoms, which is labor-intensive and time-consuming. In this study, we proposed a depressive－like animal model induced by 24-hour restraint stress. As a result, the restraint mice displayed depression-like behaviors, decreased glucose uptake in prefrontal-limbic areas and inhibited adult neurogenesis in hippocampus 35days after the restraint. Analysis of gene expression microarray also suggested that genes involved in pathways related to depression were found to express differentially in both cortex and hippocampus. Furthermore, the depression-like symptoms induced by 24-hour restraint could be reversed by fluoxetine, a type of antidepressant drug. To conclude, these findings demonstrated that mouse with 24-hour

restraint is a feasible and effective animal model of stress induced depression. **RESEARCH SUPPORT:** Grant HF2013-K-02, the National Nature Science Foundation of China (81271511), the National Major Scientific Instruments Development Project (2012YQ03026007, 2013YQ030923), the Shanghai Municipal Commission of Science and Technology Program (14JC1403700), "Eastern Scholar" project supported by Shanghai Municipal Education Commission.

EMBRYONIC NMDA RECEPTOR BLOCKADE INDUCED ANXIETY BEHAVIOR IN ADULT RATS BY DEVELOPMENTAL NMDA RECEPTOR PLASTICITY CHANGE IN HIPPOCAMPO-PREFRONTAL PATHWAY. Y Wang, W Ren, Institute of Brain Science, Fudan University, Shanghai, China. Perinatal period was important for NMDA receptor (NMDAR) development and neuronal network formation. Previous study showed that pregnancy NMDAR blockade induced NMDAR upregulation and abnormality in learning/memory of juvenile offspring. However, the long-lasting effect of embryonic NMDAR blockade on offspring behavior still remained unknown. In this study, we treated the E14 pregnant rats with NMDAR blocker ketamine for 5 consecutive days and used multiple behavior tests including open field and elevated platform measurement, patch clamp electrophysiology measuring of NMDA evoked current and western blotting technics to detect the changes in behavior and NMDAR expression and function in hippocampus and prefrontal cortex regions in 4- and 8-week old offspring. Intro-hippocampal injection of shNR2B-lentivirus was used to knockdown the NR2B expression in hippocampal CA1 area. We found that embryonic NMDAR blockade induced anxiety-like behavior in 8-week time, associated with decreased NR2A and NR2B membrane expression as well as the lowered NMDA-evoked current in PFC area. Moreover, in postnatal 4-week-time, NMDA-evoked current was not changed in PFC while it was enhanced in ventral hippocampal CA1 area, associated with significant increment of the NR2B expression in hippocampus. Furthermore, reverse of the NR2B increase by intro-hippocampal shNR2B-lentivirus injection in 4-week hippocampus rescued the decreased NR2A expression and anxiety-like behavior in PFC in 8-week time. In conclusion, embryonic NMDAR blockade with ketamine induced anxiety-like behavior in offspring adulthood, which may result from the reinforced inhibitory hippocampo-prefrontal pathway during development and under-development of NR2A subunit in adult prefrontal cortex.

LONG-TERM RESCUE OF RAT RETINAL GANGLION CELLS AND VISUAL FUNCTION BY AAV-MEDIATED BDNF EXPRESSION AFTER ACUTE ELEVATION OF INTRAOCULAR PRESSURE. R Ren, S He, School of Biomedical Engineering, Institute of Natural Science and Bio-X Research Institute, Shanghai Jiao Tong University, Shanghai, China. **PURPOSE:** To evaluate the ability of increased expression of brain-derived neurotrophic factor (BDNF) using adenoassociated viral (AAV) vector to prevent the loss of rat retinal ganglion cells (RGCs) and visual function after acute elevation of intraocular pressure (IOP). **METHODS:** AAV vectors (expressing BDNF or GFP) were injected into the vitreous 6 h after a transient IOP elevation to 130 mm Hg for 45 minutes. Protective effects were evaluated by counting RGCs retrogradely labeled with fluorogold (FG) from the superior colliculus, measuring the amplitude and the latency of the P1 component of the visual evoked potential (VEP), and observing the visual acuity and contrast sensitivity in awake and behaving animals. **RESULTS:** RGC numbers decreased continuously to 9 weeks after the elevation of IOP. FG-positive RGC loss was significantly decreased in the retinas treated with AAV-BDNF at 3, 6, and 9 weeks after the insult, with corresponding improvements in VEP parameters. Supplementing BDNF protein once to compensate for the slow onset of AAV-mediated gene expression rescued a larger number of RGCs and the parameters of the VEP. Visual acuity and contrast sensitivity were significantly improved in all treated groups, with the largest improvement in the combined-therapy group, and were maintained for up to 70 weeks. The authors further demonstrated that BDNF rescued the RGCs by activating TrkB receptors through both autocrine and paracrine mechanisms. **CONCLUSIONS:** AAV-mediated BDNF expression in the rat retina achieved a sustained rescue of RGCs and visual function after an acute elevation of IOP.

CEREBRAL ACTIVATIONS IN NIGHTMARE DISORDER REFLECTED BY RESTING-STATE FMRI. W Wang, C Shen, Q Zhu, Department of Clinical Psychology and Psychiatry, School of Public Health, Zhejiang University College of Medicine, Hangzhou, China. **INTRODUCTION:** Nightmare experience is presented in sorts of psychiatric disorders, but cerebral areas involved in nightmare disorder remains unclear. **METHODS:** Fifteen nightmare disorder patients and 15 healthy volunteers were invited to undergo tests of the resting-state functional magnetic resonance imaging and the Nightmare Experience Questionnaire (NEQ). **RESULTS AND DISCUSSION:** The nightmare disorder patients scored higher on NEQ Physical Effect and Horrible Stimulation, had enhanced values of regional homogeneity (ReHo) in clusters within the left anterior cingulate cortex and right inferior parietal lobule, and decreased ReHo values within left superior and inferior frontal gyri and bilateral middle occipital gyri. NEQ Physical Effect was negatively correlated with ReHo values in anterior cingulate cortex and inferior parietal lobule in the nightmare disorder group, and was positively correlated with ReHo value in inferior frontal gyrus in the healthy control group. To our best knowledge, this is the first neuroimaging study in nightmare disorders, to disclose their cerebral activities underlying the altered hyperarousal and emotion regulation. These results in waking hour and in resting-state indicate a "default" model of brain activities in nightmare disorder. **RESEARCH SUPPORT:** the Natural Science Foundation of China (No. 81571336).

SYMPOSIUM VII: BIOLOGICAL PSYCHIATRY

Chairs: AV Kalueff (Russia, USA, China), D Kozic (Serbia)

SIMULTANEOUS NEURAL ACTIVITY OF RIGHT AND LEFT MEDIAL FRONTAL CORTEX IN RAT BEHAVIOR. EV Filatova, AA Orlov, SV Afanasyev, AY Egorov, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry, St. Petersburg Bekhterev Psychoneurological Research Institute, St. Petersburg State University, St. Petersburg, Russia. **INTRODUCTION:** Medial frontal cortex plays the key role in decision-making behavior. The number of investigations showed difference in cognitive and affective effects of unilateral lesions of medial frontal cortex. The goal was to study the frontal cortex asymmetry in behavioral experiments on the intact brain. **METHODS:** We recorded simultaneously the neuronal activity in two symmetrical points of the medial frontal cortex of rats (55 in the left hemisphere and 47 - in the right one). Extracellular recording of unit activity was recorded during the behavioral task of choice in the double ring maze. The recording of the unit activity were carried out in two different behavioral conditions: 1. with the condition stimulus, when reinforcement was given only when the signal side coincided to the side of choice; and 2. without any signals, when any side were reinforced. The estimated differential neural activity that was considered as the

difference between the bursting activity for each neurons during right and left operations. **RESULTS AND DISCUSSION**: In both behavioral situations when the animal is not guided by external stimulus (error trials and trials without stimulus) we observe the prevalence of differential neural activity in the left hemisphere. In the correct trials in cases of work according to external stimuli the prevalence of differential activity in the right hemisphere, especially in the decision making phase was observed. Obviously, this is evidence of the constant dynamics of hemispheric interaction, depending on the external and internal conditions and the special role of the right hemisphere in the mechanisms of learning and inclusion of external determinants in the adaptive response system. **RESEARCH SUPPORT:** The state budget for 2013-2017 years (project 01201351571).

PHEROMONE-INDUCED GENOME INSTABILITY IS ASSOCIATED WITH NEGATIVE fMRI RESPONSE IN MOUSE MAIN OLFACTORY BULB. TS Glinin, AV Romaschenko, VA Shubina, PA Starshova, LS Onopa, AA Bondarev, MP Moshkin, EV Daev, St. Petersburg State University, Institute of Cytology and Genetics SORAS, Novosibirsk, Russia. **INTRODUCTION:** In recent years, the information is accumulated that physiological stress may lead to genome instability in mammals. But the mechanisms of interconnection between stress and DNA damage requires further investigation. We developed the mouse model of pheromonal stress. We use the mouse pheromone 2,5-dimethylpyrazine (DMP), which excretes only by overcrowded females and induces stress in male recipients. Previously it was found that this pheromone induces chromosome aberrations in dividing cells of mouse bone marrow and testes. Nevertheless, pathways through central nerve system to periphery still unclear. We check here first stages of DMP action in main olfactory epithelium and main olfactory bulbs. **METHODS:** For all experiments, we used male CBA or BALB/c mice. For the fMRI detection of DMP action on olfactory bulb we used 11,7T tomograph BioSpec (Brucker) with olfactometer. Five urethane (75mg/kg) narcotized mice sniffed 100 µl of 0.01% DMP. During tomography, odor signal was alternated with fresh air (control). 136 fMRI tomograms were made for each animal: 96 control and 40 DMP-exposed. Difference between DMP and control signals was checked by LSD test. In the second experiment the role of olfactory epithelium in DMP-induced genome instability was studied by the epithelium pre-inactivation by Zn2+ ions (10% solution of Zn(NO3)2) given three days before DMP sniffing. Mice were treated with DMP for 24 hours and after that were sacrificed by cervical dislocation. We used H2O as control for DMP and PBS – as control for Zn2+ action. To detect genome instability in bone marrow cells we used anaphase-telophase chromosome aberration test. Differences between groups were assessed by Fisher's exact test. **RESULTS AND DISCUSSION:** We demonstrate that inactivation of the main olfactory epithelium by Zn2+ leads to the absence of genome destabilizing effect of DMP sniffing. It suggests that modulation of chromosome aberration frequency is regulated by central nerve system. Surprisingly DMP reduces BOLD contrast in the main olfactory bulbs, which reflects inhibition of nervous activity of this zone. Additional research is necessary to find the further links between chemosignals action in central nerve system and peripheral organs in mice. **RESEARCH SUPPORT:** RFBR grant 16-04-00678. Experiments were conducted with the help of RRC MCT SPbSU and Centre for Genetic Resources Laboratory Animals (RFMEFI61914X0005 and RFMEFI62114X0010) SB RAS.

THE PEPTIDES DRUGS IN THE COMPENSATION OF THE MAMMALS AMNESTIC, ANXIETY AND DEPRESSION DISTURBANCES. TN Sollertinskaja, ISBS Fellow, MV Shorokhov, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia. **INTRODUCTION:** The creation and application of the new therapeutic drugs for the successful therapy of the consequences different genesis stresses are the key problem of modern neurophisiology and medicine. Stresses are the main reason of the many nervous and psychoemotional diseases, including the Chronic Fatigue Syndrome (CFS). CFS is a known as multi-factorial disease with the general deficit of the CNS, immune and endocrine systems, and their interaction with the stress stimuli. The important role for the correction of brain functions deficits belongs to biologically active peptides and their synthetics analog, such as Semax (Sem) and Selank (Sel). Their role in the compensation of the brain functions during CFS has not been studied yet. The new peptide drug ACTH6-9 has not been tested yet as well. The model of the CFS in rodents and primates we developed, reveals the distinctions in the dynamic and duration of CFS in two representative mammals. In monkeys, three stages of the CFS development include: 1) earlier stage, 2) overt manifestations, 3) psycho-emotional disturbances (anxiety state and depression). The anxiety state and depression disturbances are a serious medical problem. The peptides' correction of these states in rodents has been studied insufficiently, but not at the primate level. The present work comparatively assesses the peptide drugs' effective actions for Sem, Sel and ACTH6-9 on correcting amnestic and psycho-emotional disturbances in the rodents and primates. **MATERIALS AND METHODS:** The experiments were performed in the rodents and primates using the food reward model. The experiments included free-moving animals, monkeys restrained in a special primatological chair, and the multiparametrical computer registration and analysis of EEG, vegetative and motor indices of CNS. Sem, Sel an ACTH6-9 drugs were given intranasaly or intramusculary. **RESULTS AND DISCUSSION:** In rodents, the antiamnestic influence of Sem, Sel and ACTH6-9 was similar and short-lasting. The effects of drugs on inherent behaviors was more significant and lasted longer time. These effects differed in the dynamic and expression. Sel and ACTH6-9 reduced fear and aggression. Sem, Sel and ACTH6-9 also exerted an anxyolitic effect. Prior injection of Sem and especially ACTH6-9 prevented the development of depressive states in rats. At the primate level, the spectrum of activity included antiamnestic actions of Sem, Sel and ACTH6-9. In monkeys, Sel exerted antianxiety and antiepileptic effects (the latter particularly robust on the EEG indicators of the left hemisphere). The dynamic compensatory effect of these peptides in primates was more extensive and lasted a longer time, compared to rodents. **RESEARCH SUPPORT:** Russian Foundation for Basic Research Grand № 15-08-0635315.

COMBAT-RELATED PTSD AND ITS CONSEQUENCES: BOSNIAN EXPERIENCE. G Sulejmanpasic, S Fisekovic, S Ler, University Clinical Centre of Sarajevo, Psychiatric clinic, Sarajevo, Bosnia and Herzegovina. **OBJECTIVES:** Post-traumatic stress disorder (PTSD) is the most frequently reported psychiatric consequence of traumatic events of human-made disasters. It is a highly prevalent, yet poorly recognized, syndrome characterized by depressive symptoms, intense reaction, sleep disturbance and nightmares depending on the severity of their PTSD (fear, horror, and helplessness) to extreme traumatic stressor. As history has shown, the most obvious group in which PTSD may occur is in combat veterans. During the war in BiH those who survived returned with serious physical and even more profound psychological injuries. Men who served in the military tended to have a higher occurrence of PTSD due to the fact that they not only witnessed violent death or murder but they often killed people. The course of PTSD is often chronic and impedes individual's functioning. Combat veterans with PTSD have been reported to have problems with depression, impulsiveness, and sleep disturbances.

METHODS: To assess prevalence rates of depression as the most frequent comorbid disorder, resistant insomnia and nightmares in patients with combat-related PTSD. The sample consisted of 80 subjects with combat-related PTSD which was divided into two groups: war veterans with comorbid depression (n=50), war veterans without comorbid disorder (n=30), all of whom were male. Clinician Administered PTSD Scale (CAPS), the Pittsburgh Sleep Quality Index, the Hamilton Depression Rating Scale, and Clinical Global Impressions scale was used for measuring the presence and severity of PTSD. **RESULTS:** Depression ratio in PTSD patients determined as 62.5% (n=50). In PTSD patients with depression, there have been statistically significant higher rates in resistant insomnia and nightmares, compared to PTSD patients with no depression (respectively p=0.037, p=0.002). **CONCLUSIONS:** Several years after the end of the traumatic experiences, the prevalence rates of severe psychological problems among war-affected people were generally high. Long-term policy to meet the mental health needs of war-affected population is required.

MOTION TRACKING AND ANALYSIS AS INDICATOR OF STRESS AT WORK. Ph Fauquet-Alekhine, M Veit, A Nieto, S Besse, Nuclear Power Plant of Chinon, Laboratory for Research in School of Energy, HOLO3, Schiltigheim, France; Department of Social Psychology, LSE, London, UK. **INTRODUCTION:** During the 17th Multidisciplinary International Conference « Stress & Behavior » taking place in St Petersburg (Russia) in May 2012, Prof. A. Kalueff presented a lecture, "Developing Zebra fish models of human brain disorders". This work caught our attention especially regarding the information he obtained from the analysis of the fish movements in open fields, i.e. inside the whole 3D aquarium in order to undertake a comparative analysis of fish responses to different substances injected into the water. From the Work Psychology standpoint addressing analyses of high risk complex socio-technical systems, it appeared that the same study could be carried out with humans working inside "aquariums" also called "control rooms" in order to provide indicators regarding stress at work. **METHOD:** A control room of a French nuclear reactor (16x3m2) was surrounded with 4 camcorders, large angle lens, in order to acquire a pairwise stereoscopic set of videos recording the work activity of people within the area of interest. Workers were given colored vests, one for each profession. The professions of interest were managers, pilots and field workers belonging to the operating team. Other workers were not considered. Acquiring videos was quite simple: positioning camcorders and press "record". The software, developed by HOLO3, performs a semi-automatic analysis of videos. First, it requires to set parameters for analysis: calibration of time zero, identification of colored vest per profession, identification of static elements inside the control room, of elements of interest because of possible interactions with subjects (e.g. computers, telephones, special control panels), and a grid of areas in order to locate people. The software can produce results within less than one hour of data processing to analyze a three-hour sequence using four camcoders. **RESULTS AND DISCUSSION:** Interpersonal as well as person-static objects interactions were obtained within the specified processing time in an Excel data file. From this output file, statistics of interactions were calculated helping analysts to compute Transition Probability Matrix and Energy Spectrum Analysis. In parallel, data were used to draw a 2D chart showing the subjects' movements with time inside the considered area of work. This elements helped analysts to characterize or to make assumptions about the stress states of the subjects involved in the studied situations. **RESEARCH SUPPORT:** EDF.

STRESS RECOGNITION FROM EEG FOR HUMAN ABILITIES/BEHAVIOR ASSESSMENT. O Sourina, X Hou, Y Liu**,** Nanyang Technological University, Singapore. Everyone experiences stress in life. Moderate stress can be beneficial to human; however, excessive stress is harmful to the health. To monitor stress, different methods can be used. Real-time Electroencephalogram (EEG)-based user's stress assessment 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. In this work, a machine learning algorithm for stress level recognition from EEG is proposed and tested. To validate the proposed stress recognition algorithm, an experiment is designed and carried out with 9 subjects. A Stroop colour-word test is used as a stressor to induce 4 levels of stress, and the EEG data are recorded during the experiment. Different feature combinations and classifiers are proposed and analyzed. By combining fractal dimension and statistical features and using Support Vector Machine (SVM) as the classifier, four levels of stress can be recognized with an average accuracy of 67.06%, three levels of stress can be recognized with an accuracy of 75.22%, and two levels of stress can be recognized with an accuracy of 85.71%. The algorithm is integrated into the system CogniMeter for stress state monitoring. Stress level of the user is visualized on the meter in real time. The system can be applied in human factor research for stress monitoring of air-traffic controllers, operators, etc. The work is supported by Fraunhofer IDM@NTU, funded by the National Research Foundation (NRF) and managed through the multi-agency Interactive & Digital Media Programme Office (IDMPO).

CHEMIOSMOTIC VS. CONFORMON MODELS OF ENERGY PRODUCTION IN MITOCHONDRIA MEDIATING CELLULAR RESPONSES TO STRESS. S Ji, Rutgers University School of Pharmacy, Rutgers University, Piscataway, NJ, USA. **INTRODUCTION:** Wallace et al. 2015 recently reviewed the experimental evidence indicating that mitochondria may play a role in mediating the cellular response to environmental stresses). In discussing possible molecular mechanisms underlying the stress-mediating role of mitochondria, Wallace et al. adopted the chemiosmotic model of oxidative phosphorylation [Mitchel, 1961] as a valid model of mitochondrial bioenergetics. However, the X-ray crystal structure of the mitochondrial F0F1-ATP synthase and its dynamics that emerged during the past two decades clearly indicate that Mitchell's chemiosmotic model is superannuated [Nath and Villadsen, 2015]. The purpose of this presentation is to discuss the non-chemiosmotic model of mitochondrial structure and function proposed by Green and Ji in 1972, that may serve as a theoretically sounder and empirically better validated alternative to the chemiosmotic model in elucidating the mechanism under-lying the role of mitochondria as a cellular stress-response mediator and regulator. **METHODS:** Wallace et al. mutated or deleted mitochondrial genes ND6 (encoding NADH dehydrogenase 6) and CO1 (cytochrome c oxidase subunit 1) and nuclear genes ANT1 (adenine nucleotide translocator 1) and NNT (nicotinamide nucleotide transhydrogenase) and monitored their effects on the response patterns of mice to restraint stress by measuring (i) the hypothalamic-pituitary-adrenal axis (HPA) activation, (ii) sympathetic adrenal medullary (SAM) activation, (iii) the blood levels of catecholamines, the inflammatory cytokine IL-6, and circulating metabolites, and (iv) hippocampal gene expression profiles. **RESULTS AND DISCUSSION:** Both the ND6 and CO1 mutations decreased the stress-induced changes in respiration, the ANT1 mutation decreased the stress-induced response in energy exchange between mitochondria and the nucleus/cytosol, and the NNT mutation increased the level of stressed-induced reactive oxygen species (ROS), which led Wallace et al. to conclude that mitochondrial bioenergetics may play a role in translating stressful experience into abnormal psychological states and their

related somatic symptoms. The conformon model of oxidative phosphorylation appears to supply a better theoretical guide than the chemiosmotic model in formulating the mechanism of mitochondrial mediation/modulation of cellular response to stresses, not only because the former is better supported by experimental data and theoretical principles but also because it affords a wider variety of regulatory mechanisms for cell metabolism. The main difference between the chemiosmotic and conformon models is that the former depends on the trans-membrane pH gradient (the Mitchell protons) for ATP synthesis and other functions, while the latter utilizes the intra-membrane protons (called the Williams protons) to drive (i) trans-membrane movement of the Mitchell protons for communication, (ii) ATP synthesis to supply energy for communication, and (iii) energized transhydrogenation for suppressing oxidative stress. **RESEARCH SUPPORT:** The Byrne Seminar Program, Rutgers University, Piscataway, NJ, USA.

Day 4. Thur, May 19, 2016
Morning Session

SYMPOSIUM VIII: ISBS FELLOWS SYMPOSIUM
Chairs: VM Klimenko, TN Sollertinskaya (Russia)

EARLY-LIFE LIPOPOLYSACCHARIDE ADMINISTRATION LEADS TO DELAYED CHANGES OF FGF2 AND BDNF mRNA EXPRESSION IN THE RAT BRAIN. OE Zubareva, EA Veniaminova, AP Schwarz, VM Klimenko, ISBS Fellow, Institute of Experimental Medicine, Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Institute of General Pathology and Pathophysiology, Moscow, Russia. The early postnatal ontogenesis is a critical period for the development of brain neuroplasticity processes. In the present study we determined the action of neonatal infection on the gene expression of proteins involved in the regulation of brain mechanisms of neuroplasticity. The mRNA level of fibroblast growth factor-2 (FGF-2) and brain-derived neurotrophic factor (BDNF) was investigated in two independent experiments in rats treated with bacterial lipopolysaccharide (LPS) during the third week of life. The study was performed using quantitative reverse transcription-PCR method. FGF2 gene expression was analyzed in the cells of medial prefrontal cortex, ventral and dorsal hippocampus, and amygdala in the 23-day-old rats received the lipopolysaccharide (LPS, 25 μg/kg, i.p.) on 14, 16, and 18 days of life. LPS-treated rats showed decrease in Fgf2 expression in medial prefrontal cortex. BDNF mRNA production was studied in the ventral and dorsal hippocampus of adult (3 month old) rats treated with LPS (25 μg/kg and 50 μg/kg, i.p.) on P15, 18, and 21. The increase of mRNA level was revealed in the dorsal but not ventral hippocampus after administration of higher dose of LPS (50 μg/kg). The data obtained demonstrate that the bacterial infections in early postnatal ontogenesis can influence the development of brain neuroplasticity mechanism.

OLFACTORY REGULATION OF ADDICTIVE BEHAVIOR. T Nevidimova, ISBS Fellow, E Masterova, D Savochkina, N Bokhan**,** Mental Health Research Institute, Tomsk, Russia. **INTRODUCTION:** Community of addictive and obsessive-compulsive disorders is suggested; in this association, the probable role of olfactory disturbances in formation of addiction is discussed. Irrespective from extent of involvement of olfactory mechanisms in regulation of addictive behavior, successful creation of diagnostic and predictive models in the field of biological and clinical narcology on their basis is possible. Purpose of present study was detection of features of olfaction in substance use and formation of substance dependence with assessment of predictive possibilities of olfactometry. **METHODS:** Altogether 146 persons (108 males and 38 females) aged 18-25 years were examined; of them with dependence syndrome (F1x.2 according to ICD-10 criteria) - 72 patients, incidental consumers of psychoactive substances (risk group) - 30 persons and 44 tentatively healthy persons (control group). The olfactometric method consisted of assessment of threshold olfactory sensitivity. The emotional attitude towards isopropanol odor, as well as pheromones androstenone and estratetraendiol (Sigma) was assessed in standard units with use of visual analogue scale. EEG reaction to smells was estimated, too. **RESULTS AND DISCUSSION:** Anamnestic olfactory disturbances were revealed more frequently in addicts and persons of risk group (62,8% and 53,3% of cases), than in controls (48,3%). Threshold olfactory sensitivity had no group differences. Lack of aversion towards odor of isopropyl alcohol was typical for persons with substance dependence (63,3% of cases). It appeared that severity of aversive reactions was reduced already at the pre-nosological stage of development of pathology (66,7% of cases) that significantly exceeded a reference level (38,2%, $p<0.05$). All shown differences were more typical for males. Difficult puberty with mental infantilism is attributed to factors increasing risk of chemical addiction. Young men of post-puberty age lose aversive reaction towards androstenone in the process of maturation (hypothetically because of desensitization of receptors in association with increase of level of endogenous metabolites of testosterone). Hypothetically, similar mechanism may operate also in relation to estratetraendiol for female persons. Reaction of aversion towards the odor of androstenone was documented in 72,0% of males with substance dependence (in 17,1% of controls, $p<0.01$), towards the odor of estratetraendiol – in 33,3% of female persons with substance dependence (in 7,0% of controls, $p<0.05$). Thus, gender immaturity and pathology of the sphere of inclinations as risk factors of formation of drug dependence, regulating addictive behavior may be assessed using olfactory tests. **RESEARCH SUPPORT:** The Russian Science Foundation grant 14-15-00183.

70 kDa HEAT SHOCK PROTEIN IN MODULATION OF SLEEP AND ANXIETY-LIKE BEHAVIOR. VV Simonova, MV Chernyshev, MA Guzeev, LY Kochemasova, IV Ekimova, ISBS Fellow, YF Pastukhov, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, Saint-Petersburg, Russia. **INTRODUCTION:** Heat Shock Proteins, Hsp70 in particular, are responsible for protein homeostasis and are involved in sleep modulation. These processes are often impaired during aging and neurodegenerative diseases that may be associated with the decrease in Hsp70 expression in the brain. In humans, long-term disturbances of sleep are commonly linked with a high level of anxiety. The preoptic area (POA) of the hypothalamus is considered as one of the integrative centers where modulation pathways of both sleep and anxiety may cross. The present research aimed to investigate an influence of chronically decreased Hsp70 level in the POA on sleep-wake cycle and anxiety-like behavior in rats. **METHODS:** Lentiviral vector pLKO.1-shRNA-Hsp70 carrying the gene of short hairpin RNA to inducible Hsp70 was injected into the POA in male Wistar rats. The content of Hsp70 in the POA was assessed by Western blot. Electrophysiological data and body temperature were recorded continuously (24 h) using a telemetric system. Total sleep deprivation (SD) was performed for the last 6 h of a light day phase. Parameters

of anxiety-like behavior in the elevated plus maze (EPM) test as well as temporary characteristics of the sleep-wake cycle were analyzed for 2-10 weeks after the transfection. **RESULTS AND DISCUSSION:** Transfection with lentivector pLKO.1-shRNA-Hsp70 induced a long-term 60-68% decrease in the level of Hsp70 in the POA neurons that resulted in a reduction of both SWS and REM sleep time in a dark day phase. A decrease in bouts number of SWS and REM sleep was observed, which indicates the suppression of sleep initiation mechanisms. The effect was followed by an increase in EEG delta power during SWS in a light day phase and by an increase in a gain of SWS time during recovery after SD. Since the third week after the transfection, significant growth of SWS time in a light day phase appeared. It was likely to be associated with the compensatory influence of other brain structures related to SWS regulation. Sleep changes were accompanied by an anxiogenic effect. This effect was revealed in the EPM test, which showed a decrease in the number of entries into open arms, and the number of sections in open arms, and both the number and time of floor inclinations. Results of the study suggest the involvement of Hsp70 in the POA in molecular mechanisms of sleep and anxiety-like behavior modulation. The reduction of Hsp70 might contribute to behavioral and sleep disturbances during aging and neurodegenerative diseases development. **RESEARCH SUPPORT:** RFBR grant 16-04-01537 A.

THE SEARCH FOR NON-MOTOR SYMPTOMS IN A NEW ANIMAL MODEL OF THE PROLONGED PRECLINICAL STAGE OF PARKINSON'S DISEASE. YuF Pastukhov, ISBS Fellow, MV Chernyshev, VV Simonova, MA Guzeev, TS Shemiakova, IV Ekimova, ISBS Fellow, Sechenov Institute of Evolutionary Physiology and Biochemistry RAS, St. Petersburg, Russia. **INTRODUCTION:** In most cases, Parkinson's disease (PD) in domestic and foreign hospitals is diagnosed too late; when the loss of neurons in the substantia nigra pars compacta (SNpc) and a decrease in dopamine (DA) levels reaches 50-70%, recovery is already impossible. The models of the preclinical stage (PS) of PD are considered to be helpful in accelerating the search for the early non-motor markers. For the first time, we have developed a model of the preclinical stages of PD in Wistar rats. This model is based on the moderate decrease in proteasomal function of the nigrostriatal system using a specific inhibitor of the enzymatic activity of proteasome lactacystin (LC, delivered directly to the neurons of the SNpc). This model was characterized by: 1) a 25-28% loss of the SNpc cell population, 2) an absence of motor dysfunctions and 3) an increase in the total time of paradoxical sleep (PS) that serves as an early marker of the PD. This research has aimed at developing new models of the PD preclinical stage based on the intranasal (i.n.) administration of the neurotoxin LC for more widespread neurodegeneration and monitoring integrative functions connected to sleep and emotional behavior. **METHODS:** LC and vehicle was administered to male Wistar rats twice (week interval). Electrophysiological assays (EEG, EOG, EMG, body temperature) were conducted for 24 h using the telemetric system 7, 14 and 21 days after LC administration, immunohistochemical assays were used once on 21 day. Emotional behavior was assessed in the elevated plus maze (EPM) test and in the open field test. The motor dysfunctions were assessed in a battery of tests. **RESULTS AND DISCUSSION:** LC induced a loss of less 20% of DA-ergic neurons in the SNpc with no motor dysfunctions. The total time of slow wave sleep (SWS) and PS did not change, but the microstructure was markedly impaired. The episode duration decreased, and the number of episodes increase. The number of microactivations also increased during SWS. Drowsiness progressively increased. Moreover, deep SWS portion (delta-sleep) decreased in prolongation of LC action. Hence, sleep became more fragmentary and superficial. Various sleep disturbances in patients are frequently associated with anxiety disorders. Findings indicating emotional impairments as early markers of the preclinical stage of PD still remain contradictory. Our study has found that LC administration increased anxiety-like behavior in the EPM test (14-21 days after the injections). The features of sleep and behavior detected in our study could be applied in a clinical investigation as non-motor markers of the preclinical stage of PD. **RESEARCH SUPPORT:** The Russian Science Foundation (RSF) grant 16-15-00278.

INFLUENCE OF METEOROLOGICAL FACTORS ON BEHAVIORAL EFFECTS OF SINGLE INTRACEREBROVENTRICULAR ADMINISTRATION OF AMYLOID-BETA PEPTIDE. V Mukhin, I Abdurasulova, K Pavlov, K Abdurasulova, V Klimenko**,** ISBS Fellow, Institute of Experimental Medicine, St. Petersburg, Russia.
INTRODUCTION: Literature data suggests that there is relationship between environmental factors and Alzheimer disease. In particular, occupational exposure to electric and magnetic fields are the risk factors for development this disease. The influence of meteorological factors on Alzheimer disease is not well studied. The aim of this study was to investigate influence of meteorological factors on behavior of rats in beta-amyloid model of Alzheimer disease. **METHODS:** Amyloid-beta peptide plays a physiological role as a neurotrophic factor. On the other hand, accumulation of this peptide in the form of soluble oligomers is the principal link of Alzheimer disease pathogenesis. It is known that portion 25-35 is the functional domain of this peptide which showed the same neurotrophic and neurotoxic effects as the amyloid beta 1-40. Therefore central injection of the fragment 25-35 was used for modeling of Alzheimer disease in rats. Four groups of Wistar rats (285 +- 12 g) were in study. Water solution of fragment 25-35 of amyloid-beta peptide was injected into the right brain ventricle (5 µl, 1.2 µl/min) in the experimental group. The other three groups were used as controls: the group of central administration of saline solution, the sham operated and the intact rats groups. The rats were exposed to behavioral testing after a fortnight (open field test, novel object recognition test, passive avoidance test and learning of operant food-getting behavior in the TSE PhenoMaster system). To study influence of the meteorological factors on behavior of rats we used weather data bases, such as http://www.pogodaiklimat.ru. **RESULTS AND DISCUSSION:** Administration of beta-amyloid caused complex of behavioral impairments including amnesia, neophobia, and reduction in exploratory and locomotor activity. Surprisingly, we found that some of these changes dependent on meteorological factors. Particularly, impairment of learning to operant food-getting behavior was well expressed only if there were low atmospheric pressure or increased cloudiness on the first day of learning. **CONCLUSION:** Meteorological factors influence impairments caused by single intracerebroventricular administration of amyloid-beta peptide in the rat brain.

CHANGES IN THE GHRELIN, OREXIN AND CRF SIGNALING SYSTEMS IN BLOOD AND IN BRAIN STRUCTURES AFTER CHRONIC ALCOHOLIZATION AND ETHANOL WITHDRAWAL IN RATS. PP Khokhlov, AA Lebedev, ER Bychkov, PD Shabanov, ISBS Fellow, Anichkov Department of Neuropharmacology, Institute of Experimental Medicine, St. Petersburg, Russia. **INTRODUCTION:** The stress conditions are the strong stimuli of addiction development and its relapse. During last decade it was shown the stress responses in the CNS network circuits have been modulated by a number of neuropeptides and peptide hormone signaling systems. Besides of the most important CRF as

stress peptide, the points of interest are ghrelin and orexin signaling systems. **MATERIALS AND METHODS:** All experiments were carried out on Wistar male rats. The high-sensitive ELISA testing was performed by "Peninsula Inst." (USA) and "SP Bio" (France). **RESULTS:** The significant decrease (about by 50%) of desacyl-ghrelin concentrations in the blood serum and amygdala structures has been demonstrated during the long-term alcoholization (6 months, 15% ethanol). These events were accompanied with the same concentration changings after alcohol withdrawal. The concentrations of orexin A were characterized by more or less significant increase during alcoholization and following decrease after alcohol withdrawal. The CRF content in the serum during alcoholization and withdrawal was characterized by strong decrease of standard deviation without significant change of means. **CONCLUSIONS:** It has been demonstrated the non-acylated version of ghrelin took part in response to long-term alcoholization. The responses of desacyl-ghrelin and orexin A occur in "counter-phase" action. The data obtained suggest the certain interrelations between desacyl-ghrelin and orexin A activities in the course of the long-term alcoholization. The comparing peptides distribution in serum and brain structures suggest the different signaling pathways of desacyl-ghrelin into the CNS. The possible pathways are: 1) penetration of peptides through blood-brain barrier, 2) signaling by means of non-GHSR receptors in peripheral nerves and 3) penetration through fenestral epithelium. Our data are in consistence with the data concerning the production and release of desacyl-ghrelin in the hypothalamus neurons.

Afternoon Session

SYMPOSIUM IX: 11TH ISBS/ZNRC ONE-DAY ZEBRAFISH BEHAVIORAL NEUROSCIENCE AND NEUROPHENOTYPING WORKSHOP (ZB2N-2016)
Chair: AV Kalueff (Russia, USA, China)

INNOVATION THROUGH PASSION NEVER STOPS: TECNIPLAST LATEST PRODUCTS FOR ZEBRAFISH HOUSING AND BREEDING. M Brocca, Aquatic Solutions, Tecniplast, Italy

ISBS PRESIDENTIAL LECTURE: STRESS, BRAIN AND THE IMMUNE SYSTEM: LESSONS FROM ZEBRAFISH, RODENTS AND HUMANS. AV Kalueff, ISBS Fellow, A Kaluyeva, C Song, International Zebrafish Neuroscience Research Consortium (ZNRC), ZENEREI Institute, Slidell, LA, USA; Institute of Translational Biomedicine, St. Petersburg State University, St. Petersburg, Institute of Chemical Technologies, Institute of Biological Science, Ural Federal University, Ekaterinburg, Russia; Research Institute for Marine Drugs and Nutrition, Guangdong Ocean University, Zhanjiang, China. Zebrafish (*Danio rerio*) is a small fish which is rapidly becoming a popular model organism in translational neuroscience and biological psychiatry research. In the next decades, it will remarkably complement the widely used rodent models. The application of this model organism to improving our understanding of brain disorders involves several directions of research, including modeling neoplastic (e.g., CNS cancers), neurological (e.g., epilepsy) and neuropsychiatric disorders (e.g., anxiety, depression, autism and schizophrenia). Here we present the 'tank to bedside' view of modern zebrafish, rodent and clinical research in the field of psychoneuroimmunology, including recent molecular, genetic and neuroimaging approaches to use this fish species in uncovering CNS pathobiology in relation to CNS-immune interplay, role of microglia and astrocytes, as well as neurotrophins and cytokines. We will also outline some conceptual and practical aspects of using several model species in this field, such as the role of high-throughput screens for CNS drug discovery, as well as the emerging role of zebrafish for toxicology and environmental health research.

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January 16-18, 2017, Rodney Bay, St. Lucia

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‘Progress not Perfection’ and upcoming ‘Capital’ projects are centered around people who currently suffer or have dealt with their addictions, whole spectrum of them. Abstract portraits of the participants who come from all walks of life show their past experience, present state of mind and future ambitions. Graphic nature in some cases suggests altered state of reality as well as playful, honest and open-minded approach to discussing many times stigmatized issue. Expressive character of the artwork relates to the fluctuating emotions, often accompanied by anxiety and depression, that is juxtaposed against clean ‘peaceful’ linework. There is certain beauty in capturing the chaos and vulnerabilities. Paintings include personal narratives of the subjects who Raytchev interviews and studies over the period of several sittings before creating the final large scale pieces.