

15th International Congress of Biorheology and
8th International Conference on Clinical Hemorheology
Seoul, Korea
May 24–28, 2015

Scientific Program

Sunday, May 24th

15:00–18:00 **Registration**

17:00–18:00 **DDP Tour**

18:00–20:00 **Welcome Reception**

Monday, May 25th

8:45–9:15 **Opening Session**

9:15–10:15 **Plenary Lecture L1**

Chwee Teck Lim: Microfluidic platforms for human diseases: From diagnosis to therapy

10:15–11:00 **Coffee Break**

11:00–12:30 **Symposia S1–S4**

S1: MICROFLUIDICS

Chairs: Chwee Teck Lim and Noo Li Jeon

S1-1 Engineering perfusable blood vessel network on a chip

Noo Li Jeon

Seoul National University, Republic of Korea

S1-2 Novel microfluidic device for sheathless particle focusing and separation using a viscoelastic fluid

Sangho Kim

Department of Biomedical Engineering, National University of Singapore, Singapore

S1-3 Advances and critical concerns in the microfluidic isolation of circulating tumor cells

Hyo-Il Jung

Yonsei University, Republic of Korea

- S1-4 *Ex vivo* study of malaria parasite infected blood with microfluidics
Eric Lombardini and Bruce Russell
Department of Microbiology, National University of Singapore, Singapore
- S2: MULTIPLE ORGAN DAMAGE: A HEMORHEOLOGICAL APPROACH**
 Chairs: Kalman Toth and Lajos Bogar
- S2-1 Leukocyte anti-sedimentation rate predicts life-threatening conditions of poly-trauma victims earlier than other conventional inflammatory markers
Lajos Bogar, Livia Szelig, Csaba Loibl, Szilard Rendeki, Timea Bocskai and Csaba Csontos
Department of Anesthesiology and Critical Care, University of Pecs, Hungary
- S2-2 Long-term hemorheological effects of moderate exercise training in ischemic heart disease patients
Barbara Sandor, Miklos Rabai, Andras Toth, Bela Mezey, Kalman Toth and Eszter Szabados
Ist Department of Medicine, University of Pecs, Hungary
- S2-3 Examination of microcirculation and hemorheological variables in high risk cardiovascular diabetic patients
Katalin Biro, Barbara Sandor, Judit Vekasi, David Kovacs, Kinga Totsimon, Andras Toth, Miklos Kovacs, Judit Papp, Katalin Koltai, Kalman Toth and Gabor Kesmarky
Ist Department of Medicine, University of Pecs, Hungary
- S2-4 Relationship between hemorheology and mortality in the intensive care unit
Kinga Totsimon, Katalin Biro, Zsofia Eszter Szabo, Barbara Sandor, Andras Toth, Kalman Toth, Peter Kenyeres and Zsolt Marton
Ist Department of Medicine, University of Pecs, Hungary
- S3: MECHANOBIOLOGY**
 Chair: Susumu Kudo
- S3-1 Role of nonmuscle myosin regulatory light chain phosphorylation in contractile force generation
S. Deguchi^a, S. Yokoyama^a, T.S. Matsui^a, K. Kato^b, A. Tomohiko^a, O. Taiki^a, M. Kuragano^c and M. Takahashi^c
^a*Department of Nanopharmaceutical Science, Nagoya Institute of Technology, Japan*
^b*Department of Imaging Science, Center for Novel Science Initiatives, National Institutes of Natural Sciences, Japan*
^c*Department of Chemistry, Hokkaido University, Japan*
- S3-2 Shear induced alterations in microglia phenotypes
S. Ahn^a, E. Park^a, M. Son^a, S. Song^b, U. Ko^a, J. Park^a and J. Shin^{a,b}
^a*Division of Mechanical Engineering, School of Mechanical, Aerospace and Systems Engineering, KAIST, Daejeon, Republic of Korea*
^b*Graduate School of Medical Science and Engineering, KAIST, Daejeon, Republic of Korea*

- S3-3 Mechano-sensing of cells via actomyosin contractility
Taeyoon Kim
Weldon School of Biomedical Engineering, Purdue University, West Lafayette, IN, USA
- S3-4 Role of collagen in bone mechanical integrity
Naoki Sasaki
Department of Advanced Transdisciplinary Science, Hokkaido University, Japan
- S4: PLATELET ASSAY AND ITS CLINICAL STUDY**
Chairs: Byoung Kwon Lee and Chae-Seung Lim
- S4-1 Comparison of three platelet function tests in predicting hemostatic disorders
Moon sub Byoun^a, Chae Seung Lim^a, HongSeok Seo^a and Sehyun Shin^b
^a*Department of Laboratory Medicine, College of Medicine, Korea University, Seoul, Republic of Korea*
^b*School of Mechanical Engineering, Korea University, Seoul, Republic of Korea*
- S4-2 Migration distance and time based platelet function analysis in a microfluidic system
Byoung-Kwon Lee^a, Minhee Cho^a, Chaeseung Lim^b and Sehyun Shin^c
^a*Gangnam Severance Hospital, Yonsei University, Republic of Korea*
^b*College of Medicine, Korea University, Republic of Korea*
^c*Department of Mechanical Engineering, Korea University, Republic of Korea*
- S4-3 Role of hemostatic function test in clinical practice
Young-Hoon Jeong
Gyeongsang National University Hospital and Gyeongsang National University School of Medicine, Republic of Korea
- S4-4 A new platelet function assay with an *in vivo*-mimicking microfluidic system
Hoyoon Lee^a, Gyehyu Kim^a, Yeonsoo Kim^a, Chae-Seung Lim^b and Sehyun Shin^{a,b}
^a*School of Mechanical Engineering, Korea University, Seoul, Republic of Korea*
^b*Department of Laboratory Medicine, College of Medicine, Korea University, Seoul, Republic of Korea*

12:30–14:00 **Lunch Break**
(Group Photo prior to lunch)

12:30–14:00 **ISB Business Meeting**

14:00–15:00 **Plenary Lecture L2**
Narla Mohandas: The red cell membrane: Past, present and future

15:00–15:30 **Coffee Break**

15:30–17:00 **Symposia S5–S8**

S5: RECENT ADVANCES IN RED CELL RHEOLOGY
Chairs: Brian M. Cooke and Gerard B. Nash

S5-1 Red blood cell rheology as a critical regulator of leukocyte and platelet adhesion
Gerard B. Nash

- Centre for Cardiovascular Sciences, School of Clinical and Experimental Medicine, College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK*
- S5-2 Blood rheology in sickle cell disease
P. Connes^{a,b}, K. Charlot^b, A. Mozar^b, M. Grau^c, R. Hierso^b, N. Lemonne^d, M. Etienne-Julan^d, Y. Lamarre^b, M.D. Hardy-Dessources^b and M. Romana^b
^a*Laboratoire CRIS EA647, Université Lyon 1, Lyon, France*
^b*UMR Inserm 1134, Université des Antilles et de la Guyane, Pointe-à-Pitre, Guadeloupe (French West Indies)*
^c*Institute of Cardiovascular Research and Sport Medicine, German Sport University Cologne, Cologne, Germany*
^d*Unité Transversale de la Drépanocytose, Guadeloupe*
- S5-3 Novel parasite protein kinases and their role in alteration of the rheological properties of malaria-infected red blood cells
Brian M. Cooke, Ghizal Siddiqui and Nicholas I. Proellocks
Department of Microbiology, Monash University, Melbourne 3800, Australia
- S5-4 Accelerated changes to reticulocyte rheology as a result of malaria parasite invasion
Bruce Russell and Rou Zhang
Department of Microbiology, National University of Singapore, Singapore
- S6: EMERGING APPROACHES FOR THE STUDY OF BLOOD CELLS AND BLOOD FLOW**
 Chair: Yong Keun Park
- S6-1 *In vivo* and *ex vivo* measurements of hemodynamic parameters for various real blood flows
Sang Joon Lee
Center for Biofluid and Biomimic Research, Department of Mechanical Engineering, Pohang University of Science and Technology, Pohang, Republic of Korea
- S6-2 Motion of red blood cells through limiting geometries: Dissipative particle dynamics study
Igor V. Pivkin^a, Zhangli Peng^b and Ming Dao^c
^a*Institute of Computational Science, Faculty of Informatics, University of Lugano, Switzerland*
^b*Department of Aerospace and Mechanical Engineering, University of Notre Dame, USA*
^c*Department of Materials Science and Engineering, Massachusetts Institute of Technology, USA*
- S6-3 Chimerism analysis using flow cytometry after haploidentical hematopoietic stem cell transplantation
Seongsoo Jang
Department of Laboratory Medicine, University of Ulsan, College of Medicine and Asian Medical Center, Republic of Korea

- S6-4 3-D quantitative optical profiling of individual red blood cells at various physiological conditions using diffraction phase microtomography
HyunJoo Park, Kyoohyun Kim, SangYoon Lee and YongKeun Park
Department of Physics, KAIST, Republic of Korea
- S6-5 Use of functional near infrared spectroscopy as an objective measure of brain response to painful stimuli in sickle cell disease
John Sunwoo^a, Maha Khaleel^b, Payal Shah^b, Roberta Kato^b, Patjanaporn Chalacheva^a, Wanwara Thuptimchang^a, Jon A. Detterich^b, Herbert J. Meiselman^b, Jenny Tsao^c, John C. Wood^{a,b}, Lonnie Zeltzer^c, Thomas D. Coates^b and Michael C.K. Khoo^a
^a*Viterbi School of Engineering, University of Southern California, Los Angeles, CA, USA*
^b*Keck School of Medicine, University of Southern California, Los Angeles, CA, USA*
^c*University of California, Los Angeles, USA*
- S7: BIOMECHANOPHARMACOLOGY: BIOMECHANICS, BIOREHOL-
OGY AND PHARMACOLOGY**
Chairs: Dong Han and Fulong Liao
- S7-1 Shear stress: A negative regulator for dendritic cells-induced immune response?
R. Dong^{a,b}, C. Wu^a, H. Yang^a, J. Long^c, X. Xu^{a,b}, H. Xue^a, Z. Hu^a, C. Zhang^b, W. Yao^d and Z. Zeng^a
^a*School of Biology & Engineering, Guizhou Medical University, Guiyang, Guizhou, China*
^b*Department of Cell Biology, Guizhou Medical University, Guiyang, Guizhou Province, China*
^c*Affiliated Cancer Hospital, Guizhou Medical University, Guiyang, Guizhou Province, China*
^d*Center of Hemorheology, School of Basic Medical Sciences, Health Science Center of Peking University, Beijing, China*
- S7-2 Mechanical environment directs the response of breast cancer cells to Lapatinib
C. Liu^a, X. Li^a, J. Feng^a, F. Liao^b and D. Han^a
^a*National Center for Nanoscience and Technology, China*
^b*Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, China*
- S7-3 Sensing rigidity: Integrin internalization and subsequent events
C. Yang, Y. Zu, J. Du, J. Li and Y. Xu
School of Aerospace, Tsinghua University, China
- S7-4 Biomechanopharmacology: A new biomechanical update in pharmacology
R. Liang^a, Y. You^a, J. Cao^a, D. Han^b and F. Liao^a
^a*Institute of Chinese Materia Medica, China Academy of Chinese Medical Sciences, Beijing, China*
^b*National Center for Nanoscience and Technology, Beijing, China*

- S8: MODELING OF CELL DYNAMICS: CYTOSKELETON AND MEMBRANE**
 Chairs: Ken-Ichi Tsubota and Taiji Adachi
- S8-1 Vertex dynamics simulations of viscosity-dependent deformation during 3D multicellular morphogenesis
S. Okuda^a, Y. Inoue^b, M. Eiraku^c, T. Adachi^b and Y. Sasai^a
^a*Organogenesis and Neurogenesis Team, RIKEN Center for Developmental Biology, Kobe, Japan*
^b*Department of Biomechanics, Institute for Frontier Medical Sciences, Kyoto University, Japan*
^c*Four-Dimensional Tissue Analysis Unit, RIKEN Center for Developmental Biology, Kobe, Japan*
- S8-2 An effect of the mechanical properties of red blood cells on oxygen transfer efficiency
X. Gong^{a,b}, Z. Gong^a and H. Huang^c
^a*MOE Key Laboratory of Hydrodynamics, Department of Engineering Mechanics, Shanghai Jiao Tong University, Shanghai, 200240, China*
^b*SJTU-CU ICRC, Shanghai Jiao Tong University, Shanghai, China*
^c*Department of Mathematics and Statistics, York University, Toronto, ON, Canada*
- S8-3 Computational modeling of cell invasion dynamics into an extracellular matrix fiber network
Min-Cheol Kim^a, Jordan Whisler^a, Yaron R. Silberberg^c, Roger D. Kamm^{a,b,c} and H. Harry Asada^{a,c}
^a*Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA*
^b*Department of Biological Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA*
^c*BioSystem & Micromechanics IRG, Singapore MIT Alliance for Research & Technology, Singapore*
- S8-4 Trafficking across cell membranes: Shape and orientation matter
Sabyasachi Dasgupta^a, Thorsten Auth^b and Gerhard Gompper^b
^a*Mechanobiology Institute, National University of Singapore, Singapore*
^b*Theoretical Soft Matter and Biophysics, Institute of Complex Systems, Forschungszentrum Juelich, Germany*

17:00–19:00 **Poster Session 1**

Tuesday, May 26th

8:30–9:30 **Plenary Lecture L3**

Thomas D. Coates: Sickle cell anemia, the quintessential red cell rheological disease: Now a neurological condition?

9:30–10:00 **Coffee Break**

10:00–11:30 **Symposia S9–S12**

- S9: HEMORHEOLOGICAL TECHNIQUES: WHICH METHOD TO USE**
Chairs: Norbert Nemeth and Peter Kenyeres
- S9-1 Challenges in experimental hemorheology: Methodological adaptation and applicability of methods investigating micro-rheological parameters in various pathophysiological processes
N. Nemeth, F. Kiss and I. Miko
Department of Operative Techniques and Surgical Research, Institute of Surgery, Faculty of Medicine, University of Debrecen, Debrecen, Hungary
- S9-2 Red blood cell mechanical stability test in basic research and its adaptability in experimental and clinical investigations
Ferenc Kiss^a, Kornel Miszti-Blasius^b, Eniko Toth^a, Pinar Ulker^c and Norbert Nemeth^a
^a*Department of Operative Techniques and Surgical Research, Institute of Surgery, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
^b*Institute of Laboratory Medicine, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
^c*Department of Physiology, Akdeniz University Faculty of Medicine, Antalya, Turkey*
- S9-3 Pitfalls to avoid during ektacytometry
Peter Kenyeres, Miklos Rabai, Andras Toth and Kalman Toth
1st Department of Medicine, University of Pecs, Hungary
- S9-4 Viscometer validation studies for routine hemorheological measurements
Andras Toth, David Kovacs, Kinga Totsimon, Katalin Biro, Peter Kenyeres, Gabor Kesmarky and Kalman Toth
1st Department of Medicine, University of Pecs, Hungary
- S10: INNER ORGAN MICROCIRCULATION**
Chairs: Lukas Prantl and Dirk Clevert
- S10-1 Dynamic contrast-enhanced computed tomography: A new diagnostic tool to assess renal perfusion after ischemia-reperfusion injury in mice
Andreas Helck, Margarita Braunagel, Mike Notohamiprodjo, Dirk-Andre Clevert, Nina Schupp, Anne Wagner, Maximilan Reiser and Antje Habicht
Großhadern Institute for Clinical Radiology, University München, München, Germany
- S10-2 Comparison of mobile ultrasound system and high end ultrasound system in detection of endoleaks
H. Zimmermann, A. Helck, R. Reimann, J. Rubentaler, G. Meimarakis, M. Reiser and D.A. Clevert
Großhadern Institute for Clinical Radiology, University München, München, Germany
- S10-3 Performance of three-dimensional-shear-wave elastography in the diagnostic work-up of the scrotum
J. Marcon, M. Trottmann, M. D'Anastasi, A. Karl, C.G. Stief, M.F. Reiser and D.A. Clevert

- Großhadern Institute for Clinical Radiology, University München, München, Germany*
- S10-4 Platelet-rich plasma affects vitality, differentiation and gene expression of adipose-derived stem cells *in vitro*
L. Prantl, S. Klein and O. Felthaus
Center of Plastic-, Hand- and Reconstructive Surgery, University of Regensburg, Regensburg, Germany
- S10-5 Combining adipose-derived stem cells and platelet-rich plasma? A novel one-step protocol for clinical use
L. Prantl, S. Klein and O. Felthaus
Center of Plastic-, Hand- and Reconstructive Surgery, University of Regensburg, Regensburg, Germany
- S11: THE ROLE OF ENDOTHELIAL CELL RHEOLOGY IN VASCULAR HEALTH, DISEASE AND DRUG DELIVERY**
Chairs: Peter J. Butler and Hanjoong Jo
- S11-1 Mechano-sensitive genes and epigenetics in atherosclerosis: From mechanobiology to nanomedicine
Hanjoong Jo
Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology and Division of Cardiology, Emory University, Department of Medicine, Emory University, Atlanta, GA, USA
- S11-2 Athero-prone flow aggravates innate immune response in endothelium
John Y.-J. Shyy
Department of Medicine/Cardiology, University of California, San Diego, La Jolla, CA, USA
- S11-3 Mechanotargeting of nanoparticles to vascular endothelium
Chanjin Huang, Pouria Fattahi, Hari S. Muddana, Justin Brown, Sulin Zhang and Peter J. Butler
Department of Biomedical Engineering, Penn State University, PA, USA
- S11-4 Essential role of the p90RSK-SEN2 module in disturbed flow-induced endothelial dysfunction and atherosclerosis
Jun-ichi Abe and Kyung-Sun Heo
Department of Cardiology, University of Texas MD Anderson Cancer Center, TX, USA
- S12: COMPUTATIONAL HEMODYNAMICS AND HEMORHEOLOGY**
Chairs: Junfeng Zhang and Edgar A. O'Rear
- S12-1 Transcellular model of nanoparticles across the blood–brain barrier
Lin Zhang, Jie Fan and Bingmei M. Fu
Department of Biomedical Engineering, The City College of The City University of New York, New York, NY, USA
- S12-2 Eddy analysis for hemolysis in turbulent flows
Edgar A. O'Rear, Mesude Ozturk and Dimitrios V. Papavassiliou
School of Chemical, Biological and Materials Engineering, University of Oklahoma, Norman, OK, USA

- S12-3 Blood cell flows in the entrance region of microvessels: Cell-free layer development and wall shear stress variation
Othmane Oulaid and Junfeng Zhang
Bharti School of Engineering, Laurentian University, Sudbury, ON, Canada
- S12-4 Simulations of device-induced thrombosis near an asymmetric sudden expansion
Joshua O. Taylor^{a,b}, Richard S. Meyer^b, Steven Deutsch^b and Keefe B. Manning^{a,c}
^a*Department of Biomedical Engineering, The Pennsylvania State University, University Park, PA, USA*
^b*Applied Research Laboratory, The Pennsylvania State University, State College, PA, USA*
^c*Department of Surgery, Penn State Hershey Medical Center, Hershey, PA, USA*

11:30–12:30 Free Communications O1–O3

O1: FLOW VISUALIZATION AND MODELING

Chairs: Sang Joon Lee and Joon Sang Lee

- O1-1 Model studies on the role of vibration in the development of cerebral aneurysms
Dieter Walter Liepsch^a, Andrea Balasso^b and Sergej Frolov^c
^a*Munich University of Applied Sciences, Germany*
^b*Technical University of Munich, Germany*
^c*Tambov University, Russian Federation*
- O1-2 *Ex vivo* measurement of blood flows using X-ray PIV technique
Hanwook Park, Eunseop Yeom and Sang Joon Lee
Pohang University of Science and Technology (POSTECH), Republic of Korea
- O1-3 Lattice Boltzmann-immersed boundary approach for vesicle motion and trajectory in bifurcated vessel
Ji Young Moon^{a,b}, Young Woo Kim^a and Joon Sang Lee^a
^a*School of Mechanical Engineering, Yonsei University, Republic of Korea*
^b*The University of Sydney, Sydney, Australia*
- O1-4 A comparative study of centrifugal blood pumps
Wonjung Kim^a, Sung-Gil Kim^a, Seokbin Hong^a, Taehong Kim^a, Sungmin Hong^a, Minwook Chang^a, Mohammad Moshfeghi^a, Seongwon Kang^a, Shin-Hyoung Kang^b and Nahmkeon Hur^a
^a*Department of Mechanical Engineering, Sogang University, Republic of Korea*
^b*Department of Mechanical and Aerospace Engineering, Seoul National University, Republic of Korea*
- #### **O2: RED BLOOD CELL MECHANICS**
- Chair: Sung Yang
- O2-1 Study on RBC (red blood cell) deformability under various shear rate condition using two plane parallel gold electrodes
Ji-chul Hyun, Taekeon Jung, Hanbyul Kim and Sung Yang
Gwangju Institute of Science and Technology (GIST), Republic of Korea

- O2-2 Evaluation of sub-hemolytic red blood cell damage based on changes of cell deformability
M. Turkay^a, B. Eglenen^a, G. Yavas^a, M.J. Simmonds^b, H.J. Meiselman^c and O. Yalcin^a
^a*Koc University School of Medicine, Istanbul, Turkey*
^b*Heart Foundation Research Centre, Griffith Health Institute, Griffith University, Queensland, Australia*
^c*Department of Physiology and Biophysics, Keck School of Medicine, Los Angeles, CA, USA*
- O2-3 Shear stress induces F-actin remodeling in erythroid cells by regulating E-Tmod isoforms
Weiyun Mu^a, Lanping Amy Sung^b and Weijuan Yao^a
^a*Hemorheology Center, Department of Physiology and Pathophysiology, School of Basic Medical Sciences, Peking University Health Science Center, Beijing, China*
^b*Department of Bioengineering, University of California, San Diego, La Jolla, CA, USA*
- O2-4 Variation in red blood cells' deformability within the whole blood using sinusoidally changing shear flow
Nobuo Watanabe, Tatsuya Tsuzuki and Yusuke Suzuki
Department of Bio-science and Engineering, College of Systems Engineering and Science, Shibaura Institute of Technology, Japan
- O3: FLOW AND RED BLOOD CELL INTERACTION IN MICROCHANNELS AND THE MICROCIRCULATION**
 Chair: Simon Song
- O3-1 Investigation of the viscoelastic property of flowing erythrocyte suspensions with oscillatory flow rate using a wall-patterned electrode configuration
Byung Jun Kim^a, Sulaiman Khan^b and Sung Yang^{a,b}
^a*Department of Medical System Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, Republic of Korea*
^b*School of Mechatronics, Gwangju Institute of Science and Technology (GIST), Gwangju, Republic of Korea*
- O3-2 S22 is required during the regulation of blood flow for the vascular development in zebrafish
Xiang Xie, Ting Sun, Daoxi Lei, Yongfei Liu, Lu Huang, Tian Zhou, Yi Wang and Guixue Wang
College of Bioengineering, Chongqing University, Chongqing, China
- O3-3 Hybrid capillary-inserted microchannel for sheathless viscoelastic particle focusing and separation
Jeonghun Nam, Justin Kok Soon Tan and Sangho Kim
Department of Biomedical Engineering, National University of Singapore, Singapore
- O3-4 Yield stress to assess the risk of microcirculatory impairment in acute coronary syndromes
Euiho Lee^a, Uiyun Lee^{a,b} and Jinmu Jung^{c,d}

^a*Department of Bionanosystem Engineering, Chonbuk National University, Jeonju, Chonbuk, Republic of Korea*

^b*BK 21 Plus Program, Chonbuk National University, Jeonju, Chonbuk, Republic of Korea*

^c*Hemorheology Research Institute, Chonbuk National University, Jeonju, Chonbuk, Republic of Korea*

^d*Division of Mechanical Design Engineering, Chonbuk National University, Jeonju, Chonbuk, Republic of Korea*

12:30–14:00 **Lunch Break**

12:30–14:00 **ISCH Business Meeting**

14:00–15:00 **Hemorheology and Microcirculation Award and Lecture L4**

Kalman Toth: The role of hemorheological factors in cardiovascular medicine

15:00–15:30 **Coffee Break**

15:30–17:00 **Symposia S13–S16**

S13: DEPLETION-MEDIATED FORCES IN RBC AGGREGATION AND ADHESION

Chairs: Björn Neu and Herbert J. Meiselman

S13-1 RBC aggregation: A tale of two models

Herbert J. Meiselman

Department of Physiology and Biophysics, Keck School of Medicine, Los Angeles, USA

S13-2 Macromolecular depletion as a determinant of red blood cell interactions

Björn Neu

Faculty of Life Sciences, University of Applied Sciences Rhine-Waal, Kleve, Germany

S13-3 Adhesion strengths, shapes and the dynamics of macromolecule-induced cell clusters at stasis and in microcapillary flow

Christian Wagner

Department of Experimental Physics, Saarland University, Germany

S13-4 Signaling mechanisms in regulation of RBC aggregation

Irina Alexandrovna Tikhomirova, Alexei Vasiljevich Muravyov, Elena Petrovna Petrochenko, Anna Olegovna Oslyakova and Yulia Victorovna Malysheva Yaroslavl State Pedagogical University, Russian Federation

S14: BLOOD FLOW VISUALISATION

Chairs: Masa Takei and Masanori Nakamura

S14-1 Visualization of hemolysis at a cellular scale towards the development of a hemolysis simulator based on the deformation analysis of a red blood cell

M. Nakamura^a, K. Okamura^a, K. Umetani^b and T. Yagi^b

^aDepartment of Mechanical Engineering, Saitama University, Shimo-Okubo 255, Sakura-ku, Saitama, Japan

^bTWINS, Waseda University, Wakamatsu-cho 2-2, Shinjuku-ku, Tokyo, Japan

S14-2 Electrical properties of blood and their applicability in thrombosis sensing

A. Sapkota^a, T. Fuse^a, O. Maruyama^b and M. Takei^a

- ^a*Division of Artificial Systems Science, Graduate School of Engineering, Chiba University, Japan*
- ^b*Institute of Human Science and Biomedical Engineering, National Institute of Advanced Industrial Science and Technology, Japan*
- S14-3 Optical imaging of thrombus formation in mechanical circulatory supports
Daisuke Sakota^a, Tatsuki Fujiwara^b, Katsuhiko Ouchi^c, Tomotaka Murashige^d, Ryo Kosaka^a, Masahiro Nishida^a and Osamu Maruyama^a
- ^a*National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Ibaraki, Japan*
- ^b*Department of Cardiovascular Surgery, Tokyo Medical and Dental University, Bunkyo-ku, Tokyo, Japan*
- ^c*Department of Advanced Surgical Technology Research and Development, Tokyo Medical and Dental University, Bunkyo-ku, Tokyo, Japan*
- ^d*Graduate School of Science and Technology, Tokyo University of Science, Noda, Chiba, Japan*
- S14-4 Hemodynamics in a pediatric ascending aorta using a pediatric viscoelastic blood model
Bryan C. Good^a, Steven Deutsch^b and Keefe B. Manning^{a,c}
- ^a*Department of Biomedical Engineering, The Pennsylvania State University, University Park, PA, USA*
- ^b*Applied Research Laboratory, The Pennsylvania State University, State College, PA, USA*
- ^c*Department of Surgery, Penn State Hershey Medical Center, Hershey, PA, USA*
- S15: OSMOTIC GRADIENT EKTACYTOMETRY**
 Chairs: Max R. Hardeman and Lydie Da Costa
- S15-1 Ektacytometry: Past and present
Narla Mohandas
New York Blood Center, New York, NY, USA
- S15-2 Investigations by osmotic gradient ektacytometry in basic and clinical research: Experiences, comparability and information content
N. Nemeth^a, F. Kiss^a and K. Miszti-Blasius^b
- ^a*Department of Operative Techniques and Surgical Research, Institute of Surgery, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
- ^b*Institute of Laboratory Medicine, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
- S15-3 South-east Asian ovalocytosis, no symptoms and total loss of RBC deformability? Further insight in Osmoscan interpretation
M.R. Hardeman^a, P. McLaughlin^b, B.A. van Oirschot-Hermans^c, M. Veldhuis^d and R. van Wijk^c
- ^a*Department of Transl. Physiol., Acad. Med. Center, University of Amsterdam, The Netherlands*
- ^b*Department of Clin. Chem. and Hematol. Certe-Prim. Care Diagn., Groningen, The Netherlands*
- ^c*Laboratory of Clin. Chem. and Hematol., University Med. Center, Utrecht, The Netherlands*
- ^d*RBC Diagnostics, Sanquin, Amsterdam, The Netherlands*

- S15-4 Osmotic deformability curves: Theory and practice
Frans A. Kuypers
Children's Hospital, Oakland, CA, USA
- S16: CLINICAL STUDIES OF ERYTHROCYTE DEFORMABILITY AND DISAGGREGATING SHEAR STRESS**
 Chairs: Kyu Chang Won and Chul Woo Ahn
- S16-1 Association between red blood cell deformability and diabetic complications in patients with type 2 diabetes
Jun Sung Moon, Yu Kyung Kim and Kyu Chang Won
Yeungnam University College of Medicine, Republic of Korea
- S16-2 Investigation of erythrocyte deformability in children with hematologic disease and hematopoietic stem cell transplantation
Jae Min Lee^a, Yu Kyung Kim^a, Jang Soo Suh^b and Jeong Ok Hah^a
^a*Yeungnam University, Republic of Korea*
^b*Kyungpook National University School of Medicine, Republic of Korea*
- S16-3 Hemorheological approach for early detection of diabetic nephropathy
Seohui Lee^a, Ji Sun Nam^a, Shin Ae Kang^a, Jong Suk Park^a, Sehyun Shin^b and Chul Woo Ahn^a
^a*Gangnam Severance Hospital, Republic of Korea*
^b*Korea University, Republic of Korea*
- S16-4 Effect of RBC deformability and fibrinogen concentration on disaggregating shear stress
Hoyoon Lee^a, Gyehyu Kim^a, Yeonsoo Kim^a, Jeongho Kim^a, Byoung-Kwon Lee^b and Sehyun Shin^a
^a*Korea University, Seoul, Republic of Korea*
^b*Gangnam Severance Hospital, Yonsei University, Republic of Korea*
- S16-5 Deformability analysis of experimentally-fixed and sickle red blood cells
Miklos Rabai^a, Jon A. Detterich^b, Rosalinda B. Wenby^c, Tatiana M. Hernandez^b, Kalman Toth^a, John C. Wood^b, Jack Feinberg^d and Herbert J. Meiselman^c
^a*1st Department of Medicine, University of Pecs, Hungary*
^b*Department of Pediatrics, Children's Hospital Los Angeles, Los Angeles, CA, USA*
^c*Department of Physiology and Biophysics, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA*
^d*Department of Physics and Astronomy, University of Southern California, Los Angeles, CA, USA*

17:00–19:00 **Poster Session 2**

Wednesday, May 27th

9:00–10:00 **Poiseuille Gold Medal Award, Ceremony and Lecture L5**

Laudatio: Herbert H. Lipowsky

Award lecture: Geert W. Schmid-Schönbein: Autodigestion and proteolytic receptor cleavage in rheological and cardiovascular dysfunction

10:00–10:30 **Coffee Break**

10:30–12:00 **Symposia S17–S20**

S17: MICROFLUIDICS: NOVEL TOOLS FOR MEASURING DEFORMABILITY OF RED BLOOD CELLS

Chairs: Walter H. Reinhart and Sergey S. Shevkoplyas

S17-1 Microfluidic technologies for high throughput analysis of red blood cell deformability

Aline Santoso, Jeong-Hyun Lee, Xiaoyan Deng, Kerry Mathews, Han Yuan, Emel Islamzada, Sarah McFaul, Marie-Eve Myrand Lapierre, Mark Scott and Hongshen Ma

University of British Columbia, Canada

S17-2 High throughput microfluidic characterization of red blood cell deformability changes during storage

C. Wang^{a,b}, Y. Zheng^b, J. Chen^b, T. Cui^b, N. Shehata^{a,b} and Y. Sun^b

^a*Mount Sinai Hospital, Toronto, ON, Canada*

^b*University of Toronto, Toronto, ON, Canada*

S17-3 Modeling the traversal of a red blood cell through a microfluidic device

Ewan Henry, Dmitry A. Fedosov and Gerhard Gompper

Institute of Complex Systems, Research Center Jülich, Germany

S17-4 Artificial microvascular network device as a new tool to measure red blood cell mechanical properties

Walter H. Reinhart, Nathaniel Z. Piety, Jennie M. Burns, Jose M. Sosa and Sergey S. Shevkoplyas

Department of Biomedical Engineering, Cullen College of Engineering, University of Houston, Houston, TX, USA

S18: EXERCISE HEMORHEOLOGY

Chairs: Michael Simmonds and Philippe Connes

S18-1 Haemorheological response to consuming an alcoholic beverage following moderate exercise-induced dehydration

Michael J. Simmonds^{a,b}, Chris Irwin^{a,b}, Jarod Horobin^{a,b}, Erica Cunningham^b, Monica Stagg^b and Ben Desbrow^{a,b}

^a*Menzies Health Institute of Queensland, Griffith University, Queensland, Australia*

^b*School of Allied Health Sciences, Griffith University, Queensland, Australia*

S18-2 Impact of training on red blood cell deformability in health and disease considering training scope and intensity

Marijke Grau, André Filipovic, Christina Koliymitra, Basit Ahmad, Bianca Collins, Klara Brixius and Wilhelm Bloch

Department of Molecular and Cellular Sport Medicine, Institute of Sport Medicine and Cardiovascular Research, German Sport University Cologne, Cologne, Germany

S18-3 Hematocrit and exercise: Old findings, new interpretations?

Jean-Frederic Brun^a, Emmanuelle Varlet-Marie^a and Eric Raynaud de Mauverger^b

- ^a*University of Montpellier, France*
^b*University of Montpellier, French Polynesia*
- S18-4 Should we promote regular physical activity in sickle cell patients?
*P. Connes^{a,b}, C. Faes^a, K. Charlot^b, E. Charrin^a, M. Petras^c, E. Aufradet^a,
 L. Doumdo^c, M. Etienne-Julan^c, X. Waltz^b, M.D. Hardy-Dessources^b,
 M. Romana^b, V. Pialoux^b and C. Martin^b*
^a*Laboratoire CRIS EA647, Université Lyon 1, Lyon, France*
^b*UMR Inserm 1134, Université des Antilles et de la Guyane, Pointe-à-Pitre,
 Guadeloupe*
^c*Unité Transversale de la Drépanocytose, Guadeloupe*
- S19: THE ENDOTHELIAL SURFACE LAYER (GLYCOCALYX) IN VASCULAR DISEASE**
 Chair: John M. Tarbell
- S19-1 Sphingosine-1-phosphate (S1P) maintains normal vascular permeability by preserving endothelial surface glycocalyx (ESG) in microvessels *in vivo*
*Lin Zhang^a, Min Zeng^a, Jie Fan^a, John M. Tarbell^a, Fitz-Roy E. Curry^b and
 Bingmei M. Fu^a*
^a*Department of Biomedical Engineering, The City College of The City University of New York, New York, NY, USA*
^b*Department of Physiology and Membrane Biology, University of California, Davis, USA*
- S19-2 Role of matrix metalloproteases on the kinetics of leukocyte–endothelium adhesion and implications for mediators of WBC rolling and firm adhesion
Herbert H. Lipowsky
Department of Biomedical Engineering, Penn State University, State College, PA, USA
- S19-3 Clinical assessment of glycocalyx: A tool to monitor vascular risk in patients?
Hans Vink
Department of Physiology, Maastricht University, The Netherlands
- S19-4 The glycocalyx, mechanotransduction and lung vascular permeability
Randal O. Dull
Department of Anesthesiology, University of Illinois College of Medicine, Chicago, IL, USA
- S20: PARTICULATE FLOW IN MICRO/MINI CHANNELS**
 Chair: Masako Sugihara-Seki
- S20-1 Simulation of the dispersion of two kinds of droplets under Couette flow
Masato Makino
Yamagata University, Jonan, Yonezawa, Yamagata, Japan
- S20-2 Experimental studies on particle migration in channel flows
M. Sugihara-Seki, T. Kimura, R. Noso and H. Shichi
Department of Pure and Applied Physics, Kansai University, Suita, Osaka, Japan

- S20-3 Experimental analysis of various 3D migration phenomena of particles in micro-scale conduits using holographic microscopy
Sang Joon Lee
Center for Biofluid and Biomimic Research, Department of Mechanical Engineering, Pohang University of Science and Technology, Pohang, Republic of Korea
- S20-4 Lateral migration of a spherical particle in a square channel flow
R. Otomo, N. Nakagawa and M. Sugihara-Seki
Faculty of Engineering Science, Kansai University, 3-3-35 Yamate-cho, Suita, Osaka, Japan

12:00–13:00 **Lunch Break**
 (IOS Press Luncheon for Biorheology (invitation only))

13:00–17:30 **SOCIAL PROGRAM**

18:00–18:30 **Arrive at ‘Some Sevit’**

18:30–21:30 **Banquet**

Thursday, May 28th

8:30–9:30 **Plenary Lecture L6**
John M. Tarbell: Fluid mechanics, vascular disease and the glycocalyx

9:30–10:00 **Coffee Break**

10:00–11:30 **Symposia S21–S23**

S21: CLINICAL RELEVANCE OF BLOOD VISCOSITY MEASUREMENT, STATE OF THE ART, LIMITATION AND INTRODUCTION TO A NEW METHODOLOGY

Chair: Alexandre De Tilly

S21-1 Blood rheology: Different aspects of the same elephant
Herbert J. Meiselman

Department of Physiology and Biophysics, Keck School of Medicine, Los Angeles, USA

S21-2 Clinical relevance of blood viscosity
Philippe Connes

Laboratoire CRIS EA647, Université Lyon 1, Lyon, France

S21-3 New aspect of blood and plasma rheology
Olivier Greffier^a, Alexandre de Tilly^b and Jean-Paul Decruppe^a

^aLaboratoire LCP-A2MC EA4632, Institut Jean Barriol, Université de Lorraine, Metz, France

^bBOWLT, Laboratoire d'étude de la viscosité du sang et des liquides complexes, Hong Kong

S21-4 A set of reliable measurements of blood viscosity
Alexandre De Tilly

BOWLT, Laboratoire d'étude de la viscosité du sang et des liquides complexes, Hong Kong

S22: CHANNELS AT THE BASE OF IT ALL: FUNDAMENTAL MECHANISMS OF MEMBRANE STRETCH ACTIVATED CHANNELS

Chairs: Peter J. Butler and Chilman Bae

S22-1 Integrating cellular mechanobiology and biomechanics: Emergence of primary cilia as mechanosensors

C.R. Jacobs and A. Nguye

Department of Biomedical Engineering, Columbia University, New York, NY, USA

S22-2 PIEZO: Eukaryotic mechanosensitive ion channel

Chilman Bae

Department of Physiology and Biophysics, State University of New York at Buffalo, NY, USA

S22-3 Fluorescence lifetime fluctuations as a new method for *in situ* measurement of membrane bending modulus

Hari S. Muddana^a, Changjin Huang^b, Selva Jeganathan^a, Sulin Zhang^b and Peter J. Butler^a

^a*Department of Biomedical Engineering, Penn State University, PA, USA*

^b*Department of Engineering Science and Mechanics, Penn State University, PA, USA*

S22-4 Determining how PIEZO1 channels sense force: Force-from-lipids?

C.D. Cox^a, P. Gottlieb^b and B. Martinac^{a,c}

^a*Victor Chang Cardiac Research Institute, Darlinghurst, NSW 2010, Australia*

^b*Department of Physiology and Biophysics, State University of New York at Buffalo, Buffalo, NY, USA*

^c*St Vincent's Clinical School, University of New South Wales, Darlinghurst, NSW 2010, Australia*

S23: OCT APPLICATION IN PATIENT-SPECIFIC COMPUTATIONAL HE-MORHEOLOGY

Chair: Joon Sang Lee

S23-1 The effects of aggregation characteristics of vesicles on their rheological properties using a computational approach

Joon Sang Lee

Department of Mechanical Engineering, Yonsei University, Republic of Korea

S23-2 Supercomputing and medical data in clinical practice on circulatory diseases

Sang Min Lee^a, Hyungwook Park^a and Joon Sang Lee^b

^a*Department of Supercomputing Modeling and Simulation, Korea Institute of Science & Technology Information, Republic of Korea*

^b*School of Mechanical Engineering, Yonsei University, Republic of Korea*

S23-3 Clinical application of 3D OCT

Jung-Sun Kim

Department of Cardiology, Yonsei University and Severance Hospital, Republic of Korea

S23-4 Advances in functional optical coherence tomography

Chulmin Joo

Department of Mechanical Engineering, Yonsei University, Republic of Korea

11:30–12:30 **Free Communications O4–O6****O4: CELLULAR AND MOLECULAR BIOMECHANICS**

Chair: Chulmin Joo

- O4-1 Altered membrane skeleton protein binding affinity by protein 4.1 phosphorylation plays a potential role in the deformability of vertebrate erythrocytes
Fuzhou Tang, Yang Ren, Ruofeng Wang, Xueru Deng and Xiang Wang
Department of Biomedical Engineering, Chongqing University, Chongqing, China
- O4-2 Investigating the molecular mechanisms of membrane vesiculation and cell deformability after microvesiculation
Duangdao Palasuwan and Attakorn Palasuwan
Department of Clinical Microscopy, Faculty of Allied Health Sciences, Chulalongkorn University, Bangkok, Thailand
- O4-3 Mechanical regulation of kinetics and structural bases of beta2 integrin–ICAM-1 interaction
Shouqin Lü, Debin Mao, Ning Li, Xiao Zhang and Mian Long
Center of Biomechanics and Bioengineering and Key Laboratory of Microgravity (National Microgravity Laboratory), Institute of Mechanics, Chinese Academy of Sciences, Beijing, China
- O4-4 Force generation and morphology of actomyosin machinery
T. Kim
Weldon School of Biomedical Engineering, Purdue University, West Lafayette, IN, USA

O5: MECHANICS OF BLOOD COMPONENTS

Chair: Brian Cooke

- O5-1 Effects of secoisolariciresinol on blood viscosity, aggregation and deformability of RBCs in ovariectomised rats
T.M. Plotnikova^a, A.M. Anishchenko^b, O.I. Aliev^b, N.E. Nifantiev^c and M.B. Plotnikov^b
^a*Siberian State Medical University, Tomsk, Russia*
^b*E.D. Goldberg Institute of Pharmacology and Regenerative Medicine, Tomsk, Russia*
^c*N.D. Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, Moscow, Russia*
- O5-2 Diversity of biomechanical and nanostructural changes to human and cynomolgus monkey red cells infected with malaria parasites
Rou Zhang^a, Eric Lombardini^b, Amirah Amir^c, Georges Snounou^d, Laurent Renia^e, Brian M. Cooke^f, Mun Yik Fong^c, Yee Ling Lau^c, Francois Nosten^g and Bruce Russell^a
^a*National University of Singapore, Singapore*
^b*Armed Forces Research Institute of the Medical Sciences (USAMC-AFRIMS), Thailand*
^c*University of Malaya, Malaysia*

- ^d*Sorbonne Universités, UPMC Université Paris 06, UPMC UMRS CR7, F-75005, France*
- ^e*A*STAR, Singapore*
- ^f*Monash University, Australia*
- ^g*Shoklo Malaria Research Unit, Mae Sod, Thailand*
- O5-3 Observation of morphological changes on platelets exposed to shear stress
Hoyoon Lee^a, Jeongho Kim^a, Jung Hun Kim^b, Hye-Sun Park^b, Chae-Seung Lim^c and Sehyun Shin^{a,c}
^a*School of Mechanical Engineering, Korea University, Seoul, Republic of Korea*
^b*Rheomeditech Inc., Seoul, Republic of Korea*
^c*Department of Laboratory Medicine, Korea University Guro Hospital, Seoul, Republic of Korea*
- O5-4 The influence of fluid shear stress on the Von Willebrand factor protein in an optical trap
Xavier J. Candela^a, Monica Corsetti^a, Peter J. Butler^a and Keefe B. Manning^{a,b}
^a*Department of Biomedical Engineering, The Pennsylvania State University, University Park, PA, USA*
^b*Department of Surgery, Penn State Hershey Medical Center, Hershey, PA, USA*
- O6: DISEASE AND HEMORHEOLOGY**
 Chair: Tamas Alexy
- O6-1 Comparative efficiency and hemorheological consequences of radiotherapy and chemotherapy in patients with solid nonmyeloid malignancies
I.A. Tikhomirova^a, A.V. Muravyov^a, S.V. Cheporov^b, N.V. Kislov^b and E.P. Petrochenko^a
^a*State Pedagogical University, Yaroslavl, Russia*
^b*Regional Cancer Hospital, Yaroslavl, Russia*
- O6-2 Autodigestion and proteolytic receptor cleavage in rheological and cardiovascular dysfunction
Geert W. Schmid-Schönbein, Frank A. DeLano, Marco H. Santamaria, Angela Y. Chen, Edward E. Tran and Stephen F. Rodrigues
Department of Bioengineering, University of California San Diego, La Jolla, CA, USA
- O6-3 Adhesion of mesenchymal stem cells from flowing blood: Effects of their tissue origin and of interactions with platelets
Asma Alanazi^{a,b}, Hafsa Munir^a, Helen M. McGettrick^a, N. Thin Luu^a, Steve P. Watson^a and Gerard B. Nash^a
^a*College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK*
^b*King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA*
- O6-4 Endothelial microparticles released in response to TNF- α vary in miRNA content and physical characteristics: Implications for their role as intercellular communicators
Tamas Alexy, Warren D. Gray, Kimberly Rooney, Martina Weber and Charles D. Searles

Emory University School of Medicine, Atlanta, GA and Atlanta VA Medical Center, Decatur, GA, USA

- 12:30–14:00 **Lunch Break**
(IOS Press Luncheon for Clin Hemorheol (invitation only))
- 14:00–15:00 **Plenary Lecture L7**
Takeo Matsumoto: Mechanical heterogeneity in the aortic wall: From macroscopic to microscopic viewpoint
- 15:00–15:30 **Coffee Break**
- 15:30–17:00 **Symposia 24–26**
- S24: MICRO/NANO BIOMECHANICS**
Chair: Toshiro Ohashi
- S24-1 Traction force measurement of migrating fibroblasts using a microchannel device
Toshiro Ohashi
Faculty of Engineering, Hokkaido University, Japan
- S24-2 Construction of microvascular networks under controlled culture microenvironments
Ryo Sudo
Department of System Design Engineering, Keio University, Japan
- S24-3 Quantification of interactions between red blood cells in solutions of blood plasma proteins and in autologous plasma by single cell force microscopy
Kisung Lee^a, Matti Kinnunen^b, Maria Dmitrievna Khokhlova^a, Evgeny Valerevich Lyubin^a, Andrey Anatolevich Fedyanin^a, Artashes Vacheevich Karmenyan^c and Alexander Vasilievich Priezhev^a
^a*Lomonosov Moscow State University, Russian Federation*
^b*University of Oulu, Finland*
^c*National Dong Hwa University, Taiwan*
- S24-4 Mechanical regulation of kinetics and structural bases of beta2 integrin–ICAM-1 interaction
Shouqin Lü, Debin Mao, Ning Li, Xiao Zhang and Mian Long
Center of Biomechanics and Bioengineering and Key Laboratory of Microgravity (National Microgravity Laboratory), Institute of Mechanics, Chinese Academy of Sciences, Beijing, China
- S25: STIMULI-RESPONSIVE BIOLOGICAL SOFT MATTER**
Chairs: Yasuyuki Maki and Takayuki Narita
- S25-1 Stress-responsive gel–sol transformation of serum albumin in aqueous ethanol solution
Yasuyuki Maki, Kazuki Yajima and Toshiaki Dobashi
Gunma University, Tenjin, Kiryu, Gunma, Japan
- S25-2 Rheological behavior of super-hydrophilic mucin from loach skin mucus
Miao Du
Department of Polymer Science and Engineering, Zhejiang University, China

- S25-3 Measurement of blood physical properties in a microfluidic environment
B.J. Kim^a, J.C. Hyun^b, A. Zhbanov^b and S. Yang^{a,b}
^a*Department of Medical System Engineering, Gwangju Institute of Science and Technology, Gwangju, Republic of Korea*
^b*School of Mechatronics, Gwangju Institute of Science and Technology, Gwangju, Republic of Korea*
- S25-4 Morphogenesis formed from alginate solutions in capillary glass tubes
Takayuki Narita^a, Natsuki Matsuda^a, Masayuki Tokita^b and Yushi Oishi^a
^a*Department of Chemistry and Applied Chemistry, Saga University, 1 Honjo, Saga, Japan*
^b*Department of Physics, Kyushu University, Hakozaki, Fukuoka, Japan*
- S26: SICKLE CELL DISEASE, BLOOD RHEOLOGY AND PATOPHYSIOLOGY**
 Chairs: Thomas D. Coates and Philippe Connes
- S26-1 Peripheral vasoconstriction and abnormal parasympathetic response to pain and mental stress in sickle cell disease: *Could the autonomic nervous system trigger sickle cell crisis?*
Thomas D. Coates^a, Maha Khaleel^a, Mammen Puliyeel^a, Patjanaporn Chalacheva^d, Roberta Kato^b, Wanwara Thuptimjang^d, John Sunwoo^d, Adam Bush^d, Jon A. Detterich^c, Payal Shah^a, Herbert J. Meiselman^e, Jenny Tsao^f, John C. Wood^{c,d}, Richard Sposto^a, Lonnie Zeltzer^f and Michael C.K. Khoo^d
^a*Division of Hematology, Department of Pediatrics, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA*
^b*Division of Pulmonology, Department of Pediatrics, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA*
^c*Division of Cardiology, Department of Pediatrics, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA*
^d*Department of Biomedical Engineering, Viterbi School of Engineering, University of Southern California, Los Angeles, CA, USA*
^e*Department of Physiology and Biophysics, Keck School of Medicine, University of Southern California, Los Angeles, California, USA*
^f*Department of Pediatrics, University of California, Los Angeles, CA, USA*
- S26-2 Red blood cell deformability and blood viscosity determine tissue oxygenation in sickle cell disease
J. Detterich^a, M. De Zoysa^b, A. Bush^a, R. Kato^c, T. Coates^d and J. Wood^a
^a*Division of Cardiology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA*
^b*Keck School of Medicine, University of Southern California, Los Angeles, CA, USA*
^c*Division of Pulmonology, Children's Hospital Los Angeles, CA, USA*
^d*Division of Hematology, Children's Hospital Los Angeles, CA, USA*
- S26-3 The development of a low-powered, portable, and inexpensive red blood cell aggregometer
Juan M. Arrieta^a, Surendran Sabapathy^b, Ozlem Yalcin^c, Guillermo Jacuinde^a and Michael Simmonds^b

- ^a*School of Allied Health Sciences, Griffith University, Australia*
^b*Heart Foundation Research Centre, Menzies Health Institute of Queensland, Griffith University, Australia*
^c*Department of Physiology, Koc University, Istanbul, Turkey*
- S26-4 The association of sickle cell trait with type 2 diabetes severely impairs blood rheology and vascular function
Mor Diaw^a, Vincent Pialoux^{b,g,h}, Cyril Martin^{b,h,}, Abdoulaye Samb^{a,c,*}, Saliou Diop^d, Camille Faes^{b,h}, Pauline Mury^{b,h}, Niama Sall Diop^e, Saïd-Norou Diop^f, Maïmouna Ndour Mbaye^f and Philippe Connes^{b,g,h}*
^{*}*Equal contributors*
^a*Laboratoire de physiologie et explorations fonctionnelles, FMPO, UCAD, Dakar, Sénégal*
^b*CRIS EA 647 Laboratory, University Claude Bernard Lyon 1, Villeurbanne, France*
^c*UMI 3189, Environnement, Santé, Sociétés, Université Bamako-UCAD, Dakar, Sénégal*
^d*Laboratoire d'hémo-immunologie, FMPO, UCAD, Dakar, Sénégal*
^e*Laboratoire de biochimie et de biologie moléculaire, FMPO, UCAD, Dakar, Sénégal*
^f*Clinique Médicale II, Centre Hospitalier Abass Ndao, Dakar, Sénégal*
^g*Institut Universitaire de France, Paris, France*
^h*Laboratory of Excellence in Red Blood Cell (LABEX GR-Ex), PRES Sorbonne, Paris, France*

17:00–17:30 **CLOSING SESSION**

Poster Session 1

- P1-1 Regional specific adaptation of the vascular cell glycocalyx in tail-suspended rats
Hongyan Kang and Xiaoyan Deng
School of Biological Science and Medical Engineering, Beihang University, China
- P1-2 The mechano-biological role of caveolae/caveolin-1 in low shear stress-induced migration and invasion of human breast carcinoma MDA-MB-231 cells
Liuyuan Guan, Fenglong Zhao, Niya Xiong, Yu Chen, Hong Yang, Chunhui Wu and Yiyao Liu
Department of Biophysics, School of Life Science and Technology, University of Electronic Science and Technology of China, China
- P1-3 Low shear stress induces breast cancer MDA-MB-231 cell motility and cytoskeleton remodeling via PI-3K/Akt/mTOR/p70S6K signal pathway
Fenglong Zhao, Niya Xiong, Liuyuan Guan, Yu Chen, Jing Zhang, Hong Yang, Chunhui Wu and Yiyao Liu
Department of Biophysics, School of Life Science and Technology, University of Electronic Science and Technology of China, China

- P1-4 Protective effect of propolis on erythrocyte rheology in experimental mercury intoxication in rats
S. Aydođan^a, S. Silici^b, K. Erciř^a and A.T. Atayođlu^c
^a*Department of Physiology, Faculty of Medicine, Erciyes University, Kayseri, Turkey*
^b*Department of Agricultural Biotechnology, Agricultural Faculty, Erciyes University, Kayseri, Turkey*
^c*Department of Family Medicine, American Hospital, Istanbul, Turkey*
- P1-5 Effect of membrane mechanical properties of red blood cells on oxygen transfer
Xiaobo Gong^a, Zhaoxin Gong^a and Huaxiong Huang^b
^a*Department of Engineering Mechanics, Shanghai Jiao Tong University, China*
^b*Department of Mathematics & Statistics, York University, China*
- P1-6 The effect of exercise on blood fluidity
Tatsushi Kimura^a, Hironobu Hamada^b, Shunsuke Taito^c, Makoto Takahashi^b and Kiyokazu Sekikawa^b
^a*Department of Early Childhood Education, Yasuda Women's College, Japan*
^b*Department of Physical Analysis and Therapeutic Sciences, Hiroshima University, Japan*
^c*Division of Clinical Support, Hiroshima University Hospital, Japan*
- P1-7 Rapid rather than gradual weight reduction impairs performance of Taekwondo Athletes through a reduction in red blood cell-nitric oxide synthase dependent nitric oxide production and has a negative effect on hemorheological parameters
Woo-Hwi Yang^{b,d}, Oliver Heine^d, Sebastian Pauly^a, Pilsang Kim^a, Wilhelm Bloch^{a,c}, Joachim Mester^{b,c} and Marijke Grau^{a,c}
^a*Department of Molecular and Cellular Sport Medicine, Institute of Cardiovascular Research and Sport Medicine, German Sport University Cologne, Cologne, Germany*
^b*Institute of Training Science and Sport Informatics, German Sport University Cologne, Cologne, Germany*
^c*German Research Centre for Elite Sports, German Sport University, Cologne, Germany*
^d*Olympic Training Centre Rhineland, Cologne, Germany*
- P1-8 Suspension state promotes the malignant potential of MDA-MB-231 cells
Xiaomei Zhang and Yonggang Lv
Key Laboratory of Biorheological Science and Technology, Chongqing University, Ministry of Education, Bioengineering College, Chongqing University, Chongqing 400044, China
- P1-9 The features of peripheral blood flow in cancer
I.A. Tikhomirova^a, D.V. Lileev^b, N.B. Kislov^b, I.A. Gordeev^b, M.E. Schekaleva^b and Yu.V. Malysheva^a
^a*Medicine & Biology Department, State Pedagogical University, Yaroslavl, Russia*
^b*Yaroslavl Regional Cancer Hospital, Yaroslavl, Russia*
- P1-10 Mechano-growth factor E peptide promoted rat tenocyte motility via the FAK-ERK1/2 signaling pathway
Bingyu Zhang, Qing Luo, Li Yang and Guanbin Song

- Key Laboratory of Biorheological Science and Technology, Ministry of Education, College of Bioengineering, Chongqing University, Chongqing, China*
- P1-11 Flow characteristics of a shear-thinning blood analog in post-stenosis region
Hyung Kyu Huh, Ho Jin Ha and Sang Joon Lee
Department of Mechanical Engineering, Center for Biofluid and Biomimic Research, Pohang University of Science and Technology, Pohang, Republic of Korea
- P1-12 Simultaneous measurement of RBC aggregation and blood viscosity under *ex vivo* condition
Eunseop Yeom and Sang Joon Lee
Pohang University of Science and Technology, Republic of Korea
- P1-13 Influence of mechanical stimulation by different sound wave frequencies on growth of vascular endothelial cells during *in vitro* culture
Yang Ren, Ruofeng Wang, Fuzhou Tang, Xueru Deng and Xiang Wang
Chongqing University Biomedical Engineering, Chongqing, China
- P1-14 Dynamics of prismatic particles in linear shear flow near a wall
Jiyeon Hyun and Sei-Young Lee
Yonsei University, Republic of Korea
- P1-15 Membrane structural protein analysis and mechanical property analysis of rat erythroblasts in different developmental stages
Xueru Deng, Fuzhou Tang, Yang Ren, Ruofeng Wang and Xiang Wang
Department of Biomedical Engineering, Chongqing University, Chongqing, China
- P1-16 Effects of magnetism and body acceleration on blood flows and its applications in human physiology
Rangarao N. Pralhad^a and Meena Sharad Kaulgi^b
^a*Defence Research and Development Organisation, India*
^b*D.Y. Patil College of Engineering, Akrudi Pune India, India*
- P1-17 An alternative, rapid method for evaluation of erythrocyte sedimentation rate
Alexander Zhanov^a and Sung Yang^{a,b}
^a*Department of Medical System Engineering, Gwangju Institute of Science and Technology (GIST), Gwangju, Republic of Korea*
^b*School of Mechatronics, Gwangju Institute of Science and Technology (GIST), Gwangju, Republic of Korea*
- P1-18 The effect of intracellular signaling mechanisms on oxygen-carrying properties of the erythrocyte
G. Yavas^a, M.J. Simmonds^b, H.J. Meiselman^c and O. Yalcin^a
^a*Koc University School of Medicine, Istanbul, Turkey*
^b*Heart Foundation Research Centre, Griffith Health Institute, Griffith University, Queensland, Australia*
^c*Department of Physiology and Biophysics, Keck School of Medicine, Los Angeles, CA, USA*
- P1-19 Facilitated solute removal by a new pumping operation during single needle hemodialysis
Seiichi Mochizuki^a, Takehito Ogawa^a, Chihiro Fujihara^b and Jun-ichi Ono^a

- ^a*Kawasaki University of Medical Welfare, Kurashiki, Japan*
^b*Okayama University Hospital, Okayama, Japan*
- P1-20 Substrate stiffness alters cell behavior and mechanical character of cells from normal human liver
Tingting Xia^{a,b}, Hui Zhou^{a,b}, Qiping Huang^{a,b}, Hongbing Wang^{a,b}, Guanglei Yu^d, Xiaobing Zou^c, Zhiling Xu^{a,b} and Li Yang^{a,b}
^a*Key Laboratory of Biorheological Science and Technology (Chongqing University), Ministry of Education, College of Bioengineering, Chongqing University, Chongqing, China*
^b*'111' Project Laboratory of Biomechanics and Tissue Repair, Bioengineering College, Chongqing University, Chongqing, China*
^c*College of Chemistry and Chemical Engineering, Chongqing University, Chongqing, China*
^d*College of Mathematics and Statistics, Chongqing University, Chongqing, China*
- P1-21 Enhanced inflammatory mediators and platelet activation in unstable angina
Xiaojuan Ma
Xiyuan Hospital and China Academy of Chinese Medicine Sciences, China
- P1-22 Exercise-induced changes in hematocrit and hematocrit/viscosity ratio in male rugby players
Jean-Frederic Brun, Emmanuelle Varlet-Marie and Eric Raynaud de Mauverger
Department of Physiology, University of Montpellier, France
- P1-23 Striped morphosis observed in collagen gels formed in a small space
Honami Takajo^a, Kazuya Furusawa^b, Yushi Oishi^a and Takayuki Narita^a
^a*Department of Chemistry and Applied Chemistry, Saga University, Japan*
^b*Department of Biological Science, Hokkaido University, Japan*
- P1-24 A non-Newtonian standard imitating the rheological characteristics of blood for hemorheology tests
Ruofeng Wang, Fuzhou Tang, Pei Xu, Yang Ren, Xueru Deng and Xiang Wang
Department of Biomedical Engineering, Chongqing University, Chongqing, China
- P1-25 One-year follow-up of blood viscosity factors and hematocrit/viscosity ratio in elite soccer players
Jean-Frederic Brun, Emmanuelle Varlet-Marie and Eric Raynaud de Mauverger
Department of Physiology, University of Montpellier, Montpellier, France
- P1-26 Blood damage assessment as gauged by erythrocyte microparticle formation during sub-hemolytic mechanical trauma
D.K. Burk and E.A. O'Rear
Department of Chemical, Biological and Materials Engineering, University of Oklahoma, USA
- P1-27 SDF-1/CXCR4 axis and MAPK signaling pathway mediate lower shear stress-induced the migration of bone marrow-derived mesenchymal stem cells
Guanbin Song^a, Yuan Lin^a, Qing Luo^a, Li Yang^a, Naoya Sakamoto^b and Masaaki Sato^c

- ^a*Key Laboratory of Biorheological Science and Technology, Ministry of Education, College of Bioengineering, Chongqing University, Chongqing, China*
- ^b*Graduate School of Biomedical Engineering, Tohoku University, Sendai, Japan*
- ^c*Department of Medical Engineering, Kawasaki University of Medical Welfare, Okayama, Japan*
- P1-28 Simulated microgravity induces cell apoptosis of the breast cancer cells by activating Rac1 and Bcl-2
Zhenhui Kang^a, Xiangdong Luo^b, Tong Qin, Yong Yang^b, Yongfei Liu^a and Guixue Wang^a
^a*College of Bioengineering, Chongqing University, Chongqing, China*
^b*State Key Laboratory of Trauma, Burns and Combined Injury, Third Military Medical University, China*
- P1-29 Is the stiffness of substrate involved in the interaction of MSCs and HSCs *in vitro*?
Qiping Huang, Quanyi Feng, Tingting Xia, Hao Wang and Dongliang Shen
Key Laboratory of Biorheological Science and Technology, Ministry of Education, College of Bioengineering, Chongqing University, Chongqing, China
- P1-30 Transforming growth factor- β 1 remodel the cytoskeleton organization of mature dendritic cells via Smad signaling pathway
Hui Yang^a, Zhu Zeng^a, Rong Dong^a, Cui Fang Wu^a, Jin Hua Long^b, Xiao Li Xu^a, Hui Xue^a, Zu Quan Hu^a and Wei Juan Yao^c
^a*School of Biology & Engineering, Guiyang Medical University, China*
^b*Affiliated Cancer Hospital, Guiyang Medical College, China*
^c*Center of Hemorheology, School of Basic Medical Sciences, Health Science Center of Peking University, China*
- P1-31 Sequence of changes in viscosity of blood, blood pressure, and vasodilator function of endothelium in young SHR
M.B. Plotnikov^a, O.I. Aliev^a, A.M. Anishchenko^a, A.V. Sidekhnmenova^a, A.Y. Shamanaev^a and T.M. Plotnikova^b
^a*E.D. Goldberg Institute of Pharmacology and Regenerative Medicine, Tomsk, Russia*
^b*Siberian State Medical University, Tomsk, Russia*
- P1-32 Haemochromatosis does not impair the haemorheological properties of blood
Antony McNamee^a, Surendran Sabapathy^b, Jarod Horobin^b, Indu Singh^b, Janelle Guerrero^b and Michael Simmonds^b
^a*School of Allied Health Sciences, Griffith University, Australia*
^b*Heart Foundation Research Centre, Menzies Health Institute of Queensland, Griffith University, Australia*
- P1-33 Rheological properties of synthetic mucin solutions as simulated normal and asthmatic airway mucus
Zhiwei Liu and Linhong Deng

- Changzhou Key Laboratory of Respiratory Medical Engineering, Institute of Biomedical Engineering and Health Sciences, Changzhou University, Changzhou, Jiangsu, China*
- P1-34 Comparison of blood flows determined by a computational model and measured by ultrasonography
Shiori Yauchi^a, Kiyomi Niki^a, Motoaki Sugawara^b, Fuyou Liang^c and Mari Ohshima^d
^a*Tokyo City University Graduate School, Japan*
^b*Himeji Dokkyo University, Japan*
^c*Shanghai Jiao Tong University, China*
^d*The University of Tokyo, Tokyo, Japan*
- P1-35 An experimental study of flow around submerged grass vegetation
Julia Seungmi Lee
School of Engineering, Brown University, USA

Poster Session 2

- P2-1 Effect of rice powder on the rheological properties of Gomatofu (sesame tofu)
Emiko Sato
University of Niigata Prefecture and Faculty of Human Life Studies, Japan
- P2-2 Analysis of blood pressure waves in a stenosis by CFD
Young Woo Kim and Joon Sang Lee
Yonsei University, Republic of Korea
- P2-3 Ultrasonic observation of erythrocyte aggregation in an elastic carotid artery bifurcation phantom under pulsatile flow
Changzhu Jin^a, Soo-Hong Min^a, Dong-Guk Paeng^a and Alfred C.H. Yu^b
^a*Ocean System Engineering, Jeju National University, Republic of Korea*
^b*EEE Department, Hong Kong University, Hong Kong*
- P2-4 Functional recirculation phenomena during single needle dialysis
Chihiro Fujihara^a, Seiichi Mochizuki^b, Takehito Ogawa^b and Jun-ichi Ono^b
^a*Okayama Department of Blood Purification Center, Okayama University Hospital, Okayama, Japan*
^b*Kawasaki University of Medical Welfare, Kurashiki, Japan*
- P2-5 Sick cell anemia and red blood cell deformability determined by ektacytometry
Nermi Parrow^a, Céline Renoux^{b,c}, Camille Faes^c, Philippe Joly^{b,c}, Max Hardeman^d, John Tisdale^a, Mark Levine^a, Nathalie Garnier^e, Yves Bertrand^e, Kamila Kebaili^e, Daniela Cuzzubbo^e, Cyril Martin^c, Vincent Pialoux^c and Philippe Connes^c
^a*National Institutes of Health, Washington, DC, USA*
^b*Laboratoire de Biochimie, Hôpital Edouard Herriot, Lyon, France*
^c*Laboratoire CRIS EA647, Université Lyon 1, Lyon, France*
^d*Academic Medical Center, Amsterdam, The Netherlands*
^e*Institut d'Hématologie et d'Oncologie Pédiatrique, Lyon, France*
- P2-6 Different systolic blood pressure changes post-stenotic cerebral blood flow in patients with intracranial atherosclerosis
Hyo Suk Nam^a, Fabien Scalzo^b, Xinyi Leng^c and David Liebeskind^b

- ^a*Department of Neurology, College of Medicine, Yonsei University, Republic of Korea*
- ^b*Neurovascular Imaging Research Core, University of California, Los Angeles, USA*
- ^c*Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Hong Kong*
- P2-7 A three dimensional microfluidic model to investigate synergism of biomechanical and biochemical factors on angiogenic sprouting
Minhwan Chung, Sudong Kim, Jungho Ahn and Noo Li Jeon
Seoul National University, Republic of Korea
- P2-8 Signaling pathway implied on the vasodilator effect of a selective β 1 adrenoceptor blocker in smooth muscle cells: Involvement of actin cytoskeleton, myosin light chains and Rho-A kinase
A. Kadi^a, N. De Isla^a, P. Lacolley^b, J.F. Stoltz^{a,c} and P. Menu^a
^a*UMR 7365 CNRS-Université de Lorraine, Ingénierie Moléculaire et Physiopathologie Articulaire (IMoPA), Vandoeuvre-lès-Nancy, France*
^b*UMR 1116 INSERM – Laboratoire de Pharmacologie Cardiovasculaire, Vandoeuvre-lès-Nancy, France*
^c*CHU Nancy – Cell and Tissue Therapy Unit and Tissue Bank, Vandoeuvre-lès-Nancy, France*
- P2-9 A microfluidic platform for quantitative analysis of metastasis
Hyunjae Lee, Woohyun Park, Hyunryul Ryu, Minhwan Chung and Noo Li Jeon
Seoul National University, Republic of Korea
- P2-10 Disturbed flow-induced p90RSK activation elicits endothelial dysfunction and atherosclerosis formation via inhibiting de-SUMOylation enzyme SENP2
Kyungsun Heo and Jun-ichi Abe
Department of Cardiology, University of Texas MD Anderson Cancer Center, Houston, TX, USA
- P2-11 Macro- and micro-circulatory adaptation in response to chronic hypoxia
Saki Hamashima and Masahiro Shibata
Division of Systems Engineering and Science, Shibaura Institute of Technology, Japan
- P2-12 Platelet activation by collagen and fibrinogen coated beads
Gyehyu Kim^a, Hoyoon Lee^a, Jeongho Kim^a, Jung Hun Kim^b, Hye-Sun Park^b, Chae-Seung Lim^c and Sehyun Shin^{a,c}
^a*School of Mechanical Engineering, Korea University, Republic of Korea*
^b*Rheomeditech, Inc., Seoul, Republic of Korea*
^c*Department of Laboratory Medicine, Korea University Guro Hospital, Seoul, Republic of Korea*
- P2-13 Examination of the effects of stirring geometry on platelet activation and aggregation
Jeongho Kim^a, Gyehyu Kim^a, Hoyoon Lee^a, Yeonsoo Kim^a and Sehyun Shin^{a,b}
^a*School of Mechanical Engineering, Korea University, Seoul, Republic of Korea*
^b*Department of Laboratory Medicine, Korea University Guro Hospital, Seoul, Republic of Korea*

- P2-14 Light-transmission based detection of platelet activation in a stirring microchip system
Jeongho Kim^a, Hoyoon Lee^a, Gyehyu Kim^a, Yeonsoo Kim^a and Sehyun Shin^{a,b}
^a*School of Mechanical Engineering, Korea University, Seoul, Republic of Korea*
^b*Department of Laboratory Medicine, Korea University Guro Hospital, Seoul, Republic of Korea*
- P2-15 Experimental measurements of the particle lateral migration in submillimeter channel flows
Hiroyuki Shichi^a, Junji Seki^b, Tomoaki Itano^a and Masako Sugihara-Seki^a
^a*Department of Pure and Applied Physics, Kansai University, Suita, Osaka, Japan*
^b*ORDIST, Kansai University, Suita, Osaka, Japan*
- P2-16 Cross-sectional distributions of platelets in blood flow through microchannels
Tomoya Kimura^a, Ryota Noso^a, Keisuke Sakamoto^a, Junji Seki^b and Masako Sugihara-Seki^a
^a*Department of Pure and Applied Physics, Kansai University, Suita, Osaka, Japan*
^b*ORDIST, Kansai University, Suita, Osaka, Japan*
- P2-17 Finite element analysis of physiological blood flow through an aneurysm
Deok-Kee Choi
Department of Mechanical Engineering, Dankook University, Republic of Korea
- P2-18 Study of an alternative pyrogen test for blood product
Ji Hye Kim and Chi-Young Ahn
Blood Product Team, National Center for Lot Release, NIFDS, Ministry of Food and Drug Safety, Republic of Korea
- P2-19 Comparative investigations for evaluating red blood cell deformability alterations related to splenectomy and various spleen-preserving operation types in a follow-up study, using filtrometry, slit-flow and rotational ektacytometry
Iren Miko^a, Eniko Toth^a, Ferenc Kiss^a, Istvan Furka^a, Andrea Furka^b, Katalin Peto^a and Norbert Nemeth^a
^a*Department of Operative Techniques and Surgical Research, Institute of Surgery, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
^b*Division of Radiotherapy, Department of Clinical Oncology, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
- P2-20 Improvement of the intestinal microcirculation by inhibition of endogenous cannabinoid degradation in experimental sepsis
Hyewon Yang, Juan Zhou and Christian Lehmann
Dalhousie University, Canada
- P2-21 Investigation of influences of flow field in the port of hemofilters on thrombus formation
Azuma Takahashi, Kiyotaka Iwasaki, Sara Suzuki, Yusuke Aoyama, Yuki Matsuhashi, Mayuki Hirata, Yoshiki Yamamoto and Mitsuo Umezu
Department of Advanced Biomedical Sciences, Waseda University, Japan

- P2-22 Dynamic response of viscoelastic fluids at a mesoscopic scale
Pamela Vazquez and Gabriel Caballero
Department of Biomedical Engineering and Physics, CINVESTAV, IPN, Mexico
- P2-23 The comparison of hemorheological parameters determined from K2- and K3-EDTA anticoagulated healthy human blood samples
Ferenc Kiss^a, Kornel Miszti-Blasius^b and Norbert Nemeth^a
^a*Department of Operative Techniques and Surgical Research, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
^b*Institute of Laboratory Medicine, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
- P2-24 Micro-rheological characterization of selected erythrocyte-related hematological disorders: Preliminary results
Ferenc Kiss^a, Kornel Miszti-Blasius^b and Norbert Nemeth^c
^a*Department of Operative Techniques and Surgical Research, Institute of Surgery, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
^b*Institute of Laboratory Medicine, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
- P2-25 Micro-rheological alterations in leukocyte-related myeloproliferative hematological malignancies: Preliminary results
Kornel Miszti-Blasius^a, Ferenc Kiss^b, Robert Szasz^c and Norbert Nemeth^b
^a*Institute of Laboratory Medicine, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
^b*Department of Operative Techniques and Surgical Research, Institute of Surgery, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
^c*Division of Hematology, 2nd Department of Medicine, Institute of Internal Medicine, Faculty of Medicine, University of Debrecen, Debrecen, Hungary*
- P2-26 Analysis of emulsion elasticity under oscillatory shear stresses
Se Bin Choi, Young Woo Kim and Joon Sang Lee
Department of Mechanical Engineering, Yonsei University, Republic of Korea
- P2-27 Flow field simulations and hemolysis estimations for the FDA CPI CFD/blood damage project
Margaret Heck, Dimitrios V. Papavassiliou, Edgar A. O'Rear and Allen W. Yen
School of Chemical, Biological and Materials Engineering, University of Oklahoma, Norman, USA
- P2-28 Adaptations of fibrinolytic factors to preparation and competition periods in professional soccer players
Sajad Ahmadizad, Davar Rezaeimanesh and Khosrow Ebrahim
Department of Exercise Physiology, Faculty of Sport and Exercise Sciences, Shahid Beheshti University, Iran
- P2-29 Fibrinolytic responses to acute simulated soccer exercise in professional players
Sajad Ahmadizad, Davar Rezaeimanesh and Khosrow Ebrahim
Department of Exercise Physiology, Faculty of Sport and Exercise Sciences, Shahid Beheshti University, Iran

- P2-30 Differences in the beat-to-beat photoplethysmographic waveform indices between normal and metabolic-syndrome subjects
Hsin Hsiu
Graduate Institute of Biomedical Engineering, National Taiwan University of Science and Technology, Taiwan
- P2-31 Effect of shear stress on osmotic deformability
Sehyun Shin, Yujin Heo, Hoyoon Lee, Yeonsoo Kim and Kehyu Kim
Department of Mechanical Engineering, Korea University, Republic of Korea
- P2-32 Effects of lipopolysaccharide treatment of mice on RBC elongation at different shear stresses
Yun-hee Kim^a, Woon-young Kim^a, Jei-hak Myung^b, Jae-kwan Lim^a, Sung-mook Yoo^a, Seol-ju Park^a and Choon-Hak Lim^a
^aKorea University College of Medicine, Ansan, Republic of Korea
^bSchool of Medicine, Korea University, Seoul, Republic of Korea
- P2-33 Effect of clinical and RBC hemorheological parameters on myocardial perfusion in patients with type 2 diabetes mellitus
Minhee Cho^a, Sehyun Shin^b and Byoung-Kwon Lee^a
^aDepartment of Internal Medicine, Gangnam Severance Hospital, Yonsei University, Republic of Korea
^bDepartment of Mechanical Engineering, Korea University, Republic of Korea