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2nd Joint Meeting of the
The European Society for Clinical Hemorheology and Microcirculation
The International Society for Clinical Hemorheology
The International Society of Biorheology
July 4–7, 2021

Live-streaming Scientific Program

July 4, 2021

14:30–15:30 **Opening Ceremony**

15:40–16:40 **Opening Plenary Lecture**
Chair: **Shinya Goto**

PL1 Coagulopathy and Anticoagulation in Covid-19 - what can we learn for future challenges?
Danial Dürschmied
Cardiology and Intensive Care Medicine, Heart Center, University of Freiburg, Germany

16:50–17:50 **Plenary Lecture for ESCHM**
Chair: **Jean-Frederic Brun**

PL2 Lessons learnt from comparative hemorheology
Ursula Windberger
Medizinische Universitaet Wien, Center for Biomedical Research

18:00–19:00 **Rising Star Award Session - 1**
Chairs: **Maria Fornal, Ursula Windberger**

RSA1-1 Towards elimination of sublethal blood trauma in mechanical circulatory support
Michael J Simmonds[1,2]
[1]*Menzies Health Institute Queensland*, [2]*Griffith University, Australia*

RSA1-2 Hemorheological changes caused by pituitary adenylate cyclase-activating polypeptide administration during vessel anastomosis regeneration in the rat
Balazs Szabo[1], **Laszlo Adam Fazekas[1]**, **Adam Varga[1]**, **Barbara Barath[1]**, **Vince Szegeczki[2]**, **Tamas Juhasz[2]**, **Dora Reglodi[3]**, **Norbert Nemeth[1]**

[1]*Department of Operative Techniques and Surgical Research, University of Debrecen, Faculty of Medicine, Debrecen, Hungary*, [2]*Department of Anatomy, Histology and Embryology, Faculty of Medicine, University of Debrecen, Debrecen Hungary*, [3]*Department of Anatomy, Faculty of Medicine, University of Pecs, Pecs, Hungary*

19:00–20:20 **Free Communication (Video Presentation 1)**

20:20–21:50 **Symposia S1–S3**

S1: Microperfusion of different inner organs examined by contrast enhanced ultrasound technology or PET/CT
Chair: **Dong Yi**

S1-1 Potential application of dynamic contrast enhanced ultrasound in predicting microvascular invasion of hepatocellular carcinoma
Yi Dong[1], Yijie Qiu[1], Daohui Yang[1], Dan Zuo[1], Qi Zhang[1], Wen-Ping Wang[1], Ernst Michael Jung[2]
[1]*Zhongshan Hospital, Fudan University*, [2]*Department of Radiology, University Medical Center Regensburg, Germany*

S2: Clinical hemorheology in critically ill patients
Chairs: **Shohei Moriyama, Michinari Hieda, Masahito Hitosugi**

S2-1 Vascular toxicity in cardio-oncology
Shohei Moriyama, Michinari Hieda
Department of Hematology, Oncology and Cardiovascular Medicine, Kyushu University Hospital

S2-2 Catheter treatment of leg arterial atherosclerosis: Endovascular treatment for peripheral arterial disease
Eiji Karashima
Shimonoseki City Hospital

S2-3 Advances in diagnosis and treatment of pulmonary hypertension
Kohtaro Abe
Department of Cardiovascular Medicine, Kyushu University Hospital

S2-4 Myocardial pathological changes in patients with epilepsy and psychiatric disorders
Marin Takaso, Misa Tojo, Masahito Hitosugi
Department of Legal Medicine, Shiga University of Medical Science

S3: Intracellular signaling in RBCs: Roles and consequences
Chairs: **Özlem Yalçın, Philippe Connes**

S3-1 Calcium signaling in red cells induced by mechanical stress and flow
Lars Kaestner
Saarland University

S3-2 Shear conditioning attenuates the effects of superoxide in red blood cells: Role of generation and signaling of nitrogen species in different cell subpopulations
Marijke Grau[1], Lennart Kuck[2], Thomas Dietz[1], Michael J Simmonds[2]
[1]*German Sport University Cologne, Institute of Cardiovascular Research and Sports Medicine*, [2]*Griffith University Mechanobiology Research Laboratory*

S3-3 Signaling in erythroid cells: Role in physiology and contribution to pathological manifestations
Wassim El Nemer
EFS

S3-4 Impact of oxidative stress and decreased NO bioavailability on eryptosis and red blood cell microparticles in SCA: Consequences on endothelial cells and vascular function
Elie Nader[1,2], Marc Romana[3,4], Nicolas Guillot[1,2], Romain Fort[5], Emeric Stauffer[1,2,6], Nathalie Lemonne[7], Yohann Garnier[3,4], Sarah Skinner[1,2], Maryse Etienne-Julan[7], Mélanie Robert[1,2,8], Alexandra Gauthier[1,2,9], Giovanna Cannas[5], Sophie Antoine-Jonville[3], Benoit Tressières[10], Marie-Dominique Hardy-Dessources[3,4], Yves Bertrand[9], Céline Renoux[1,2,11], Philippe Joly[1,2,11], Marijke Grau[12], Philippe Connes[1,2]
[1]*Laboratoire Interuniversitaire de Biologie de la Motricité (LIBM) EA7424, Team "Vascular Biology and Red Blood Cell", Université Claude Bernard Lyon, Université de Lyon, Lyon, France*, [2]*Laboratoire d'Excellence du Globule Rouge (Labex GR-Ex), PRES Sorbonne, Paris, France*, [3]*Université des Antilles, Pointe-à-Pitre, France*, [4]*Université de Paris, Paris, France*, [5]*Département de Médecine Interne, Hôpital Edouard Herriot, Hospices Civils de Lyon, Lyon, France*, [6]*Centre de Médecine du Sommeil et des Maladies Respiratoires, Hospices Civils de Lyon, Hôpital de la Croix Rousse, Lyon, France*, [7]*Unité Transversale de la Drépanocytose, Hôpital de Pointe-à-Pitre, Hôpital Ricou, Guadeloupe, France*, [8]*Erytech Pharma, Lyon, France*, [9]*Institut d'Hématologie et d'Oncologie Pédiatrique, Hospices Civils de Lyon, Lyon, France*, [10]*Centre Investigation Clinique Antilles Guyane, 1424 Inserm, Academic Hospital of Pointe-à -Pitre, Guadeloupe, France*, [11]*Laboratoire de Biochimie et de Biologie Moléculaire, UF de Biochimie des Pathologies érythrocytaires, Centre de Biologie et de Pathologie Est, Hospices Civils de Lyon, Lyon, France*, [12]*Molecular and Cellular Sport Medicine, Deutsche Sporthochschule Köln, Köln, Germany*

S3-5 Phosphoproteomic changes in red blood cell membrane by Adenylyl cyclase/Protein kinase A signaling pathway and their roles on the mechanical stress responses of red blood cells
Elif Ugurel[1,2], Neslihan Cilek[1,2], Evrim Goksel[1,2], Ozlem Yalcin[1,2]
[1]*Koc University School of Medicine Department of Physiology*, [2]*Koc University Research Center for Translational Medicine*

July 5, 2021

09:10–10:10 **Keynote Lecture 1**
Chair: **Toru Maruyama**

KL1 Endothelium-dependent hyperpolarization (EDH) and endothelial dysfunction in hypertension: The role of endothelial ion channels
Kenichi Goto
Kyushu University

09:10–10:10 **Keynote Lecture 2**
Chair: **Takeshi Nakatani**

KL2 Clinical management of adverse complications in patients with left ventricular assist devices
Michinari Hieda
Kyushu University

09:10–10:40 **Symposium S4**
S4: Microfluidic and in silico device applications in hemorheology
Chair: **Sara Hashmi**

S4-1 Microfluidic assays to investigate the role of red blood cell-derived extracellular vesicles in sickle cell disease
Ran An, Umut Gurkan
Case Western Reserve University

S4-2 Hemorheology and pathophysiology of COVID-19 induced thrombosis predicted by Vein-Chip
Navaneeth Krishna Rajeeva Pandian, **Abhishek Jain**
Texas A&M University

10:20–11:50 **Symposia S5–S6**
S5: Mechanical circulatory support: From in-development to in vivo
Chairs: **Michael Simmonds, Tamas Alexy**

S5-1 The importance of blood rheology in left ventricular assist device therapy
Mohammed Chowdhury[1], **Valmiki Maharaj[2]**, **Arianne Agdamag[2]**, **Blair Edmiston[3]**, **Bellony Nzemenoh[3]**, **Victoria Charpentier[4]**, **Tamas Alexy[2]**
[1]*North Central Heart, Sioux Falls, SD, USA*, [2]*Department of Medicine, Division of Cardiology, University of Minnesota, MN, USA*, [3]*Department of Medicine, University of Minnesota, MN, USA*, [4]*University of Minnesota Medical School, Minneapolis, MN, USA*

S5-2 Hemo-compatibility related adverse events with left ventricular assist device (LVAD) support: Past, present, and future
Valmiki Maharaj[1], **Mohammed Chowdhury[2]**, **Arianne Agdamag[1]**, **Blair Edmiston[3]**, **Bellony Nzemenoh[3]**, **Victoria Charpentier[4]**, **Tamas Alexy[1]**

[1]*Department of Medicine, Division of Cardiology, University of Minnesota, MN, USA*, [2]*North Central Heart, Sioux Falls, SD, USA*, [3]*Department of Medicine, University of Minnesota, MN, USA*, [4]*University of Minnesota Medical School, Minneapolis, MN, USA*

S5-3 Analysis of the HeartMate 3 pump characteristics under continuous and pulsatile flow operation – An in vitro study
Jo Pauls[1,2], Nicole Bartnikowski[2,3], E-Peng Seah[2], Clayton Semenzin[2], Martin Mapley[2]
[1]*Griffith University - School of Engineering and Built Environment*, [2]*Innovative Cardiovascular Engineering and Technology Laboratory, Critical Care Research Group, The Prince Charles Hospital*, [3]*Queensland University of Technology - Science and Engineering Faculty*

S5-4 Re-evaluation of blood trauma from a sublethal perspective
Michael J Simmonds[1,2]
[1]*Menzies Health Institute Queensland*, [2]*Griffith University, Australia*

S6: Multi-scale diagnosis of biorheology and microcirculation
Chairs: **Yu Nakamichi, Daisuke Furukawa**

S6-1 Micro-tomographic visualization of tissue rheological properties by mechanical stimulation using optical coherence tomography
Daisuke Furukawa[1], Souichi Saeki[2]
[1]*Akita Prefectural University, Faculty of Systems Science and Technology*, [2]*Meijo University, Graduate School of Science and Technology*

S6-2 Three-dimensional detection of hemodynamic changes in skin microcirculation by optical coherence tomography-angiography
Yu Nakamichi
Sanyo-Onoda City University

S6-3 Investigation the extensional effects on the viscosity distribution of bile in the cystic duct
Ngoc Minh Nguyen[1], Hiromichi Obara[2]
[1]*Department of Mechanical Engineering, Thuyloi University, 175 Tay Son, Dong Da, Ha Noi, Vietnam*, [2]*Department of Mechanical Systems Engineering, Tokyo Metropolitan University, 1-1 Minami Osawa, Hachioji, Tokyo, Japan*

S6-4 Quantitative evaluation of flowing blood with the electrical parameters based on the Hanai mixture equation
Yusuke Nakajima[1], Daisuke Kawashima[1], Ryubu Shoji[1], Katsuhiro Matsuura[2], Masahiro Takei[1]
[1]*Division of Mechanical Engineering, Chiba University*, [2]*Department of Veterinary Surgery, Tokyo University of Agriculture and Technology*

S6-5 Development of butterfly type artificial atrioventricular valve with anisotropic valvular cusps by using collagenous connective tissue membrane "Biosheet®" similar to *in vivo* tissue architecture
Yota Sekido[1], Yasuhide Nakayama[2], Tsutomu Tajikawa[3]
[1]*Kansai University, Graduate School of Science and Engineering*, [2]*Biotube Co., Ltd*, [3]*Kansai University, Faculty of Engineering Science*

12:00–13:00 **President-Invited Plenary Lecture - 1**
Chair: **Toshiro Ohashi**

PL3 On the path of cell biomechanics research
Masaaki Sato
Tohoku University

14:20–15:50 **Symposia S7–S9**
S7: Whole blood behaviour in chips, stents and capillaries
Chairs: **Andreas Passos, Efstathios Kaliviotis**

S7-1 Investigation of hemorheological and hematological properties of blood in stented mice
Despoina Kokkinidou[1,2], Konstantinos Kapnisis[2], Efstathios Kaliviotis[1], Andreas Anayiotos[2]
[1]*Biorheology Laboratory, Dept. of Mechanical Engineering and Material Science and Engineering, Cyprus University of Technology, Cyprus*, [2]*BioLISYS Laboratory, Dept. of Mechanical Engineering and Material Science and Engineering, Cyprus University of Technology, Cyprus*

S7-2 Estimation of whole blood coagulation using image processing techniques
Marinos Louka[1], Antonios Inglezakis[2], Constantinos Loizou[2], Savvas Psarelis[3], Elena Nikiphorou[4], Efstathios Kaliviotis[1]
[1]*Cyprus University of Technology*, [2]*EMBIO Diagnostics Ltd, Nicosia, Cyprus*, [3]*Ministry of Health Cyprus, Nicosia, Cyprus*, [4]*King's College London, King's College Hospital, London, UK*

S7-3 Capillary blood flow on a chip: Influence of hemorheological factors.Capillary blood flow on a chip: Influence of hemorheological factors.
Dimitris Pasias Pasias, Andreas Passos, Georgios Constantinides, Loukas Koutsokeras, Stavroula Balabani, Efstathios Kaliviotis
Cyprus University of Technology

S7-4 Erythrocyte sedimentation rate measurements in a high aspect ratio microfluidic channel
Andreas Passos[1], Antonis Nikolaidis[1], Charalampos Vryonidis[1], Konstantinos Loizou[2], Antonis Inglezakis[2], Efstathios Kaliviotis[1]
[1]*Dept. of Mechanical Engineering and Material Science and Engineering, Cyprus University of Technology, Cyprus*, [2]*EMBIO Diagnostics Ltd, Nicosia, Cyprus*

S7-5 Influence of hemorheological parameters on the local velocity characteristics of blood in a superehydrophylic channel
Efstathios Kaliviotis[1], Dimitris Pasias[1], Andreas Passos[1], Loukas Koutsokeras[1], Georgios Constantinides[1], Stavroula Balabani[2]
[1]*Cyprus University of Technology*, [2]*University College London*

S8: Mechanobiology of red blood cells
Chairs: **Michael Simmonds, Jon Detterich**

S8-1 Role of Piezo1 in red blood cell sickling
Elie Nader[1,2,3], Aline Hatem[4], Robin Bertot[1], Philippe Joly[1,2,3], Camille Boisson[1,2,3], Guillaume Bouyer[4], Nicolas Guillot[1,2,3], Alexandra Gauthier[1,2,3], Solène Poutrel[1,2,3], Céline Renoux[1,2,3], Nicola Conran[5], Flavia Costa[5], Yves Bertrand[3], Stéphane Égée[4], Philippe Connes[1,2,3]
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S8-2 Shear induced red blood cell nitric oxide production is increased in sickle cell disease
Jon A Detterich[1,2], Silvie Suriany[1], Honglei Liu[1], Pinar Ulker[3], G Esteban Fernandez[1], Matthew Borzage[1], Rosalinda Wenby[2], Herbert J Meiselman[2], Henry J Forman[4], Thomas D Coates[1]
[1]*Children's Hospital of Los Angeles*, [2]*Keck School of Medicine, University of Southern California*, [3]*Department of Physiology, Akdeniz University*, [4]*Department of Gerontology, University of Southern California*

S8-3 Contribution of red blood cells to pulmonary arterial hypertension pathogenesis: NOS activity and vessel responses
Pinar Ulker[1], Ibrahim Basarici[2], Nur Özen[1], Ece Kilavuz[1], Fatih Kisak[1], Filiz Basrali[1], Nazmi Yaras[3], Sadi Koksoy[4], Mukadder Levent Celik[5], Leyla Abueid[1], Ahmet Yildirim[1]
[1]*Department of Physiology, Medical Faculty, Akdeniz University, Antalya, Turkey*, [2]*Department of Cardiology, Medical Faculty, Akdeniz University, Antalya, Turkey*, [3]*Department of Biophysics, Medical Faculty, AkdenizUniversity, Antalya, Turkey*, [4]*Department of Medical Microbiology, Medical Faculty, AkdenizUniversity, Antalya, Turkey*, [5]*Department of Internal Medicine, University of Health Sciences Antalya Training and Research Hospital, Antalya, Turkey.*

S8-4 Impaired mechanotransduction in diamide-treated erythrocytes
Lennart Kuck[1], Jason N. Peart[2], Michael J. Simmonds[1]
[1]*Biorheology Research Laboratory, Menzies Health Institute, Griffith University Gold Coast, Queensland, Australia*, [2]*School of Medical Science, Griffith University Gold Coast, Queensland, Australia*

S9: Hemorheological Measurement and Analysis: RBCs and Platelets
Chairs: **Sehyun Shin, Dong-Guk Paeng**

S9-1 Deformability measurement of RBCs flowing in capillary channels using a coflowing channels-based pressure sensor
Yang Jun Kang[1], Sami Serhrouchni[2], Anna Bogdanova[2], Sung-Sik Lee[3]
[1]*Chosun University*, [2]*University of Zürich*, [3]*ETH Zürich*

S9-2 Numerical study of local parabolic rouleaux formation analyzed by axial and radial shear rates
Cheong-Ah Lee[1], Dong-Guk Paeng[1,2]
[1]*Jeju National University*, [2]*University of Virginia*

S9-3 Total volume ratio (TVR): A new parameter to evaluate the risk of aneurysm rupture
Jinmu Jung[1], Ui Yun Lee[1], Hyosung Kwak[2], Dongwhan Lee[1]
[1]*Division of Mechanical Design Engineering, College of Engineering, Jeonbuk National University, Jeonju, South Korea*, [2]*Department of Radiology, Jeonbuk National University Hospital, Jeonju, South Korea*

S9-4 Measurement of platelet adhesion by using correlation mapping
Eunseop Yeom
Pusan National University

S9-5 Thrombus formation through upstream activation and downstream adhesion of platelets in a microfluidic system
Sehyun Shin[1], SeonYoung Kim[2], ByoungKwon Lee[3], ChaeSeung Lim[4]
[1]*Korea University*, [2]*Rheomeditech. Inc.*, [3]*Gangnam Severance Hospital, Yeonsei University*, [4]*Guro Hospital, Korea University*

16:00–17:30 **Symposia S10–S12**

S10: Rheological models and estimation of prognosis in clinical hemorheology
Chairs: **Kalman Toth, Peter Kenyeres**

S10-1 Hemorheological alterations in patients with chronic cerebrovascular disease
Peter Kenyeres[1], Kinga Totsimon[1], Alexandra Nagy[3], Barbara Sandor[1], Katalin Biro[1], Laszlo Szapary[2], Kalman Toth[1], Zsolt Marton[1]
[1]*1st Department of Medicine, University of Pecs, Medical School, Pecs, Hungary*, [2]*Department of Neurology, University of Pecs, Medical School, Pecs, Hungary*, [3]*Department of Behavioral Sciences, University of Pecs, Medical School, Pecs, Hungary*

S10-2 Novel predictors of future vascular events in post-stroke patients
Diana Schrick[1], Erzsebet Ezer[1], Margit Tokes-Fuzesi[2], Tihamer Molnar[1]
[1]*Department of Anaesthesiology and Intensive Therapy, University of Pecs, Medical School, Pecs, Hungary*, [2]*Department of Laboratory Medicine, University of Pecs, Medical School, Pecs, Hungary*

S10-3 Hemorheological investigations in critically ill patients
Zsolt Marton, Zsofia Eszter Szabo, Kinga Totsimon, Kalman Toth, Peter Kenyeres
1st Department of Medicine, University of Pecs, Medical School, Pecs, Hungary

S10-4 Maternal hemorheological changes in early-onset preeclampsia
Beata Csiszar[1,2], Gergely Galos[1,2], Peter Kenyeres[1,2], Kalman Toth[1,2], Barbara Sandor[1,2]
[1]*1st Department of Medicine, University of Pecs, Medical School, Pecs, Hungary*, [2]*Szentagothai Research Centre, Pécs, Hungary*

S10-5 The French paradox - from a rheological point of view
Andras Toth[1,2], Barbara Sandor[2], Judit Papp[2,3], Miklos Rabai[2], Peter Kenyeres[2], Istvan Juricskay[2], Kalman Toth[2]
[1]*Department of Medical Imaging, University of Pecs, Medical School, Pecs, Hungary*, [2]*1st Department of Medicine, University of Pecs, Medical School, Pecs, Hungary*, [3]*Hungarian Defence Forces Medical Centre, Budapest, Hungary*

S10-6 Hemorheological, hematological and histological examination, and 3D flow simulation of arterio-venous fistulas or loop-shaped venous grafts in the rat
Balazs Szabo[1], Adam Varga[1], Barbara Barath[1], Souleiman Ghanem[1], Orsolya Matolay[2], GyorgyTrencseny[3], Levente Kiss-Papai[5], Balazs Gasz[5], Lajos Daroczi[4], Norbert Nemeth[1]
[1]*Department of Operative Techniques and Surgical Research, University of Debrecen, Faculty of Medicine, Debrecen, Hungary*, [2]*Department of Pathology, Faculty of medicine, University of Debrecen, Debrecen, Hungary*, [3]*Division of Nuclear Medicine, Department of Medical Imaging, Faculty of medicine, University of Debrecen, Debrecen, Hungary*, [4]*Institute of Physics, Department of Solid State Physics, Faculty of Physics, University of Debrecen, Debrecen, Hungary*, [5]*Department of Surgical Research and Techniques, Faculty of Medicine, University of Pecs, Hungary*

S11: Known and unknown factors regulating the circulatory system
Chairs: **Kvetoslava Burda, Maria Fornal**

S11-1 Association of sulfur concentration in erythrocytes with heart geometry parameters and blood pressure
Maria Fornal[1], Janusz Lekki[2], Jarosław Krolczyk[1], Barbara Wizner[1], Tomasz Grodzicki[1]

[1]*Jagiellonian University Medical College, Krakow, Poland*, [2]*Institute of Nuclear Physics PAN, Krakow, Poland*

S11-2 Results of blood research relating to: rheology, morphology and biochemistry of blood in a man living 50 days in extremely low temperatures
Zbigniew Joseph Dabrowski[1], Aneta Teleglow[1], Anna Marchewka[1], Maria Fornal[2]
[1]*Academy of the Physical Education in Cracow, Poland*, [2]*Collegium Medicum, Jagiellonian University, Krakow, Poland*

S11-3 Interactions of β-carotene with red blood cells - its effect on their stability and functioning
Joanna Fiedor[1], Mateusz Przetocki[1], Aleksander Siniarski[2,3], Grzegorz Gajos[2,3], Nika Spiridis[4], Kinga Freindl[4], Kvetoslava Burda[1]
[1]*AGH University of Science and Technology, Faculty of Physics and Applied Computer Science, Krakow, Poland*, [2]*Jagiellonian University Medical College, Krakow, Poland*, [3]*The John Paul II Hospital, Krakow, Poland*, [4]*Polish Academy of Sciences, Krakow, Poland*

S11-4 Correlations between hemorheological parameters in a group of qualified healthy blood donors compared to those in a group of cardiovascular patients.
Anna Marcinkowska-Gapinska
Department of Biophysics, Karol Marcinkowski University of Medical Sciences in Poznan, Poland

S11-5 Can nanoparticles be responsible for the development of hypertension?
Kvetoslava Burda[1], Joanna Fiedor[1], Magdalena Peter[1], Mateusz Przetocki[1], Jaroslaw Kiecana[2,3], Aleksander Siniarski[2,3], Grzegorz Gajos[2,3], Nika Spiridis[4]
[1]*AGH-University of Science and Technology, Krakow, Poland*, [2]*The John Paul II Hospital, Krakow, Poland*, [3]*Jagiellonian University, Medical College, Krakow, Poland*, [4]*Jerzy Haber Institute of Catalysis and Surface Chemistry, Polish Academy of Sciences, Krakow, Poland*

S12: Colloidal models in red blood cell behaviour
Chairs: **Alexis Darras, Alexander Pribush**

S12-1 Intricate journey of micro- and nano-carriers for drug delivery in the blood stream
Dmitry Fedosov
Forschungszentrum Juelich GmbH

S12-2 Physical mechanism of erythrocyte sedimentation: Experiments and gel-model
Alexis Darras[1], Anil Kumar Dasanna[2], Thomas John[1], Gerhard Gompper[2], Lars Kaestner[1], Dmitry A. Fedosov[2], Christian Wagner[1]

[1]*Experimental Physics, Saarland University, 66123 Saarbruecken, Germany*, [2]*Theoretical Physics of Living Matter, Institute of Biological Information Processing and Institute for Advanced Simulation, Forschungszentrum Jülich, 52425 Jülich, Germany*

S12-3 The erythrocyte sedimentation rate as a diagnostic biomarker for neuroacanthocytosis syndromes

Alexis Darras[1], **Kevin Peikert[2,3]**, **Antonia Rabe[1,4]**, **François Yaya[1,5]**, **Greta Simionato[1,6]**, **Thomas John[1]**, **Anil Kumar Dasanna[7]**, **Semen Bavalyy[7]**, **Jürgen Geisel[8]**, **Andreas Hermann[2,3,9,10]**, **Dmitry A. Fedosov[7]**, **Adrian Danek[11]**, **Christian Wagner[1,12]**, **Lars Kaestner[1,4]**

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S12-4 Investigating the red blood cell (dis)aggregation mechanism by means of optical tweezers

Francois Yaya[1,2], **Olivera Korculanin[3,4]**, **Mehrnaz Babaki[3,4]**, **Pavlik Lettinga[3,4]**, **Christian Wagner[1]**, **Kisung Lee[5]**

[1]*Experimental Physics, University of Saarland, Saarbrücken, Germany*, [2]*Laboratoire Interdisciplinaire de Physique (LIPhy), CNRS and University of Grenoble, Grenoble, France*, [3]*Biomacromolecular Systems and Processes (IBI-4), Forschungszentrum Jülich GmbH, Jülich, Germany*, [4]*Laboratory for Soft Matter and Biophysics, KU Leuven, Leuven, Belgium*, [5]*Center for Soft and Living Matter, Institute for Basic Science, Ulsan, South Korea*

17:50–18:50 **President-Invited Plenary Lecture - 2**
Chair: **Alberto Caggiati**

PL4 Pathophysiology and treatment options for venous ulceration: Is there a role for exercise?

Markos Klonizakis

Lifestyle, Exercise and Nutrition Improvement (LENI) Research Group, Department of Nursing and Midwifery, Sheffield Hallam University, United Kingdom

19:00–20:00 **Plenary Lecture for ISCH**
Chair: **Brian Cooke**

PL5 Hemodynamic functionality of transfused red blood cells - a potent effector of transfusion outcome
Saul Yedgar[1], Neta Goldschmidt[2], Orly Zelig[2], Axel Pries[3], Gregory Barshtein[1]
[1]*The Hebrew University Medical School, Jerusalem, Israel*, [2]*Hadasah Hospital, Jerusalem, Israel*, [3]*Charite-Free University, Berlin, Germany*

20:10–21:40 **Symposia S13–S15**
S13: Preclinical and clinical studies on blood cells and microcirculation
Chair: **Anna Maria Blocki**

S13-1 Nanoparticle-mediated delivery of nucleic acids in primary human endothelial cells
Manfred Gossen[1,2], Skadi Lau[1,2], Hanieh Moradian[1,2,3], Marc Behl[1], Andreas Lendlein[1,2,3]
[1]*Institute of Active Polymers, Helmholtz-Zentrum Hereon, Teltow, Germany*, [2]*Berlin-Brandenburg Center for Regenerative Therapies (BCRT), Berlin, Germany*, [3]*Institute of Biochemistry and Biology, University of Potsdam, 14476 Potsdam, Germany*

S13-2 Long-term stabilization of three-dimensional perfusable microvascular networks in microfluidic devices
Ho-Ying Wan[1], Jack Chun Hin Chen[2], Qinru Xiao[2], Christy Wingtung Wong[1], Yi-Ping Megan Ho[2], Roger D. Kamm[3], Sebastian Beyer[2], Anna Maria Blocki[1]
[1]*Institute for Tissue Engineering and Regenerative Medicine, The Chinese University of Hong Kong*, [2]*Department of Biomedical Engineering, Faculty of Engineering, The Chinese University of Hong Kong*, [3]*Department of Biology and Mechanical Engineering, Massachusetts Institute of Technology*

S13-4 Assessment of leukocyte activation in the intestinal microcirculation in a novel model of CNS injury-induced immunodepression
Bashir Bietar, Christian Lehmann
Dalhousie University

S13-5 Experimental Cannabinoid Receptor 2 Modulation for the Treatment of Interstitial Cystitis
Geraint Christopher Berger[1], Juan Zhou[1], Melanie Kelly[2,1,4], Christian Lehmann[1,2,3,5]

[1]*Department of Anesthesia, Pain Management and Perioperative Medicine, Dalhousie University*, [2]*Department of Pharmacology, Dalhousie University*, [3]*Department of Microbiology & Immunology, Dalhousie University*, [4]*Department of Ophthalmology & Visual Sciences, Dalhousie University*, [5]*Department of Physiology and Biophysics, Dalhousie University*

S14: Biorheology and COVID-19 Thrombosis
Chairs: **Barbara Zieger, Shinya Goto**

S14-2 Retrospective study of COVID-19-associated coagulopathy in hospitalized patients at Tokai University Hospital
Masayuki Oki[1], Hideki Yanagi[1], Masahiro Kamono[1], Saki Manabe[1], Akiko Taoda[1], Ayumi Tsuda[1], Satoshi Abe[1], Takako Kobayashi[1], Koichiro Asano[2], Yoshihide Nakagawa[1], Yasuhiro Kanatani[3], Hideki Ozawa[1], Shinya Goto[2]
[1]*Department of General Medicine, Tokai University School of Medicine*, [2]*Department of Internal Medicine*, [3]*Department of Pharmacology*

S14-3 COVID-19 and thrombosis: the importance of endothelial function
Shinichi Goto[1,2,3], Shinya Goto[3]
[1]*Brigham and Women's Hospital, Harvard Medical School*, [2]*Keio University School of Medicine*, [3]*Tokai University School of Medicine*

S15: New useful techniques in disease
Chairs: **Özlem Yalçın, Philippe Connes**

S15-1 A novel integrated biomarker for screening diabetic kidney diseases: critical shear stress of RBCs
Sehyun Shin[1], Junsung Moon[2], Jimi Choi[3], Sin-Gon Kim[3], Kyu Jang Won[2]
[1]*Korea University*, [2]*Yeungnam University Hospital*, [3]*Korea University Anam Hospital*

S15-2 Clinical microfluidic biomarker assays for red cell health and blood rheology
Umut Gurkan
Case Western Reserve University

S15-3 Concurrent assessment of deformability and adhesiveness of sickle red blood cells by measuring perfusion of an adhesive artificial microvascular network
Madeleine Lu[1], Celeste Kanne[2,3], Riley Reddington[1], Dalia Lezzar[1], Vivien Sheehan[2,3], Sergey Shevkoplyas[1]
[1]*Department of Biomedical Engineering, University of Houston, Houston, TX, USA*, [2]*Aflac Cancer and Blood Disorders Center, Children's Healthcare of Atlanta, Atlanta, GA, USA*, [3]*Department of Pediatrics, Emory University School of Medicine, Atlanta, GA, USA*

S15-4 Usefulness of oxygen gradient ektacytometry in sickle cell disease

Philippe Connes[1,2], Camille Boisson[1,2,3], Minke Rab[4,5], Elie Nader[1,2], Céline Renoux[1,2,3], Philippe Joly[1,2,3], Romain Fort[1,2,6], Alexandra Gauthier[1,2,7], Yves Bertrand[7], Richard van Wijk[4], Vivien Sheehan[8], Eduard van Beers[5]
[1]*Laboratoire Interuniversitaire de Biologie de la Motricite (LIBM) EA7424, Team Vascular Biology and Red Blood Cell, Universite Claude Bernard Lyon 1, Universite de Lyon, France*, [2]*Laboratoire d'Excellence du Globule Rouge (Labex GR-Ex), PRES Sorbonne, Paris, France*, [3]*Laboratoire de Biochimie et de Biologie Moleculaire, Lyon*, [4]*Central Diagnostic Laboratory - Research, University Medical Center Utrecht, Utrecht University, Utrecht, The Netherlands*, [5]*Van Creveldkliniek, University Medical Center Utrecht, Utrecht University, Utrecht, The Netherlands*, [6]*Departement de Meedecine Interne, Hopital Edouard Herriot, Hospices Civils de Lyon*, [7]*Institut d'Hematologie et d'Oncologie Pediatrique, Hospices Civils de Lyon, Lyon*, [8]*Department of Pediatrics, Division of Hematology/Oncology, Baylor College of Medicine; Houston Texas, USA*

S15-5 A novel microfluidics-based point of care technique for viscoelastic hemostatic assay

Ozlem Yalcin[1], Ahmet Can Erten[2], Berfin Irmak Torun[3], Fatma Oz[3]
[1]*Koc University, School of Medicine, Koç University, Research Center for Translational Medicine (KUTTAM), Istanbul, Turkey*, [2]*Department of Electronics and Communication Engineering, Istanbul Technical University, Istanbul, Turkey*, [3]*Koç University, Graduate School of Biomedical Sciences and Engineering, Istanbul, Turkey*

July 6, 2021

9:10–10:10 **Rising Star Award Session – 2**
Chair: **Edgar O'Rear, Tamas Alexy**

RSA2-1 Blood flow thrombosis simulation to understand complex phenomenon of thrombosis under blood flow conditions

Shinichi Goto[1], Noriko Tamura[3], Masamitsu Nakayama[2], Shu Takagi[4], Shinya Goto[2]
[1]*Brigham and Women's Hospital, Harvard Medical School, MA, USA*, [2]*Tokai University School of Medicine, Japan*, [3]*Niigata University of Health and Welfare, Japan*, [4]*Graduate School of Engineering, The University of Tokyo, Japan*

RSA2-2 Suspension rheology of red blood cells under oscillatory shear flow

Naoki Takeishi[1], Marco E Rosti[2], Naoto Yokoyama[3], Shigeo Wada[1], Luca Brandt[4]
[1]*Osaka University*, [2]*OIST*, [3]*Tokyo Denki University*, [4]*KTH*

10:20–11:20 **Free Communication (Video Presentation 2)**

11:30–12:30 **Plenary Lecture for ISB**
Chair: **Peter Butler**

PL6 Lessons from red blood cell mechanics to endothelial cell mechanobiology
Kris N. Dahl
Carnegie Mellon University

13:50–14:50 **Keynote Lecture 3**
Chair: **Toshiaki Dobashi**

KL3 Coagulation of blood: A possible triggering mechanism of the intrinsic coagulation pathway, and assessment of anticoagulant effect of DOACs using a seesaw-type device
Makoto Kaibara[1], Hiroshi Ujiie[2]
[1]*Past affiliation: RIKEN (The Inst. Phys. Chem. Res.)*, [2]*Ujiie Neurosurgical & Medical Clinic*

13:50–14:50 **Keynote Lecture 4**
Chair: **Nobuo Watanabe**

KL4 Computational fluid dynamics (CFD) analysis to optimize the design of rotary blood pumps
Masahiro Nishida
National Institute of Advanced Industrial Science and Technology

13:50–14:50 Keynote Lecture 5
Chair: **Toru Maruyama**

KL5 Dynamics of blood fluidity under various pathologic conditions. The roles of endothelial anticoagulant activities and their pathophysiologic conditions
Ikuro Maruyama
Department of Systems Biology in Thromboregulation, Kagoshima University Graduate School of Medical and Dental Sciences

15:00–16:30 **Symposia S16-S17 / Free Communication (Live presentation) O1**

S16: Hemorheological and metabolic properties of red blood cells
Chairs: **Björn Neu, Olivera Korculanin**

S16-1 Competition between red blood cell aggregation and breakup: Depletion force due to filamentous viruses vs. shear flow
Olivera Korculanin[1,2], Tatiana Kochetkova[1], Pavlik Minne Paul Lettinga[1,2]
[1]*Biomacromolecular Systems and Processes (IBI-4), Forschungszentrum Juelich GmbH, Germany*, [2]*Laboratory for Soft Matter and Biophysics, KU Leuven, Belgium*

S16-2 Sphingosine-1-phosphate and adenosine affect the oxygen dependence of erythrocyte metabolism
Francesco Misiti
Cassino and Lazio Meridionale University

S16-3 The role of macromolecular depletion on the adhesion of red blood cells with a reduced sialic acid content
Björn Neu[1], Huimin Teo[2], Zhengwen Zhang[2]
[1]*Rhine-Waal University of Applied Sciences*, [2]*Nanyang Technological University*

S16-4 The Mizar®: A novel, fully-automated aggregometer
Lennart Kuck[1], Francesco A. Frappa[2], Michael J. Simmonds[1]
[1]*Biorheology Research Laboratory, Menzies Health Institute Queensland, Australia*, [2]*Alcor* Scientific *Inc., Rhode Island, USA*

S17: Microrheological responses of blood cells under normal and pathological conditions
Chairs: **Alexei Muravyov, Nadia Antonova**

S17-1 Development of an experimental microfluidic device and methodology for assessing microrheological properties of blood
Nadia Mladenova Antonova[1], Khristo Khristov[2], Anika Svilenova Alexandrova[3], Alexei Vasilievich Muravyov[4]
[1]*Dept. Biomechanics, Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria*, [2]*Institute of Physical Chemistry at the Bulgarian Academy of Sciences, Sofia, Bulgaria*, [3]*Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria*, [4]*Yaroslavl State Pedagogical University Ushinskii, Yaroslavl, Russia*

S17-2 Comparative study of the microrheological properties of blood in patients with type 2 diabetes mellitus, using viscometry and microfluidic flow analysis
Anika Svilenova Aleksandrova-Watanabe[1], Nadia Mladenova Antonova[1], Alexey Vasilievich Muravyov[2], Khristo Ivanov Khistov[3], Irena Vasileva Velcheva[4]
[1]*Dept. of Biomechanics, Institute of Mechanics, Bulgarian Academy of Sciences, Sofia, Bulgaria*, [2]*Dept. of Medical and Biological Foundations of Sports, Yaroslavl State Pedagogical University named after K. D. Ushinsky, Yaroslavl, Russia*, [3]*Dept. of Interfaces and Colloids, Institute of Physical Chemistry, Bulgarian Academy of Sciences, Sofia, Bulgaria*, [4]*Clinic of Nervous Diseases, Uni Hospital, Panagyurishte, Bulgaria*

S17-3 Microrheological responses of red blood cells (RBCs) to gasotransmitters in persons with different levels of oxygen supply to the body
Alexei Vasilievich Muravyov[1], Pavel Valentinovich Mikhailov[1], Irina Alexandrovna Tikhomirova[1], Roman Sergeevich Ostroumov[1], Victor Vasilievich Zinchuk[2]
[1]*State pedagogical university, Yaroslavl*, [2]*State Medical University, Grodno, Belarus*

S17-4 Effect of gasotransmitters (NO and H2S) on hemorheology and blood clotting

Irina Alexandrovna Tikhomirova[1], Elena Petrovna Petrochenko[1], Yulia Viktorovna Malysheva[1], Alexei Vasiljevich Muravyov[1], Alexander Sergeevich Petrochenko[2]
[1]*Yaroslavl State Pedagogical University*, [2]*Yaroslavl State Medical University*

S17-5 Interaction forces of pair interaction of RBCs and their relation to aggregation parameters under normal and pathological conditions
Alexander V. Priezzhev[1], Andrei E. Lugovtsov[1], Alexey N. Semenov[1], Larissa I. Dyachuk[2], Petr B. Ermolinskiy[1]
[1]*Physics Department of Lomonosov Moscow State University*, [2]*Medical Research and Education Centre of Lomonosov Moscow State University*

S17-6 Microrheological responses of RBCs after age (density) separation
Petr Ermolinskiy[1] Andrei Lugovtsov[1], François Yaya[2,5], Lars Kaestner[2,3], Christian Wagner[2,4], Alexander Priezzhev[1]
[1]*Physics Department, Lomonosov Moscow State University, 119991 Moscow, Russia*, [2]*Experimental Physics, Saarland University, 66123 Saarbrücken, Germany*, [3]*Theoretical Medicine and Biosciences, Saarland University, 66123 Saarbrücken, Germany*, [4]*Physics and Materials Science Research Unit, University of Luxembourg, L-1511 Luxembourg, Luxembourg*, [5]*Laboratoire Interdisciplinaire de Physique, UMR 5588 CNRS and University Grenoble–Alpes, 38058 Grenoble, France*

16:40–18:10 **Symposia S19–S20**

S19: Microcirculation disturbances, blood microrheological properties and functional states of leukocytes
Chair: **Nadia Mladenova Antonova**

S19-1 Disturbances in skin temperature oscillations and blood rheological and electrical properties in patients with Diabetes mellitus type 2
Nadia Mladenova Antonova[1], Vasilka Krumova Paskova[2], Irena Vasileva Velcheva[3], Sergey Yurievich Podtaev[4]
[1]*Dept. Biomechanics, Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria*, [2]*Institute of Mechanics at the Bulgarian Academy of Sciences, Sofia, Bulgaria*, [3]*Uni Hospital, Panagyurishte, Bulgaria*, [4]*Institute of Continuous Media Mechanics, RAS, Perm, Russia*

S19-2 Functional states of PMN in pregnant women with hypertension assessed with chemiluminescent method - preliminary data
B. Bechev[1], M. Magrisso[2], S. Stoeff[1], Sv. Jovtchev[1], S. Miteva[1], S. Alexandrov[1], J. Ivanov[1], M. Pencheva[3], D. Koleva[4], I. Buteva[4], M. Vretenarska[5], N. Nikolova[6] and V. Iliev[6,7]
[1]*Dept Medical Physics and Biophysics and* [3]*Dept Biology of Medical University Sofia, Bulgaria,* [2]*Omrad Electronics LTD, Beer Sheva, Israel,* [4]*OGW/MHAT "Nadezhda" Sofia,* [5]*2nd MHAT Sofia, Nephrology Ward,* [6]*MC Vitclinic,* [7]*Military Medical Academy of Sofia*

S19-3 Participation of polymorphonuclear leukocytes in initiation and evolvement of pathologies induced by SARS-Cov-2 virus
B. Bechev[1], S. Stoeff[1] and K. Kavaldzhieva[2]
[1]*Dept Medical Physics and Biophysics*, [2]*Dept Biology of Medical University Sofia, Bulgaria*

S20: Nanomechanical and nanorheological assessments of various diseases
Chairs: **Malgorzata Lekka, Joanna Zemla**

S20-1 Search for efficient diagnosis and therapy of resistant BRAF mutated melanoma using biophysical methods
Tomasz Kobiela[1], Anna Sobiepanek[1], Swamy Kasarla[1], Weronika Prorok[1], Tomasz Gambin[2]
[1]*Warsaw University of Technology, Faculty of Chemistry*, [2]*Warsaw University of Technology, Faculty of Electronics and Information Technology*

S20-2 Rheological properties of biological materials
Joanna Zemla[1], Claude Verdier[2], Malgorzata Lekka[1]
[1]*Institute of Nuclear Physics Polish Academy of Sciences, PL-31342 Krakow, Poland*, [2]*Laboratoire Interdisciplinaire de Physique, Université Grenoble Alpes, CNRS, Grenoble, F-38000, France*

S20-3 Nanomechanical assessment of cancer cells and solid tumors as a mechanical biomarker
Andreas Stylianou[1,2]
[1]*European University Cyprus*, [2]*University of Cyprus*

16:40–18:30 **Free Communication (ePoster)**

19:20–20:00 **ESCHM-ISCH-ISB Combined Business Online Meeting**

20:10–22:00 **Symposium S21**

S21: Shear stress and red cell rheology
Chairs: **Edgar O'Rear, Ozlem Yalcin**

S21-1 Cell age sensitivity of red cells to mechanical stresses and calcium load
Lennart Kuck[1], Jason N. Peart[2], Oliver Todd[1], Michael J. Simmonds[1]
[1]*Biorheology Research Laboratory, Menzies Health Institute, Griffith University Gold Coast, Queensland, Australia*, [2]*School of Medical Science, Griffith University Gold Coast, Queensland, Australia*

S21-2 Senescence and red cell rheology
Edgar O'Rear[1], James Buerck[1], Phillip Coghill[2], Ahmed El Banayosy[3], Hendra Setiadi[3]
[1]*University of Oklahoma*, [2]*VADovations, Inc.*, [3]*INTEGRIS Baptist Medical Center*

S21-3 Asymmetrical erythrocyte morphology to detect sublethal damage
Nobuo Watanabe[1,2], Antony P. McNamee[3], Jarod T. Horibin[3,4], John F. Fraser[5], Masataka Inoue[2], Masaya Hakozaki[2], Fukuta Matsuzawa[2], Michael J. Simmonds[3]
[1]*Biofluid Science and Engineering Laboratory, Dept. of Bio-Science and Engineering, College of Systems Engineering and Science, Shibaura Institute of Technology, Saitama, Japan*, [2]*Biofluid Science and Engineering Laboratory, Systems Engineering and Science, Graduate School of Engineering and Science, Shibaura Institute of Technology, Saitama, Japan*, [3]*Biorheology Research Laboratory, Menzies Health Institute Queensland, Griffith University, Gold Coast, Australia*, [4]*Perth Blood Institute, West Perth, Perth, Australia*, [5]*Critical Care Research Group, University of Queensland & The Prince Charles Hospital, Brisbane, Australia*

S21-4 Effects of mechanical heart valves on circulating blood in patients with valvular heart diseases
Toru Maruyama[1], Michinari Hieda[1], Aya Sato[2], Takehiko Fujino[2]
[1]*Kyushu University*, [2]*Institute of Rheological Function of Foods, Co. Ltd.*

S21-5 A structured mechanical risk sensitivity assessment system using red cell deformability and fragmentation parameters
Ozlem Yalcin[1,2], Elif Ugurel[2], Polat Goktas[1], Evrim Goksel[1,3], Neslihan Cilek[1,3], Dila Atar[1]
[1]*Koç University, School of Medicine, Istanbul, Turkey*, [2]*Koç University, Research Center for Translational Medicine (KUTTAM), Istanbul, Turkey*, [3]*Koç University, Graduate School of Biomedical Sciences and Engineering, Istanbul, Turkey*

S21-6 Measurements of erythrocyte deformation in shear and extensional flows
M Keith Sharp[1], Mohammad M Faghih[2]
[1]*University of Louisville*, [2]*US Food and Drug Administration*

S21-7 In silico simulation of hemodynamics and blood cell mechanics inside human vasculature
Senol Piskin[1], Aya Ahmed Faeek Elgebaly[2]
[1]*Department of Mechanical Engineering, College of Engineering, Istinye University, Istanbul, Turkey*, [2]*Department of Biomedical Engineering, Faculty of Electrical and Electronics Engineering, Yildiz Technical university, Istanbul, Turkey*

20:30–22:00 **Symposia S22–S23**

S22: Microbiorheology from molecules to tissues
Chairs: **Daisuke Mizuno, Kengo Nishi**

S22-1 Motion of molecular motors reflecting rheological properties in cells
Takayuki Ariga
Yamaguchi University

S22-2 Glassy cytoplasm driven by non-thermal forces
Kenji Nishizawa[1,2], Daisuke Mizuno[3]
[1]*IBDM*, [2]*CNRS*, [3]*Department of Physics, Kyushu University*

S22-3 Metabolism-Dependent Active Diffusion in Living Cells
Yujiro Sugino[1], Kenji Nishizawa[2], Daisuke Mizuno[1]
[1]*Department of Physics, Kyushu University*, [2]*IBDM-CNRS*

S22-4 Microrheology of a concentrated emulsion as a model cytoplasm
Shono Inokuchi, Ryosuke Matsuoka, Daisuke Mizuno
Kyushu University

S22-5 Non-equilibrium fluctuations in cells report on driving forces and organelle mechanics
Kengo Nishi[1,2], Sufi Raja[1], An Pham[1], Fred C MacKintosh[3], Christoph F Schmidt[1]
[1]*Duke University*, [2]*UNC Chapel Hill*, [3]*Rice University*

S23: **Clinical studies using various assays for platelets and hemostasis**
Chairs: **Paul Gurbel, Young-Hoon Jeong**

S23-1 The Global Thrombosis Test
Diana Adrienne Gorog
University of Hertfordshire & Imperial College, London

S23-2 Thromboelastography: Viscoelastic properties of clot formation and their clinical impact in ASCVD patients
Young-Hoon Jeong
Gyeongsang National University Changwon Hospital

S23-3 Clinical trial with Microfluidic Platelet Function Assays(Anysis-200): Comparison with Turbidity-based Drug Response Assay(Verify-NOW
Byoung Kwon Lee[1], Miney Cho[1], Sehyun Shin[2]
[1]*Cardiology, Department of Internal Medicine, Gangnam severance Hospital, Yonsei University, Seoul, Korea*, [2]*Department of Mechanical Engineering, Korea University, Seoul, Korea*

S23-4 T-TAS 01: A novel flow-based system for hemostasis monitoring
Jeffrey Dahlen
Fujimori Kogyo Co., Ltd.

July 7, 2021

9:00–10:30 **Symposia S24–S26**

S24: Cell mechanics and cell mechanobiology
Chairs: **Toshiro Ohashi, Taiji Adachi, Susumu Kudo**

S24-1 Identification of leader cells in cell migration by filopodia using computer vision
Baasansuren Otgon[1], Ganbat Danaa[2], Toshiro Ohashi[3]

[1]*Graduate School of Engineering, Hokkaido University, Japan*, [2]*Open Education Center, Mongolian University of Science and Technology, Mongolia*, [3]*Faculty of Engineering, Hokkaido University, Japan*

S24-2 Intracellular tension of osteoblast in collagen gel elicits osteocyte alignment under uniaxially-fixed boundary condition
Jeonghyun Kim[1], **Keiichi Ishikawa[2]**, **Junko Sunaga[2]**, **Taiji Adachi[2]**
[1]*Nagoya University*, [2]*Kyoto University*

S24-3 Emulating endothelial dysfunction by mimicking the microenvironment of early atherosclerotic lesions within a microfluidic chip
Bomi Gweon[1], **Yujin Shin[2]**
[1]*Sejong University*, [2]*Hanyang University*

S24-4 Enhancement and stabilization of sprouting angiogenesis by curvature-oriented behaviors of mesenchymal stem cells
Takanori Sano[1], **Jun-Ichi Kawabe[2]**, **Yukiko T. Matsunaga[1]**
[1]*Institute of Industrial Science, The University of Tokyo*, [2]*Asahikawa Medical University*

S24-5 Mechanism driving hydrostatic pressure-induced endothelial tube formation
Daisuke Yoshino
Tokyo University of Agriculture and Technology

S25: Microparticle and cell behavior in confined fluid flows - 1
Chairs: **Masako Sugihara-Seki**, **Naoki Takeishi**, **Ryoko Otomo**

S25-1 Numerical analysis of the inertial migration of red blood cells in a channel
Naoki Takeishi[1], **Hiroshi Yamashita[1,2]**, **Naoto Yokoyama[3]**, **Seki Masako[1,2]**, **Shigeo Wada[1]**
[1]*Osaka University*, [2]*Kansai University*, [3]*Tokyo Denki University*

S25-2 Droplet breakup limits in simple shear flows
Mohamed Shoieb Abdelgawad, Marco Edoardo Rosti
Okinawa Institute of Science and Technology

S25-3 Swelling and hemolytic behavior of human red blood cells in hypotonic fluid
Ryoko Otomo, Ryuta Minami, Kiyoshi Bando
Kansai University

S25-4 Spectral change of a stress-responsive fluorescent molecule caused by the hydrodynamic stress field of microchannel flow
Reiko Kuriyama[1], **Waka Yamamoto[1]**, **Hidetsugu Kitakado[2]**, **Shohei Saito[2]**, **Kazuya Tatsumi[1]**, **Kazuyoshi Nakabe[1]**
[1]*Department of Mechanical Engineering and Science, Kyoto University*, [2]*Graduate School of Science, Kyoto University*

S25-5 Segregation in shear-thickening materials

Alessandro Monti, **Marco Edoardo Rosti**
Okinawa Institute of Science and Technology (OIST)

S26: **Contributing role of erythrocytes for platelet adhesion and thrombus formation**
Chair: **Shinya Goto**

S26-1 Important physical regulatory roles of erythrocytes on platelet adhesion under blood flow conditions
Noriko Tamura[1,2], **Kazuya Shimizu[3]**, **Seiji Shiozaki[2]**, **Kazuyasu Sugiyama[4]**, **Masamitsu Nakayama[2]**, **Shinichi Goto[2]**, **Shu Takagi[3]**, **Shinya Goto[2]**
[1]*Department of Health and Nutrition, Niigata University of Health and Welfare*, [2]*Department of Medicine (Cardiology), Research Center for Metabolic Disease, Tokai University School of Medicine and Tokai University Graduate School of Medicine*, [3]*Graduate School of Engineering, The University of Tokyo*, [4]*Department of Mechanical Science and Bioengineering, Osaka University School of Engineering Science*

S26-2 Physical interactions between platelets and erythrocytes play an important role for initial platelet adhesion mediated by the interaction of glycoprotein 1b with von Willebrand factor.
Shinichi Goto[1,2,3], **Noriko Tamura[4]**, **Kazuya Shimizu[5]**, **Masamitsu Nakayama[3]**, **Shu Takagi[5]**, **Shinya Goto[3]**
[1]*Brigham and Women's Hospital, Harvard Medical School*, [2]*Keio University School of Medicine*, [3]*Tokai University School of Medicine*, [4]*Niigata University of Health and Welfare*, [5]*The University of Tokyo*

S26-3 Water-ethanol separation with tip charged carbon nanotubes
Yuui Ono, **Eiji Yamamoto**, **Kenji Yasuoka**
Keio University

10:40–12:10 **Symposia S27–S28**

S27: Microparticle and cell behavior in confined fluid flows - 2
Chairs: **Masako Sugihara-Seki, Naoki Takeishi, Ryoko Otomo**

S27-1 Inertial focusing of red blood cells suspended in blood plasma flowing through square tubes
Masako Sugihara-Seki[1,2], **Saori Tanaka[1]**
[1]*Kansai University*, [2]*Osaka University*

S27-2 Role of fluid dynamics in optical trapping
Tetsuro Tsuji
Kyoto University

S27-3 Deformable particle suspensions
Marco Edoardo Rosti
Okinawa Institute of Science and Technology

S27-4 On-chip manipulation for revealing novel aspects of red blood cell mechanics
Hiroaki Ito
Chiba University

S27-5 Measurement of near-wall microparticles motion under the influence of radiation pressure of evanescent field
Miyu Inoue, **Reiko Kuriyama**, **Kazuya Tatsumi**, **Kazuyoshi Nakabe**
Kyoto University

S28: Joint symposium with commons for medicine and engineering japan: Application of high performance computer for biorheology
Chairs: **Shinya Goto, Kazuo Tanishita**

S28-1 Protein disintegration as a possible mode of protein dissociation between GP1bα and VWF in blood flow condition: Insights from steered molecular dynamic simulation.
Shinichi Goto[1,2,3], **Masamitsu Nakayama[2]**, **Shu Takagi[4]**, **Shinya Goto[2]**
[1]*Brigham and Women's Hospital, Harvard Medical School*, [2]*Tokai University School of Medicine*, [3]*Keio University School of Medicine*, [4]*Graduate School of Engineering, The University of Tokyo*

S28-2 Salt bridge formation between A1 domain of von Willebrand Factor and Platelet Glycoprotein (GP) Ibα by molecular dynamics simulations
Masamitsu Nakayama, **Shinichi Goto**, **Shinya Goto**
Tokai University School of Medicine

S28-3 Finite element analysis of blood clots through visco-hyperelastic constitutive theories
Koichiro Tashiro[1,2], **Yasuhiro Shobayashi[2]**, **Iku Ota[1]**, **Atsushi Hotta[1]**
[1]*Department of Mechanical Engineering, Keio University*, [2]*Biomedical Solutions Inc.*

S28-4 Newly developed drug-eluting stent (DES) system for cardiovascular diseases: Hybrid nano-coating technology
Terumitsu Hasebe[1,2], **Shunto Maegawa[1,3]**, **Kenta Bito[1,3]**, **Yutaka Okamoto[3]**, **Shunsuke Kamei[1]**, **Shota Yamamoto[1,3]**, **Kosuke Tomita[1]**, **Satoshi Suda[1]**, **Kazunobu Hashida[1]**, **Tomohiro Matsumoto[1]**, **Yoko Usami[4,1]**, **Yasutaka Baba[4,1]**, **Yutaka Imai[1]**, **Atsushi Hotta[3]**
[1]*Tokai University Hachioji Hospital, Tokai University School of Medicine*, [2]*Keio University Hospital Clinical & Translational Research Center*, [3]*Keio University Faculty of Science and Technology*, [4]*Saitama Medical University International Medical Center*

12:10–13:10 **Plenary Lecture in Tribute to Prof. Akira Kamiya**
Chair: **Joji Ando**

PL7 Emerging roles of membrane lipids and mitochondria in endothelial cell mechanosensing

Kimiko Yamamoto
The University of Tokyo

14:00–15:00 **Closing Plenary Lecture for ISB**
Chair: **Peter Butler**

PL8 The mechanotransduction of cancer and blood cells exposed to circulatory levels of fluid shear stress
Michael R. King
Vanderbilt University

15:00–15:50 **Closing Ceremony**

On-Demand Program

Free Communication (Video presentation)

O2: Hemorheology in health and disease-1

O2-1 Effects of L-arginine on blood fluidity impaired after high-intensity exercise: An *in vitro* evaluation
Haruchi Namba[1], Tatsushi Kimura[2], Hironobu Hamada[1], Kiyokazu Sekikawa[1], Hatsumi Ishio-Ueoka[1], Teruki Kajiwara[1], Yoshinobu M Sato[1], Fumiya Aizawa[1], Takamasa Yoshida[1], Naoto Kanda[1], Aoi Takagi[1]
[1]*Department of Physical Analysis and Therapeutic Sciences, Graduate School of Biomedical and Health Sciences, Hiroshima University, Hiroshima, Japan*, [2]*Faculty of Early Childhood Education and Care, Ohkagakuen University, Aichi, Japan*

O2-2 Hematological and hemorheological changes in a model of atherosclerotic disease in rabbits
Bence Tanczos[1], Viktoria Somogyi[1], Mariann Bombicz[2], Bela Juhasz[2], Norbert Nemeth[1], Adam Deak[1]
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O2-3 Examination of the hemorheological changes in a rat model of polycystic ovary syndrome
Barbara Barath[1], Adam Varga[1], Adam Attila Matrai[1], Pathan Afrin Javed[1], Krisztina Deak-Pocsai[2], Norbert Nemeth[1], Adam Deak[1]
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O2-4 The hazard of PLGA nanoparticles on intima hyperplasia of vascular restenosis in ApoE-/- mice.
Tieying Yin[1], Wen Shi[1], Atik Rohmana Maftuhatul Fuad, Yanhong Li[1], Yang Wang[1], Junyang Huang[1], Ruolin Du[1], Guixue Wang[1], Yazhou Wang[2]
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O3: Hemorheology in health and disease-2

O3-1 Is leptin a significant regulator of erythrocyte rheology?
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O3-2 Which sub-compartments of fat mass and fat-free mass are related to blood viscosity factors?
Jean-Frederic Brun[1], Emmanuelle Varlet-Marie[2], Laurent Vachoud[3], Bénédicte Marion[2], Céline Roques[2], Eric Raynaud de Mauverger[1], Jacques Mercier[1]
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O3-3 A link between storage-related sequence of nanoscale changes in RBC membranes and their biochemical and morphological properties
Ewa Szczesny-Malysiak[1], Magdalena Kaczmarska[1], Katarzyna Bulat[1], Anna Zimna[1,2], Fatih Celal Alcicek[1], Jakub Dybas[1], Katarzyna Maria Marzec[1]
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O3-4 Investigation of effect of measurement time for transmitted light through blood on relationship between erythrocytes' sedimentation velocity and aggregation parameters
Makoto Higuchi[1,2], Nobuo Watanabe[1]

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O4: Red cell deformability in humans and mammalians

O4-1 3-D analysis of the deformation of RBCs in a doublet while tuning the interaction

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O4-2 Osmotic gradient ektacytometric parameters in human and seven mammalian species

Adam Varga, **Barbara Barath**, **Adam Attila Matrai**, **Viktoria Somogyi**, **Adam Deak**, **Norbert Nemeth**
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O4-3 Effect of heat stress on macro- and micro-rheological parameters in an experimental model

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O4-4 *In vitro* effects of heat-treatment on red blood cell micro-rheology in human and various vertebrate species

Adam Attila Matrai[1], Gabor Varga[1], Bence Tanczos[1], Barbara Barath[1], Adam Varga[1], Laszlo Horvath[2], Zsuzsanna Bereczky[3], Adam Deak[1], Norbert Nemeth[1]
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O4-5 Activation of Protein kinase A cascade increases deformability of sickle red blood cells

Evrim Goksel[1,2], Philippe Connes[4,5,6], Camille Boisson [4,5,7], Céline Renoux[4,5,7], Alexandra Gauthier[4,5,8], Romain Fort[4,5,9], Elie Nader[4,5], Solène Poutrel[4,5,9], Ozlem Yalcin[1,2,3]
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Free Communication (ePoster)

P-1 Impaired deformability and association with density distribution of erythrocytes in patients with type 2 diabetes mellitus under treatment
Toru Maruyama[1], Michinari Hieda[1], Takeshi Arita[2], Taku Yokoyama[1], Mitsuhiro Fukata[1], Takehiko Fujino[3], Koichi Akashi[1]
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P-2 Prognostic significance of red cell distribution width in hospitalized old patients with bacterial infection
Toru Maruyama[1], Keitaro Nakashima[2], Eiichi Ohgami[2], Kazuhiko Katoh[2], Souichi Yoshitomi[2], Mine Harada[2]
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P-3 Results of blood research relating to rheology, morphology and biochemistry of blood in a man living 50 days in extremely low temperatures
Aneta Teleglow[1], Anna Marchewka[1], Maria Fornal[2], Zbigniew Dąbrowski[1], Jakub Marchewka[1], Bartłomiej Ptaszek[1], Mateusz Mardyła[1], Dariusz Mucha[1], Łukasz Tota[1], Marcin Maciejczyk[1]
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P-4 Activation of K^+ ATP channels is involved additively in NO-induced vasodilation
Noriko Iida
ex-Department of Neurophysiology, Graduate School of Biomedical and Health Sciences, Hiroshima University, Japan

P-5 Stiffening of the human keratinocytes in response to the cyclic temperature changes
Yan Nie[1,2], Weiwei Wang[1], Xun Xu[1], Nan Ma[1,3], Andreas Lendlein[1,2,3]

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P-6 Extensional rheology of semi-dilute entangled solutions of polyelectrolytes in a cross-slot microchannel
Arisa Yokokoji[1], Tadashi Inoue[1], Atsushi Matsumoto[2], Simon J Haward[3], Amy Q Shen[3]
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P-7 Entrapment dynamics of micro-particles in a Pulmonary Capillary Network (PCN) microfluidic device
Merav Belenkovich, Josué Sznitman, Netanel Korin
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P-8 Time-series snapshots of the entire circumferential wall of arteries under pulsatile pressure condition captured by grating-based phase-contrast CT
Takeshi Matsumoto[1], Hiroyuki Tachibana[2], Masato Hoshino[3]
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P-9 Hemorheology and blood coagulation in COVID-19 patients
Irina Alexandrovna Tikhomirova[1], Mihail Mihajlovich Ryabov[2]
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P-10 Extended fibrinolysis times in vitro of clots containing erythrocyte microparticles formed by supraphysiologic shear stress
Kylie Foster[1,2], James Buerck[1], Edgar O'Rear[1]
[1]*University of Oklahoma*, [2]*VADovations Inc.*

P-14 Change in oxygen transport by erythrocytes treated with TiO_2 nanoparticles and functionalized carbon nanotubes
Magdalena Peter[1], Jarosław Kiecana[2], Aleksander Siniarski[2,3], Grzegorz Gajos[2,3], Józef Korecki[4], Kvetoslava Burda[1]
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P-15 [Withdrawn]

P-16 Hemodynamic characteristics of fully polymer bioresorbable scaffolds of rats in different ages

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