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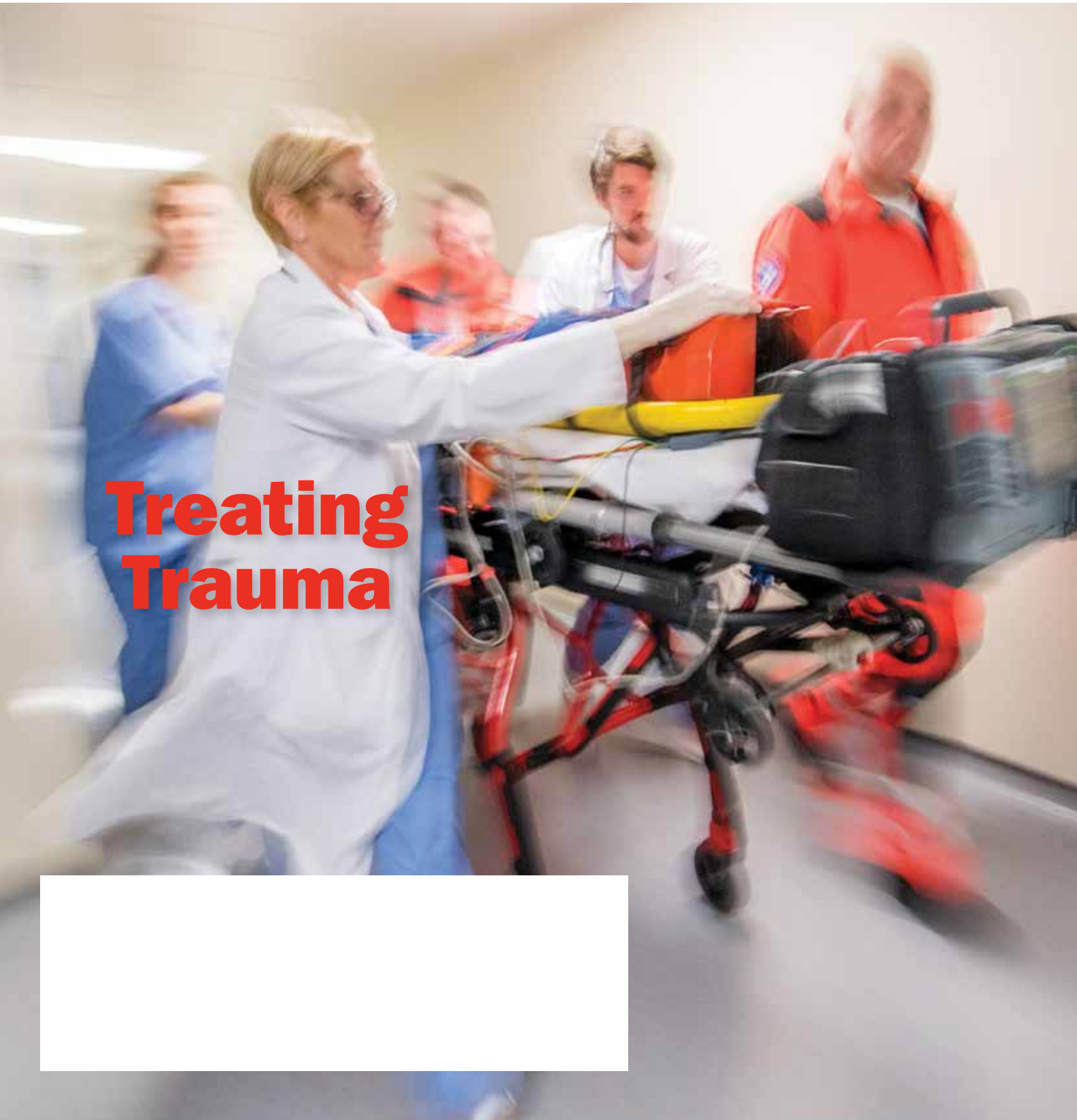
AABB News



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QUOTIENT

Contents

Exploring New Treatments for Trauma Patients

Mary Beth Bassett, BS, MT(ASCP)

Treating trauma patients has increasingly become a more critical aspect of transfusion medicine. This has been the focus of considerable research in recent years; *AABB News* has previously covered new protocols for treating trauma patients, advancements in prehospital care, optimal blood use for trauma patients and various other related topics.

This month, we cover news of trauma from a slightly different angle, one that unifies multiple aspects of AABB's scope. Our first feature story, beginning on page 6, examines how researchers are looking to cellular therapies as potential new treatments for trauma patients. In trials for oncologic treatments, cellular therapies have been shown to reduce inflammation, protect cells, and stimulate tissue regeneration and repair — all of which are essential properties for the treatment of trauma patients. The idea that cellular therapies could be considered to treat traumatic injuries has been welcomed by experts in the trauma field, where advancements in therapeutic options have sometimes been slower than in other areas of health care.

AABB recognizes the potential that cellular therapies represent for advancements in trauma patient care. Our Association is devoting a one-day pre-conference workshop to this topic in conjunction with our upcoming Annual Meeting. The workshop, developed in collaboration with the Cellular Therapies in Trauma and Critical Care Conference (CTTACC) faculty, will bring together researchers, health care providers and industry to collaborate on advancing this exciting area of the field.

Upcoming Annual Meeting

Speaking of the 2018 AABB Annual Meeting, we are now only about two months away from this year's event, which will be held Oct. 13-16 in Boston. On page 10 of this issue, we preview some of sessions we are most excited to attend at this year's Annual Meeting. This issue also features an article, beginning on page 13, about Shawn Achor, who will be giving the keynote address at this year's Annual Meeting. Achor is one of the world's leading experts on happiness research. I know his talk will be one of the highlights of this year's Annual Meeting.

As usual, the AABB Annual Meeting will feature dozens of educational programs, the latest research in the field, an exhibit hall showcasing the innovations from our industry partners, opportunities to network with colleagues from throughout the world – and plenty of fun.

I am really looking forward to this year's Annual Meeting; I hope to see many of you there. ■

Mary Beth Bassett

Mary Beth Bassett, BS, MT(ASCP)
AABB President

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NBF Events at the 2018 AABB Annual Meeting

NBF Grant Recipients' Lecture and Luncheon

The National Blood Foundations' annual Grant Recipients' Lecture and Luncheon will take place on Saturday, Oct. 13, 11:30 am-1:30 pm. The event, which last year drew a crowd of more than 150 current and past grant recipients, industry professionals and NBF donors, will feature lectures from past and present NBF early-career Scientific Research Grant awardees.

Avital Mendelson, PhD, from the Lindsley F. Kimball Research Institute at the New York Blood Center and recipient of a 2018 award, will discuss her research project, "A Biomimetic Niche for Platelet Formation in Vitro."

NBF Hall of Fame member, **Karina Yazdanbakhsh, PhD**, also from the New York Blood Center's Lindsley F. Kimball Research Institute, will discuss the research that earned her NBF support in 2000, "Recombinant Antigens as Tools for Identification of Alloantibodies in Patients' Sera."

During the Luncheon, the NBF will also introduce the newest recipient of its Award for Innovative Research, which recognizes a scientist whose original research resulted in an important contribution to the body of scientific knowledge in transfusion medicine or cellular therapies:

Sean Stowell, MD, PhD, from the Emory University School of Medicine, will discuss his research that was funded by the NBF in 2013, "Characterization of Immunity and Tolerance Following RBC Transfusion."

Those who attend the program will also have the opportunity to reconnect with each other and network. Admission to the NBF Grant Recipients' Lecture and Luncheon requires advance registration and a ticket, which are available through the Annual Meeting registration process.

20th Annual NBF Run for Research/1-Mile Walk

The NBF hosts an annual 5K run/1-mile walk for those who want to spend a morning outside in the fresh air with friends and colleagues while supporting funding for early-career researchers. The 20th annual NBF Run for Research is scheduled to take place at Castle Island on Sunday, Oct. 14 at 7 am. Transportation will be provided to and from the event.

Registration is required and available in advance and on-site. Those who wish to preregister can do so when completing their Annual Meeting registration. The cost is $50, or $60 for those who would like a souvenir t-shirt. Some t-shirts will be available onsite, but only those who preregister are guaranteed a t-shirt in their size. Registration will also be available onsite, and preregistration packets will be available on Saturday, Oct. 13 from 9 am-5 pm at the Annual Meeting registration desk.

NBF Sleep-In for Research

Those who prefer to spend their mornings sleeping rather than taking an early-morning run can support the NBF's important work without losing any sleep, by signing up for the Foundation's newest event: the NBF Sleep-In for Research. Registration is $25 and those who choose to snooze can register in advance through the Annual Meeting registration process or on-site. Those who register will also receive a souvenir t-shirt.

NBF Council on Research and Development (CORD) Summit

This annual event designed specifically for NBF CORD and Partner member contributors is scheduled for Monday, Oct. 15 from 10 am-noon. The invitation-only meeting convenes clinical and research leaders along with industry executives to engage in critical conversations that can spark innovation, enhance the exchange of ideas and confirm priorities. The Summit's theme this year is the "Sociological Shift of Younger Donors."

NBF Reception

This invitation-only reception will take place on Monday, Oct.15, from 6-7:30 pm, to celebrate the NBF and its achievements. High-level industry executives, NBF's CORD and Partner members, board members, prior NBF grant recipients, foundation

Sean Stowell, MD, PhD

Diane Krause, MD,

Stella T. Chou, MD

Jeffrey L. Carson, MD

donors, volunteers and event participants are cordially invited to join in the celebratory reception, during which several honors will be presented.

Four former grant recipients who have completed their NBF-funded studies and earned the title of NBF Scholar will be recognized:

Yacine Boulaftali, PhD
Sarika Saraswati, PhD
Angelo D'Alessandro, PhD
Mobin Karimi, MD, PhD

The NBF will present the Dale A. Smith Memorial Award to an individual or institution responsible for groundbreaking work performed in the application of technology to the practice of transfusion medicine or cellular therapies. Since 2002, the NBF Scientific Grants Review Committee — with approval from the NBF Board of Trustees — has given the award in honor of Dale A. Smith, a longtime Baxter Healthcare executive who established the company's Fenwal Division. The September issue of *AABB News* will introduce the 2018 AABB memorial award recipients.

In addition, the reception hosts the induction of new members into the NBF Hall of Fame, to recognize how they leveraged their NBF early-career Scientific Research Grant funding into successful careers in transfusion medicine, cellular therapies or patient blood management. This year, the NBF will induct three new members into this prestigious group:

Jeffrey L. Carson, MD, received an NBF grant in 1993 for his work on the cost effectiveness of autologous transfusion. He now serves as provost at Rutgers Biomedical and Health Sciences and a distinguished professor of medicine and the Richard C. Reynolds, MD, chair in general internal medicine at Rutgers Robert Wood Johnson Medical School, both in New Brunswick, N.J.

Stella T. Chou, MD, was awarded an NBF grant in 2013 for her research into generating red blood cells from human induced pluripotent stem cells for use in transfusion medicine. Today, Chou is an associate professor of pediatrics at the Perelman School of Medicine at the University of Pennsylvania in Philadelphia. Chou practices pediatric hematology and transfusion medicine at The Children's Hospital of Philadelphia, as well.

Diane Krause, MD, PhD, received an NBF grant to study the regulation of Cd34 expression during hematopoiesis in 1997. Krause is a professor of laboratory medicine, of cell biology and of pathology at the Yale University School of Medicine; the associate director of the Yale Stem Cell Center; and the medical director of the Clinical Cell Processing Laboratory.

Advance registration is required to attend the NBF Reception, which is by invitation only. Those who make a contribution to the NBF before September 15 will receive an invitation to attend. Additional information is available on the NBF web page at *www.aabb.org/nbf*. ■

TREATING TRAUMA:

Cellular Therapies Aim to Fill a Void in Clinical Care

By Elissa Fuchs
Contributing Writer

Cellular therapies are gaining traction as promising treatments in various clinical settings. Just last year, CAR T cell therapies were approved by the United States Food and Drug Administration for pediatric acute lymphoblastic leukemia and advanced adult lymphoma. Experts expect cellular therapy treatments for graft-versus-host disease to be approved next year.

The concept of cellular therapies working to attack tumor cells, while still novel, is fairly well-accepted in the scientific community, said David McKenna Jr., MD, the American Red Cross chair in transfusion medicine and director of transfusion medicine at the University of Minnesota.

"People think of cellular therapies for treating oncology and sometimes forget about other disease targets," said McKenna. Using cell therapies in the trauma setting, he said, is not as well-established.

But these therapies hold potential in trauma care and critical care medicine because of their ability to reduce inflammation, protect cells, facilitate change in the damaged microenvironment, repair and possibly stimulate tissue regeneration and repair. And many early studies are showing potential efficacy in treating a range of traumatic injuries.

"The inflammatory response is fairly aggressive after trauma; you want to modulate this response," said Anthony Atala, MD,

of the Wake Forest Institute for Regenerative Medicine, and the W. Boyce Professor and chair of urology at Wake Forest University in Winston-Salem, N.C. "Inflammation is so strong after major trauma and it disturbs the natural balance of the body. Establishing equilibrium is very important."

Professionals are excited by these potential new treatment options for trauma care, which, they say, have lagged behind other areas of medicine. Some trauma-induced conditions that show promise for responding favorably to cellular therapies include acute lung injury, traumatic brain injury (TBI), spinal cord injury, bone trauma, burns and soft tissue damage.

"Relative to the burden of disease, trauma is the most poorly funded public health challenge in the United States today," said Shibani Pati, MD, PhD, scientific director of cellular therapies in the Department of Laboratory Medicine at the University of California, San Francisco. "If you compare trauma with diseases such as cancer or heart disease, it has received much less attention from a funding and research perspective. Many current treatments include supportive care alone." In various publications[1,2], Pati noted that trauma is the leading cause of death for individuals between age 1 and 44 and the third leading cause of death in the U.S. overall.

Pati said the public and medical community should view trauma as a more long-term condition that can worsen over time and is associated with a significant burden of survivorship. With that perspective in mind, she sees cellular therapies as a promising novel approach that can potentially mitigate short- and long-term outcomes. Immediately after the traumatic incident, bleeding control, resuscitation and coagulation are critical points to address.

One such trauma-induced condition is ARDS, which constitutes acute respiratory failure. ARDS accounts for more than **10%** of intensive care unit admissions globally

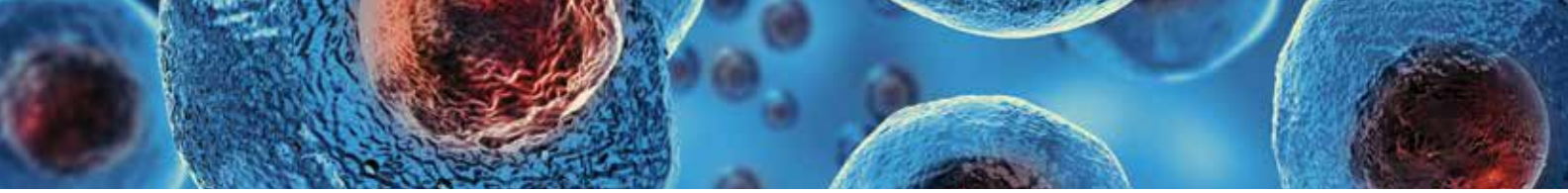
However, after hemostasis has been achieved, about a quarter of deaths occurring approximately 3 days post injury are secondary to inflammation and thromboembolic and infectious conditions. Pati believes that those who survive the initial traumatic event could have a better quality of life if these inflammatory conditions are addressed early on after injury.

Acute Respiratory Distress Syndrome

One such trauma-induced condition is acute respiratory distress syndrome (ARDS), which constitutes acute respiratory failure. ARDS accounts for more than 10% of intensive care unit admissions globally and has an approximately 30-40% mortality rate, according to an article published in the *American Journal of Respiratory and Critical Care Medicine*.[3] To date, there are limited treatments.

New options may be available in the form of mesenchymal stem cells (MSCs). Mark Matthay, MD, professor of medicine at the University of California, San Francisco and colleagues have been investigating MSCs for ARDS, and the cells have shown efficacy in preclinical studies.

MSCs are multipotent stromal cells that can differentiate into many cell types. They have multiple mechanisms that can reduce



lung injury, including inflammation reduction as well as antimicrobial effects, which cause the secretion of antimicrobial peptides and modulate the immune system. MSCs also facilitate mitochondrial transfer to the injured area, which has reduced lung injury and increased survival in animal models.

Based on these encouraging preclinical results, Matthay is examining whether bone marrow MSCs can be a safe and effective treatment for humans with ARDS. Both a phase-1 and a phase-2a clinical trial showed no safety issues.

Now Matthay is in the planning stages of a phase 2b trial, which will enroll 120 patients with ARDS. Respiratory endpoints such as oxygenation will be the primary objective of the trial.

"If the phase-2b trial shows efficacy for improvement of respiratory endpoints, our next step would be a larger, phase-3 trial that would include 800-1,000 patients," he said. "The endpoint would be mortality."

Traumatic Brain Injury

Stem cells have shown potential in the preclinical setting for TBI, but often do not translate to the clinical setting. Charles Cox Jr., MD, the George and Cynthia Mitchell Distinguished Chair in Neurosciences and children's regenerative medicine director at the University of Texas Health Science Center in Houston, believes that part of the reason for that disconnect could be that researchers have traditionally used the Glasgow Outcomes Scale, which is not sensitive enough to detect moderate improvements.

"The clinical trial design requirements are generated from a top-down approach with the Glasgow Outcomes Score," he said. "It is an easy-to-understand score, but it does not show improvements that are substantial but not necessarily miraculous."

Cox and his colleagues have been using advanced imaging and information technologies to see if autologous stem cells infused intravenously can reduce intracranial and cerebral inflammation and preserve brain function.

"Using sophisticated imaging strategies such as MRI scans, we are trying to quantify and measure those structural regions of the brain and see how much brain tissue is preserved after trauma," he said. "The more brain tissue preserved after injury, the better off the patient is."

Cox and his colleagues are ultimately looking to see how more preserved brain tissue affects neurological function.

"Patients who do not lose that much brain tissue do not have as bad a neurocognitive outcome. We have seen hints of that in early studies," he said. "If we can move patients from a brain loss to brain preservation group, how does their neurocognitive outcomes improve?"

As other experts have noted, Cox believes the anti-inflammatory properties are a major benefit for TBI treatment.

"Cell-based therapies serve to downregulate and counterbalance that pro-inflammatory response," he said. "These cells interact with immune cells to release cytokines that are a counterweight to the initial inflammatory response from trauma."

These cells can also foster growth of neural and other tissues. They may help stop secondary brain injury, which is the body's response to the initial injury. Secondary brain injury can cause injured cells to die for months or years after the traumatic event and worsen the patient's condition.

Regenerating Tissues and Organs

Perhaps the cellular therapies treatment the farthest out on the horizon is the act of creating new tissues and organs. But even that has become more likely with new research.

Regenerative medicine, which the National Institutes of Health defines as the process of creating living, functional tissues to repair or replace damaged tissue or organ function, is becoming a key part of treating patients after trauma.

Wake Forest's Atala and his colleagues are involved in clinical trials in which trauma patients receive new skin, blood vessels and even muscle after a traumatic event. Post trauma, a biopsy of the patient's cells at the site of injury (i.e., skin cells for a burn injury) are extracted and built outside the body.

"Once you take the cells, you expand them outside the body. You build a three-dimensional structure using scaffolds or three-dimensional printing capabilities," he said. "Then you let the cells mature in the right conditions — the same temperature, same oxygen content — and eventually implant them back into the patient."

He likened the process to baking. "To repair substantial defects is like baking a layer cake," he said. "It is like putting these cells on top of each other, one layer at a time, and mature them in an incubator until the final product is ready."

Of course, some cakes are easier to bake than others. "Skin is the least complex," Atala said. "Flat structures are the least complex to build." He said that tubular structures, such as blood vessels, are more challenging because of their shape and need to remain open. Organs like the stomach and bladder are even more difficult, on account of their shape and

interactions with other organs.

"And solid organs, like the heart, liver and kidney, are the hardest because there are so many more cells, and blood flow becomes an issue to keep these cells alive," Atala said.

Atala emphasized that regenerating tissues and organs is still in the research stage with early human clinical trials, but said the field could offer a lot of advantages over current treatments, such as transplantation.

"Transplantation has been great for medicine, but patients have to wait for an organ to be available, and there is a major organ shortage right now," he said. "Once you do get the organ, there is a chance for rejection, and you have to keep the patients on anti-rejection medications."

Challenges on the Horizon

While cellular therapies for trauma care are certainly showing promise, there are a number of issues that stand in the way of moving these treatments through the clinical trials process and into mainstream medicine.

For one, efficacy trials are costly and logistically complex, according to Cox. "All of these cellular therapy projects are difficult and expensive to execute, and acute care interventions that require a huge logistical set-up are tough to conduct," he said.

Other experts agree with him. In an article published in the *Journal of Tissue Engineering*[3] last year, the authors surveyed various cellular therapies stakeholders and found that "the logistics involved in product collection, storage and delivery, which may require maintenance of sterility, can be complex in a health care environment." Other obstacles identified in the article include efficacy, regulation and cost-effectiveness.

But one of the biggest challenges is manufacturing the cells.

"The complex nature of biomanufacturing and distribution processes, and the associated costs, have been highlighted ... as a key reason for the need for these treatments to demonstrate their superior efficacy over current treatments in order to successfully enter the marketplace," the authors wrote.

And having high-quality cells for the clinical trials setting — and beyond — is critically important, said Pati.

"There is a real dearth of quality cells," she said. "No matter how strong your trial is, it does not matter. Your cell product is everything."

Ensuring consistency among the cells is also important, according to Matthay.

"A challenge in translating MSCs to clinical use in ARDS is the issue of batch-to-batch MSC heterogeneity," wrote Matthay and his colleague John Laffey, MD, MA, in the *American Journal of Respiratory and Critical Care Medicine*[4] article. "Although cell donors are extensively screened ... other donor-related variables, such as age, may be important."

While further research is necessary to answer this question, the demand for high-quality cells presents a great opportunity for AABB members, said University of Minnesota's McKenna.

"There are a lot of members with evolved cellular therapy labs," he said. "They could play a huge role in manufacturing these cells from start to finish. And blood centers — with all their technical, medical and regulatory frameworks already in place — could collect stem cells and cord blood and send these raw materials to other laboratories."

McKenna also sees AABB members becoming more involved as these treatments eventually reach the patient's bedside.

"The treatments will be administered in hospitals, with the hospital transfusion service infusing the therapy in the patients," McKenna said. "I see a huge role for our membership in administering these therapies and helping advance this emerging field of medicine."

AABB Pre-Meeting Workshop on Cellular Therapies for Trauma

People who are interested in learning more about cellular therapies in the trauma care setting may want to consider attending a one-day workshop on this topic on Oct. 12 in Boston, one day before the 2018 AABB Annual Meeting starts. "Cellular Therapies in Trauma and Critical Care" will examine how cellular therapies can be tested to treat trauma and critical care conditions. Experts will discuss novel products and their applications, as well as cell manufacturing, regulatory challenges and production needs. More information is available at aabb.org > Annual Meeting > Pre-Meeting Workshops.

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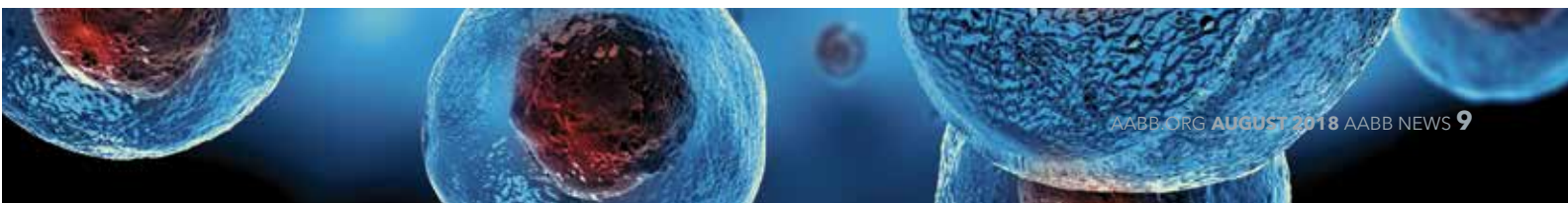

Highlights of the Upcoming 2018 AABB Annual Meeting

The 2018 AABB Annual Meeting, to be held Oct. 13-16 in Boston, is rapidly approaching. Once again, this year's meeting will be the preeminent gathering for professionals in the fields of transfusion medicine, cellular therapies and patient blood management.

The 2018 Annual Meeting will feature three pre-meeting workshops, 140 educational sessions and 650 scientific and administrative abstracts. In addition, AABB's signature event will once again offer a variety of scientific sessions highlighting the latest data in the field, in-depth discussions about some of the most important topics affecting the industry, on-site confirmation of CME/CE credits, unparalleled opportunities for networking with like-minded professionals from throughout the world, an exhibit hall featuring state-of-the-art products and services from industry partners, a presentation from an inspiring keynote speaker, and the bestowal of AABB's Memorial Awards to leaders who have shaped the field.

For more information about the 2018 AABB Annual Meeting, visit AABB's Annual Meeting website at www.aabb.org/annual-meeting and the AABB Annual Meeting blog at www.aabb18.org.

Below is a preview of just a few of the Hot Topic Sessions that will be offered to attendees at the 2018 AABB Annual Meeting:

BLOOD PRODUCTS: TIME TO CONSIDER THE INFLAMMATORY SIDE

Blood product transfusion is one of the most vital treatments in medicine and surgery. Even though blood transfusion is very safe, we can still observe residual clinical manifestations associated with inflammation. One hypothesis proposes that the method used to collect, process and store blood products may be behind immunomodulatory and inflammatory complications of transfusion (e.g. bioactive substances, microparticles, DNA mitochondria, DAMPS). Moreover, a more integrated approach to donor attributes, transfusion products and recipients could help explain these effects. Transfusions contribute to inflammatory clinical manifestations; however, a patient's inflammatory status can induce different reactions to transfusion. This session aims to update knowledge and present evidence of the relationship between the transfusion of blood products (platelets, red blood cells) and inflammation in recipients. Transfusion and inflammation are in close relationship, and it is therefore time to consider the inflammatory side of blood products.

Chair: **France Pirenne, MD, PhD**

Speakers: **Eldad A. Hod, MD; Fabrice Cognasse, MD**

TRANSFUSION MEDICINE, HEMOSTASIS, APHERESIS AND CELLULAR THERAPY REVIEW SESSION FOR TRAINEES

Transfusion medicine, hemostasis, apheresis and cellular therapies have been identified as challenging topics for both the examinees attempting the American Board of Pathology examination and pathologists in clinical practice. Additionally, these are important topics for physicians in other specialties, such as hematology and anesthesiology. Moreover, the topics for these areas overlap, and thus a strong foundation in one area may enhance the knowledge in the other. In this session, using a Q&A format, authors of many chapters in the "Transfusion Medicine, Apheresis, and Hemostasis: Review Questions and Case Studies" board review book will review 25-30 clinical cases with the session participants, from basic to challenging situations. The cases are designed to cover "high-yield" material and "diagnostic pearls" that may be useful to residents and fellows taking both Clinical Pathology and Transfusion Medicine board exams. For example, speakers will review basic regulation and donor qualification criteria and discuss common pre-transfusion testing and transfusion practice in both adult and pediatric patients. The session will also review different technical and indications/aspects

of apheresis, as well as hematopoietic progenitor cell collection. Finally, speakers will provide common calculations in the daily practice of transfusion medicine, hemostasis, apheresis and cellular therapies.

***Chair*: Huy P. Pham, MD, MPH**

***Speaker*: Lawrence Albert Williams III, MD**

TRANSFUSION CONFUSION: WHAT TO DO WHEN THE GENOTYPE DOES NOT MATCH THE SEROLOGIC PHENOTYPE

DNA extracted from EDTA blood is being used to obtain the molecular genotype that predicts what blood group antigens will be expressed on the patient or donor red cells. We are learning, however, that there can be molecular changes that alter the expression of the predicted antigens. Often these discrepancies are discovered only after blood has been found incompatible in the crossmatch. The standard for finding compatible blood has historically been based upon serologic testing; however, interest is increasing for using the genotype alone to select blood for transfusion. Apparent discrepancies and incompatible crossmatches are confusing and may cause a delay in the provision of blood. This program will describe cases where there are discrepancies and help guide the blood bank technologist on the selection of blood when there are discrepant testing results.

***Chair*: Gregory Ray Halverson, MT(ASCP)**

***Speakers*: Christine Lomas-Francis; Jill Storry, PhD, FIBMS**

MANAGEMENT OF PERIOPERATIVE COAGULOPATHY: ARE THERE ALTERNATIVES TO PLASMA TRANSFUSION?

Many clinicians struggle to manage stable, non-bleeding patients with peri-procedural — or "laboratory-defined" — coagulopathies. While it has never been proven that the use of common screening tests such as the PT/INR are predictive of bleeding, it is common clinical practice to utilize plasma transfusion or coagulation factor concentrates as a means of "correcting" elevations in these values prior to performing procedures. Pathologists and other specialists overseeing the transfusion service are often actively consulted regarding appropriate plasma transfusion. This session will briefly review the literature related to perioperative coagulopathy management and when/if it is necessary. The session will also provide a review of key properties of plasma transfusion and of its effects on common screening tests, such as the PT/INR. To facilitate ease of use during bedside clinical practice, an innovative web-based calculator will be described and its usefulness demonstrated using actual clinical cases in this session. Finally, the usefulness of alternative methods for directing management, such as coagulation factor concentrates or thromboelastography/rotational thromboelastrometry, will be discussed.

***Chair*: Huy P. Pham, MD, MPH**

***Speakers*: Thorsten Haas; Huy P. Pham, MD, MPH; Edward Wong**

EXTENDING THE STORAGE OF BLOOD PRODUCTS

Transfusion medicine providers struggle with maintaining an adequate inventory, especially for blood products with a short shelf-life. Cryoprecipitated anti-hemophiliac factor, or cryoprecipitate, must be used within six hours of thawing for single units or units that were pooled using a sterile connector, and within four hours after thawing for units that were pooled in an open system. This mandated short shelf-

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140

educational sessions and

650

scientific and administrative abstracts.

life and these thawing requirements often result in a delay in administration, and unused cryoprecipiate is often discarded. Speakers will evaluate data on the stability and sterility of extended shelf-life cryoprecipitate. Platelets are only stored for five to seven days before they must be used or discarded. Data regarding the shelf-life and in vitro characteristics of cold-stored platelets will be summarized. Clinical evidence of their superior hemostatic function, particularly for trauma patients, will be discussed. Extended storage RBCs have already been developed. Questions of how best to use extended storage capacity have arisen. Blood collectors may also want to consider an overnight warm hold to consolidate component preparation to a single day shift to reduce costs. Critical care physicians may want blood with better recovery, limiting exposure to non-transferrin-bound iron. Remote locations may want longer storage.

***Chair*: Aaron Tobian, PhD, MD**

***Speaker*: Parvez M. Lokhandwala, MD, PhD**

MEN WHO HAVE SEX WITH MEN: THE COMPLEXITY OF COMPLIANCE

In 2016, the FDA guidance on "Revised Recommendations for Reducing the Risk of Human Immunodeficiency Virus Transmission by Blood and Blood Products" permitted MSM to donate as long as their last sexual encounter was more than 12 months earlier (formerly not permitted if "since 1977"). Version 2 of the AABB DHQ and related materials included all changes in the guidance. Many countries with 12-month deferrals are interested in further modifying their policy, either to a shorter deferral period — such as the recent change to three months in England — or to an individual risk assessment approach, in which low-risk MSM may be eligible to donate blood. There is increasing evidence that the success of such policies depends on how well donors comply with the deferral. In this session, the AABB Donor History Task Force and the International Society for Blood Transfusion's Transfusion-Transmitted Infectious Diseases Working Party will present the latest research and policy updates on this issue from throughout the world.

Chair: Sheila O'Brien

***Speakers*: Brian Custer; PhD; Eammon Ferguson, PhD; Yves Grégoire, MSc**

DISASTER POTPOURRI: WHAT DOES IT TAKE TO HAVE AN EFFECTIVE BUSINESS CONTINUITY PLAN?

The number and variety of disasters increases each year. Previously, we thought of disasters in terms of natural events such as hurricanes, earthquakes and floods. However, the number and type of these natural events have increased, with the addition of wild fires, mud slides and weather bombs. In addition, the types of disaster have increased to include mass shootings, bombings and the threat of a nuclear disaster — which can no longer be ignored. Even attacks on IT systems, through hacking and the release of destructive computer viruses, can cause irreparable harm. Are we prepared to address these disasters and attacks? Come learn what AABB, the U.S. government and one blood center are doing to prepare for some of these new threats.

***Chair*: Marc James Pearce, MBA**

***Speaker*: John B Holder, MTS, CISM, CISA, ITILF V3**

2018 AABB Annual Meeting to Feature Shawn Achor as Keynote Speaker

By Jay Lewis, MPH
Director of Communications

AABB is pleased to welcome Shawn Achor as the keynote speaker for its 2018 Annual Meeting. Achor is one of the world's leading experts on happiness research and positive psychology. His work traces the links between happiness and success and seeks to examine the often overlooked science of human happiness.

Achor has achieved widespread acclaim for his research and his ability to translate it to a broad audience. He is a bestselling author whose books include *Big Potential, The Happiness Advantage* and *Before Happiness*. His TED talk, The Happy Secret to Better Work, became one of the most widely viewed in the genre, with more than 16 million views. In addition, Achor and his work were the subject of a two-hour program with Oprah Winfrey in 2014. He has also been showcased on PBS programming.

Achor earned a Bachelor of Arts degree from Harvard University and a Master of Arts degree in Christian and Buddhist Ethics from Harvard Divinity School. After completing his education, he remained at Harvard, where he served as a teaching assistant and lecturer, winning more than a dozen distinguished teaching awards and delivering some of the most popular lectures on campus.

Achor is also the founder of both GoodThinkInc and the Institute for Applied Positive Research, where he works with expert researchers, speakers and trainers to "bridge the gap between academic research and the real world."

Linking Happiness and Success

AABB News spoke recently with Achor about his research and his plans for the upcoming AABB Annual Meeting.

Achor stressed that although many people believe success will lead to happiness, his research indicates the exact opposite is more likely to be true. "Our formula for pursuing success is backwards," Achor told *AABB News*. "Success doesn't lead to greater levels of happiness, but greater levels of optimism and happiness correlate with significantly higher levels of successful outcomes."

Achor said he hopes his work can help teach people to translate positivity into success for themselves. "I'm hoping that my research will help show how we are not victims of our genes and our environment, but that mindset and happiness can be a conscious choice if paired with daily habits akin to brushing our teeth or showering."

Happiness as a research subject is one that Achor believes deserves more focus and respect. "We overlook happiness because it seems soft," he said. "Of course, we rigorously measure depression and anxiety and even medicate based on these. So why can't we use that same research to look at the other end of the spectrum and learn from those who have created happiness or social connection?"

Achor noted his research is particularly applicable for those in the health care field. In fact, he highlighted that about one-third of his research has focused on health care. "This research is crucial in the health care space," he said.

Shawn Achor

"There is so much change in the political and economic space, which can wear down our own emotional immune system. In my talks, I differentiate happiness as pleasure from happiness that can occur even when life is challenging or displeasurable – and how to inoculate your mindset so that you can create a positive ripple effect outward."

The link between happiness and long-term health outcomes is also of deep interest to Achor and a topic that he hopes to continue to study. "It is crucial because social connection and positive mindset have such a massive impact upon long-term health outcomes," he said. "We can't just fight the negative; we need to *create* the positive."

Don't miss Achor's keynote speech at the 2018 AABB Annual Meeting. His speech will be part of the General Session, which will be held on Saturday, Oct. 13 from 3:30-5 pm.

ON THE FRONT LINES

In the Aftermath of a Mass Casualty Event

By Jerilyn Schweitzer, MA
Managing Editor

Mass casualty events may be the most harrowing experiences that those working in blood banking and transfusion services will ever face. Such events typically happen without warning and require the rapid transport of blood — especially type O and O-negative for patients with unknown blood types — to the hospitals where the victims are taken. In such times of crisis, information can be scarce or contradictory. Recent years have seen mass shootings and bombing attacks that have injured dozens — and in some cases hundreds — of victims. While facts and figures, like the number of units transfused, are easy to find, first-hand perspectives of what it was like to work through the aftermath of a mass casualty event are much less common. AABB News spoke with a few individuals who worked on the front lines during this type of crisis. Their stories are presented here.

Boston Marathon Bombing

On April 15, 2013, a few minutes before 3 pm, two bombs exploded near the finish line of the Boston Marathon. Three individuals were killed and 264 were injured.

Jim Caron, a transfusion medicine supervisor at Boston Medical Center, told *AABB News* that he heard about the bombings when a blood bank employee called him from her car shortly after the explosions, to let him know. It was almost time for a shift change; Caron asked his colleagues to stay at work as they prepared for the influx of patients.

The blood bank has two campuses, a larger one where Caron was working and a smaller one closer to the Boston Medical Center Emergency Department, which has fewer staff members and a more limited inventory. Caron called the smaller blood bank and told the staff to set up emergency release boxes. He also immediately moved two people to the smaller campus and loaded boxes with red blood cells and thawed AB plasma to ship to that blood bank.

Within two minutes of the original call, Caron said the blood bank got the call for a phase B disaster. "Available inventory for the immediate and ongoing is always the concern at this point," he said. "An employee at home called in to get inventory counts. She realized we would need more platelets." She recognized that the local supplier would be overwhelmed with requests, so she contacted the Rhode Island Blood Center (RIBC) for assistance. "She then drove to RIBC to retrieve the supply of platelets.

Caron said that the blood center had already run several practiced drills, so he felt comfortable running the emergency plan during an actual mass casualty event. "During the drills and exercises, you always think, 'What's next? Think ahead. What could happen next? What would you do?'"

The worst-case scenario called for employees to work 12-hour shifts, on and off, for several days. "An off-site staff person contacted other staff to start figuring out in-and-out schedules if needed, so people would be replaced a few hours apart and not all at once at the 12-hour mark, as that would cause chaos," said Caron.

Once the blood began reaching the emergency department, products meant for one patient were frequently given to other patients with more severe injuries. As a result, the blood bank's tracking ability was affected, although it did continue constantly thawing and moving products to where they were needed.

"As a long-time blood banker," Caron said, "my instinct was to jump in to thaw, process and crossmatch the blood. However, I had to keep reminding myself that one person must be in charge and watch the bigger picture." Because Caron was not involved in any direct patient product needs, he had a good perspective to coordinate where staff and products were sent.

When asked about his take-away from the experience, Caron said, "You have a plan, follow it. If you deviate from your plan because you panic, it's downhill from there." He added that following the chain of command and having an actively involved medical director were also crucial.

Caron said that because of the incident, the blood bankers developed a better understanding of how the ER operates, which has led to better transitions of blood products. "We also came to a better understanding of mass casualty events and who best to hand out blood in those scenarios. Policies are now in place to take a large box of blood to the ER and hand products out when staff are available. This will lead to better tracking and availability," he concluded.

Florida Mass Shootings

Over the past two years, Florida has experienced several mass casualty events. The Pulse Nightclub shooting in Orlando, in which 49 people died and another 58 were injured, occurred June 12, 2016. In another mass shooting about six months later, a gunman shot and killed five people and injured six others at the Fort Lauderdale-Hollywood International Airport. Then on Feb. 14 of this year, the shooting at Marjory Stoneman Douglas High School resulted in 17 deaths and injuries to another 17 people. *AABB News* recently spoke to Susan Forbes, vice president of marketing and communications for OneBlood, about the experience of working through these crises.

The Pulse Nightclub shooting occurred on a Sunday night during the third shift, according to Forbes. OneBlood had recently implemented a new business continuity plan with several possible scenarios, Forbes told *AABB News*, and the organization had already held drills for a few of them. As a result, she said, the team was familiar with the plan and prepared to swing into action. The third-shift team working in distribution that night began

packing hundreds of additional units of blood to be rushed to the trauma center, Forbes said. From that point on "a domino effect started taking place and it was 'all hands on deck,'" said Forbes.

The trauma center transfused an unprecedented 441 units of blood to the victims in the first 24 hours. OneBlood had sufficient blood on-hand to meet the immediate needs. Other blood centers also offered to provide blood products to help replenish the depleted blood supply.

Meanwhile, as the frontline team was encountering a massive donor surge. The biologics team was working around-the-clock to process all the blood coming in. Within seven days of the shooting, the blood center had collected 28,500 units of blood. Eighty-five percent of that blood was distributed to more than 200 hospitals in the region by the following Wednesday.

In addition to the issue of physically processing such a large amount of blood, the biologics team also had to process the event emotionally, and that soon became more personal when they learned that one of their colleagues had died in the shooting. "It was devastating and heartbreaking. People were crying and working and crying and working," said Forbes. She described a remarkable effort by her colleagues, many of whom worked through the night.

The significant number of donors spontaneously showing up also required that OneBlood present a unified message to the public and monitor its response through social media. OneBlood was able to provide consistent messages by having only two authorized spokespeople, Forbes and her colleague Pat Michaels, and by releasing messages through the media, the OneBlood website and social media. One of the most critical messages they conveyed was the immediate need for donors with types O-negative and -positive blood and AB plasma.

In addition to providing information to the media, there were also times when OneBlood had to respond to incorrect information, including a rumor that FDA had lifted its deferral policy for men who have sex with men (MSM).

The need for blood made headlines again after the Marjory Stoneman Douglas High School tragedy and the Fort Lauderdale airport shooting. Within minutes of each event, the OneBlood distribution team was en route to the hospitals with additional blood, and donors once again began lining up to donate.

A crucial lesson from these tragedies is that the public needs to know — and blood centers publicize — the critical need for a ready blood supply before a mass casualty event occurs, said Forbes. OneBlood produced a documentary, *Lifeline: The Untold Story of Saving the Pulse Survivors*, that conveys this message. Lifeline contains interviews with some of the donors who donated just days before the tragedy and brings them face-to-face in an emotional reunion with the Pulse survivors they helped save.

Paris Bombing and Shooting Attacks

France has a national transfusion service that manages the blood supply throughout the country. This is done through regional establishments, which sends blood products directly to the hospital departments where they are needed with no need for an intermediary.

AABB News spoke with François Toujas, CEO of French's national transfusion public service, the Etablissement Français du Sang (EFS), about how the agency responded to the mass casualty events of Nov. 13, 2015, which included bombings and shootings at multiple locations throughout Paris. On that Friday night, 130 individuals were killed and hundreds more injured.

Although the EFS had an emergency plan in place and had conducted practice drills, Toujas said that "one is never comfortably prepared for such a crisis." Even with a plan in place, it is impossible to anticipate every possible scenario. Very early on, and as the attacks were still ongoing, the EFS experienced a limited but unforeseen difficulty transporting blood and personnel in the chaos of the ongoing crisis. Regarding personnel, this was especially true for the hospitals that were in close proximity to the attack sites. There were also challenges obtaining accurate and verifiable information as the crisis unfolded, said Toujas, and a massive influx of donors and blood donations complicated the situation further.

According to Toujas, the EFS had little difficulty overall staffing the hospital blood banks — other than a brief 1- to 2-hour delay Friday evening to fully staff the hospital immediately adjacent to the main terrorist attack location, Hôpital St. Louis. Throughout the Saturday and Sunday following the attacks, the EFS made adjustments at both the national headquarters and the local Paris regional center to better respond to the crisis and to continue maintaining the organization's "standard" day-to-day activities.

Toujas said the EFS's position as a single organization managing virtually all of the nation's blood supplies — including blood products stocked in hospitals — was a major advantage during the crisis. In fact, the EFS' nation-wide blood rotation process resulted in a very small number of outdated blood products. As a result, the EFS was able to maintain both the overall national availability of blood and to respond to the immediate blood needs of the patients injured in the attacks. One factor that worked in the EFS's favor was that the main crisis zone was close to several major Paris hospitals, so critical patients could be very quickly transferred to the hospital and transfused.

The EFS faced some unexpected issues, including challenges transporting blood and personnel, as well as delays in patient identification, which increased the risk of misidentifying patients and overusing type O blood. Another issue resulted from people who wanted to donate blood immediately after the attacks. A massive influx of donors necessitated a major increase in processing blood products. In addition, prospective donors flooded the phone lines, which in turn disrupted ongoing activities. Finally, the EFS had difficulty communicating information about blood needs to the public. "We tried to tell donors 'We do not need you now, but we do need you tomorrow,'" said Toujas.

The EFS has made a few changes as a result of this crisis. The large influx of donors proved to be a greater problem than anticipated, so the EFS has worked to improve donor messaging and management in the aftermath of a mass casualty event. In addition, the EFS adjusted its inventory management structure to make it easier to restock blood supplies — including freeze-dried plasma, which can be available immediately — and to adapt stock based on planned mass gatherings. The EFS has also strengthened communications with hospitals and local health authorities to improve collaboration during a crisis.

Las Vegas Music Festival Shootings

The Route 92 Harvest music festival was in full swing on the Las Vegas Strip the night of Oct. 1, 2017, when a gunman began firing on the crowd. By the end of the attack, 59 people were killed and more than 500 were injured. Erik Hill, regional director of United Blood Services (part of Blood Systems), discussed the experience of working through this mass casualty event with *AABB News*.

Hill was at home that Sunday night when his wife told him there were reports of a shooting at the concert, and he turned on the news as the story developed. Hill said his first thoughts were about the safety of the thousands attending the concert. When reporters began announcing that there were multiple shooting victims, he called the hospital services team to make sure they were aware of the situation. They had already begun contacting hospitals to ask what blood products would be needed.

United Blood Services' plan for responding to mass casualty events focuses on communicating with area hospitals to meet their blood needs and transporting blood products to places with limited access. The team had received training on the plan, which involved numerous people both locally and throughout the 28 states served by Blood Systems. "The local managers were in constant communication and came to work in the middle of the night," said Hill. "Our donor care managers called their teams immediately, first to check that they were safe and then to ask them report to work." The hospital services manager also arrived to manage the increased deliveries.

The blood center stayed in constant contact with area hospitals, according to Hill. "Personally, I spoke with the lab director of our level 1 trauma center nearly every hour to make sure they had all needs met."

Hill and his colleagues also stayed in constant contact with the Las Vegas mayor's office and the police department, so they could provide feedback on messaging to the public. United Blood Services also received assistance from outside of Las Vegas. Blood Systems national office staff prepared to ship additional products. Blood Systems' president of Blood Services, Robert Van Tuyle, drove from Scottsdale, Ariz. to Las Vegas to provide local support.

"Our donor care managers called their teams immediately, first to check that they were safe and then to ask them to report to work."

Hill noted the surge of people wanting to donate blood after the tragedy was almost overwhelming. "We were not prepared to handle the huge influx of blood donors that wanted to immediately help," Hill explained. "The parking lot of our main location already had 40 cars waiting in it at 2 am." The donor center was not scheduled to open until 7 am Monday morning, but staff began arriving in the middle of the night and continued drawing blood until 10 pm that evening. According to Hill, there was no way to meet the outpouring of support that continued through the following week. "At points there were more than a thousand prospective donors waiting," added Hill.

To deal with the influx of donors, blood center staff made other adjustments, as well. They opened a collection center that had been scheduled to be closed on Monday and moved multiple mobile collection busses to the level-1 trauma hospital. United Blood Services received more external support when employees from other Blood Systems locations flew in to assist for the next four weeks.

The blood center had to change its messaging to the public after being overwhelmed by such an immense number of prospective donors. Instead of showing up right then and there to give blood, donors were asked to schedule a donation during the next few months. "That evening," said Hill, "we checked and every available appointment at our three Las Vegas centers had been filled through late November."

In addition to the survivors and the public, the shooting proved to be emotionally difficult for blood center staff, as well. Hill said he did not learn the extent of the tragedy until Monday morning at 9 am, when a group of police officers arrived. "I can't say I truly held my emotions in check," admitted Hill. "I hugged donors who had come directly from the concert. I cried with them. Many of our staff would take time to find a quiet space to try and deal with the high level of emotion we were all experiencing."

Hill said he is proud of the overall response of the entire Blood Systems family. "We had a great plan that was well executed in assisting hospitals, a great plan on reaching our staff, but we are continuing to work on our plans for blood collections," concluded Hill. ■

New Ways to Treat Bleeding In the Field

Smartphone App Teaches Bystanders to 'Stop the Bleed'

During an emergency, bystanders are often called upon to take action before professional help arrives. The Uniformed Services University's National Center for Disaster Medicine and Public Health recently released a complimentary "Stop the Bleed" app for iPhone and Android that provides basic instructions on identifying and stopping serious bleeding and potentially saving a life. In an emergency, bystanders can open the app to find step-by-step instructions on what to do — including in audio format that leaves the bystander's hands free to apply pressure. Available on Google Play and iTunes, the app also offers a five-minute video, a Q&A section, a quiz and other resources. "Stop the Bleed" is a White-House launched campaign supported by several government and nongovernmental groups to encourage bystanders to act in a bleeding emergency. Uncontrolled bleeding currently accounts for 40% of trauma-related deaths in the world, and the app can empower a bystander to take action in the crucial first moments before help arrives that can determine whether a victim lives or dies. The program is also available online at https://stopthebleed.usuhs.edu/.

FDA Grants Authorization for Military Use of Freeze-Dried Plasma

The Food and Drug Administration granted an emergency use authorization (EUA) to the Department of Defense (DOD) that permits the use of pathogen-reduced leukocyte-depleted freeze-dried plasma (referred to in the EUA as French FDP) to treat hemorrhage or coagulopathy in U.S. military personnel in combat settings where plasma is either unavailable or impractical for use. The French FDP, a powdered, freeze-dried product manufactured by the Centre de Transfusion Sanguine des Armées that can be reconstituted and used in place of fresh or frozen plasma, eliminates the need for refrigeration or long thawing periods. The EUA is the result of collaboration between FDA and the DOD to prioritize the efficient development of safe and effective medical products intended to help save the lives of American military personnel.

16th International Cord Blood Symposium:
Cord Blood and Perinatal Tissues Provide New Directions for Regenerative Medicine

By Kerri Wachter
Staff Writer

Umbilical cord blood (UCB) transplant has been an important treatment option for patients with hematologic malignancies, other blood disorders or immune diseases for decades. The last decade has seen increased growth in the investigation of cells derived from UCB and other perinatal tissues — like the amnion, chorion and cord itself — as regenerative medicine treatments for an impressive number of diseases and injuries. Alternative uses for these cells were highlighted throughout the 16th International Cord Blood Symposium, held in San Diego in June. Treatments for pediatric neurologic diseases, wound healing and autoimmune disorders showcase the spectrum of research.

Pediatric Neurologic Diseases

Cerebral palsy is a group of heterogeneous movement disorders that stem from in utero or perinatal brain injury. While clinical trials have shown functional improvements associated with UCB infusion, it appears that the mechanisms are likely different than for UCB transplantation. UCB cells can work through paracrine and trophic mechanisms to help endogenous cells heal brain tissue damaged by disease or injury, according to Joanne Kurtzberg, MD, who is the Jerome S. Harris Professor of Pediatrics at Duke University; chief scientific officer of the Robertson Clinical and Translational Cell Therapy Program; and director of Carolinas Cord Blood Bank.

In one session, Kurtzberg discussed current research on UCB-based approaches to treating children with brain conditions/disorders, like hypoxic ischemic encephalopathy, cerebral palsy and autism. These treatments are based on observations from studies using unrelated donor UCB transplantation to treat children with certain inherited metabolic diseases.

Research suggests an association between cerebral palsy and inflammation. Not only are UCB cells thought to decrease inflammation, but they also promote neurogenesis and oligodendrocyte proliferation. Oligodendrocytes are responsible for forming the myelin sheath that surrounds axons and helps to speed electrical impulses along nerve fibers in the brain. All of these activities help form new connections in and around damaged areas in the brain and restore function, according to Kurtzberg. These mechanisms mean that it is not necessary for UCB cells to engraft and remain in the brain.

In the double-blinded Duke study, children 1 to 6 years old with spastic cerebral palsy were randomized either to receive an infusion of autologous UCB and then crossed over to a placebo infusion (n=32) or to receive placebo with crossover to UCB infusion (n=31).[1] Researchers assessed the children at baseline and at 1 and 2 years post-treatment for changes in motor function. Brain connectivity was assessed using MRI at the same time points. The primary endpoint was change in motor function 1 year after baseline infusion.

At 1 year, the researchers observed no differences in gross motor function between children receiving cord blood or placebo. However, they did detect a dosing effect, which showed that patients who received doses ≥2×10^7/kg had significantly greater increases in motor function above those predicted by age and severity using two validated measures. They also noted normalized brain connectivity on imaging tests. These findings suggest that appropriately dosed cord blood infusion improves brain connectivity and gross motor function in young children with cerebral palsy.

Kurtzberg and colleagues have also been investigating the use of autologous UCB cells in young children with autism spectrum disorders (ASD). Autism is considered by some to be a complex group of disorders with a number of potential causes, and researchers have identified brain

connectivity defects in individuals with ASD. UCB cells may act favorably in autism for two reasons. First, they may help restore more normal connectivity, as suggested in animal models and pilot studies.

Second, UCB contains populations of cells that are precursors of microglial cells. In the case of children with leukodystrophies, these cells are known to migrate to and engraft in the brain. While it is unclear if this is happening in the brains of individuals with ASD, it is potentially one path through which they might work.

Early results of autologous UCB infusion in children with ASD have shown improvements in socialization.[2] In an open-label phase-I study, 25 children from 2 to 6 years with ASD received a single intravenous infusion of autologous UCB. Researchers observed significant increases in socialization scores on validated measures, said Kurtzberg. They also found that children with greater baseline IQ scores had greater responses following infusion. No safety concerns were identified.

Results are expected in late 2018 for a randomized double-blind study comparing autologous or allogeneic unrelated UCB in 180 children ages 2 to 7 years with ASD. Change in social communication at 6 months is the primary outcome.

Wound Management

Wound healing is a complex process involving multiple phases and interactions between different blood cells, extracellular matrix components, and growth factors and cytokines. With the capacity for self-renewal and multi-lineage differentiation, mesenchymal stromal cells (MSCs) have been shown to enhance cutaneous wound healing. MSCs are believed to work through paracrine signaling to accelerate wound closure, increase angiogenesis, minimize wound inflammation, regulate extracellular matrix remodeling and promote regeneration of normal skin architecture and function.[3]

However, their regenerative capabilities decline with donor age, limiting the autologous applications of MSCs for chronic wound healing in an aging population, said Chijioke Magadugwulike, MD, senior manager of medical and clinical affairs at Osiris Therapeutics, Inc. Cryopreserved placental tissue (amnion/chorion/umbilical) offers a way to deliver young potent MSCs directly to chronic wounds. Placental tissue has a long history of clinical use in areas such as wound care and burn treatment. Fresh placental tissue is naturally anti-inflammatory, anti-microbial, anti-scarring, anti-adhesion and angiogenic. In addition, placental tissue includes structural extracellular matrix components, naturally occurring cells, and growth factors, cytokines and other mediators — all part of the wound healing process.

To retain these properties in the wound-healing setting, tissue integrity must be preserved. Osiris has developed two viable cryopreserved placental product lines — Grafix and Stravix — using proprietary cryopreservation technology. Grafix is sourced from placental membranes, while Stravix is sourced from cord tissue. Shelf life is 2 and 3 years for Stravix and Grafix respectively, said Magadugwulike. These products are intended for homologous use as wound covers, tissue wraps or barriers for external and internal acute and chronic wounds and soft tissue repair.

Several clinical studies have demonstrated wound closure and granulation in simple and complex wounds without the need for concomitant therapies such as negative pressure wound therapy. Studies show that Grafix can effectively treat diabetic foot ulcers, with fewer adverse events than standard treatments. In one open-label RCT of Grafix for the treatment of complicated diabetic foot ulcers, complete wound closure occurred in 59% of 31 patients at an average of 9 weeks. In addition, at 4 weeks the average reduction in wound area was 54% and at 16 weeks it was 92%.[4]

These products can be used for many types of wounds — both chronic and acute — and for internal and external body locations; over exposed deep structures; for patients with a glucated hemoglobin of 14 g/dL (important for diabetic wounds) and wounds older than 1 year; and for patients with multiple comorbidities. Fewer adverse events and hospitalizations may translate into lower costs, as well.[5] Additional research suggests that both products may be useful for fistula closure, reconstructive procedures, keloid scars, tendon and nerve repair, as an adjunct to skin grafts/flaps and radiation wounds.

Systemic Lupus Erythematosus

With the potential to affect almost any organ, a widely variable prognosis and a menu of standard therapies with potentially serious side effects, systemic lupus erythematosus (SLE) is a particularly challenging disease to treat.

"We do have drugs that patients respond to, but there is still a large percentage of patients who do not respond, and these drugs are relatively toxic," Gary Gilkeson, MD, said in an interview. Gilkeson is a professor of medicine in the Department of Microbiology and Immunology at the Medical University of South Carolina (MUSC). He discussed the potential of MSCs for treating SLE. "So the big goal is to find treatments that are not as toxic, especially because most of the patients are young women in their childbearing years," he said. "We want to avoid drugs that may affect their fertility."

Cord tissue-derived MSCs are under active investigation as a treatment for autoimmune diseases, such as SLE. "Prior studies have recognized for a few years that MSCs have prominent immune suppressive ability," said Gilkeson. In fact, MSCs were first used clinically to treat acute graft-versus-host disease following allogeneic hematopoietic stem cell transplant and have since been investigated for the treatment of autoimmune disorders, including Sjogren's syndrome, systemic sclerosis and dermatomyositis/polymyositis.

Several papers published by Gilkeson's collaborator, Lingyun Sun, MD, PhD, from The Affiliated Drum Tower Hospital of Nanjing University Medical School in China, showed good response rates when these cells were given to patients with SLE who had not responded well to other therapies.[6,7] Gilkeson and his colleagues also found that MSCs seemed to be active suppressing agents in a number of studies using mouse models.

Researchers launched a phase-I trial in the United States with MSCs obtained from the umbilical cords of healthy donors having an elective Caesarean section. The cells were processed at MUSC's good manufacturing practice- (GMP) quality clean-cell facility to ensure the quality and safety of the MSCs prior to infusing into patients.

While the phase-I results are uncontrolled, the preliminary data is encouraging. In general, patients had good responses with no significant side effects. A phase-II trial starts in 2018, with funding from the Lupus Foundation of America and the National Institutes of Health.

So far, the response seen in patients in the Chinese trials seems to be durable, with some patients doing well without medication at 5, 6 and 7 years post-treatment, said Gilkeson. While it is too soon to know whether similar results will be seen in the U.S. trial, he said "we have two patients who are out 8 or 9 months and are still doing fine. We are just giving one infusion, so we'll have to see how long it lasts."

Researchers are still working to determine the optimal dose, with investigational doses so far ranging from 1 million to 10 million cells per kilogram — with no differences observed in the side effect profile. It is also too early to say whether certain patients may respond better than others. No discernable patterns have been seen in the Chinese trials so far.

"We are also doing very intense mechanistic studies, looking at everything we can think of regarding the immune system," Gilkeson said. "The phase-I trial showed that we do see very marked changes in the immune profile of the patients. The key question is whether this might be predictive of who will respond."

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Excited About Going Backward

ANDRE CAP

New research is revealing that the old approach to platelet storage may be better than the modern-day one — and could be linked to reduced mortality in trauma patients.

Colonel Andrew "Andre" Cap, of the United States Army Medical Corps, said the phrase "army of one" makes him chuckle. "There may be a perception in the civilian world that there are tons of people in the military to do all the work. The truth is, if you stick around for a few years, you start collecting other jobs — lots of them," he said. "I admit I've picked up quite a few hats — which is typical."

Cap is the chief of coagulation and blood research at the U.S. Army Institute of Surgical Research. He is also an attending hematologist-oncologist at the San Antonio Military Medical Center, medical director for the Fort Sam Houston Akeroyd Blood Donor Center, program director for the Clinical Research Fellowship Program, associate professor of medicine at the Uniformed Services University's San Antonio campus and co-chair of the NATO Blood Panel. "There are probably a few more roles I could add. How much time do you have?" he joked.

Cap has served on active duty in the U.S Army for 15 years and spent two years in the reserves before that. For the past nine years, he has served at the U.S. Army Institute of Surgical Research in San Antonio. He earned a Bachelor of Arts degree in government from Harvard University in 1992, a Master of Science degree in technology and policy from the Massachusetts Institute of Technology in 1995 — "in between there I got my pre-med requirements out of the way" — and then earned his M.D. and Ph.D. from Boston

> “We don’t care about how many days the platelets circulate. We want to know did the patients stop bleeding? Are they still alive?”

University School of Medicine in 2003. He completed an internship and residency in internal medicine and a fellowship in hematology and oncology at the Walter Reed National Military Medical Center, which included training and research in bone marrow transplantation at the National Institutes of Health.

AABB NEWS: WHAT MISCONCEPTIONS DO PEOPLE HAVE ABOUT YOUR WORK?

Cap: I’m probably best known for my work on platelet storage and whole blood. A lot of my work is focused on platelet storage, but when I tell people I have training in internal medicine, they are surprised. People see me more as a director of a laboratory and less as a physician. As an attending hematologist-oncologist at the medical center, I take consults for trauma and burns. I spend a lot of time doing clinical work, including in oncology, and much of it is not closely tied to my research.

I also do a lot of work with our operational forces, helping them develop transfusion strategies and train medics. I work directly with military units about to deploy. Some of those techniques and studies have led to opportunities for educational programs and concepts we are trying to bring from the military into civilian spaces.

AABB NEWS: WHAT ARE SOME OF THE PRACTICES THAT HAVE APPLICATIONS IN CIVILIAN SPACES?

Cap: One of the things we’ve become really focused on is hemorrhage. What we’ve learned through studies of military and civilian trauma cases is that hemorrhage is the number one preventable cause of fatalities. Some of those fatalities are caused by compressible hemorrhages and manageable with the use of tourniquets. We’ve made huge strides in that area, but there are still fatalities there. Where we see the biggest problems are non-compressible hemorrhages. For civilians, this most often presents in situations such as blunt force trauma in a car crash. You cannot deal with internal bleeding using external means.

When dealing with this in military settings, we found that beginning a transfusion immediately created a tremendous reduction in fatalities. Troops can carry blood with them, start transfusions right away and then get to a medical facility. For civilians, we’re trying to improve that pre-hospital care. Time is a big issue. With standard response time, it’s five to 10 minutes for first responders to get to a car crash. They get there, take stock, realize it’s serious, then call for a helicopter. That’s another 10 to 15 minutes or more. By the time the helicopter is landing, it’s been at least half an hour. That’s how long it takes people die from internal hemorrhaging. If you wait until people get to the hospital, they will bleed out. The mortality rate for trauma patients who have bled significantly and present to the hospital requiring emergency transfusion can be as high as 76%.

The approach to trauma patients has been — and continues to be in many areas — to put them in an ambulance and drive fast. That works if you’re five minutes from the hospital. But more than 40% of people in the U.S. are more than an hour away from a trauma center. We need to do more lifesaving work pre-hospital. In this area, we’ve started a program making sure ambulances have blood and are trained to use it in trauma situations. We have started seeing some spectacular saves. People who would have bled out and died otherwise are being saved by those immediate transfusions.

Another example of this need shows up in the 20-year analysis of trauma laparotomy mortality outcomes. The mortality rate for trauma laparotomies has not significantly changed in 20 years. Why? We have better technology. We have better training. Why? Because mostly, people are showing up in the hospital nearly dead. We have to improve pre-hospital care.

AABB NEWS: WHAT IS SOME ONGOING RESEARCH OR RECENT BREAKTHROUGHS THAT YOU FIND PROMISING?

Cap: The biggest breakthrough is the renewed appreciation for the cold storage of platelets. It’s kind of funny to be excited about going backward, but in this case, we had it right and are coming back to doing it right. In the 1960s, when you took blood, you’d use it right away or refrigerate it. Around that time, a study found that cooled platelets would clear from the patient’s system faster. To keep up those platelet counts, there was a major push to store them at room temperature.

As we have done more studies on platelets, we discovered all the things they do to restore hemostasis. Unfortunately, almost all those functions are lost relatively quickly when platelets are stored at room temperature — usually in about three days. In fact, overall usefulness of

> "The point is that by extending storage shelf life, you make platelets available to a greater number of bleeding patients who will benefit immediately."

platelets at room temperature is relatively short, about three to five days. When you consider that drawing and testing the blood takes a day or two and transportation can be another day, a lot of hospitals are infusing four- or five-day-old platelets, which have severely compromised hemostatic properties.

Room temperature storage was favored for a long time because of the benefit for prophylactic transfusions, but now we are seeing the remarkable, lifesaving benefits of maintaining platelets' hemostatic function, which can be maintained over a 15-day or longer shelf life in cold storage. Think about it. If we can triple the shelf-life, we can more strategically supply hospitals. That means more immediate help for patients coming into trauma units, but more opportunities for ambulance teams to carry blood with them, as well. Our findings on the preserved function of cold platelets also re-open the door to storing whole blood. If you think about it, what the bleeding patient really needs is whole blood. People used to think that the platelets in whole blood wouldn't work and that it didn't make sense to store them. We've shown that cold-stored platelets, whether stored as apheresis units or as whole blood, maintain their hemostatic function. Now we can provide oxygen carrying capacity and hemostasis to bleeding patients with either cold-stored whole blood or component therapy that includes cold-stored platelets, and we can provide that life-saving treatment outside of a Level -1 trauma center — in rural America or on the battlefield.

AABB NEWS: **IF THIS COULD LEAD TO BETTER PRE-HOSPITAL CARE, WHAT IS THE DELAY ON THIS PRACTICE?**

Cap: The good news is that the infrastructure exists. What does cold storage need? Refrigerators. Hospitals have refrigerators. There this has no cost to implement. In fact, if hospitals want to have blood on hand to transfuse trauma patients, they can start today. After you collect whole blood, just walk right past the centrifuge and put it in the fridge. Then, when a trauma patient comes in, give them whole blood, which is what they are losing. It will contain the cold platelets, which restore hemostasis. If you collect platelets, put them in the refrigerator as well. They will stop bleeding.

The major barrier we face to implementing these changes is inertia. Pick up any textbook from the 1980s through today, and it will likely say that platelets are used to treat thrombocytopenia, so they should be stored at room temperature. That's it. End of sentence. There is no consideration of the need for acute hemostasis in the bleeding patient; there is only a focus on the patient with low platelet counts who *may* bleed if platelets are not replaced.

In severely bleeding patients, we don't care about the platelet count. We know that we have to replace all the elements of blood — red cells, plasma and platelets — to keep the patient alive. We want to know did the patients stop bleeding? Are they still alive? Cold-stored platelets are cleared from circulation over the course of two days. That makes them less than ideal for prophylactic transfusion in which you'd expect them to circulate for a week. But in bleeding patients, what matters is whether the bleeding stops in the first minutes to hours after transfusion. If cold platelets stop bleeding and can be kept available over a longer shelf life, then who cares whether they are cleared over two days instead of seven or eight? The point is that by extending storage shelf life, you make platelets available to a greater number of bleeding patients who will benefit immediately. Culturally, we've trained ourselves to be obsessed with post-transfusion platelet counts and circulation time. That may be important in some patients, but not in the ones who are bleeding to death in front of you. So really, we're fighting dogma.

What we need is two products: One that is optimized for prophylactic transfusion, for cancer patients whose bone marrow can't make platelets. And another that is optimized for immediate use in bleeding patients. Keeping the supplies separate could go a long way toward making sure we can save lives in both cases. ■

2018-19 Board of Directors Elections to Begin This Month

Elections for the 2018-19 AABB Board of Directors are scheduled to begin later this month. On Aug. 31, 2018, ballots will be distributed to all AABB members in good standing as of the record date (Aug. 20, 2018). The image below is a sample of the ballot every AABB member will receive.

AABB members are invited to submit their ballots until Sept. 30, 2018. The new Board of Directors will be inaugurated at the 2018 AABB Annual Membership Business Meeting, to be held Oct. 16 in Boston.

More information about the candidates is available on AABB's website at www.aabb.org > Membership > Governance and Policies > Nominations and Elections.

Candidiates for the 2018-19 AABB Board of Directors

OFFICERS

President-Elect	Beth Shaz, MD
Vice President	Steve Sloan, MD
Secretary	Dana Devine, PhD

AT-LARGE DIRECTORS

Position #2:	Barbara Bryant, MD, MT(ASCP)SBB
Position #3:	Richard Schäfer, MD Salem Akel, PhD
Position #4:	Aaron Tobian, MD, PhD
Position #6:	Debra Kessler, RN, MS
Position #8:	Julie Allickson, PhD
Position #10:	Daryl Kor, MD, MSc Mary Berg, MD

In Memoriam: Marjory Stroup Walters

Marjory Stroup Walters, MT(ASCP) SBB, died on June 19 at the age of 93. Considered a pioneer in transfusion medicine and one of the leading immunohematologists of the 20th century, Stroup spent more than 30 years working in blood banking. She joined Ortho Pharmaceutical Corporation in Raritan, N.J. in 1951, where she began working in quality assurance and manufacturing. Soon, she moved to the Blood Consultation Service, where she became renowned as an immunohematology researcher, educator and author. An AABB member for more than 50 years, Stroup was honored with two AABB awards: She received the Ivor Dunsford Memorial Award in 1973 and Emily Cooley Memorial Award in 1983. She will be remembered by scientists, business colleagues and friends, not only for her significant contributions, but also for her commitment to quality, leadership and education delivered with an irrepressible spirit and enthusiasm.

PEP Volunteer Spotlight

P. Dayand Borge, Jr., MD, PhD

Divisional Chief medical Officer,
East Division, American Red Cross

How long have you been an AABB member?

I have been an AABB member since 2009.

In which AABB volunteer activities are you currently active? In which have you participated?

As a volunteer member of AABB and a designated representative of my organization, I have worked on the Immunohematology Reference Labs Accreditation Committee, the Circular of Information Task Force and the FDA Liaison Committee. I was recently elected to the 2018-19 AABB Board of Directors as an at-large director.

What motivates you to volunteer?

AABB's mission and core values, specifically "an unwavering focus on donor and patient safety," align completely with my own personal and professional goals. It is easy to support an organization that endeavors to advocate for the best possible treatment of our donors and patients.

How has your volunteer work affected your professional work?

I've had an incredible opportunity to make new professional connections and get involved in activities that have helped me grow as a transfusion medicine professional. Even better, many of these connections have become trusted colleagues, mentors and life-long friends!

What have you learned from volunteering with AABB? What advice would you give someone interested in volunteering?

Volunteering isn't just about showing up, it's about actively participating and supporting AABB. The growth of our community depends on us all to give our best. You will find that an investment in AABB pays a much greater reward both personally and professional when you are actively engaged in the organization.

What fun fact about you would you like people to know?

I am also a certified volunteer youth soccer coach for an under-13 boys travel team. It is a great opportunity to teach and mentor youth on teamwork and sportsmanship. It's also a great opportunity to spend time with my son doing something fun. ■

CALENDAR

August

1 HOT TOPIC: Challenges and Solutions to Implementation of Licensed PI for Platelets (#18EL-350)
*AABB eCast**

19 Patient Blood Management Certification: "We're Certifiable"
The Joint Commission Webinar

22 Immunohematology Boot Camp: Duffy (#18EL-352)
*AABB eCast**

26 Tubeless Blood Bank: Tech Savor or Work Generator (Perils of Automation) (#18EL-364)
*AABB eCast**

September

6 Cord Blood - Where Are We 30 Years On? (Anniversary of the First Transplant (1988)) (#18EL-360
*AABB eCast**

12 Immunohematology Boot Camp: Nonspecific Agglutination (#18EL-361)
*AABB eCast**

27 Métodos para Tipificación Molecular de los Genes HLA (#18EL-365) - [Spanish speaking eCast]
*AABB eCast**

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