The 17th International Symposium on Blood Substitutes and Oxygen Therapeutics (XVII-ISBS-2019)  
— Program —  

20 November 2019 (Wednesday)  
Venue: Hotel Nikko Nara, the 4th floor  
19:00-21:00 Registration & Welcome Reception  

21 November (Thursday)  
Morning Program  
Venue: Nara Kasugano International Forum “IRAKA”  
9:00 Registration, Poster setting up  

Noh Theatre  
9:30 Opening Ceremony  
Hiromi Sakai & Chengmin Yang (Co-presidents, 17th ISBS-2019)  
Hiroshi Hosoi (President, Nara Medical University)  
9:50-10:30 Presidential Lecture-1  
Chair: Chengmin Yang (Inst. of Blood Transfusion, Chin. Acad. Med. Sci., China)  
What is the most effective replacement for blood loss?  
Thomas M. S. Chang  
Depts. of Physiology, Medicine & Biomed. Eng., Faculty of Medicine, McGill University, Canada  
10:30-11:10 Presidential Lecture-2  
Chair: Hiroyuki Nishide (Waseda University)  
Artificial red cells project in Japan  
Hiromi Sakai  
Department of Chemistry, Nara Medical University, Kashihara, Japan  
11:10-11:20 Break
Program

11:20-12:00 Plenary Lecture-1
Blood component, transfusion requirements and mortality in the two largest phase III trials of hemoglobin-based oxygen carriers: Hemopure® and PolyHeme
Jonathan S. Jahr
Depts. of Anesthesiology and Perioperative Medicine, David Geffen School of Medicine at UCLA, Los Angeles, USA

12:00-12:40 Plenary Lecture-2
Chair: Akira Yoshioka (Nara Medical University)
Turning stem cells into platelets
Koji Eto
Department of Clinical Application, CiRA, Kyoto University, Kyoto, Japan

12:40-12:50 Break

Conference Rooms 1&2

12:50-13:30 Luncheon Seminar-1
Chair: Hiromi Sakai (Nara Medical University)
Big issues for the world malaria elimination
Shigeyuki Kano
Res. Inst. Natl Center for Global Health & Med., Tokyo, Japan

Reception Hall

13:30-13:50 Poster-viewing

Noh Theatre

13:40-13:50 General Meeting of the Society of Blood Substitutes, Japan

Afternoon Program

Noh Theatre

Session-1: Keys to Develop Blood Substitutes (1)
Chairs: Leif Bülow (Lund University)
Hiromi Sakai (Nara Medical University)

13:50-14:10 Keynote Lecture-1
History of blood substitutes research in Japan (tentative)
Koichi Kobayashi
Keio University, Tokyo, Japan
14:10-14:40  **Keynote Lecture-2**  
Restoration of oxygen carrying capacity/delivery capacity in anemia  
Marcos Intaglietta  
Department of Bioengineering, University of California, San Diego, La Jolla, USA

14:40-15:10  **Keynote Lecture-3**  
Protein engineering in the design of safe and robust HBOCs  
Leif Bülow  
Pure and Applied Biochemistry, Dept of Chemistry, Lund University, Lund, Sweden

15:10-15:50  **Plenary Lecture-3**  
Preclinical investigation of polymerized porcine hemoglobin  
Chao Chen  
Northwest University, X’ian, China

15:50-16:00  Break

**Session-2: Keys to Develop Blood Substitutes (2)**  
Hae Won Kim (Brown University)

16:00-16:30  **Keynote Lecture-4**  
Acellular hemoglobin-based oxygen carrier (HBOC)-mediated bradycardia: another affair with nitric oxide?  
Hae Won Kim and A. Gerson Greenburg  
Brown University, Providence, USA

16:30-17:00  **Keynote Lecture-5**  
Human albumin based drug delivery: SNO-albumin dimer for cancer therapeutic application  
Masaki Otagiri  
Sojo University, Kumamoto, Japan

17:00-17:20  **IL-1**  
Hemoglobin vesicles treatment in future perinatal medicine: application of artificial oxygen carriers for pre-eclampsia  
Hidenobu Ohta  
Department of Neuropsychiatry, Akita University Graduate School of Medicine, Akita, Japan

17:20-17:40  **IL-2**  
Erythrocytes derived from hematopoietic stem cell-independent pathway  
Feng Ma  
Inst. Blood Transfusion, Chin. Acad. Med. Sci., Chengdu, China

17:40-18:00  **IL-3**  
Identification of potential chemical compounds able to trigger enucleation of immortalized human erythroid cell lines  
Kenichi Miharada  
Div. Molecular Medicine and Gene Therapy, Lund Stem Cell Center, Lund University, Lund, Sweden
Session 3: Artificial Cells and Functional Liposomes

**Chairs:** János Szebeni (Semmelweis University)  
Tatsuhiko Ishida (Tokushima University)

### 13:50-14:10 IL-4
Liposome-encapsulated hemoglobin: Review of the progress of a synthetic red cell  
**János Szebeni**  
Nanomedicine Research and Education Center, Semmelweis University, Budapest, Hungary

### 14:10-14:30 IL-5
Induction of B7-H3 positive myeloid-derived suppressor cells (MDSC) by liposomal nanoparticles  
**Hiroshi Azuma**  
Department of Pediatrics, Asahikawa Medical University, Asahikawa, Japan

### 14:30-14:50 IL-6
Immunological response to PEGylated liposomes: production of anti-PEG antibodies and their affection on PK of second dose  
**Tatsuhiro Ishida**  
Institute of Biomedical Sciences, Tokushima University, Tokushima, Japan

### 14:50-15:05 OP-1
Surface-anchored framework for generating RhD-epitope stealth red blood cells  
**Ben Wang**  
The Second Affiliated Hospital, School of Medicine, Zhejiang University, Hangzhou, China

### 15:05-15:20 OP-2
Evasion of the accelerated blood clearance phenomenon by polysarcosine coating of liposomes  
**Kon Son**  
RIKEN Cluster for Pioneering Research, School of Adv. Sci. & Eng., Waseda University, Tokyo, Japan

### 15:20-15:35 OP-3
Arginine-based cationic liposomes promoted antigen presentation and T cell activation *in vitro*  
**Tianshu Li**  
Waseda Research Institute for Science and Engineering, Waseda University, Tokyo, Japan

### 15:35-15:50 OP-4
Development of high-sensitive and rapid biomolecule detection method by using temperature-responsive fluorescent liposomes  
**Runkai Hu**  
Graduate School of Advanced Science and Engineering, Waseda University, Tokyo, Japan

### 15:50-16:00 Break

Session 4: Strategies to PEGylate HBOCs

**Chairs:** Seetharama Acharya (Albert Einstein College of Medicine)  
Stefano Bruno (University of Parma)

### 16:00-16:20 IL-7
Pegylated HBOCs with higher oxygen affinity effectively target oxygen delivery to ischemic and/or hypoxic tissues  
**Peter E. Keipert**  
Keipert Corp. Life Sciences Consulting, San Diego, USA
16:20-16:40  **IL-8**  
Increased oxygen extraction from RBCs during anemia by high O2 affinity Hb in plasma: Combining supra plasma expansion with O2 transfer catalysis by Hb for treating anemia  
Seetharama Acharya  
Albert Einstein College of Medicine, Bronx, USA

16:40-17:00  **IL-9**  
Different oxygen stress induced by high- and low-affinity PEGylated hemoglobin-based oxygen carriers in a Guinea pig exchange transfusion model  
Stefano Bruno  
Department of Food and Drug, University of Parma, Parma, Italy

17:00-17:20  **IL-10**  
Polymerized bovine hemoglobin derivatives by 8-arm PEG: Different abilities of oxygen delivery and unloading  
Tao Hu  
Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China

17:20-17:35  **OP-5**  
Supramolecular ring-opening polymerization of hemoglobin and subsequent fixation using site-specific cross-linking within α₂β₂ tetramers  
Takashi Matsuhira  
Department of Chemistry, Nara Medical University, Kashihara, Japan

17:35-17:50  **OP-6**  
Site-specific propylation of hemoglobin at Val-1(α) improves the structural and functional properties of di-PEGylated hemoglobin at Val-1(β)  
Weili Yu  
Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China

17:50-18:05  **OP-7**  
A uniquely homogenous PEGylation method without significantly affecting hemoglobin oxygen affinity and cooperativity.  
Brandon Reeder  
School of Life Sciences, University of Essex, Wivenhoe Park, Colchester, UK

**Reception Hall**

18:05-18:30  Poster-viewing

**Noh Theatre**

18:30-19:00  **Stage Show: Gagaku Instrumental Music Show**

19:00  **Commemorative Photograph**

**Reception Hall**

19:00-20:30  **Banquet**

21:00  **Building Closed**
Morning Program

8:30  Registration
Poster-viewing

Noh Theatre

Session 5: Hemostasis and Artificial Platelets

Chairs: Rong Xia (Fudan University)
        Shinji Takeoka (Waseda University)

9:00-9:20  IL-11
Bleeding management is coagulation management: the European approach of targeted coagulation therapy in massive bleeding
Judith Martini
Clinic for Anaesthesia and Intensive Care Medicine, Medical University Innsbruck, Austria

9:20-9:40  IL-12
Basic and clinical aspects of platelet transfusion refractoriness
Rong Xia
Department of Blood Transfusion, Huashan Hospital, Fudan University, Shanghai, China

9:40-10:10  Keynote Lecture-6
Innovative research approach to produce a large quantity of regenerated platelets/platelet substitutes in Japan
Yasuo Ikeda
Waseda University, and Keio University, Tokyo, Japan

10:10-10:40  Keynote Lecture-7
Evaluation of fibrinogen dodecapeptide(H12)-coated, ADP-encapsulated liposomes as hemostatic nanoparticles
Shinji Takeoka
Graduate School of Advanced Science and Engineering, TWIns, Waseda University, Tokyo, Japan

10:40-10:50  Break

10:50-11:10  IL-13
Megakaryocytes and platelets from novel human adipose tissue-derived mesenchymal stem Cells
Yumiko Matsubara
Clinical and Translational Research Center, Keio University School of Medicine, Tokyo, Japan

11:10-11:25  OP-8
Therapeutic potential of fibrinogen gamma-chain peptide-coated, ADP-encapsulated liposomes, as a synthetic platelet substitute, for post-cardiopulmonary bypass coagulopathy
Osamu Ishida
Dept. of Cardiovascular Surgery, National Defense Medical College, Tokorozawa, Japan
IL-14
Combination therapy using fibrinogen γ-chain peptide-coated, ADP-encapsulated liposomes and hemoglobin vesicles for trauma-induced massive hemorrhage in thrombocytopenic rabbits
Kohsuke Hagisawa
Dept. of Physiology, National Defense Medical College, Tokorozawa, Japan

OP-9
Study on universal virus-inactivated plasma for Chinese population
Liguozh
Dept. of Blood Transfusion, Chinese PLA General Hospital, Beijing, China

OP-10
Antiplatelet and antithrombotic activity of a novel phthalide derivative (CD21) and its neuroprotective effect against ischemic stroke in rodents
Junrong Du
Dept. of Pharmacology, West China School of Pharmacy, Sichuan University, Chengdu, China

Session 6: Characterization of New HBOCs
Chairs: Chris Cooper (Essex University)
Hirohisa Horinouchi (Saitama City Hospital)

IL-15
CMC regulatory considerations in the drug development of hemoglobin-based oxygen carriers
Yiping Jia
Center for Biologics Evaluation and Research, Food and Drug Administration, Silver Spring, USA

IL-16
New design approaches for a recombinant hemoglobin based oxygen carrier
Chris Cooper
School of Life Sciences, University of Essex, Colchester, UK

IL-17
Hemoglobin vesicle: resuscitation fluid for hemorrhagic shock
Hirohisa Horinouchi
Saitama City Hospital, Saitama, Japan

IL-18
Crocodile hemoglobin: challenging and beyond
Sompong Klavnongsruang
Faculty of Science, Khon Kaen University, Khon Kaen, Thailand

IL-19
Design of hemoglobin-polymer nano-assemblies for oxygen transfusion and other biomedical attempts
Yubin Huang
Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, ChangChun, China

Break
10:50-11:10 **IL-20**
Chronic anti-arrhythmogenic effect of liposome-encapsulated hemoglobin (HbV) on the myocardium through improving myocardial electrical remodeling and the arrhythmogenic substrate in hemorrhagic shock heart syndrome

Bonpei Takase
Department of Intensive Care Medicine, National Defense Medical College, Japan

11:10-11:30 **IL-21**
PolyHb toxicity is determined by molecular weight

Pedro Cabrales
Department of Bioengineering, University of California San Diego, La Jolla, USA

11:30-11:50 **IL-22**
Designs and benefits of oxygen carriers from site-selectively coupled cross-linked hemoglobins

Aizhou Wang, and Ronald Kluger
Department of Chemistry, University of Toronto, Toronto, Ontario, Canada

11:50-12:10 **IL-23**
Mixtures of tense and relaxed state polymerized human hemoglobin regulate oxygen affinity and tissue construct oxygenation

Andre F. Palmer
William G. Lowrie Department of Chemistry and Biomolecular Engineering, The Ohio State University, Columbus, USA

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**Conference Rooms 1&2**

**Session 7: Gas Biology and ROS Control**

Chairs: Kazuaki Taguchi (Keio University)
Alexey F. Topunov (Russian Academy of Sciences)

9:00-9:20 **IL-24**
Carbon monoxide bound Hemoglobin-vesicles are effective in treating inflammatory disorders

Kazuaki Taguchi
Faculty of Pharmacy, Keio University, Tokyo, Japan

9:20-9:40 **IL-25**
Biological roles of endogenous carbon monoxide in blood

Hiroaki Kitagishi
Dept. of Molecular Chemistry and Biochemistry, Doshisha University, Kyoto, Japan

9:40-9:55 **OP-11**
Encapsulation of S-nitrosoglutathione within liposomes for enhanced nitric oxide donor stability and delivery

Ye Cao*, Yee Shan Wong*
School of Materials Science and Engineering, Nanyang Technological University, Singapore

*Co-first authors

9:55-10:10 **OP-12**
A novel S-sulfhydrated human serum albumin suppresses reactive oxygen species induced by kidney injuries

Mayumi Ikeda
Dept. of Pharmacokinetics and Biopharmaceutics, Tokushima University, Tokushima, Japan
10:10-10:25  **OP-13**  
Therapeutic effect of albumin-based nitric oxide donor on the renal fibrosis  
Shun Oshiro  
Dept. of Biopharmaceutics, Graduate School of Pharmaceutical Sciences, Kumamoto University, Kumamoto, Japan

10:25-10:40  **OP-14**  
Measures to prohibit post mortem hemoglobin mediated lipid oxidation in herring and rainbow trout  
Semhar Ghirmai  
Dept. of Biology and Biological Engineering, Chalmers University of Technology, Gothenburg, Sweden

10:40-10:55  **OP-15**  
Hemoglobin transition to membrane-bound state and its correlation with erythrocyte stability  
Alexey F. Topunov  
Federal Research Center of Biotechnology of the Russian Academy of Sciences, Moscow, Russia

10:55-11:05  Break

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**Session 8: New PFC Materials**

Charis: Marrie P. Krafft (University of Strasbourg)  
Katja B. Ferenz (University Hospital Essen)

11:05-11:25  **IL-26**  
Advances in fluorocarbon-assisted oxygen delivery, diagnostics and theranostics  
Marie Pierre Krafft  
Institut Charles Sadron, Centre National de la Recherche Scientifique, University of Strasbourg, Strasbourg, France

11:25-11:40  **OP-16**  
Microsized perfluorocarbon-based oxygen carriers prepared via SPG membrane emulsification  
Xiaoting Fu  
Dept. of Bioengineering, Univ. of Tokyo, Tokyo, Japan

11:40-11:55  **OP-17**  
Does a perfluorooctylbromide-core improve the performance of albumin-derived perfluorocarbon-based artificial oxygen carriers?  
Katja Bettina Ferenz  
Institute of Physiology, University of Duisburg-Essen, University Hospital Essen, Essen, Germany

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**Reception Hall**

12:20-13:00  **Luncheon Seminar-2**  
Chair: Yasuo Ikeda (Waseda University, Keio University)  
New therapy for hemophilia A by factor VIII mimicking bispecific antibody  
Midori Shima  
Dept. of Pediatrics, Nara Medical University, Kashihara, Japan  
Sponsored by Chugai Pharmaceutical Co., Ltd.

13:00-13:20  Break / Poster-viewing
Program

Afternoon Program

Noh Theatre

13:20-14:00  **Plenary Lecture-4**  
Chair: Masanori Matsumoto (Nara Medical University)  
Development and future of Chinese transfusion medicine  
Jiaxin Liu  
Institute of Blood Transfusion, Chinese Academy of Medical Sciences, Chengdu, China

14:00-14:40  **Plenary Lecture-5**  
Chair: Hiroshi Azuma (Asahikawa Medical University)  
Current blood program and blood substitutes  
Masahiro Satake  
Japanese Red Cross Central Blood Institute, Tokyo, Japan

14:40-14:50  **Break**

Session 9: Transfusion Managements and Blood Substitutes  
Masahiro Satake (Japanese Red Cross)

14:50-15:20  **Keynote Lecture-8**  
Individualized red-cell transfusion strategy for non-cardiac surgery in adults: a prospective, open-label, randomized clinical trial  
Jin Liu  
Dept. of Anesthesiology, West China Hospital, Sichuan University, Chengdu, China

15:20-15:40  **IL-27**  
Microvascular response to blood transfusion in a moderately anemic hamster model shows the importance of oxygen delivery over oxygen-carrying capacity.  
Amy G. Tsai  
Dept. of Bioengineering, University of California, San Diego, La Jolla, USA

15:40-16:00  **IL-28**  
20 Year Journey of blood safety in China  
Zhong Liu  
Institute of Blood Transfusion, Chin. Acad. Med. Sci., Chengdu, China

16:00-16:20  **IL-29**  
Critical obstetric hemorrhage: perinatal system problem in Japan and need for blood substitutes  
Katsuo Terui  
Dept. of Obstetric Anesthesiology, Saitama Medical Center, Saitama Medical University, Kawagoe, Japan

16:20-16:40  **IL-30**  
What we learned from the cure of HCV: Road leads to the control of transfusion-transmitted infectious diseases (TTIDs)  
Limin Chen  
Institute of Blood Transfusion, CAMS&PUMC, Chengdu, China

16:40-16:50  **Break**
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<tr>
<th>Time</th>
<th>Session Title</th>
<th>Presenter</th>
<th>Institution</th>
</tr>
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<tbody>
<tr>
<td>16:50-17:10</td>
<td>IL-31 Patient blood management</td>
<td>Lihua Hu</td>
<td>Huazhong Univ. Sci.&amp;Eng., Wuhan, China</td>
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<tr>
<td>17:10-17:30</td>
<td>IL-32 Medical countermeasure using hemoglobin vesicles against trauma hemorrhagic shock</td>
<td>Manabu Kinoshita</td>
<td>Dept. of Immunology and Microbiology, National Defense Medical College, Tokorozawa, Japan</td>
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<tr>
<td>11:10-11:25</td>
<td>OP-18 Hemoglobin vesicles prolong the time to circulatory collapse in rats during apnea</td>
<td>Yusuke Naito</td>
<td>Department of Anesthesiology, Nara Medical University, Japan</td>
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<tr>
<td>17:45-18:00</td>
<td>OP-19 Analysis of adverse reactions of blood transfusion in China</td>
<td>Ling Li</td>
<td>Institute of Blood Transfusion, CAMS&amp;PUMC, Chengdu, China</td>
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<tr>
<td>18:00-18:15</td>
<td>OP-20 A de novo molecular mechanism of hypertyrosinemia mediated by TTC36-STK33-PELI1 signaling axis</td>
<td>Qin Zhou</td>
<td>College of Laboratory Medicine, Chongqing Medical University, Chongqing, China</td>
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**Reception Hall**

**Session 10: Characterization of New HBOCs and Plasma Substitutes**

**Chairs:** Teruyuki Komatsu (Chuo University)  
Zhiguo Su (Chinese Academy of Sciences)

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<th>Time</th>
<th>Session Title</th>
<th>Presenter</th>
<th>Institution</th>
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<tr>
<td>14:50-15:20</td>
<td>Keynote Lecture-9 Hemoglobin modification engineering</td>
<td>Zhiguo Su</td>
<td>Institute of Process Engineering, Chinese Academy of Sciences, Beijing, China</td>
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<td>15:20-15:40</td>
<td>IL-33 Microscopic structural insights into hemoglobin vesicles (HbVs) and closely related polymer and protein solutions</td>
<td>Takaaki Sato</td>
<td>Dept. of Chemistry and Materials, Shinshu University, Ueda, Japan</td>
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<td>15:40-16:00</td>
<td>IL-34 Hemoglobin submicron particles as carriers for oxygen and drugs</td>
<td>Hans Bäumler</td>
<td>Institute of Transfusion Medicine, Charité-Universitätsmedizin Berlin, Belin, Germany</td>
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<td>Time</td>
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<td>Speaker/Institution</td>
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<td>16:00-16:20</td>
<td><strong>IL-35</strong> Hemoglobin-albumin cluster “HemoAct™” as red blood cell substitute and O₂ therapeutic reagent</td>
<td>Teruyuki Komatsu, Department of Applied Chemistry, Faculty of Science and Engineering, Chuo University, Tokyo, Japan</td>
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<tr>
<td>16:20-16:40</td>
<td><strong>IL-36</strong> The study of 300% isovolemic exchange transfusion with polymerized porcine hemoglobin in rats</td>
<td>Kunping Yan, College of Life Sciences, Northwest University, Xi’an, China</td>
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<td>16:40-16:50</td>
<td>Break</td>
<td>Chairs: Hans Bäumler (Charité-Universitätsmedizin Berlin) Toru Maruyama (Kumamoto University)</td>
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<td>16:50-17:10</td>
<td><strong>IL-37</strong> Albumin fusion protein: next generation of albumin preparation</td>
<td>Toru Maruyama, Graduate School of Pharmaceutical Sciences, Kumamoto University, Kumamoto, Japan</td>
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<td>17:10-17:30</td>
<td><strong>IL-38</strong> Characterization of hydroxypropyl, acid-thinned waxy tapioca starch based plasma expander</td>
<td>Surapong Chatpun, Inst. of Biomedical Engineering, Faculty of Medicine, Prince of Songkla Univ., Songkla, Thailand</td>
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<td>17:30-17:45</td>
<td><strong>OP-21</strong> The formation of oxygen carrying hemoglobin nanoparticles through desolvation precipitation</td>
<td>Richard Hickey, William G. Lowrie Dept. of Chemical and Biomolecular Engineering, The Ohio State University, Columbus, USA</td>
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<td>17:45-18:00</td>
<td><strong>OP-22</strong> Nanoparticles fully made of hemoglobin and their evaluation as potential oxygen delivery systems</td>
<td>Xiaoli Liu, DTU Health Tech, Technical University of Denmark, Kgs. Lyngby, Denmark</td>
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<tr>
<td>18:00-18:15</td>
<td><strong>OP-23</strong> Preliminary study on the effect of polymerized human cord hemoglobin on rat myocardial tissue</td>
<td>Jing Wang, Inst. of Blood Transfusion, Chin. Acad. Med. Sci., Chengdu, China</td>
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<td>18:15-18:45</td>
<td>Walk to Nara National Museum</td>
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<td>19:00-21:00</td>
<td>“Get Together” (Supper) at “Halftime” in Nara National Museum</td>
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23 November (Saturday)

Morning Program

8:30  Registration
Poster-viewing

Noh Theatre

9:00-9:40  Plenary Lecture-6
Chair: Chao Chen (Northwest University)
Preclinical perspective on the cardiovascular responses to hemoglobin-based oxygen carriers
Felice D'Agnillo
Center for Biologics Evaluation and Research, Food and Drug Administration, Silver Spring, USA

9:40-9:45  Break

Session 11: R&D of HBOCs (from Companies) (1)

Chairs: Manabu Kinoshita (National Defense Medical College)
Amy G. Tsai (Univ. of California, San Diego)

9:45-10:15  Keynote Lecture-10
SanFlow for unmet medical needs caused by superoxide toxicity
Carleton J.C. Hsia
AntiRadical Therapeutics LLC, Sioux Falls, USA

10:15-10:35  IL-39
First-in-human use of a marine oxygen carrier for organ preservation: a safety and proof-of-principle study
Franck Zal
HEMARINA, Morlaix, France

10:35-10:55  IL-40
Hemopure, in the aftermath of HBOC industry’s collapse following the 2008 FDA/NIH workshop: What have we learned since then?
Zafiris Zafirelis
Hemoglobin Oxygen Therapeutics LLC, Souderton, USA

10:55-11:15  IL-41
VirTech Bio’s progress and future plans with a large human hemoglobin polymer
William R. Light
VirTech Bio, Inc., Natick, USA

11:15-11:35  IL-42
A different perspective on hemoglobin solutions: The need to move beyond the mis-directed classification of “blood” substitutes
Carl W. Rausch
8-BioMed, Hong Kong

11:35-11:50  Break
Session 12: Applications of Blood Substitutes and Related Technologies

Chairs: Jinhai Shi (China Protein Drug Quality Alliance)
Naoaki Rikihisa (Chiba University)

9:45-10:05  **IL-43**
Therapy development for oxygen supply
Jinhai Shi
China Protein Drug Quality Alliance, Tianjin, China

10:05-10:20  **OP-24**
Targeted depletion of tumor-associated macrophages by hemoglobin-based nanomedicines for cancer chemo/immunotherapy
Dongfang Zhou
Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, China

10:20-10:35  **OP-25**
Tumor vascular status is the determinant of oxygen delivery facilitated by transfused polymerized hemoglobins
Donald Belcher
William G. Lowrie Dept. of Chem. and Biomolecular Engineering, The Ohio State Univ., Columbus, USA

10:35-10:50  **OP-26**
Microbiota-host interactions in an ex vivo arterially perfused intestinal loop: Searching for neuroactive molecules
Chiko Shimbori
Farncombe Family Digestive Health Research Institute, McMaster University, Hamilton, Canada

10:50-11:10  **IL-44**
Artificial red blood cells as potential photosensitizers in laser treatment against red birthmarks
Naoaki Rikihisa
Dept. of Plastic, Reconstructive, and Aesthetic Surgery, Chiba University, Chiba, Japan

17:30-17:45  **OP-27**
SanFlow™: a neuroprotective superoxide dismutase/catalase mimetic drug for resuscitation after traumatic brain injury combined with hemorrhage shock for the combat casualty care and global healthcare
Soichiro Seno
Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University, Baltimore, USA

11:25-11:45  **IL-45**
Study on the mechanism of plasma adsorption (PA) in treating amyotrophic lateral sclerosis (ALS) and potential pathogenesis of ALS
Hequn Zou
The 3rd Affiliated Hospital of Southern Medical University, Guangzhou, China

11:45-11:50  Break
11:50-12:30  **Presidential Lecture-3**  

**Chair:** Thomas M.S. Chang  
(McGill University)

The exploration and discussion about the guiding principle of HBOCs research and design

**Chengmin Yang**  
Inst. Blood Transfusion, Chin. Acad. Med. Sci., Chengdu, China

12:30-13:20  **Break / Poster viewing / Lunch**

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### Afternoon Program

#### Noh Theatre

**Session 13: R&D of HBOCs (from Companies) (2)**  
**Chairs:** Thomas M.S. Chang  
(McGill University)  
Koichi Kobayashi  
(Keio University)

13:20-13:40  **IL-46**  
ErythroMer: bio-inspired design & performance data for nanofabricated artificial RBCs

**Allan Doctor**  
KaloCyte, University of Maryland, Baltimore, USA

13:40-14:00  **IL-47**  
Mitered oxygen delivery and transport to prevent ischemia and reperfusion injury of the heart

**Olga Bockeria**  
Medical Technology Associates (MTA) II, USA

14:00-14:20  **IL-48**  
From a different angle: How to make hemoglobin based oxygen carrier (HBOC) work for human application.

**Bing Lou Wong**  
Advisor and Adjunct Professor, Inst. of Blood Transfusion, Chin. Acad. Med. Sci., Chengdu, China

14:20-14:35  **OP-28**  
Toward understanding the impact of hemoglobin-based oxygen carriers on erythropoiesis

**Jan Simoni**  
Texas HemoBioTherapeutics & BioInnovation Center, Lubbock, USA

14:35-14:50  **OP-29**  
Challenges and opportunities in product development – Act-O2-Hem a story of ups and downs

**Maria Seriakov**  
M bioserviceS GmbH, Linz, Austria
Session 14: New Applications of HBOCs

Chairs: Naoto Matsuno (Asahikawa Medical University)
Leticia Hosta-Rigau (Technical University of Denmark)

13:20-13:40  **IL-49**
**Present status of transplant organ preservation by dynamic machine perfusion system: How important is the development of a novel organ preservation solution?**
Naoto Matsuno
Asahikawa Medical University, Asahikawa, Japan

13:40-14:00  **IL-50**
**Normothermic preservation of the rat hind limb with artificial oxygen-carrying hemoglobin vesicles and the possibility of therapeutic application**
Jun Araki
Division of Plastic and Reconstructive Surgery, Shizuoka Cancer Center Hospital, Shizuoka, Japan

14:00-14:15  **OP-30**
**Hemoglobin-based oxygen carrier with antioxidant properties towards hypoxia treatment**
Michelle M. T. Jansman
Centre for Nanomedicine and Theranostics, Technical University of Denmark, Lyngby, Denmark

14:15-14:30  **OP-31**
**Polymerized human placenta hemoglobin attenuates severe burns-induced myocardial and vascular damage**
Tao Li
Laboratory of Anesthesiology and Translational Neuroscience Center, West China Hospital, Chengdu, China

14:30-14:45  **OP-32**
**The efficacy of hemoglobin vesicles (HbV) containing solution in machine perfusion in donation after cardiac death (DCD) in pig liver model**
Tatsuya Shonaka
Department of Surgery, Asahikawa Medical University, Asahikawa, Japan

Noh Theatre

14:50-  **Closing Ceremony**
Awards Announcement
Closing Remarks
Next ISBS-2021 (Europe) Announcement
P-1  Effects of stem cell collection and cryopreservation at -80°C on the count and activity of CD34+ cells and mononuclear cells
   Zimin Lu
   Department of Blood Transfusion Affiliated Tongji Hospital, Shanghai Tongji University, Shanghai, China

P-2  Metal-Organic Framework-Hemoglobin Conjugates for Oxygen Carriers
   Zhigang Xie
   Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, China

P-3  Properties of oxygen carrier Acto2HemR particles fabricated by CCD technique
   Yu Xiong
   Biophyll GmbH, Germany; Inst. of Transfusion Medicine, Charité-Universitätsmedizin Berlin, Berlin, Germany

P-4  Synthesis of the hemoglobin-conjugated polymer micelles by thiol Michael addition reaction
   Yanxin Qi
   Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, China

P-5  Engineering heme stability in recombinant human hemoglobin to design potential hemoglobin based artificial oxygen carrier
   Mohd. Asim Khan
   Department of Biochemistry, University of Delhi, South Campus, New Delhi, India

P-6  Conformational changes and oxygen affinity shifts of glutaraldehyde polymerized crocodile (Crocodylus siamensis) hemoglobin during storage
   Phanuphong Wannaphong
   Faculty of Science, Khon Kaen University, Khon Kaen, Thailand

P-7  A hidden cooperative function of NAD(P)H and HbO2 for suppressing metHb formation and elucidation of its antioxidative pseudo-enzymatic mechanism
   Magohei Yamada
   Department of Chemistry, Nara Med. University, Kashihara, Japan

P-8  Hemoglobin-albumin cluster “HemoAct™” for resuscitation from hemorrhagic shock in rats
   Wataru Okamoto
   Department of Applied Chemistry, Faculty of Science and Engineering, Chuo University, Tokyo, Japan

P-9  Electronic control of myoglobin function
   Tatsuro Sugita
   Department of Chemistry, University of Tsukuba, Tsukuba, Japan

P-10  In vitro toxicity and physiological effects of polymerized crocodile hemoglobin (Poly-cHb) on hemorrhage class II and resuscitation in hamster model
    Napaporn Roamcharern
    Department of Biochemistry, Khon Kaen University, Khon Kaen, Thailand

P-11  Polydopamine-based surface modification on hemoglobin particles for stability enhancement of oxygen carriers
    Jilin Hu
    Institute of Health Service and Transfusion Medicine, Beijing, China
P-12 Synthesis and oxygen binding property of recombinant hemoglobin(βC93A)-albumin cluster “HemoAct™” with allosteric effect of inositol hexaphosphate
Yoshitsugu Morita
Department of Applied Chemistry, Chuo University, Tokyo, Japan

P-13 Efficient synthesis procedure of hemoglobin-albumin cluster “HemoAct™”
Tatsuhiko Hamano
Department of Applied Chemistry, Faculty of Sci. and Eng., Chuo University, Tokyo, Japan

P-14 Total liquid ventilation with oxygen fine bubbles for acute lung injury
Kenta Kakiuchi
Dept. of Life Science and Medical Bioscience, Waseda University, Tokyo, Japan

P-15 Quantification of hybrid α2β2 tetramer formed by spontaneous exchange of dimeric αβ subunits between PEGylated and native hemoglobins using intra-molecular cross-linking
Takashi Matsuhira
Department of Chemistry, Nara Medical University, Kashihara, Japan

P-16 Genetically modified fetal hemoglobins for HBOC development
Karin Kettisen
Dept. of Chemistry, Div. of Pure and Applied Biochemistry, Lund University, Lund, Sweden

P-17 Effect of cationic lipid structure on cellular membrane fusion behavior of cationic liposomes
Mizuki Fujisawa
Graduate School of Advanced Science and Engineering, Waseda University, Tokyo, Japan

P-18 Regulation of blood substitutes in Japan
Teruyo Arato
Clinical Research and Medical Innovation Center, Hokkaido University Hospital, Sapporo, Japan

P-19 Protective effect and mechanism of high oxygen affinity hemoglobin oxygen carrier on isolated rat hearts
Wentao Zhou
Institute of Blood Transfusion, Chin. Acad. Med. Sci., Chengdu, China

P-20 Reperfusion of subepithelial capillaries after tracheal transplantation and systemic administration of hemoglobin vesicles in a mouse model.
Hiroto Onozawa
Division of General Thoracic Surgery, Dept. of Surgery, Tokai University School of Medicine, Isehara, Japan

P-21 Recombinant hemoglobin-albumin cluster “HemoAct™” as an entirely synthetic O2 carrier
Ryosuke Funaki
Department of Applied Chemistry, Chuo University, Tokyo, Japan

P-22 Preparation of anionic liposomes encapsulating FITC-Dextran in microfluidic device for multivariate analyses
Morihiro Hotta

P-23 Pre-treatment with Doxebo suppresses anti-PEG IgM immune responses through PEG-specific immune tolerance
Taro Shimizu
Dept. of Pharmacokinetics and Biopharmaceutics, Tokushima Univ., Tokushima, Japan

P-24 Immediate effects of systemic administration of high-O2-affinity hemoglobin vesicles in a rat pneumonectomy model
Ryo Hashimoto
Division of Thoracic Surgery, Department of Surgery, Tokai University School of Medicine, Isehara, Japan
P-25 Effects of carbon monoxide-bound hemoglobin-vesicles on the cranial nervous system
Chie Okuda
Department of Chemistry, Nara Medical University, Kashihara, Japan

P-26 Preparation of Hb-V using rotation-revolution mixer for high encapsulation efficiency
Tomoko Kure
Department of Chemistry, Nara Medical University, Kashihara, Japan

P-27 Efficacy of resuscitative transfusion with hemoglobin vesicles for severe postpartum hemorrhage
Hiroki Ishibashi
Dept. of Obstetrics & Gynecology, National Defense Medical College Hospital, Tokorozawa, Japan

P-28 Hemoglobin-vesicles as a transfusion alternative for perioperative hemorrhage in pneumonectomized mice
Kana Oiwa
Division of Thoracic Surgery, Department of Surgery, Tokai University School of Medicine, Isehara, Japan

P-29 From blood substitutes to medicine for ischemic cardio-cerebrovascular diseases
Ziyuan Wang
School of Life Sciences, Jiangsu Normal University, Xuzhou, China

P-30 PolyCHb oxygen-carrying fluid resuscitation can reduce tissue hypoxia caused by hemorrhagic shock
Wanjing Li
Institute of Blood Transfusion, Chinese Academy of Medical Sciences, Chengdu, China

P-31 Effect of PolyCHb on pulmonary tissue of resuscitating hemorrhagic shock rats
Hongying Li
Institute of Blood Transfusion, Chinese Academy of Medical Sciences, Chengdu, China

P-32 Preliminary study on the effect of PolyCHb on liver of resuscitating hemorrhagic shock rats
Siying Xie
Institute of Blood Transfusion, Chinese Academy of Medical Sciences, Chengdu, China

P-33 Investigation the loyalty of apheresis platelet donors
Ying Hong
Chengdu Blood Center, Chengdu, China

P-34 Distribution of Rh blood group among inpatients in Shenzhen
Shiqiao Zhou
Dept. of Transfusion Medicine, Shenzhen Hospital, Southern Medical University, Shenzhen, China

P-35 Glutaraldehyde-polymerized hemoglobin and hemerythrin: in search of improved performance as oxygen carrier in hemorrhage models
Radu Silaghi-Dumitrescu
Dept. of Chemistry and Chemical Engineering, Babeş-Bolyai Univ., Cluj-Napoca, Romania