

SIPS | SURABAYA
2017 | INTERNATIONAL
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SEMINAR

**PROCEEDINGS OF
THE SURABAYA
INTERNATIONAL PHYSIOLOGY
SEMINAR**

Surabaya, October 12-14, 2017

Editors:

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Gestrindo



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BRIEF CONTENTS

INVITED SPEAKERS	IV
ORGANIZING COMMITTEES	V
FOREWORD	VII
CONTENTS	XI

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FOREWORD

Dean of Faculty of Medicine, Universitas Airlangga

Assalamu'alaikum Wr. Wb.

Distinguished Guests, all the Participants, Ladies and Gentlemen

On behalf of Faculty of Medicine, Universitas Airlangga, it is my great pleasure to welcome all the speakers, moderators, and participants on **Surabaya International Physiology Seminar 2017 (SIPS 2017)**, which will be held from today, October 12th until October 14th, 2017. I would like to express my hearty welcome to all the international speakers, **Prof. Cheng Hwee Ming**, from University of Malaya, Malaysia; **Prof. Daniel John Green**, from University of Western Australia; **Dr. Fadzil Hamzah**, from Sport Center of Changi General Hospital, Singapore and **Dr. Deanne Helena Skelly**, from Griffith University, Australia.

The aim of SIPS 2017 is to provide a platform for academicians, educators, researchers, practitioners, undergraduate and postgraduate students to share and discuss the knowledge of the recent issues, opinions, researchers about the development and innovation of physiology in medical science, dentistry, veterinary, plants and agriculture, sports and sciences.

I believe this event is a great purpose in order to develop knowledge, experiences and best practices that can be applied for the good, especially in the field of healthcare as a whole.

Finally, I would like to express my sincere acknowledgements to those who take part and especially for Department of Medical Physiology, Faculty of Medicine, Universitas Airlangga for their effort in holding this event and wishing all to have success.

Wassalamu'alaikum Wr. Wb.

Prof. Dr. Soetojo, MD.

Faculty of Medicine, Universitas Airlangga

Chair of Committee / Head of Physiology Department, Faculty of Medicine, Universitas Airlangga

Assalamu 'alaikum Wr. Wb

Greetings,

On behalf of SIPS committee and Physiology Department, Universitas Airlangga, we are welcoming to Surabaya, City of Heroes.

This year, the annual meeting of Indonesian Physiology Society (IAIFI) is hosted at Surabaya, entitled "**Surabaya International Physiology Seminar Workshop (SIPS)**". We present some update workshop and lectures in order to bring physiology research from basic to clinical application on humanities, animal welfare and good environment. All participants have opportunities to publish their research in presentation, poster and ISBN proceeding. Selected papers will be submitted to SCOPUS indexed proceeding/ journal and awarded as Best Poster and Best Oral Presentation.

We hope that all participants will get some interesting experiences for next 3 days, 12-14 October 2017. Enjoy our lectures and workshops, taste the culinary and take your time to sightseeing around Surabaya.

Wassalamu 'alaikum wr. wb.

Dr. Bambang Purwanto

Chairman of Committee / Head of Physiology Department
Faculty of Medicine, Universitas Airlangga

Welcome Address - Surabaya International Physiology Seminar Workshop (SIPS)

Dear fellow Physiologists and Participants,

On Behalf of the Indonesian Physiological Society (IAIFI) and the Physiology Department Faculty of Medicine Universitas Airlangga, I would like to welcome you all to Surabaya International Physiology Seminar (SIPS), held on 12-14 of October 2017.

Finally after long-awaited Surabaya gets a turn again to host and organize the International Physiology Seminar. Hence the Steering- and Organizing Committee consisting of young energetic physiologists are determined to make the Seminar a successful one. The theme of the seminar is:

"The Role of Physiology in Translation Research: From Basic to Application"

This annual meeting covers a wide range of topics of Physiology on Medicine, Dentistry, Veterinary, Plants and Agriculture, Sports and Sciences. We sincerely hope that SIPS 2017 enable to provide a platform for academicians, educators, researchers, practitioners and postgraduate students to present and discuss researches, development and innovations in wide range of topics as mentioned above. It will provide all participants to share knowledge, exchange new ideas and their experiences in many research topics, for then it will enhance future collaborations.

With great interest and enthusiasm I look towards the success of this Seminar, and wish all of you every success and a pleasant stay in Surabaya.

May Allah Swt. bestow upon us His Blessings.

On Behalf of the Steering and Organizing Committee Senior Physiologist,
Prof. R. Soedarso Djojonegoro

CONTENTS

PAPERS

FULL PAPERS

- The Dominant Personality Type in Vertigo Patients
Nanda Rizky FS, Netty Herawati, Nyilo Purnami, Nining Febriyana and Abdurachman 5
- The Role of Osteocytes in Alveolar Bone During Tooth Movement
Agni Febrina Pargaputri1 and Noengki Prameswari 10
- Body Movement and Islamic Energy Psychology Acupressure to Improve the Future Orientation In A Person With HIV
Ambar Sulianti and Fenti Hikmawati 15
- White Matter Changes in Neurodegenerative and Global Cortical Atrophy Scale Correlation in Older Patients Using Magnetic Resonance Imaging
Anggraini Dwi Sensusiaty 21
- The Influence of Mass Basic Life Support Training on The Skills and Attitude in Undertaking Life Support Using the Method of the Faculty of Medicine, Universitas Airlangga
Arie Utariani, Teguh Sylvaranto, April Poerwanto Basoeki, Prananda Surya Airlangga, Windy Ari Wijaya, Soni Sunarso Sulistiawan, Bambang Pujo Semedi, Christrijogo Sumartono, Hamzah, Kohar Hari Santoso, Philia Setiawan and Eddy Rahardjo 26
- Reflections of a Physiology Teacher
Cheng Hwee Ming 30
- Does Sequential Diabetes Dance Improve on Glucose Level and Glucose Tolerance?
Cynthia Wahyu Asrizal and Bambang Purwanto 33
- Antioxidant Effect of Dayak Onion Extract (*Eleutherine Americana* Merr.) on Serum MDA Levels in Mice (*Mus Musculus*) Exposed by Lead Acetate
Daeng Agus Vieya Putri, Gadis Meinari Sari and Tjitra Wardani 37
- Exercise as Cardiovascular Medicine: Early Detection and Optimal Prevention
Danny Green and Raden Argarini 40
- The Effect of Circadian Rhythm on Hematopoietic Stem Cell Mobilization in Peripheral Blood as a Result of Submaximal Physical Exercise
Dhoni Akbar Ghozali, Harjanto and Agung Dwi Wahyu Widodo 48
- The Effect of Intermittent Fasting Vs Low Calorie Diet to Insuline Like Growth Factor-1 (IGF-1) Concentration, Fat Mass and Lean Mass of *Rattus Norvegicus* Obesity Model
Dian Wijayanti, Sunarjati Sudigdo Adi, Achadiyahani, Gaga Irawan Nugraha, Reni Farenia and Adi Santosa Maliki 53
- Uphill 10° Inclination Angle of Treadmill Concentric Exercises Improves Blood Glucose Levels and Glut-4 Levels in Diabetes Mice Model
Dini Surya Noviyanti, Bambang Purwanto and Choesnan Effendi 56

Variability in The Response to Low Impact Aerobic Exercise in Women Abdominal Obese With the Polymorphism of Uncoupling Protein-1 Gene <i>D Mukhtar, Siagian M, N Ibrahim, Neng Tine, T Ahmad, M Suryaatmadja, SW Jusman, AS Sofro, M Abdullah, S Waspadji and S Sugondo</i>	62
The Effect of an Aluminium Foil Shield on Reducing The Strength of Electromagnetic Radiation of Mobile Phones Reaching the Oculi of Adult Male Rats <i>Dion K. Dharmawan, Viskasari P. Kalanjati and Abdurachman</i>	67
The Effect of Osteocyte Signalling on Osteocyte Apoptosis <i>Dwi Setiani Sumardiko, Purwo Sri Rejeki and Gadis Meinar Sari</i>	72
Intermittent Physical Training Decreases Peak of Blood Glucose Level after Meals in Rats <i>Eka Arum Cahyaning Putri, Raden Argarini, Bambang Purwanto and Lilik Herawati</i>	76
The Effect of Cantaloupe Extract on Sperm Quality of Adult White Rats (<i>Rattus Novergicus</i>) Strain Induced by Ciproteron Acetat <i>Elyna Mahruzza Putri, Achadiyani, Sunarjati, Sudigdoadi, Oki Suwarsa and Adi Santosa Maliki</i>	80
Correlation Between Academic Stress, Sleep Quality, Circadian Misalignment, Cortisol Concentration and Heart Rate Value at the First Year Medical Student at the State Islamic University Maulana Malik Ibrahim of Malang <i>Ermin Rachmawati, Muhammad Farid Wafi and Ira Resmi Melani</i>	84
PIGF as Predictor of Preeclampsia Complication <i>Ernawati E, Manggala PS, Khanisyah Erza, Rozi Aditya, Cininta M, MI Aldika Akbar, Budi Wicaksono, Agus Sulistyono, Hermanto TJ, Nadir Abdulah, Erry Gumilar and Adityawarman A</i>	91
Aluminum Foil Shield Diminishes the Electromagnetic Radiation of Mobile Phones in the Cerebellum of Adult Male Rats <i>Etha Rambung, Viskasari P. Kalanjati and Abdurachman</i>	97
Sauropus Androgynus for Increasing Uterine Weight in Menopausal Women: An Experimental Study Using Animal Models <i>Exma Mu'tatal Hikmah and Retno Susilowati</i>	101
Exercise And Swimming in Pregnancy - Physiological Considerations <i>Fadzil Hamzah</i>	106
The Comparison Effect Between Bodyweight and Sprint Interval Exercises Using Tabata Method Towards Heart Rate Frequency, Lactate Blood and Physical Fatigue Perception <i>Fengki Aditiansyah, Elyana Asnar and Choesnan Effendi</i>	112
Detection of COMT ^{Val158^{Met}} Gene Polymorphism in Chronic Schizophrenic Patients at Psychiatric Unit of DR. Soetomo Hospital Surabaya, East Java, Indonesia <i>Gwenny Ihsan Prabowo, Margarita Maria Maramis, Erikavitri Yulianti, Afrina Zulaikah, Zain Budi Syulthoni, Citrawati Dyah Kencono Wungu, Hendy Muagiri Margono and Retno Handajani</i>	117
Hyperbaric Oxygen (HBO) Heals Cell Through Reactive Oxygen Species (ROS) <i>Handi Suyono and Guritno Suryokusumo</i>	123
Correlation of Fat Free Mass and Skeletal Muscle Mass with Left Ventricular Mass in Indonesian Elite Wrestlers and Dragon Boat Rowers <i>Henny Tantonno, Mohammad Rizki Akbar, Badai B. Tiksnadi, Triwedya Indra Dewi, Sylvie Sakasasmita, Maryam Jamilah, Daniel Womsiwor, Ambrosius Purba, Augustine Purnomowati and Toni Mustahsani Aprami</i>	128

Decrease of Homocysteine Plasma Degree in Smokers by Low Intensity Weight Training and Supplementation of Folic Acid and Cyanocobalamin <i>HS Muhammad Nurfatony, Damayanti Tinduh and Tjitra Wardhani</i>	133
The Role of Physiology in Ergonomics - Empowerment Human Resources for Nations Competitiveness <i>I Putu Gede Adiatmika</i>	137
Influence of Use of Insole on Blood Glucose Rate Diabetes Mellitus Type-2 <i>Ignatius Heri Dwianto, Bambang Purwanto and Sony Wibisono</i>	143
The Profile of Endothelin-1 (Et-1), Receptor ET _A , And Receptor ET _B in Young and Adult Obese Wistar Rat <i>Irfan Idris, Aryadi Arsyad, A. Wardihan Sinrang and Syarifuddin Alwi</i>	147
Characteristics of Glucose Tolerance, Energy Expenditure, Lactic Acid Level, and Oxygen Saturation in Indonesian Diabetes Dance Version 6 <i>Irfiansyah Irwadi and Bambang Purwanto</i>	151
The Effect of Aluminium Foil Shielding in Hampering Electromagnetic Radiation Emitted from A Mobile Phone as an Oxidative Stressor in The Cerebra of Adult Male Rats <i>Irmawan Farindra, Viskasari P. Kalanjati and Ni Wajan Tirthaningsih</i>	154
Effect of Exercise on Learning Capability and Memory of Mice (<i>Mus Musculus</i>) Exposed to Monosodium Glutamate (MSG) <i>Husnur Rofiqoh, Kristanti Wanito Wigati and Suhartati</i>	159
Low, Moderate, and High Intensity Swimming Exercise Has No Negative Effect on Semen Analysis Test in Male Wistar Rats <i>Kristanti Wanito Wigati, Sundari Indah Wiyasihati and Misbakhul Munir</i>	165
High-Calorie Diet Reduces Neuroglia Count <i>Nilam Anggraeni, Kristanti Wanito Wigati, I Lukitra Wardani and Lilik Herawati</i>	169
Three Weeks of High-Intensity Interval Training (HIIT) Decreases Visfatin Level on Overweight Men <i>Amal A. Hidayat, Mohammad Budiarto and Lilik Herawati</i>	174
VO ₂ MAX of Ergocycle Astrand Test Differs from 12-Minutes Cooper Running Test on Medical Students' Physical Fitness Level <i>Bella Anggi Afisha, Atika and Lilik Herawati</i>	178
Non-Invasive Method on Slow-Twitch Quadriceps Muscle Fibers Dominate a High Level of Fitness <i>Yuannita Ika Putri, Andre Triadi Desnantyo and Lilik Herawati</i>	182
Genotype Hepatitis B Virus Among Intravenous Drug Users with Occult Hepatitis B Infection in Surabaya, Indonesia <i>Lina Lukitasari, Lilik Herawati, Edhi Rianto, Indri Safitri, Retno Handajani and Soetipto</i>	186
Anopheles Vagus Larval Midgut Damage as an Effect of Areca Catechu L. Seed Extract <i>Majematang Mading, Yeni Puji Lestari, Etik Ainun Rohmah, Budi Utomo, Heny Arwati and Subagyo Yotoprano</i>	192
The Effect of Mozart's Music on <i>Mus Musculus</i> Balb/C Spermatozoa's Quantity and Motility Exposed by Lead Acetate <i>Maria Selviana Joni, Paulus Liben and Hermanto Tri Joewono</i>	198

The Lactid Acid's Decrease After Submaximal Exercise Due to Zamzam Water Treatment Compared the Packed Water <i>Moh. Tomy Yusep, Elyana Asnar STP and Harlina</i>	201
The Correlation of Lung Vital Capacity, VO ₂ Max, and Heart Rate Recovery With Changes in Blood Lactate Levels in Young Male: Cross Sectional Study in Provoked By Repeated Sprint Sessional-3 <i>Mustofa, Susiana Candrawati, Khusnul Muflikhah, Tiara Dwivantari, Rahardita Alidris and Dessy Dwi Zahrina</i>	204
Fgf 21 Secretion as Acute Response to Exercise in High Fat Diet Fed Rats <i>Nafi'ah, Imelda Rosalyn Sianipar, Nurul Paramita, Rabia and Neng Tine Kartinah</i>	208
The Miracle of Stichopus Hermanii <i>Noengki Prameswari</i>	212
Effect of Chemical Exposure on Endocrine System Disorder (Article Review) <i>Nurul Mahmudati and Husamah</i>	220
The Effect of Acute Exercise of Basic Breathing Motion on Breathing Skills Retention in Swimming <i>Okky Sinta Dewanti and Choesnan Effendi</i>	226
Correlation Between Body Mass Index and Medial Longitudinal Arch of The Foot in Children Aged 5–6 Years <i>Purwo Sri Rejeki, Irfiansyah Irwadi, Widiarti and Misbakhul Munir</i>	230
Correlation Between Agility and Flat Feet in Children 5–6 Years Old <i>Anita Faradilla Rahim, Miftahul Nur Amaliyah, Irfiansyah Irwadi and Purwo Sri Rejeki</i>	234
Correlation Between Hand Grip and Achievement in Indonesian Female Floorball Athletes <i>Loren Fibrilia Perangin-angin, Siti Maesaroh, Irfiansyah Irwadi and Purwo Sri Rejeki</i>	238
Maternal Anthropometrics as a Predictor of Preeclampsia Risk Factor <i>Putri Wulan Akbar, Florentina Sustini, Hermanto Tri Juwono and Handayani</i>	241
Correlation Between Activity Level and Circadian Rhythmicity of Medical Students (Class Of 2014) at the Faculty of Medicine, Airlangga University <i>Qurrota Ayuni Novia Putri, Irfiansyah Irwadi, Agustina Salinding and Sundari Indah Wiyasihati</i>	244
Exercise Formula to Induce Beiging Process: A Study Based on Acute Response of Irisin <i>Rabia, Neng Tine Kartinah, Nurul Paramita, Nafi'ah and Imelda Rosalyn Sianipar</i>	248
Effects of the 6th Series of Senam Diabetes Indonesia on Energy Expenditure <i>Riza Pahlawi, Harjanto JM and Dwikora Novembri Utomo</i>	252
The Difference of B-Endorfin Level in Brain Tissue and Testicular Tissue on Wistar Rats Given Once a Week Aerobic and Anaerobic Exercise <i>Rostika Flora, Lisna Ferta Sari, Muhammad Zulkarnain and Sukirno</i>	256
The Effectiveness of Ultrasound-Guided Injection for Pain Management in Indonesia <i>Soni Sunarso Sulistiawan, Dedi Susila, Belindo Wirabuana, Herdiani Sulilstyo Putri, Yusuf Fil Ardy, Ferdian Rizaliansyah, Noryanto Ikhromi, Bambang Pujo Semedi, Arie Utariani, Hamzah and Nancy Margarita Rehatta</i>	261
Effects of Moderate Intensity Aerobic Exercise on MMP-9 Level, NO _x Plasma Level and Resting Blood Pressure in Sedentary Elderly Women With Overweight <i>Suhartini SM, Gusbakti R and Ilyas EII</i>	265

Correlation Between Oxidative Stress Level with Plasma Beta Endorphin Level of Male Laboratory Rats Given Aerobic and Anaerobic Exercise <i>Sukirno, Herlia Elvita, Mohammad Zulkarnain and Rostika Flora</i>	271
Bone Age Estimates the Onset of the Adolescent Growth Spurt Among Male Basketball Players <i>Sundari Indah Wiyasihati, Bambang Purwanto and Agus Hariyanto</i>	277
The Correlation Between Haemoglobine and Body Mass Index With The Changes of Blood Lactate Levels in University of Jenderal Soedirman's Medical Students - A Study at Repeated Sprint Sessional 3 <i>Susiana Candrawati, Wiwiek Fatchurohmah, Ahmad Agus Faisal and Hana Khairunnisa</i>	280
Laughter Therapy Lowers Blood Pressure and Heart Rate in Hypertensive Balinese Patients at Ambarashram Ubud Bali <i>Suyasning HI and Adi Pratama Putra P</i>	284
The Different Effects of Contrast Water Immersion and Warm Water Immersion on Blood Lactic Acid Levels After Submaximal Physical Activity Among Basketball Athletes <i>Taufan Reza Putra, Elyana Asnar STP and Dwikora Novembri</i>	288
Diabetes Sprague-Dawley Model Induced With Fat Diet And Streptozotocin <i>Thressia Hendrawan, Nurul Paramita, Dewi Irawati and Ani Retno Prijanti</i>	292
The Difference of Heart Rate and Blood Pressure in Aerobic and Anaerobic Predominant Athlete Koni West Java Year 2016 <i>Titing Nurhayati, Hafiz Aziz and Nova Sylviana</i>	294
Effect of Exhaustive Exercise on Blood Lymphocyte Count and Diameter of Splenic White Pulp in Rats <i>Tri Hartini Yuliawati, Dewi Ratna Sari, Rimbun, Atika, Iskantijah and Ari Gunawan</i>	298
The Use of Purple Sweet Potato (<i>Ipomoea Batatas L.</i>) to Decrease Levels of Mda and Recover Muscle Damage <i>Utami Sasmita Lestari, Elyana Asnar and Suhartati Soewono</i>	304
Risk Factors of Low Back Pain Among Tailors in Kramat Jati, East Jakarta <i>Vivi Anisa Putri, Leli Hesti and Nurfitri Bustamam</i>	310
The Correlation of Norovirus Infection to Severity Degree of Acute Diarrhea in Children Under Five Years Old in Mataram City, Lombok <i>Warda Elmaida, Juniastuti and Soetjipto</i>	316
Malaria Prevalence in Alor District, East Nusa Tenggara, Indonesia <i>Yeni Puji Lestari, Majematang Mading, Fitriah, Avia Putriati Martha, Didik Muhammad Muhdi, Juniarsih, Zainal Ilyas Nampira, Sukmawati Basuki and Florentina Sustini</i>	321
The Potential Role of 25-Hydroxycholecalciferol on Calcium Regulation in Young Sedentary Women With Goat's Milk Intervention <i>Yusni</i>	326
Hemoglobin A1C as the Strongest Influencing Factor in relation to Vascular Stiffness in Type 2 Diabetes Mellitus - Metabolic Syndrome Patients <i>Deasy Ardiany, Soebagijo Adi, Ari Sutjahjo and Askandar Tjokroprawiro</i>	331
Thyroid Crisis and Hyperosmolar Hyperglycemic State in a Hyperthyroid Patient <i>Yudith Annisa Ayu Reskitha, Rio Wironegoro, Hermawan Susanto, Soebagijo Adi and Ari Sutjahjo</i>	336

Effect of Growth Hormone Deficiency on the Cardiovascular System <i>Irma Magfirah, Soebagijo Adi Soelistijo, Hermina Novida and Deasy Ardiany</i>	342
Metformin, Effects Beyond Glycemic Control <i>Soebagijo Adi Soelistijo and Askandar Tjokroprawiro</i>	349
The Correlation of Initial CD4 Cell Count with Increased Alanine Aminotransferase in Patients with Human Immunodeficiency Virus Who Have Received Nevirapine <i>Abdur Rokhim, Usman Hadi and Erwin Astha Triyono</i>	356
Profile of Bacteraemia and Fungemia in HIV/AIDS Patients with Sepsis <i>Sajuni Widjaja, Erwin Astha Triyono and Arthur Pohan Kawilarang</i>	363
The Association between Cryptococcal Antigenemia and CD4+ T lymphocyte Count in HIV/AIDS Patients with Suspected Cryptococcus Infection <i>Sajuni Widjaja, Erwin Astha Triyono and Arthur Pohan Kawilarang</i>	370
Impact of Music on Sport Intensity (Allegro) and on Levels of Left Ventricular Myocardial Damage in Wistar Rats <i>Faris Pamungkas Wicaksono, Sugiharto, Rias Gesang Kinanti, Paulus Liben, Suhartono Taat Putra and Purwo Sri Rejeki</i>	378
Association of Topical Capsaicin Exposure Dosage and Its Influence on Macrophages and Neutrophils in Periodontal Tissue <i>Ratna Mustriana, Haryono Utomo and Purwo Sri Rejeki</i>	383
Pharmacological Therapy of Portal Hypertension <i>Mukhammad Burhanudin, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Muhammad Miftahussurur, Husin Thamrin and Amie Vidyani</i>	389
Chronic Constipation Management in Adults <i>Erliza Fatmawati, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Husin Thamrin, Amie Vidyani and Muhammad Miftahussurur</i>	397
Diagnosis and Management of Ulcerative Colitis <i>Rendy Revandana Bramantya, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Amie Vidyani, Muhammad Miftahussurur and Husin Thamrin</i>	405
The Diagnosis and Management of Achlorhydria <i>Dicky Febrianto, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Amie Vidyani, Muhammad Miftahussurur and Husin Thamrin</i>	413
Acute Liver Failure <i>Troy Fonda, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Husin Thamrin, Amie Vidyani and Muhammad Miftahussurur</i>	421
Transient Elastography as Non-Invasive Examination of Hepatic Fibrosis <i>Satyadi, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Amie Vidyani, Muhammad Miftahussurur and Husin Thamrin</i>	426

Termination of Antiviral Administration in Chronic Hepatitis B <i>Edward Muliawan Putera, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Husin Thamrin, Amie Vidyani and Muhammad Miftahussurur</i>	431
Management for a Patient with Barret’s Esophagus: A Case Report <i>Muhammad Miftahussurur, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Husin Thamrin and Amie Vidyani</i>	438
Thrombocytopenia in Chronic Hepatitis C <i>Arvi Dian Prasetia Nurwidda, Poernomo Boedi Setiawan, Iswan Abbas Nusi, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Amie Vidyani, Muhammad Miftahussurur and Husin Thamrin</i>	446
Short Bowel Syndrome: Review of Treatment Options <i>Nina Oktavia Marfu’ah, Herry Purbayu, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Muhammad Miftahussurur, Husin Thamrin and Amie Vidyani</i>	453
Problematic Diagnosis of a Patient with Tuberculosis Peritonitis <i>Elieza L. Pramugaria, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Husin Thamrin, Amie Vidyani and Muhammad Miftahussurur</i>	462
Pathophysiology of Irritable Bowel Syndrome <i>Rastita Widyasari, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Ulfa Kholili, Budi Widodo, Husin Thamrin, Amie Vidyani and Muhammad Miftahussurur</i>	470
Recent Pathophysiology and Therapy for Paralytic Ileus <i>I Putu Surya Pridanta, Ulfa Kholili, Iswan Abbas Nusi, Poernomo Boedi Setiawan, Herry Purbayu, Titong Sugihartono, Ummi Maimunah, Budi Widodo, Amie Vidyani, Muhammad Miftahussurur and Husin Thamrin</i>	477
A Case Report of a Patient with a Rare and Aggressive Plasma Cell Leukemia <i>Ugrosono Yudho Bintoro, Putu Niken Amrita, Raharjo Budiono, Made Putra Sadana and Ami Ashariati</i>	482
Decreased Triglyceride and Protein Levels in Diabetic Rat Muscle Following Physical Exercise <i>Susi Anggawati, Bambang Purwanto and Sutji Kuswarini</i>	487
Abnormal Uterine Bleeding with Three Different Doses and Intervals of Hormonal Contraceptive Injection <i>Ananda Febina Kimresti A, Ashon Sa’adi, Lilik Djuari and Maftuhah Rochmanti</i>	491
Hypertrophic Scars Cause Burn Injuries Assessed by the Vancouver Scar Scale <i>Ardea Ramadhanti Perdanakusuma, Iswinarno Doso Saputro and Diah Mira Indramaya</i>	497
Description of Body Mass Index Changes in Emergency Patients at the Intensive Observation Room–Emergency Installation <i>Galang Damariski Lusandi, Prananda Surya Airlangga and Ariandi Setiawan</i>	501
Laboratory Profile of Acute Diarrhea and Chronic Diarrhea in Children <i>Mochammad Nasrulloh, Alpha Fardah Athiyyah and Arifoel Hajat</i>	505

Effect of Ethanol Extract of <i>Ruellia tuberosa</i> L. Leaves on Total Cholesterol Levels in Hypercholesterolemia Model of <i>Mus Musculus</i> L <i>Nurin Kusuma Dewi, Siti Khaerunnisa and Danti Nur Indriastuti</i>	512
Combination of Aerobic and Resistance Exercise in Lowering Blood Glucose Levels Compared to Aerobic or Resistance Exercises in a Male Wistar Rat Model with Diabetes Mellitus <i>Sahrul Latif, Dwikora Novembri Utomo and Purwo Sri Rejeki</i>	517
AUTHOR INDEX	523

Characteristics of Glucose Tolerance, Energy Expenditure, Lactic Acid Level, and Oxygen Saturation in Indonesian Diabetes Dance Version 6

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Keywords: Diabetes Dance, Energy Expenditure, Glucose Tolerance, Lactate, Oxygen Saturation.

Abstract: Objective: One approach of the Indonesian Diabetes Association (PERSADIA) to prevent glucose intolerance, which is the first sign of the course of diabetes mellitus progression, is through increased programmed and measurable physical activity, such as dance. This study aims to determine the effect of diabetes dance version 6 on oxygen saturation, energy expenditure, lactic acid levels and glucose tolerance. Methodology: A total of 32 subjects were measured for fasting and 2 hours post prandial (2hPP) blood glucose, then they performed a diabetes dance version 6 and we measured heart rate, oxygen saturation, energy expenditure and lactic acid blood levels. A day later, at the same time, we measured the same parameters. Output: There was no difference in glucose tolerance, both before (33.91 ± 24.14) and after (34.37 ± 22.31) the diabetes dance version 6 ($p: 0.918$). Total energy expenditure still did not reach the recommended value: 83.77 ± 22.96 (>135 kcal). Diabetes dance version 6 is accordance with American Diabetes Association (ADA) recommendations in terms of percentage of heart rate maksimum 67.12 ± 8.46 (standard: 50-70%), lactic acid 1.79 ± 0.82 (standard: <4 mmol/L and SpO_2 97.94 ± 0.72) Conclusion: diabetes dance version 6 did not produce a significant difference in glucose tolerance, and did not achieve the recommended energy expenditure, but this version of the exercise of diabetes dance did match the training zone requirement.

1 INTRODUCTION

Diabetes mellitus (DM) is a syndrome characterized by elevated blood glucose levels (hyperglycemia) above the normal average. Increased blood glucose levels are caused by the failure of cells to transport glucose from the blood into the cells. Disturbance of glucose transport is caused by low insulin stimulation and/or low response to insulin stimulation. Both glucose transport impairments were observed through fasting blood glucose loading tests. Increased blood glucose levels after the loading of glucose per oral is called glucose intolerance (WHO, 1999; ADA, 2004).

Glucose intolerance is an early sign of DM progression. Pancreatic beta cells are unable to release adequate insulin, or tissue cells are unable to respond to insulin stimulation properly. Intolerance develops into sedentary hyperglycemia that triggers further DM complications. Prevention of glucose

intolerance is an important first step in the control of DM disease (Sato, 2000; IDF, 2006).

Nutritional needs, especially glucose as the main ingredient of energy metabolism, can not be ignored in the daily diet. Daily glucose intake, in the form of polysaccharide, disaccharides, and monosaccharides, becomes the main menu. High glucose intake burdens pancreatic beta cells to synthesize insulin. Glucose restriction as an effort to prevent glucose intolerance often fails (Sato, 2000).

The Indonesian Diabetes Association (PERSADIA) recognizes the difficulty of preventing glucose intolerance through the restriction of glucose in the diet. Prevention of glucose intolerance is further developed through increased programmed and measurable physical activity, such as gymnastics/dance (Fox, 1998; Brown et al., 2009; Yendi, 2014). PERSADIA has developed a series of Diabetes dance, from series 1 to series 6. This study aims to determine the effect of diabetes dance

version 6 on oxygen saturation, energy expenditure, lactic acid levels and glucose tolerance.

2 METHODS

This study was a field experiment study. The population of this study was educational staff of Medical Faculty of Universitas Airlangga which has characteristics according to the criteria of women aged 21-60 years and with a random blood glucose concentration of 120-200 mg/dL. The subjects of the study underwent a health examination, were given information for consent and signed informed consent forms for approval following research procedures. Selected candidates who met the exclusion criteria and/or were unwilling to sign informed consent forms are excluded from the sample and replaced by another candidate. Subjects were asked to fast for 8 hours, and then their fasting blood glucose levels were taken. Subsequently subjects received carbohydrate for consumption, then 2 hours post prandial (2hPP) blood glucose levels were measured. Research subjects were then guided to do the movement of diabetes dance version 6 for 30 minutes with a tool installed to measure energy expenditure, that is, an Actiheart monitor. During diabetes dance, we measured heart rate, and oxygen saturation. And after diabetes dance, we determined the lactic acid level in the blood. A day later, at the same time, we measured the same parameters.

3 RESULTS

The research results show, that there were 35 research subjects that were able to follow the whole process, and we obtained the basic data characteristics as shown in Table 1.

Table 1: Distribution of the participants.

Characteristic	Mean	Std. Deviation
Age (year)	32.40	10.310
Body weight (kg)	61.23	12.074
Body height (cm)	153.86	4.380
Body mass index	25.49	4.937

We measured the fasting blood glucose and 2 hours PP blood glucose before and after the diabetes dance version 6, and the results can be seen in Table 2.

Table 2: Fasting blood glucose and 2 hours PP blood glucose.

	Mean	Std. Deviation	Normal Distribution
Fasting Blood Glucose Pre exercise (mg/dL)	83.829	11.2184	.200
2 hoursPP Pre exercise (mg/dL)	117.743	24.2443	.200
Fasting Blood Glucose Post exercise (mg/dL)	79.486	11.3484	0.126
2hPP Blood Glucose Post exercise (mg/dL)	113.857	20.9005	0.179

Table 3: Glucose tolerance comparison.

	Mean	Std. Deviation	Normal Distribution	Wilcoxon
Glucose tolerance Pre exercise (mg/dL)	33.9143	24.13975	0.14	0.918
Glucose tolerance Post exercise (mg/dL)	34.3714	22.31734	0.12	

From Table 3, blood glucose levels were increased after glucose loading (glucose tolerance) both for on pre and post-diabetes dance version 6. That is 33.91 ± 24.13 before diabetes dance version 6, and 34.37 ± 22.31 on one day after diabetes dance version 6. Based on statistics analysis, there was no significant difference in glucose tolerance between before and after the treatment of diabetes dance version 6.

Table 4: Percentage of HR Max (%HR_{max}), lactic acid levels, total energy expenditure, and oxygen saturation.

	Mean	Std. Deviation	Recommendation
%HR _{max} (%)	67.1254	8.45762	50-70
Lactic acid levels (mmol/L)	1.7857	0.82217	<4
Total energy expenditure (Kcal)	83.7714	22.96684	>135
SpO ₂ (%)	97.94	.725	95-100

Other parameters measured in this study were Percentage of Heart Rate maximum (%HR_{max}), lactic acid levels, total energy expenditure, and oxygen saturation. This was done to see if the diabetes dance version 6 performed is in accordance with the recommendations issued by the ADA. In

Table 4 it can be seen that the diabetes dance version 6 was in accordance with the ADA recommendation in terms of %HR_{max} is 67.12 ± 8.46 (standard: 50-70%), lactic acid 1.79 ± 0.82 (standard: <4mmol/L) and SpO₂ 97.94 ± 0.72. From the data it can be seen that diabetes dance version 6 is done in the aerobic zone, but in the total energy expenditure results it still has not reached the recommended value of > 135 kcal.

4 DISCUSSION

Diabetes dance is a sequence of physical activities that was developed to prevent diabetes. Subjects with a high risk of diabetes were recommended to perform diabetes dance. Impaired fasting glucose and obesity were two diabetes risks commonly found among Indonesian subjects. Mean of fasting blood glucose level of subjects was 83.83mg/dl, higher than the ADA recommendation (≤ 70 mg/ dl). Mean of body mass index of subjects was 25.49kg/m², higher than the ADA recommendation (20 -24 kg/m²) (WHO, 1999; ADA, 2004; Chambers et al., 2009)

There were six versions developed of diabetes dance. This research evaluated the latest version compared with the ADA physical activity recommendation for diabetes prevention. Diabetes dance version 6 fulfilled the ADA recommendation for the exercise intensity (67.25% HR_{max}) and lactate level (1.78 mmol/L). Unfortunately, the total energy expenditure was only 83.77 kcal, significantly below the ADA recommendation. (WHO, 1999; ADA, 2004; Seo et al., 2009).

A low level of energy expenditure was found almost all subjects after a single bout of diabetes dance. Consistent with this, the fasting blood glucose levels were also not significantly lower (p= 0.92), even though the mean level of fasting blood glucose was lower after single bout diabetes dance version 6 performance. Higher energy expenditure might result in a lower fasting blood glucose level after performing diabetes dance. Repeated bouts of diabetes dance would increase total energy expenditure to the ADA recommendation. (ADA, 2004; Heled et al., 2005; Seo et al., 2009).

It was impossible to increase the intensity of the exercise in order to reach minimum energy expenditure. The exercise intensity of diabetes dance had reached an optimum level at aerobic zone of moderate intensity. Higher exercise intensity stimulated a higher level of lactate. It is necessary to find an alternative method to increase higher energy

expenditure without any changes in repetition, exercise intensity and lactate level.

5 CONCLUSIONS

In this study, diabetes dance version 6 did not produce significant differences in glucose tolerance, and also did not reach the energy expenditure recommended by the ADA. However, diabetes dance version 6 has met the aerobic exercise zone, as can be seen from %HR_{max} of 67%, and it is still below the anaerobic threshold value, judging by the lactate level measured post-exercise (1.78mmol / L). We suggest further improvements should be made to the movements of the diabetes dance, in accordance with the progress of existing science and technology.

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