

The International STRESS AND BEHAVIOR Society (ISBS)

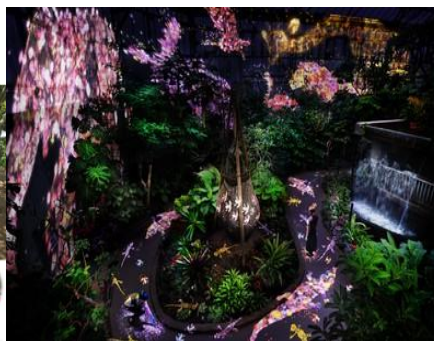
Program



**15th International Regional (Asia)
ISBS Neuroscience and Biological Psychiatry
“Stress and Behavior”
Conference**



September 9-10, 2018



Excursion:

Sep. 8

Sep. 9

Sep. 11

September 8th: One-day playpark in Ube: Child Centered Sanctuary

September 9th: Real Plant and Digital Animal Zoo: Augmented Reality

September 11th Primate Zoo and Yamaguchi Visits / Discussion Meeting

COMMITTEES:

Conference co-chairs:

Prof. Mamiko Koshiba, PhD (Yamaguchi/Saitama, Japan), LOC Chair

Prof. Hideo Yamanouchi, MD, PhD (Saitama, Japan), LOC Co-Chair

Prof. Allan V. Kalueff, PhD (New Orleans, USA), ISBS President

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Prof. Mamiko Koshiba, PhD (Yamaguchi/Saitama, Japan), Chair

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Prof. Shun Nakamura, PhD (Tokyo, Japan), Co-Chair

Prof. Mitsuhiro Yoshioka, MD, PhD (Hokkaido, Japan)

Prof. Akemi Tomoda, MD, PhD (Fukui, Japan)

Day 1. Sunday, September 9, 2018

Hall D11, Yamaguchi University, Tokiwa Campus, Ube, Japan

9.00-17.00 REGISTRATION

9.30-9.40 ISBS OPENING CEREMONY AND WELCOMING ADDRESSES

Morning session

9.40-11.10 SYMPOSIUM 1. BIOLOGICAL PSYCHIATRY IN AQUATIC VERTABRATES Chairs: Nakamura S (Japan) and Kalueff AV (Russia/China/USA)

9.40-10.00 EXTRA LOW VOLTAGE ELECTRIC SHOCK EXPOSURE AS A POTENTIAL TEST TO ACCESS DESPAIR-LIKE BEHAVIOR IN ZEBRAFISH. Demin KA, Savva AK, Alexeeva PA, Kalueff, Institute of Experimental Medicine, Almazov National Medical Research Centre, Institute of Translational Biomedicine, St. Petersburg State University (Russia), Southwest University (China); Novosibirsk State University (Russia), ZENEREI Research Center (USA); Russian Research Center of Radiology and Surgical Technologies, Ministry of Health (Russia), Ural Federal University (Russia)

10.00-10.20 EXAMING THE EFFECTS OF CHRONIC TREATMENT OF U-47700, A μ - OPIOID RECEPTOR AGONIST, IN ADULT ZEBRAFISH IN NOVEL TANK TEST. Kolesnikova TO, Khatsko SL, Shevyrin VA, Eltsov OS, Kalueff AV, Ural Federal University (Russia).

10.20-10.40 PLENARY LECTURE: HOW ZEBRAFISH MODELS ARE RESHAPING MODERN TRANSLATIONAL NEUROSCIENCE AND BIOPSYCHIATRY RESEARCH. Kalueff AV, Tatiana O. Kolesnikova, Andrey Volgin and Konstantin A. Demin. Southwest University (China), St. Petersburg State University (Russia), Military Medical Academy, St Petersburg, Russia, Scientific Research Institute of Physiology and Basic Medicine (Russia), The International Zebrafish Neuroscience Research Consortium (ZNNRC), Slidell (USA), Ural Federal University (Russia), ZENEREI Research Center (USA), Almazov National Medical Research Centre (Russia), Granov Russian Center for Radiology and Surgical Technologies (Russia)

10.40-11.10 EDUCATION LECTURE: A BIOPSYCHOLOGICAL APPROACH TO INVESTIGATING THE NEURAL BASIS OF FISH EMOTIONS. Yoshida M, Hiroshima University (Japan).

11.10-11.30 COFFEE BREAK

11.30-12.15 SYMPOSIUM 2. PEDIATRIC RESEARCHES. Chair: Yamanouchi H (Japan)

11.30-11.45 PRETERM INFANT VOCAL BEHAVIOR AND SpO₂ MODULATION UNDER OPTICAL FREQUENCY CONDITION IN NEONATAL INTENSIVE CARE UNIT. Tao T, Sakurai H, Kakei H, Morita K, Honda M, Yamanouchi H, Kunikata T. Koshiba M, Saitama Medical University, Saitama, Japan, Yamaguchi University, Ube, Japan.

11.45-12.15 PLENARY LECTURE: MECHANISM AND MANAGEMENT OF STATUS EPILEPTICUS. Yamanouchi H, Saitama Medcial University (Japan).

12.15-13.30 LUNCH BREAK

Afternoon session

13.30-16.45 SYMPOSIUM 3. PLAY AND LEARNING IN CHILDHOOD. Chair: Koshiha M (Japan) and Amano H (Japan)

13.30-13.40 EARLY CHILDHOOD LEARNING AND DEVELOPMENT IN PLAY: UBE CITY ONE-DAY PLAYPARK REPORT Koshiha M, Yamaguchi University (Japan)

13.40-14.10 PLENARY LECTURE: MULTI-LAYERD AND CHILD-CERNTERD EARLY CHILDHOOD EDUCATION AND CARE FOR INDIVIDUAL, CREATIVE AND SOCIAL DEVELOPMENT. Watanabe H, Youyounomori Kindergarten and Nursery School, Kohoku Kindergarten (Japan).

14.10-14.30 IMPORTANCE OF EARLY EDUCATIONAL INTERVENTION FOR CHILDREN BASED ON REVERSIBILITY OF ENVIRONMENTAL STRESS-INDUCED EPIGENETIC ALTERATIONS. Kubota T, Mochizuki K, Seitoku University (Japan), University of Yamanashi (Japan)

14.30-14.50 INDOOR AND OUTDOOR POSITIONING SYSTEMS FOR BEHAVIOR ANALYSIS OF CHILDREN. Hariyama M, Miyamoto N, Kobayashi Y, Koshiha M, Matunaga T, Kai R, Watanabe H, Ito S, Kubota T, Senda M, Taniguchi S. Tohoku University (Japan), National Institute of Technology, Oyama College (Japan), Yamaguchi University (Japan), Kohoku Kindergarten (Japan), Seitoku University (Japan), Environment Design Institute (Japan)

14.50-15.10 A PEDIATRICIAN'S ENDEAVOR TO SUPPORT COMMUNITY CHILDBREARING - REFLECTIONS ON CREATING A PLACE TO STAY IN THE COMMUNITY - Kaneko J, Kaneko Pediatric Office (Japan)

15.10-15.45 DISCUSSION "STARTING STRONG IN THE COMMUNITY FOR THE NEXT GENERATION". All participants.

15.45-16.00 COFFEE BREAK

16.00-18.00 SYMPOSIUM 4. MOLECULE AND BEHAVIOR QUANTIFICATION TO VISUALIZE MENTAL ACTIVITIES. Chairs: Tomoda A and Yoshioka M (Japan)

16.00-16.30 THE RELATIONSHIP BETWEEN PARENTAL VISITATION AND MENTAL HEALTH AMONG INSTITUTINALIZED CHILDREN IN JAPAN. Yazawa A, Tomoda A, Fukui University (Japan)

16.30-17.00 NORADRENALINE REUPTAKE INHIBITION INCREASES CONTROL OF IMPULSIVE ACTION BY ACTIVATING D1-LIKE RECEPTORS IN THE INFRALIMBIC CORTEX. Sasamori H, Ohmura Y, Yoshioka M, Hokkaido University (Japan)

17.00-17.15 FAMILIAR OR UNFAMILIAR INFANT-SOCIAL DISTANCE DURING PLAY VISUALIZED BY GPS, CONFIRMED BY VIDEO. Kai R, Matunaga T, Yokota S, Suzuki S, Singh KJ, Kanazawa R, Hariyama M, Miyamoto N, Kobayashi Y, Watanabe H, Ito S, Kubota T, Senda M, Taniguchi S. Koshiha M Tohoku University (Japan), National Institute of Technology, Oyama College (Japan), Yamaguchi University

(Japan), Kohoku Kindergarten (Japan), Seitoku University (Japan), Environment Design Institute (Japan)

17.15-17.45 DAY 1 CLOSING LECTURE: BEHAVIOR STUDY AND BODY CODE CONCEPT.
Nakamura S, Tokyo University of Agriculture and Technology, CorLab Inc, (Japan)



18.30-20.30 DAY 1 CONFERENCE DINNER

20.30-21.30 DAY 1 EXCURSION. UBE PLANT GARDEN DIGITAL INTERACTIVE ART TOUR

Day 2. Monday, September 10, 2018

Hall D11, Yamaguchi University, Tokiwa Campus, Ube, Japan

09.00-17.00 REGISTRATION

Morning session

09.30-12.00 SYMPOSIUM 5. COMPARATIVE BEHAVIOR AND PSYCHO-COGNITIVE BIOLOGY
Chairs: Kalueff AV (Japan) and Yamanouchi H (Japan)

09.30-09.50 LEISURE MOTIVATION, BENEFIT, CONSTRAINT AND NEGOTIATION OF GAY PEOPLE – AN EXPLORATORY STUDY WITH JAPANESE AND AMERICAN RESPONDENTS . Bình Nghiệm-Phú, National Institute of Technology – Fukushima College (Japan)

09.50-10.10 THE ROLE OF PREFRONTAL CORTEX IN STRESS VULNERABILITY (LITERATURE REVIEW). Ayu TA, Zainuri S, Handayani ES, Islamic university of Indonesia (Indonesia)

10.10-10.30 A MALE COMMON MARMOSET GRIEF AT THE PARTNER'S DEATH. Yoda M, Hua Z, Tao T, Yamanouchi H, Koshiba M, Yamaguchi University, Saitama Medical University, Gunma University of Health and Welfare (Japan)

10.30-10.50 STRESS-RESPONSE AND STEPS AGAINST STRESS OF NONHUMAN PRIMATES IN ZOO. Kimura Y, Kawade H, Kajigaeshi T, Miyashita M, Tokiwa Zoo (Japan)

10.50-11.00 (COFFEE BREAK)

11.00-11.20 DIFFERENT PREDICTIVE STRENGTHS OF CORTISOL, OXYTOCIN, AND SLEEP FOR DIFFERENT PSYCHOLOGICAL SYMPTOMS. Larkin TA, Thomas S, University of Wollongong, (Australia)

11.20-11.40 PRACTICAL APPLICATION OF MONTESSORI EARLY CHILDFOOD EDUCATION AND CARE. Watarai-Senoo A, Sakuragaoka Nursing School (Japan)

11.40-12.00 A CHERRY TREE'S STRESS AND RECOVERY BY INCLUSIVE INTERVENTION

Hayakawa Y, Koshiba M, Japan Tree Doctors Association, Yamaguchi University (Japan)

12.00-13.00 LUNCH BREAK (@ University Cafeteria)

Afternoon session

13.00-16.00 SYMPOSIUM 6. STRSS-LESS LIFE APPLICATION TECHNOLOGY AND INTELLIGENCE Chairs: Koshiba M and Kuremoto T (Japan)

13.00-13.20 WELFARE TECHNOLOGY FOR FUTURE LIFE . Narasaki H, Nakashima S, Yamaguchi University (Japan)

13.20-13.40 MENTAL TASK RECOGNITION USING EEG SIGNAL AND DEEP LEARNING METHODS. Kuremoto T, Sasaki T, Mabu S, Yamaguchi University (JAPAN)

13.40-14.00 VERTUAL EMBRACE INTERVENTION WITH VISUALIZATION USING HYPER MIRROR AND JACKET CONTROL OF TOUCH AND THERMAL SENSES. Morikawa O, Yamaguchi University (Japan)

14.00-14.20 SHRINE INTERACTIVE INSTALATION VITALIZED CHILDREN ACTIVE BEHVIORS AND POSITIVE EMOTION IN THE LOCAL COMMUNITY. Hua Z, Sato R, Horikawa Y, Kumagai M, Hayakawa Y, Kaneko J, Marumo Y, Koshiba M, Yamaguchi University (Japan)

14.20-14.40 ELDERLY PSYCHOLOGICAL INFLUENCES IN DIGITAL-INTERACTIVE SPACE TRAINING THROUGH HUMAN SOUND OR MOTION SENSING. Fujita K, Sato R, Takata J, Matsuda Y, Tao T, Kinoshita F, Koshiba M, Japan Tree Doctors Association, Yamaguchi University (Japan)

14.40-15.40 PLENARY LECTURE: INTERNET OF THINGS (IOT)'S FUTURE SOCIETY, Watanabe J, Hitachi, Ltd. Syatems & Services Division, President of Business Management Division Director, The Society of Project Managementchi University (Japan)

15.40-16.00 COFFEE BREAK

16.00-17.45 SYMPOSIUM 7. IMPLEMENTING CONTENT AND LANGUAGE INTEGRATED LEARNING IN NEUROSCIENTIFIC CONSIDERATION Chairs: Uemura T and Koshiba M (Japan)

16.00-16.30 DEVELOPING CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL) FOR MANUFACTURING EDUCATION. Tanaka M, Ikeda M, Aoyagi N, Mukogawa Women's University, Sophia University, National Institute of Technology, Nagaoka College (Japan)

16.30-17.00 A NEW APPROACH OF CLIL FOR MECHANICAL ENGINEERING COURSE. Ichimura K, Aoyagi N, Tanaka M, Ikeda M, Uemura T, Nagaoka College, Mukogawa Women's University, Sophia University, Yamaguchi University (Japan)

17.00-17.30 PEDAGOGICAL INNOVATION AND MATERIALS DEVELOPMENT IN ENGLISH EDUCATION: APPLYING CLIL FOR POSTGRADUATE ENGINEERING STUDENTS. Uemura T, Tanaka M, Ichimura K, Aoyagi N, Ikeda M, Yamaguchi

University, Mukogawa Women's University, National Institute of Technology, Nagaoka College, Sophia University (Japan)

17.30-17.45 DISCUSSION

17.45-18.00 CONFERENCE CLOSING REMARKS



19:00-21.00 DAY 2 CONFERENCE DINNER

Post ISBS Meeting. Tuesday, September 11, 2018

09.00-17.00 UBE CITY AND YAMAGUCHI PREFECTURE VISIT AND DISCUSSION FOR NEXT ISBS REGIONAL MEETING JAPAN .

Abstracts

9.40-11.10 SYMPOSIUM 1. BIOLOGICAL PSYCHIATRY IN AQUATIC VERTABRATES Chairs: Nakamura S (Japan) and Kalueff AV (Russia/China/USA)

9.40-10.00 EXTRA LOW VOLTAGE ELECTRIC SHOCK EXPOSURE AS A POTENTIAL TEST TO ACCESS DESPAIR-LIKE BEHAVIOR IN ZEBRAFISH. Demin KA, Savva AK, Alexeeva PA, Kalueff, Institute of Experimental Medicine, Almazov National Medical Research Centre, Institute of Translational Biomedicine, St. Petersburg State University, St. Petersburg, Laboratory of Insect Biopharmacology and Immunology, Faculty of Biology, St. Petersburg State University, St. Petersburg, Russia; School of Pharmacy, Southwest University, Chongqing, China; Laboratory of Translational Biopsychiatry, Research Institute of Physiology and Basic Medicine, Neuroscience Department, Novosibirsk State University, Novosibirsk, Russia; ZENEREI Research Center, Slidell, LA, USA; Russian Research Center of Radiology and Surgical Technologies, Ministry of Health, St. Petersburg, Russia; Ural Federal University, Ekaterinburg, Russia

Depression and other stress-related affective disorders are serious CNS pathologies with recurrent nature and poor treatment outcomes in clinical practice. Relatively well studied in rodents, depression-like phenotype in fish remains obscure. Here we have attempted to model zebrafish despair-like behavior using low voltage electric stimuli to cause avoidance. Briefly, fish were placed in a standard Novel Tank Test (20 x 20 x 5 cm) filled with water 5 cm deep, for 5 min after 20-min exposition to 5 mg/L fluoxetine or drug-free vehicle in 0.5-L beaker (n=15). Back- and sidewalls of tank were covered with white film to direct escape attempts to the clear frontal side of the tank. Wire ends were attached to the opposite sidewalls and current was set to 0.1 V/cm of water. Using manual scoring, we have been accessed frequency (n) and time spent near transparent wall (s), and average time spent near wall (s), erratic movements (n) and number and time spent freezing (n, s). For statistical analysis, we used Mann-Whitney U test to compare cumulative endpoints, and two-way ANOVA (factors: Group and Minute/Time) to access differences in behavioral profiles over time. All data is represented as Mean±SEM. While there was no difference between groups for any parameters assessed globally by U-test, the two-way ANOVA test revealed significant Group and Minute effects without interaction: (F(6)=2.36, p<0.05 Group, F(24)=3.01, p<0.001, Minute). Interestingly, the observed effect can be described as a slow reduction of escape activity in control group (27.033±12.33 s Min 1 vs. 11.83±9.68 s Min 5 for time spent near wall) that is absent in fluoxetine-treated group (27.07±8.27 vs. 25.43±17.25). Thus, the inescapable electric shock exposure produces phenotype that can be plausibly associated with despair-like behavior in zebrafish. Interestingly, habituation with decrease in activity among test was reduced by antidepressant exposure, similar to results in known rodent 'despair' tests, such as the Tail Suspension and the Forced Swim Test. Clearly, further studies are needed to replicate and better understand the observed effects in zebrafish models. Acknowledgements: The study was supported RFBR research project 18-34-00996 to KAD.

10.00-10.20 EXAMING THE EFFECTS OF CHRONIC TREATMENT OF U-47700, A μ - OPIOID RECEPTOR AGONIST, IN ADULT ZEBRAFISH IN NOVEL TANK TEST. TO Kolesnikova, SL Khatsko, VA Shevyrin, OS Eltsov, AV Kalueff, Ural Federal University, Ekaterinburg, Russia.

INTRODUCTION: The drug abuse is a global health problem, and studying new synthetic drugs of abuse and their mechanisms is an important task in modern pharmacology and neurobiology. 3,4-dichloro-N-[(1R,2R)-2-dimethylamino)cyclohexyl]-N-methylbenzamide (U-47700), a μ -opioid receptor agonist, developed in 1978, has demonstrated opiate-like adverse effects in human and similar analgesic properties with morphine. Zebrafish (*Danio rerio*) is a popular animal model for

toxicology and neurobiology research and CNS drug discovery. The aim of this study was to characterize chronic behavioral effects of 3,4-dichloro-N-[(1R,2R)-2-dimethylamino]cyclohexyl]-N-methylbenzamide (U-47700) in adult zebrafish in the novel tank test. **METHODS:** 80 adult wild type short-fin zebrafish were used. Zebrafish were housed in group of 40 per 40-L tank filled with clear water according to the standards of zebrafish care. All fish were experimentally naïve before testing. The novel tank test was used to assess zebrafish behavior for 5 min after 2-weeks exposition in 1, 0.5, and 0.1 mg/L of U-47700. We analyzed the distance moved, velocity, frequency and duration moving and not moving behavior, high and low acceleration states and rotation frequency. **RESULTS AND DISCUSSION:** U-47700 increased total distance moved and velocity in all studied concentration. Also, the frequency and duration of moving states was significantly higher in 0.1, 0.5 and 1 mg/L compared with control. Mobility was increased at 0.5 and 1 mg/L. In addition, there was no difference between experimental and control groups in high acceleration states, although low acceleration states decreased at all concentrations. Thus, a 2-weeks chronic treatment with U-47700 increases exploratory activity of zebrafish, likely exerting a psychostimulant-like properties with prolonged use. **RESEARCH SUPPORT:** This article was prepared with the financial support of Competitiveness Enhancement Program – CEP3.1.1.1-18.

10.20-10.40 PLENARY LECTURE: HOW ZEBRAFISH MODELS ARE RESHAPING MODERN TRANSLATIONAL NEUROSCIENCE AND BIOPSYCHIATRY RESEARCH. Allan V. Kalueff, Tatiana O. Kolesnikova, Andrey Volgin and Konstantin A. Demin School of Pharmacy, Southwest University, Chongqing, China Institute of Translational Biomedicine, St. Petersburg State University, St. Petersburg, Russia Military Medical Academy, St Petersburg, Russia Scientific Research Institute of Physiology and Basic Medicine, Novosibirsk, Russia, The International Zebrafish Neuroscience Research Consortium (ZNRC), Slidell, LA, USA, Ural Federal University, Ekaterinburg, Russia, Institute of Experimental Medicine, Almazov National Medical Research Centre, St. Petersburg, Russia, Granov Russian Center for Radiology and Surgical Technologies, St. Petersburg, Russia

The zebrafish (*Danio rerio*) is a small aquatic vertebrate organism from South-East Asia, which has gradually become a new powerful model organism in preclinical biomedical research. Zebrafish possess all major neurotransmitter receptors, transporters and enzymes, as well as express rich behavioral repertoire, thereby offering a wide spectrum of CNS disease models. However, our understanding of zebrafish role as a new emerging mainstream model in neuroscience research is still limited. For example, zebrafish behavior has long been mistakenly viewed as “primitive” or “reflex-driven”, resulting in incomplete utilization of the major advantages of this species for CNS disease modeling or drug discovery – 1) phenotypic robustness, 2) ease of experimental manipulations, 3) high-throughput potential, and 4) high relevance to the 3Rs principles of humane animal experimentation. Likewise, zebrafish nociception has also been a matter of debate – since some continue to falsely claim that zebrafish “feel no pain” despite the fact that they 1) possess all main elements of the nociception system and 2) respond to pain stimuli by increasing avoidance and anxiety-like behavior, in a manner similar to mammals. This presentation will discuss zebrafish models relevant to several important human disorders, including epilepsy, autism, sleep disorders, cognitive deficits, depression, anxiety and addiction, to demonstrate excellent future of this model organism in biological psychiatry research. Furthermore, zebrafish are highly sensitive to all major classes of neurotropic drugs (including antipsychotics, anxiolytics, antidepressants, sedatives/anesthetics, stimulants, hallucinogens, antiepileptics) and are well-suited to various high-throughput applications (due to their high fecundity, rapid extrauterine development, transparency, fast drug intake, and robust behavioral and physiological phenotypes in both larval and adult fish). Finally, zebrafish emerge as an excellent model for neurogenetic analyses, as they have 25 pairs of chromosomes containing >26,000 protein-coding genes, with the overall genetic homology to mammals and humans around 75%, and nearly 85% of shared genes known to be associated with

human disease. Collectively, this indicates zebrafish as a powerful promising model organism for neuroscience and biopsychiatry research.

10.40-11.10 EDUCATION LECTURE: A BIOPSYCHOLOGICAL APPROACH TO INVESTIGATING THE NEURAL BASIS OF FISH EMOTIONS, Yoshida M, Hiroshima University, Higashi-hiroshima, Japan.

Fishes share fundamental emotional repertoires and underlying brain mechanisms with other vertebrates, including mammals. There are, however, a considerable amount of challenges in evaluating their emotional states. This is partly due to difficulties in quantifying and interpreting behavioral and physiological measures derived from various positive and negative emotional states. Among the diverse emotions studied in fish, the behavioral and physiological manifestations of fear and anxiety are relatively well-understood in some representative fish species. This recent progress, in combination with neurobiological experiments, has contributed to gaining insight into the neural basis of emotions shared by many vertebrates. We have performed biopsychological studies on fear-based learning in goldfish. Goldfish is easily conditioned for fear using light as a conditioned stimulus and a mild electric shock as an unconditioned aversive stimulus. Classical delay conditioning paradigm was used and cardiac deceleration, or bradycardia, that occurred in response to the conditioned stimulus was quantified as a conditioned fear response. In mammals, both the telencephalon and the cerebellum are required for this type of conditioning. In goldfish, however, the classical fear conditioning was not impaired by an ablation of the telencephalon, although, as in mammals, intactness of a certain part of the cerebellum is known to be essential for the acquisition of conditioned fear. Therefore, we focused on the role of cerebellum in classical fear conditioning in goldfish. We found that cerebellar Purkinje cells change the pattern of responses to the conditioned stimulus during and after the acquisition of conditioned fear. Our results suggest that emotional fear conditioning in goldfish shares cerebellar circuit with other types of conditioning; it does so at least partly with discrete motor conditioning. We further investigated neural mechanisms involved in classical fear conditioning at the whole-cerebellum level by using larval zebrafish. Molecular genetic and imaging studies revealed that cerebellar granule cells play a role in controlling conditioned fear responses. Recently, we developed a camera-less technique to monitor ventilatory activity in small free-moving fish. In the present topic, detection of the changes in the emotional states in zebrafish by this technique will also be introduced.

11.10-11.30 COFFEE BREAK

11.30-12.15 SYMPOSIUM 2. PEDIATRIC RESEARCHES. Chair: Yamanouchi H (Japan)

11.30-11.45 PRETERM INFANT VOCAL BEHAVIOR AND SpO₂ MODULATION UNDER OPTICAL FREQUENCY CONDITION IN NEONATAL INTENSIVE CARE UNIT. Ting Tao¹⁻², Hayato Sakurai², Hiroko kakei², kayo Morita², Masakazu Honda², Hideo Yamanouchi², Tetsuya Kunikata¹, and Mamiko Koshiba¹⁻², ¹ Yamaguchi University, Yamaguchi, Japan, ² Department of Pediatrics, Saitama Medical University, Saitama, Japan

Background: The Japanese premature delivery number still keeps high and the preterm infants must be exposed absolutely different circumstances from the fetuses. In our neonatal intensive care unit (NICU), we focused on preterm infants' vocal behaviors and oxygen saturation percentage (SpO₂) modulation under optical frequency condition in an incubator longitudinally for several days or a few weeks, and explored any modulators to their behaviors during cares.

Method: We complied with the approved contents by Saitama Medical University Hospital Institutional Review Board (IRB) Committee. Data from a preterm infant (weight: 1644g, height: 40.4cm, gestational age: 31weeks and 5 days, from July 21st to 25th) were acquired by the longitudinal detector system. Acoustic data (sample rate 24 kHz) were analyzed the crying and

caring sounds frequency by Matlab customized application. The light optical frequency in an incubator was detected by an optical splitter. SpO2 and pulse rates (PR) were monitored by Convidien Nellcor.

Results and discussion: Acoustic frequency identification visualized the sounds over 500 Hz seemed intermittently repeated per appropriately 2.7 hours, like a life rhythm of crying during cares, such as intervention, ventilation, diaper changing, or drug administration. When the peak values of fluorescent light (green), and sunlight intensities were extracted as the characteristic parameters, the alternations of day and night could be seen as circadian rhythms, or suggestive waveforms caused by the orientation of the incubator, even caring time at night. Considering the relevance in the peaks of crying duration, SpO2 and PR seemed synchronized one another. SpO2 and PR tended to decrease and increase during crying, respectively. To screen the most correlated timing between cry and SpO2, or between cry and PR, the SpO2 timing appeared slightly delayed to cry in the present study. In addition, the case had the intermodulated condition in cry and SpO2, which disappeared after the strong sun light exposure. These preliminary hypothetic results should be furthermore investigated to develop longitudinal diagnosing intelligence.

Research support: This research was supported by JSPS (5J06978, 17K18648, 25282221, 21200017, 25119509), JST-ALCA, JST-a-step and SCOPE.

Keywords: Preterm infant, vocal behavior, SpO2 modulation, PR, optical frequency, NICU, developmental disorders.

11.45-12.15 PLENARY LECTURE: MECHANISM AND MANAGEMENT OF STATUS EPILEPTICUS. Yamanouchi H, Saitama Medcial University (Japan). Department of Pediatrics and Comprehensive Epilepsy Center, Saitama Medical University, Saitama, Japan

Status epilepticus (SE) is one of the most common neurological emergencies in infancy and childhood. Pediatric mortality is relatively low, however I should be mentioned that SE exhibits various degrees of neurological sequelae. SE is classically defined as persistent seizure status for “a sufficient length of time”, ordinarily over 30min. This reflects irreversible neuronal damages, such as neuronal death or neuronal injury as well as alteration of neuronal networks, although the degree of which may be dependent on causative etiologies and the age of the onset. Studies have shown several mechanisms for drug resistance of SE including neurotransmitter receptor trafficking, i.e., the internalization of GABAA receptor which causes decrease of GABAA receptor on the synaptic cell wall sites leading reduced GABAA mediated synaptic inhibition. Increased glutamatergic neuronal excitation is induced by the externalization of NMDA receptor moved from the interior sites to the synaptic cell wall in the condition of prolonged seizure. Altered subunit composition of GABA and glutamate receptors may play a role for susceptibility of prolonged seizures, at least in the neuropathological conditions such as tuberous sclerosis or cortical dysplasia. These mechanisms help to understand the clinical data that the longer a seizure lasts, the less likely it is to stop. Prompt drug choice should be determined appropriately based on the timing after provocation of seizures.

12.15-13.30 LUNCH BREAK

Afternoon session

13.30-16.45 SYMPOSIUM 3. PLAY AND LEARNING IN CHILDHOOD. Chair: Koshiba M (Japan) and Amano H (Japan)

13.30-13.40 EARLY CHILDHOOD LEARNING AND DEVELOPMENT IN PLAY: UBE CITY ONE-DAY PLAYPARK REPORT Koshiba M, Yamaguchi University (Japan)

13.40-14.10 PLENARY LECTURE: MULTI-LAYERD AND CHILD-CERNTERD EARLY CHILDHOOD EDUCATION AND CARE FOR INDIVIDUAL, CREATIVE AND SOCIAL DEVELOPMENT. Watanabe H, Youyounomori Kindergarten and Nursery School, Kohoku Kindergarten (Japan).

In Japanese contemporary society surrounding children, there are many issues such as falling birthrate, the waiting list for nursery schools, difficulty in raising, so on and these various stress may influence the development in early childhood due to their vulnerability. When we consider primary learning in early childhood that greatly influences the future development of individuality, creativity and cooperativeness, it is thought that discontinuity arising in the administrative system walls of education and welfare, ambiguity of the role and position of nursery, furthermore, a bias to solve requests of adults including parents and supporters. It is necessary to rethink “what is important for children’s development”, centering the child's view.

A child is a dignified human who is learning through daily changing experiences by oneself in diversified family environment, nursery school, kindergarten, local community. Parenting and childcare are continuous acts to support and guide the child learning in all of the life. Caregivers should consider child-centered thinking rather than the adult convenience, study and keep seeking the principles of early education and care. It needs time for adults to have an immature child’s mind open and sympathize with them, which will bring adult active learning. Different cultured children with two-earner family or mother caring at home, handicap absence or presence raise multilayer learning environment that must play significant consideration on the roles of not only child but parent and supporters development.

In this lecture based on my own forerunner experiences of the unification of the kindergarten and nursery school systems, I argue the critical consideration with children centered on early childhood education and care.

14.10-14.30 IMPORTANCE OF EARLY EDUCATIONAL INTERVENTION FOR CHILDREN BASED ON REVERSIBILITY OF ENVIRONMENTAL STRESS-INDUCED EPIGENETIC ALTERATIONS. Kubota T, Mochizuki K, Seitoku University (Japan), University of Yamanashi (Japan)

It is known that environmental stress due to chemicals, malnutrition and viral infection cause congenital disorders. It is also known that improper lifestyle in adulthood cause adult-onset metabolic disorders. However, several lines of evidence suggest that improper lifestyle during pregnancy can offer the origins of adult-onset metabolic disorders to the fetuses. This concept is referred to the developmental origins of health and disease (DOHaD). Epigenetics is a gene regulation mechanism based on a chemical modification of DNA. We and other researchers have demonstrated that epigenetic modification is reversible since it is based on attach- and detach-ment of chemical residues on a DNA sequence, and thus, disease-causing epigenetic alterations are potentially corrected taking advantage of use of the reversibility. Since an environmental stress-induced epigenetic marking persists during the life span of an individual and can be transmitted to the offspring. Therefore, the epigenetic memory, which reflects past experiences, can be used as a preventing marker of adult-onset diseases not only for the children (i.e., present generation) but also in their offspring (i.e., succeeded generations). Furthermore, this will be an important concept not only for medical stuff but also for educational stuff in nursery and elementary school.

14.30-14.50 INDOOR AND OUTDOOR POSITIONING SYSTEMS FOR BEHAVIOR ANALYSIS OF CHILDREN. Hariyama M, Miyamoto N, Kobayashi Y, Koshiba M, Matunaga T, Kai R, Watanabe H, Ito S, Kubota T, Senda M, Taniguchi S. Tohoku University (Japan), National Institute of Technology, Oyama College (Japan), Yamaguchi University (Japan), Kohoku Kindergarten (Japan), Seitoku University (Japan), Environment Design Institute (Japan)

INTRODUCTION: The recent survey of Ministry of Health, Labor and Welfare, Japan shows that the number of children with developmental disorders such as autism increases clearly. It is said that one reason for this is the change in living environment and playing environment. In order to improve this situation, we must clarify the relations between environment and mental-and-physical development quantitatively. For the quantitative evaluation, the use of various sensors plays an important role such as sensors for biological signals, accelerations and positions. As a first step for this purpose, this paper reports the outdoor positioning system using a highly-accurate GPS, and an indoor positioning system using wireless tags for behavior analysis of children.

METHODS: In order to measure the position of children outdoor, we use kinematic GPS since they are more accurate than conventional static-type GPS. The accuracy of kinematics GPS is typically less than 10cm. One problem of current real-time kinematic GPS is its large size and heavy weight. To solve this problem, we use kinematic GPS of the post-processed type, AT-H-02 from AOBA Technologia LLC since it is compact (78.5mm x 38.5mm x 18.5 mm) and light (69g) with long battery life(6 hours). For indoor positioning, we are developing the system using wireless tags TWELITE 2525A from MONO Wireless Inc. Base stations using Raspberry Pi are also developed.

RESULTS AND DISCUSSION: For the outdoor positioning system, the resulting accuracy is around 20cm by using the smoothing filter. Thanks to this high accuracy, we can find clearly that two children go around by tricycles together. Such group play can be thought of as an indication of children's social development. For the indoor positioning system, the resulting accuracy is around 50cm-1m. The accuracy is sensitive to the number and the locations of the wireless base stations.

14.50-15.10 A PEDIATRICIAN'S ENDEAVOR TO SUPPORT COMMUNITY CHILDCARE - REFLECTIONS ON CREATING A PLACE TO STAY IN THE COMMUNITY - Kaneko J, Kaneko Pediatric Office (Japan)

This year marks the 13th year of the “festival” for children, which we initiated in 2005. The event initially took place from my wish to allow children to enjoy the pediatric clinic and the childcare ward for sick children, places where children normally associate with sickness or immunization. During the festival, we opened the clinic to public and offered various attractions, each year different from the last one; mochi pounding, chikuwa (fish sausage) grabfest, water balloon fishing, juggling show, and story-reading by a guest picture-book author, as well as dietary education in the form of sausage and pizza making workshops, offering of stew chock-full of vegetables, etc. To make sure that every child can enjoy the event regardless of their parents' financial situations, we offered all attractions for free.

In 2014, as the clinic became too small to accommodate the growing number of visitors, we moved the location to the nearby shopping street with a total length of about 400m. Taking advantage of the spaciousness, we introduced various elements of play, such as a large inflatable playground, mini-shinkansen rail track, etc. When we organized a rhythm dance training session as a mean to improve children's athletic ability, quite a number of kindergarten and nursery teachers took part in. A symposium on childrearing environments was joined by many, including not only government officials, council members and doctors but also people from different walks of life involved in childrearing, such as guardians and neighborhood residents. These experiences taught me the possibility that, by stepping out of its traditional roles, a town clinic can serve as a foundation of a new network surrounding children.

Leveraging the knowhow of nursing sick children and food-serving at the festival, we have been running a children's diner named “Minnya Shokudo (everyone's diner)” in a neighborhood temple once in every two weeks since last July. It is a free-of-charge diner open not only to children and their family but also to local residents, both young and old. Each time, the diner bustles with about 300 visitors. Apart from pediatricians, the project is co-sponsored by obstetricians and gynecologists, monks, and business owners, and supported by individuals and companies through donation of food ingredients and various other things. For households unable to visit the diner due to difficulties, we offer a service to deliver food, clothes, etc. on demand.

While the children's diner is primarily intended as a countermeasure against poverty, it also offers local children a place to stay. Here, children can experience various activities besides eating, and people other than their family members look after them, help them, and take time for them. I believe that the pediatricians' involvement as a core of such activity can strengthen the community support network, as well as the children's safety net.

For the festival this year, we are planning to offer "Play Park for Delivery," a project to merge "a place to stay" and "a place to play" for children. We will invite play leaders to make a liberal use of the shopping street for children. I hope this would further expand the community network.

15.10-15.45 DISCUSSION "STARTING STRONG IN THE COMMUNITY FOR THE NEXT GENERATION". All participants.

15.45-16.00 COFFEE BREAK

16.00-18.00 SYMPOSIUM 4. MOLECULE AND BEHAVIOR QUANTIFICATION TO VISUALIZE MENTAL ACTIVITIES. Chairs: Tomoda A and Yoshioka M (Japan)

16.00-16.30 THE RELATIONSHIP BETWEEN PARENTAL VISITATION AND MENTAL HEALTH AMONG INSTITUTIONALIZED CHILDREN IN JAPAN. Aki Yazawa¹ and Akemi Tomoda¹, 1. Research Center for Child Mental Development, University of Fukui, Fukui, Japan

Abstract: Research has shown that mental health problems are frequently observed among children in child care institutions. Although it is important to have positive communication with parents for their well-being, the situation might be different for institutionalized children who live separately from their parents and more likely to have experienced childhood adversity and lack secure attachment formation with their parents. The objectives of this study were to investigate the relationship between parental visitation and depressive symptoms among institutionalized children in Japan, and to explore whether the established security of attachment interacts with that relationship. A mixed effects regression analysis was conducted to investigate the associations using a cross-sectional data from 399 institutionalized children aged 9 to 18. Results showed that institutionalized children who had parental visitation had higher depressive symptoms than those who did not. Particularly, father's visitations were significantly associated with higher depressive symptoms. There was a significant interaction of secure attachment on the association; children with low scores on secure attachment showed higher levels of depression when they have father's visitation, whereas children with high scores on secure attachment did not. Although our cross-sectional results cannot infer any causal relationship, it may be important to conduct careful assessment before starting parental visitation, especially when children seem to have problems with attachment formation.

16.30-17.00 NORADRENALINE REUPTAKE INHIBITION INCREASES CONTROL OF IMPULSIVE ACTION BY ACTIVATING D1-LIKE RECEPTORS IN THE INFRALIMBIC CORTEX. Sasamori H, Ohmura Y, Yoshioka M, Hokkaido University (Japan) Hitomi Sasamori¹, Yu Ohmura¹, Mitsuhiro Yoshioka¹, ¹Department of Neuropharmacology, Faculty of Medicine and Graduate School of Medicine, Hokkaido University

Higher impulsivity is a risk factor for criminal involvement, substance abuse, and suicide. However, only a few drugs are clinically available for the treatment of deficient impulse control. We recently proposed a strategy for identifying potential drugs to treat such disorders by investigating clinically available drugs that increase extracellular dopamine levels in the medial prefrontal cortex and stimulate dopamine D1-like receptors without increasing extracellular dopamine levels in the ventral striatum. To determine whether this strategy is promising, we examined the effects of duloxetine, a

serotonin-noradrenaline reuptake inhibitor that might meet these criteria, on impulsive action in adult male Wistar/ST rats using a 3-choice serial reaction time task. The effects of duloxetine on extracellular dopamine levels in the medial prefrontal cortex and nucleus accumbens, a part of the ventral striatum were evaluated using in vivo microdialysis, as the noradrenaline transporter transports dopamine in some brain regions. Our results showed that the administration of duloxetine reduced impulsive actions and increased extracellular dopamine levels in the medial prefrontal cortex but not in the nucleus accumbens. Microinjection of a selective D1-like receptor antagonist into the infralimbic cortex, a ventral part of the medial prefrontal cortex, blocked the suppression of impulsive action by duloxetine. In addition, we demonstrated that the microinjection also blocked the suppression of impulsive action by atomoxetine, a noradrenaline reuptake inhibitor and an established anti-impulsive drug. These results support our proposed strategy for identifying and developing anti-impulsivity drugs.

17.00-17.15 FAMILIAR OR UNFAMILIAR INFANT-SOCIAL DISTANCE DURING PLAY VISUALIZED BY GPS AND CONFIRMED BY VIDEO. Kai R, Matunaga T, Yokota S, Suzuki S, Singh KJ, Kanazawa R, Hariyama M, Miyamoto N, Kobayashi Y, Watanabe H, Ito S, Kubota T, Senda M, Taniguchi S, Koshiha M Tohoku University (Japan), National Institute of Technology, Oyama College (Japan), Yamaguchi University (Japan), Kohoku Kindergarten (Japan), Seitoku University (Japan), Environment Design Institute (Japan)

Introduction: Current social issues such as infantile maladaptation in surrounding communities or parenting disabilities are facilitating a movement to find the solution for these issues based on a new technology to understand child mental development in the plays at home and any places. Many reports addressed early child learning how to interact and communicate with others during plays and how these plays may affect future individual characters of socialization. If novel information technology enables us to have the socializing process visualized quantitatively, such advanced internet of things (IoT) to support mental development may network in humans over generations.

Methods: We adhered to the contents approved by Yamaguchi University internal ethics consideration. Four five-year-old children participated wearing the usual caps attached by a light GPS (5 Hz) and small video camera (30 Hz) during their normal kindergarten lives outside. The data were post-analyzed each movement trajectory and distances between children by the latitude and longitude coordinates. The teachers wrote the behavioral observation briefly.

Results and discussion: The time series visualization enabled us to comprehend quantitatively where each participant walked and ran on Google map of the kindergarten and which children pair's distance was shorter or longer. The social distance shorter, supposedly the pair familiar each other, was referred to the teachers' observation, however, it seemed not always consistent. Alternatively, by the video data, we could exactly confirm that the closer distance pair played together. The more precise information would give us function to consider the more appropriate support and care for each individual.

17.15-17.45 DAY 1 CLOSING LECTURE: BEHAVIOR STUDY AND BODY CODE CONCEPT. Nakamura S, Tokyo University of Agriculture and Technology, CorLab Inc, (Japan), nakashn@cc.tuat.ac.jp

Behavior has been a focus of human studies from different research fields. Charles Darwin studied the origin of human emotion using facial expression among different ethnicities. The direct descendant of C Darwin, Konrad Lorenz, Nikolaas Tinbergen, and K von Frisch pioneered ethology of instinct and learning. Sigmund Freud started his psychiatry from a neuroethological study of crayfish. A psychiatrist J Bowlby developed the concept of attachment formation through the communication with these ethologists. We have re-investigated the neuroethological development of attachment formation using animal model (domestic chick and common marmoset, (Koshiha et al,

PloS ONE, 2013, Koshiba et al, Sci Rep, 2013) and child with autistic spectrum disorder (ASD), (Koshiba, Senoo et al, Sci Rep, 2013). We found a combinatorial code of behavior under a social context reveals emotional state without any psychological model over animal species like chick, marmoset, and human child (Bouquet method, Koshiba et al, Sci Rep, 2013). More general applicability of the combinatorial code of behavior has promoted us to develop it as a body code concept and to implement Bouquet method in a multi-modal sensor-analyzer system.

Recent advance of AI technology especially in the field of natural language processing and computer vision supports feature extraction from various biological data including behavior. I briefly introduce our recent study on a dancing behavior using Labanotation and suggest the importance of a new behavior research direction using both of body code and brain code.

Day 2. Monday, September 10, 2018

Hall D11, Yamaguchi University, Tokiwa Campus, Ube, Japan

09.00-17.00 REGISTRATION

Morning session

09.30-12.00 SYMPOSIUM 5. COMPARATIVE BEHAVIOR AND PSYCHO-COGNITIVE BIOLOGY
Chairs: Kalueff AV (Japan) and Yamanouchi H (Japan)

09.30-09.50 LEISURE MOTIVATION, BENEFIT, CONSTRAINT AND NEGOTIATION OF GAY PEOPLE – AN EXPLORATORY STUDY WITH JAPANESE AND AMERICAN RESPONDENTS . Binh Nghiêm-Phú, National Institute of Technology – Fukushima College (Japan)

Introduction Leisure has provided many benefits for gay people on the one hand. On the other, there are many factors that can negatively affect their leisure activities. Yet, the literature on gay leisure is very thin and scattered. Many issues remain unaddressed, for example, the leisure activities that gay people are taking, the motivations to participate in leisure activities, leisure constraints and negotiation strategies, and leisure benefits and their contributions to gay individuals' perception of quality of life. This study, therefore, aims to simultaneously investigate these issues using a qualitative research method.

Methods Eight interviews with Japanese and American gay people in Japan were implemented and structurally analyzed to produce six narrative stories about gay leisure.

Results and discussion Findings revealed that balancing work and leisure was the ultimate reason that motivates the respondents of this study to participate in leisure activities. In other words, it is the seeking of the benefits that motivate the respondents to do leisure. The rewards were numerous, including a relaxed mental state and some new life experiences. Otherwise, time, money, physical strength and social pressure were the four major factors that may constrain the respondents' leisure life. The major negotiation strategies were adaptation and/or avoidance. These findings suggest that leisure motivation, benefit, constraint and negotiation all could be structured by internal and external factors. In addition, sexual orientation may not the major factor which motivates and/or constrains gay people to enjoy leisure activities.

Research support The researchers would like to thank Professor David Freedman, Keio University, Japan and his students for their invaluable helps during the research period.

Keywords LGBT, snowball sampling, unstructured interview, storytelling

09.50-10.10 THE ROLE OF PREFRONTAL CORTEX IN STRESS VULNERABILITY (LITERATURE REVIEW). Tazkia, Alya Ayu. Sabtanugraha, Zainuri. Etty, Sari Handayani. Indonesia, Islamic university of Indonesia

Prefrontal works as a higher cognitive function, wherein a state of prefrontal stress is closely related to decision making. Each individual effect has different vulnerabilities in dealing with stress problems based on experience. In the state of stress occurs maladaptation of stress stimulation, with reducing in adaptation or cannot take decisions. Stress alters the dendritic structure of the Prefrontal, ie with reducing stress signaling pathway. The amygdala and mPFC play an important role during stressful situations, the occurrence of a reduction in mPFC dendritic cells. Recurrent Stress Stimulation will result in the reduction of dendritic mPFC and increased dendritic in the amygdala depending on how long exposure to stress. The dendritic cells of the distal portion will be significantly reduced while in the thin part of the dendritic cell is the part that serves as an adaptation, does not reduce. The mPFC Input Process connected to the Baso Lateral Amygdala (BLA) mPFC is also connected to the OFF level to the visceromotor network. Stress stimulation will focus on bottom-up regulation using activation on the amygdala and inhibiting prefrontal working memory dlPFC. DIPFC works as a working memory when people experience stress, they cannot think rationally as dlPFC is not activated. Unactivated dlPFC will inhibit the efferent work on the cerebral, premotor cortex, associate cortex (auditory, visual etc) and HPA axis. In this Literature Review will be discussed more in how Input and Output stress on prefrontal especially on the part involved and how the cognitive decreasing process in decision making in stress.

10.10-10.30 A MALE COMMON MARMOSET GRIEF AT THE PARTNER'S DEATH. YODA M, HUA Z, TAO T, YAMANOUCHI H, KOSHIBA M, YAMAGUCHI UNIVERSITY, SAITAMA MEDICAL UNIVERSITY, GUNMA UNIVERSITY OF HEALTH AND WELFARE (JAPAN)

Common marmoset *Callithrix jacchus* (hereinafter marmoset) is a kind of small monkeys living in the tropical relatively dry forests of the Atlantic coastal area of the northeastern part of Brazil. Not only mothers but also fathers and elder siblings support raising. Behaviors similar to humans, which are not recognized in other primates, such as vocal communication and sharing foods, are observed and are expected as model animals in social behavior research 1). Thus, the body motion in 3D space of our model animal, a male common marmoset was evaluated on the ability to express his emotion. The female partner died of an illness. He spent more than seven year with the partner at home. The behaviors of the male were recorded on (1) the five days before death, (2) the day confirmed dead, and (3) seven days after death. The center motion of the body for 3 minutes were quantified and compared. In the results, the male motion was suppressed significantly on the day of female's death comparing to (1) and (3). The male might understand the grief at the partner's death. Immobility is used as behavioral markers of diagnosis "depression". In human case, the grief must be the saddest condition in emotional category. It may be discussed whether it is early or not for the male to have recovered on the seventh day after the partner's death. The cause of the female death was unclear except cavities in the mouth. On the other hand, common marmoset nature impresses us on mental vulnerability.

*Reference: Mansfield K. et al. Comp Med. 2003; Miller CT. et al. Neuron. 2016

10.30-10.50 STRESS-RESPONSE AND STEPS AGAINST STRESS OF NONHUMAN PRIMATES IN ZOO. Kimura Y, Kawade H, Kajigaeshi T, Miyashita M, Tokiwa Zoo (Japan)

Nonhuman primates in zoos are received specific stress different from in wild environment. Because they are fed in facilities, the area which animals can move is restricted and behavioral variability is decrease. Therefore, stress-response occur in animals. Other factors of stress for animals are gaze and voices from visitors, and noise of traffic and constructions. Behaviors of primates which are received stress are "over-grooming" "regurgitation and reingestion" "stereotypic behavior". Methods of estimating stress level about nonhuman primates in zoos are investigated behavior and endocrine. Recently, researchers in zoos measures cortisol to examine stress level, and they estimate stress level in scientific. Zoos tackle to be decrease stress and they aimed

animals are lived in happiness on physical and mental. These steps are called “Environmental Enrichment”, which are methods of Animal Welfare. “Environmental Enrichment” has some methods, for example “Feeding Enrichment”, “Social Enrichment” and many zoos are doing “Environmental Enrichment”. I will give a few stress-response about nonhuman primates and I will introduce steps against specific stress like “Environmental Enrichment”.

10.50-11.00 (COFFEE BREAK)

11.00-11.20 DIFFERENT PREDICTIVE STRENGTHS OF CORTISOL, OXYTOCIN, AND SLEEP FOR DIFFERENT PSYCHOLOGICAL SYMPTOMS. Larkin TA, Thomas S, University of Wollongong, (Australia) University of Wollongong, Wollongong, NSW, Australia

Introduction: Cortisol and oxytocin are both implicated in psychological health and disease, but with contrasting effects. Cortisol is associated with psychopathologies including stress and hostility, while oxytocin is inversely correlated with anxiety. However, there are inconsistency in results, and comprehensive studies examining multiple hormones alongside additional measures such as sleep are lacking. We aimed to determine whether cortisol, oxytocin and sleep are differentially correlated with distinct symptom profiles of psychopathology in depressed and non-depressed individuals.

Methods: Plasma cortisol and oxytocin concentrations were quantified from a morning blood sample in healthy participants and participants meeting DSM 5 criteria for major depressive disorder. Participants completed the Brief Symptom Inventory (BSI), a 53-item self-report measure of most major forms of psychopathology with nine domains (Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic anxiety, Paranoid ideation, Psychoticism) and three global indices.

Results and Discussion: Cortisol was significantly positively correlated, and sleep was significantly inversely correlated, with all psychopathology domains. Oxytocin had a more discriminatory profile, with stronger correlations with the somatization, paranoid ideation, interpersonal sensitivity and anxiety domains; weaker correlations with depression, phobic anxiety and psychoticism; and no significant correlation with the obsessive-compulsive and hostility domains. Multiple regression analyses indicated that cortisol predicted 30%, and the combination of cortisol, oxytocin, age and sleep predicted 40-50%, of the variance of the BSI total score and the Global Severity Index. Overall, cortisol and sleep were stronger predictors of psychological symptom profiles, while oxytocin was more discriminatory, having stronger correlations with psychopathologies characterised by distress pertaining to interpersonal relations and social situations.

11.20-11.40 PRACTICAL APPLICATION OF MONTESSORI EARLY CHILDFOOD EDUCATION AND CARE. Watarai-Senoo A, Sakuragaoka Nursing School (Japan)

In Japan, a lot of two-income households have been increasing the rate of utilization of a nursery school. Therefore, many children spend most of their time at a nursery school not at home. They have to acquire abilities of daily living, e.g., meal, exercise, change of clothes, excretion, and sleeping. Since it is important to observe and analyze the behavior of child with an extensive knowledge of the process and characteristics of the development, nursery teachers slowly and clearly give instructions according the stages of development of children and help them to solve their problem by themselves. Although early childhood education becomes increasingly sophisticated through involvement with children, its approaches base on individual's subjective view and have little support by scientific evidence or expertise. This presentation introduces the example of a nursery education style and suggests issues that frontline nursery faces today.

11.40-12.00 A CHERRY TREE'S STRESS AND RECOVERY BY INCLUSIVE INTERVENTION-Cerasus xyedoensis (Matsum.) Masam. & Suzuki 'Somei-yoshino', Hayakawa Y1, Koshiba M2, Japan Tree Doctors Association, Yamaguchi University (Japan)

Plants based on different biological mechanisms from animals "act" slowly in longer time series than animals. However, plant biological functions are influenced by the environment stress like animals. In this report, one case is introduced how the subject tree had got stressed in Yamaguchi Ube City facing the western Seto Inland Sea, where the International Stress Behavior Society conference 2018 is held, and how the tree recovered with intervention as a qualitative observation. A tree of the Japanese national flower, cherry (*Cerasus xyedoensis* (Matsum.) Masam. & Suzuki 'Somei-yoshino') was targeted, that was diagnosed "remarkably vulnerable state" (Japan Greenery Center 2009). The pathogenetic factors for the appropriately 60 year-old tree was assumed some incidents at the building constructed eleven years ago. Water, nutrients and air around the root are essential for a tree health. The soil investigation of these factors resulted in high risk condition about lower air and water with many waste materials. The trunk had damaged bark predicted exfoliation near future. Thus, soil intervention to give water, nutrients, air and the damaged bark were covered and operated to promote and regulate root and trunk development. Consequently, a recovery symbol, a young branch with amount of leaves was induced its development. These diagnoses and interventions suggested the soil air gaps important for roots but might be easily reduced by artificial environment stress, such as many blossom lovers staying near the tree. We must design some novel intelligence to understand trees' stress to be removed for our mutually sustainable society of plants and animals.

12.00-13.00 LUNCH BREAK (@ University Cafeteria)

Afternoon session

13.00-16.00 SYMPOSIUM 6. STRSS-LESS LIFE APPLICATION TECHNOLOGY AND INTELLIGENCE Chairs: Koshiba M and Kuremoto T (Japan)

13.00-13.20 WELFARE TECHNOLOGY FOR FUTURE LIFE . Narasaki H, Nakashima S, Yamaguchi University (Japan)

13.20-13.40 MENTAL TASK RECOGNITION USING EEG SIGNAL AND DEEP LEARNING METHODS. Takashi KUREMOTO¹, Takasaki SASAKI¹, Shingo MABU¹, ¹Graduate School of Science and Technology for Innovation, Yamaguchi University,

Electroencephalogram (EEG) signal recorded electrical activity of the brain has been used to analysis disorders of the brain, mental task classification, motor imagery recognition, and so on. Conventionally, machine learning methods, e.g., multi-layer perceptron (MLP), support vector machine (SVM), linear discriminant analysis (LDA), etc, are utilized in EEG signal recognition, and recently, deep learning, i.e., convolutional neural networks (CNN) are adopted into this field for its powerful ability of feature extraction of high dimensional data. In this study, we investigated kinds of classifiers and proposed to construct hybrid EEG signal recognition methods such as the composition of MLP and SVM, and CNN with SVM. Metal task benchmark data provided by Colorado University which includes 5 tasks, i.e., relaxing, computation, counting, article considering, and 3-D object rotating, were used in the experiments and all experiment results showed the priority of the proposed methods.

13.40-14.00 VERTUAL EMBRACE INTERVENTION WITH VISUALIZATION USING HYPER MIRROR AND JACKET CONTROL OF TOUCH AND THERMAL SENSES.
Morikawa O, Yamaguchi University (Japan), Yamaguchi University, Japan,
morikawa@yamaguchi-u.ac.jp

Abstract: Virtual embrace is healthcare technique aiming at drawing out the psychological response when being embraced without being embraced actually. The subject can see him-/herself hugged by a favorite and trustful person in the synthesized digital mirror image. This psycho-

cognitive experience like so-called 'Rubber Hand Illusion' consequentially induces euphorogenic effects in the subject with his/her physiological responses. The current report is our recent progression around an approach to practical application with touch and thermal sensory stimulation by jacket pressure control using air cylinder. The participants were induced their positive emotion and relaxation by both senses stimulation. Particularly, touch? sensory stimulation just before the body supported under the bondage condition revealed the most effective results in the participants.

14.00-14.20 SHRINE INTERACTIVE INSTALATION VITALIZED CHILDREN ACTIVE BEHVIOIRS AND POSITIVE EMOTION IN THE LOCAL COMMUNITY. Hua Z, Sato R, Horikawa Y, Kumagai M, Hayakawa Y, Kaneko J, Marumo Y, Koshiha M, Yamaguchi University (Japan)

Any of the Japanese local communities are facing the issues, declining birthrate and aging population. Such the unbalanced communities commonly seem to have communication problems between different generations. This situation often makes children relieved nowhere. Although information and communication technology, ICT, has been progressing day by day, we see ICT is sometimes likely to avoid the humane communication between children and adults. Thus, to seek novel ICT design direction to activate mental and body function in both children and adults for their communication, we attempted to develop a series of installation consisting of human sensor- digital image communicating system as augmented reality (AR) at one real space. That was a shrine, traditional symbolic place for the community on the festival day. The multiple particle falling movements to various directions were interactively dependent on some visitors and presented on the semitransparent screen hanged at the shrine gate "Torii" and the same particles were simultaneously projected on the ground where pebbles spread. The visually cognitive space modulation seemed to induce most of all visitors' behaviors reactive in both 101 children and 199 adults. To assess how the visually illumination stimulated and functioned the visitors behavioral and mental modulation, the behavioral types were discriminated into six types as communicating, observing, image recording, physical motion, running, and no reaction. Consequently, the analysis described 90 % of the visitors appeared positive behaviors and the children behavior were characterized in physical activation significantly more than adults, remarkably dependent on the number of children as positive correlation. This ICT work showed its possibility for vitalization of both children and adults in the community space.

14.20-14.40 ELDERLY PSYCHOLOGICAL INFLUENCES IN DIGITAL-INTERACTIVE SPACE TRAINING THROUGH HUMAN SOUND OR MOTION SENSING. Fujita K, Sato R, Takata J, Matsuda Y, Tao T, Kinoshita F, Koshiha M, Japan Tree Doctors Association, Yamaguchi University (Japan)

One of the characteristics seen of elderly people with dementia is a reduction in behavioral motivation. This induces synergistic deterioration of the emotional and any other functions, including senses, cognition and motion.

Therefore, we develop an interactive video / sound output system that responds to the elderly movements and voices and seek effect to induce positive emotion with negatively mental suppressed. The multiple particle images are regulated on the size, color and motion dependently on human sensing by acoustic sensors via auditory systems or human behavioral motion image acquisition by depth cameras. We also set the control without interactive function as passive state. These three types of digital space training program were experienced by six elderly participants. The output of vocal languages during the program were recorded and discriminated emotionally positive or negative.

In the current programs, the participants' physical activation by 3D depth camera affected increasing the number of positive emotional words than acoustic sensing program significantly. As negatively emotional words output were hardly heard in any kinds of the programs, unlimited

possibilities would be open by digital interactive space training program which can be tailored to each individual through precise regulation by computer.

14.40-15.40 PLENARY LECTURE: INTERNET OF THINGS (IOT)'S FUTURE SOCIETY,
Watanabe J, Hitachi, Ltd. Systems & Services Division, President of Business Management Division Director, The Society of Project Managementchi University (Japan) Joji Watanabe, Hitachi, Ltd. Systems & Services Division, President of Business Management Division, Director, The Society of Project Management

In this lecture, we first learn the general concept of IoT (Internet of Things) and the relationship with synonym "digitization". Next, we know some of the symbolic cases of transformation that IoT has brought to society. These are examples of the fact that IoT has changed the form of offer of goods, thereby changing human purchasing behavior as well. Many countries around the world are promoting policies and standardization related to IoT. We grasp the outline and study the "Society 5.0" advocated by the Japanese government. Society 5.0" is a concept that appeared in the fifth period of the Basic Law of Science and Technology (FY 2016 to FY 2020). It aims at solving economic development and "social problems with a system that integrates cyber space (virtual space) and physical space (real space). It can be said that Society 5.0 predicts the near future by IoT. Finally, I will introduce the "KIZASHI of digital society" which is the research result of Hitachi, Ltd. to which I belong. This is derived from the psychological knowledge and design-oriented consideration of the change that IoT brings to the human mind, and it predicts the change in IoT on a somewhat long time axis .

15.40-16.00 COFFEE BREAK

16.00-17.45 SYMPOSIUM 7. IMPLEMENTING CONTENT AND LANGUAGE INTEGRATED LEARNING IN NEUROSCIENTIFIC CONSIDERATION Chairs: Uemura T and Koshihara M (Japan)

16.00-16.30 DEVELOPING CONTENT AND LANGUAGE INTEGRATED LEARNING (CLIL) FOR MANUFACTURING EDUCATION. Mayumi Tanaka*1, Makoto Ikeda*2, Naritoshi Aoyagi*3, *1 Mukogawa Women's University, Hyogo, Japan, *2 Sophia University, Tokyo, Japan, *3 National Institute of Technology, Nagaoka College, Niigata, Japan

INTRODUCTION: The English language is the current lingua franca of international business and technology. Since English communication skills are essential for engineering students, we have developed a pedagogical model for manufacturing education based on Content and Language Integrated Learning (CLIL). CLIL is "a dual-focused educational approach in which additional language is used for the learning and teaching of both content and language" (Coyle et al. 2010: 1). In our research, the content to teach is manufacturing engineering, and the language to use and teach is English.

METHODS: We interviewed 5 engineers who had worked in international settings, 1 engineering student, and 1 English teacher working at a college of technology. We conducted a qualitative content analysis of the interview data.

RESULTS AND DISCUSSION: We developed a model of CLIL for manufacturing education. The model follows the teaching and learning principles called 'the four C's of CLIL': Content (teaching subject matters and skills for manufacturing), Communication (teaching English communication skills for manufacturing), Cognition (developing thinking processes and skills for manufacturing), and Culture/Community (developing intercultural understanding or cooperative learning in manufacturing settings). We also identified four types of expressions necessary for communication in the manufacturing industry: (1) simple expressions (directing or reporting routine operations simply); (2) detailed expressions (directing or reporting operations in detail); (3) logical expressions (directing or reporting operations logically to those who share the same context); and (4) appropriate and

accurate expressions (directing or reporting operations accurately in a socio-culturally appropriate way to those who do not share the same context).

RESEARCH SUPPORT: The Mitsubishi Foundation Research Grants 2015 in the Humanities, JSPS, KAKENHI Grant Number JP18K00741

16.30-17.00 A NEW APPROACH OF CLIL FOR MECHANICAL ENGINEERING COURSE.

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INTRODUCTION: This article explains an English lesson newly designed for engineering students based upon the pedagogy called Content and Language Integrated Learning (CLIL) conducted at a KOSEN, or national college of technology in Japan. Aoyagi et al. (2016) has already presented the results of this attempt in Japanese and showed the effectiveness of the approach. The purpose of this articles is therefore to introduce the authors' previous efforts and achievements in English of the CLIL pedagogy applied for mechanical engineering students in order to share the achievements with people outside Japan.

METHODS: The course was divided into five classes and a teaching material opted for was a vegetable-harvest robot that they had already been taught and experienced. Teachers gave the students tasks that they were asked to work in groups and prepare a sales presentation in English using five presentation slides for the vegetable-harvest robots that they designed, processed and assembled during the course.

RESULTS: The results from a questionnaire given to the students suggest that the effectiveness of students' motivation for learning English as well as their positive attitude towards learning should be confirmed. The results of the questionnaire also revealed the effectiveness of CLIL education for utilizing English and fostering English cognition through this approach, the meaningfulness of fusion of engineering subject and English education, and students' strong wish to convey the contents they experienced. Furthermore, it suggests that specific feedback given to students should be effective for improving their English expressions born by their cognitive minds.

DISCUSSIONS: Based upon the teaching principles of CLIL, a simulation of overseas sales presentations of vegetable-harvest robots attempted this time proves its effectiveness of teaching English with CLIL, which can be one of educational models for teaching English for engineering students.

RESEARCH SUPPORT: This work was supported by JSPS KAKENHI Grant Number JP18K00741.

Keywords CLIL, Engineering education, KOSEN, English in engineering

17.00-17.30 PEDAGOGICAL INNOVATION AND MATERIALS DEVELOPMENT IN ENGLISH EDUCATION: APPLYING CLIL FOR POSTGRADUATE ENGINEERING STUDENTS. Uemura T, Tanaka M, Ichimura K, Aoyagi N, Ikeda M, Yamaguchi University, Mukogawa Women's University, National Institute of Technology, Nagaoka College, Sophia University (Japan)

INTRODUCTION: To meet increasing expectations from Japanese industries to produce innovative and global human resources, the Graduate School of Sciences and Technology for Innovation at Yamaguchi University launched a new educational program called Center for Postgraduate Training (CPOT), which provides students with opportunities, including English education, to collaboratively learn in an interdisciplinary cohort of 15 to 20 learners. This paper outlines plans of a four-year collaborative research project to develop innovative practical English course materials for CPOT engineering students, applying the latest Content and Language Integrated Learning (CLIL) pedagogy.

PROTOCOLS FOR PEDAGOGICAL AND MATERIALS DEVELOPMENT: In the first year, we will (1) interview engineers and develop sample dialogues according to the complexity of expressions required in differing business contexts; (2) conduct discourse analysis of the dialogues, identifying linguistic features; (3) design a new syllabus and develop authentic tasks informed by the discourse analysis; (4) prepare a rubric for student self-assessment, and pre- and post-course achievement tests. In the second year, we will (5) pilot materials developed in (3) and (4) for one semester and conduct classroom discourse analysis; (6) administer questionnaires and interviews concerning student progress, the rubric, and pre- and post-course achievement tests. We will also (7) develop a textbook reflecting upon aforementioned data. In the third year, we will (9) use the textbook for one semester and enhance it after conducting the same data collection and analyses as in the previous year. In the fourth year, we will (10) publish a revised textbook and present on this project at an international conference.

EXPECTED OUTCOME AND FUTURE PLANS: This project will result in the publication of the first textbook applying CLIL principles for engineering students at the postgraduate level in Japan. The team will then develop additional textbooks for wider educational contexts such as technical colleges and high schools within 10 years.

RESEARCH SUPPORT: This work was supported by JSPS KAKENHI Grant Number JP18K00741 and fiscal 2016 budget requests to MEXT by Yamaguchi University entitled *Establishing new model of postgraduate school education for development of innovative human resources*.

17.30-17.45 DISCUSSION

17.45-18.00 CONFERENCE CLOSING REMARKS





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