

Meeting Report and Perspectives

The 5th Annual Midwest Conference on Cell Therapy and Regenerative Medicine

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To improve access to experimental adult stem cell therapies for patients in the region, Governor Sam Brownback and the Kansas legislature passed a state bill in 2013 that enabled the establishment of the Midwest Stem Cell Therapy Center (MSCTC). This highly laudable and truly visionary act was primarily directed at promoting therapy of patients with adult stem cells. Additional major objectives of this initiative were to disseminate knowledge about adult stem cells and to dispel myths and misconceptions about the efficacy of various stem cell therapies in general. Consistent with these educational missions, the team at the MSCTC soon began to plan for the inaugural Midwest Conference on Cell Therapy and Regenerative Medicine, which was held on November 23, 2013, in Kansas City. The contents of this inaugural meeting were extremely well received by scientists and physicians as well as various community members. The format was subsequently changed to a 2-day conference, which has since been held every fall in the Kansas City region.

The Fifth Annual Midwest Conference on Cell Therapy and Regenerative Medicine was held on September 15 and 16, 2017, in Overland Park, Kansas. To cater to the educational needs of a very diverse audience, the topics ranged from cell therapy for various disease conditions to discussion of innovative approaches to make cell therapy more widely available. With regard to organ systems and specific diseases, a wide array was covered, including cardiac conditions, neurological pathologies, cancer, arthritis, and liver injury, to name a few. The speakers included academicians, scientists, clinicians, legislators, religious leaders, as well as industry members from several countries (Figure). The audience was equally diverse, including physicians, nurses, and other healthcare workers, students and trainees at various levels, and also lay members of the community.

The overarching theme of the conference, similar to that of the MSCTC itself, was therapy with adult stem cells. Seven sessions were built around this broad focus, starting with new concepts in cardiovascular regenerative therapy. During the first session centered on advances in cardiovascular regeneration, **Keith March** (University of Florida) highlighted the potential benefits of using cellular secretomes instead of cells. In particular, he presented data that supported the therapeutic

efficacy of exosomes derived from adipose stem cells for both cardiac and neuronal injuries. His talk was followed by an excellent lecture detailing the possible uses of stem cell exosomes for heart repair by **Raj Kishore** (Temple University). This talk also highlighted the influence of specific cytokines and microRNAs on cellular exosomal products. The third presentation by **Yi-gang Wang** (University of Cincinnati) focused on the possibility of stimulating proliferation of endogenous cardiomyocytes and the role of miR-128 in cardiac repair. **Arshed Quyyumi** (Emory University) delivered a highly insightful talk on the progress and state-of-the-art in cellular therapy for heart failure. The cardiovascular session was rounded up by an excellent presentation on vascular regeneration by **Young-sup Yoon** (Emory University).

The next session was dedicated to newer targets of cell therapy, including those for arthritis, liver, and blood vessels. **Devendra Agrawal** (Creighton University) discussed the potential use of mesenchymal stem cells in cartilage repair. The efficacy of MSCs from different tissues in osteoarthritis of hip is being tested in clinical trials. **Liya Yin's** (Northeast Ohio Medical University) talk underscored the regenerative potential of induced vascular progenitor cells, especially in the setting of metabolic syndrome, an increasingly prevalent medical condition. With a view to therapy in patients, the automation for mass production of clinical grade pluripotent stem cells was discussed by **Daniel Paull** from the New York Stem Cell Foundation. This session was followed by several talks that gave the audience a flavor of how arduous and challenging it is to bring stem cell discoveries from the bench to the bedside for actual treatment of diseases in humans. **James Sherley** (Asymmetrex, Inc) emphasized the need for precise quantification of stem cell numbers for therapeutic purposes and described a unique tool that can be used to accurately determine stem cell numbers for various uses. **Warren Sherman** (LoneStar Heart, Inc) presented information on novel technological advances in cardiac reparative approaches, particularly in the area of biomaterials. Next, **Joyce Frey-Vasconcells** (Frey-Vasconcells Consulting, LLC) provided an excellent overview of the Food and Drug Administration regulatory maze toward approval of cellular and regenerative therapies with particular emphasis on several key changes that have

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(*Circ Res.* 2018;123:21-23. DOI: 10.1161/CIRCRESAHA.118.310765.)

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Circulation Research is available at <http://circres.ahajournals.org>

DOI: 10.1161/CIRCRESAHA.118.310765



Figure. The members of the Midwest Stem Cell Therapy Center (A, from left, Robert Vincent, Rupal Soder, Kunjan Desai, and Yanqing Zhu) put together an exciting array of sessions with participation by leaders in the academic community (B, Doug Girod, Chancellor, University of Kansas), the scientific community (C, Kevin Eggan, Harvard Medical School), clinicians (D, Daniel Saris, University Medical Center Utrecht), industry (E, Warren Sherman, Lone Star Heart, Inc), stem cell centers (F, Dan Gincel, Maryland Stem Cell Foundation), religious leaders (G, Monsignor Tomasz Trafny, The Vatican), and legislature (H, Kansas Governor Sam Brownback [right] pictured with Buddhadeb Dawn). Outstanding moderators (I, from left Young-sup Yoon [Emory], Yi-gang Wang [University of Cincinnati], Keith March [University of Florida], Raj Kishore [Temple], and Arshed Quyyumi [Emory]) facilitated participation by a diverse and lively audience (J).

been instituted recently. In the final talk of the session, **Lisa Kadyk** (California Institute for Regenerative Medicine) went over possible strategies to speed up stem cell therapies for patients with unmet medical needs. Lastly, the discussion of various cell-based approaches for neurological diseases comprised the final session of the day. **Kevin Eggan** (Harvard Medical School) and **James Berry** (Massachusetts General Hospital) presented data on exciting basic science discoveries and testing of new therapies in clinical trials of amyotrophic lateral sclerosis, respectively.

The initial sessions on day 2 covered the potential cell-based approaches for hematologic diseases and cancer; and various unique and innovative approaches that have resulted in translation of laboratory findings into clinical treatments. **Anurag Singh** (University of Kansas Medical Center)

described the historical perspectives on hematopoietic stem cell transplantation, the form of adult stem cell transplantation that has been used successfully for many years across the world. This was followed by 2 talks related to cell therapy for graft versus host disease, a common and potentially lethal condition in cancer survivors. **Jan-Eric Ahlfors** (Fortuna Fix, Inc) presented exciting data supporting the potential of directly reprogrammed neural precursor cells for treatment of neurological pathologies; and **Michael Detamore** (University of Oklahoma) described how advances in research with hydrogels can be leveraged to repair craniectomy defects after traumatic brain injury.

One of the highlights of this conference was a stimulating speech by the then Kansas Governor **Sam Brownback**, who currently serves as the United States Ambassador-at-large for

International Religious Freedom. Governor Brownback articulated the strong rationale for promoting scientific evidence-based cell therapy for numerous human diseases that currently do not have any definitive medical or surgical options. He emphasized the need for MSCTC to start a clinic for therapy in patients. He hoped that the MSCTC would collaborate with other institutions and hospitals in the region and move forward on this issue in the near future. His talk was followed by a keynote address by Monsignor **Tomasz Trafny**, Head of the Science and Faith Department in the Pontifical Council for Culture at the Vatican, on the acute need for rapid and effective utilization of cell therapy strategies for the masses. He underscored the *value of life* and thereby, the urgent need to make cell therapy accessible for countless patients across the globe who may not have the resources to afford more expensive medical and surgical alternatives.

This global theme of cellular therapy was continued in the final session of the meeting. **Dan Gincel** (Maryland Stem Cell Foundation) pointed out that despite tremendous promise, many stem cell trials have failed to document significant benefits in patients. He discussed several issues with the design of clinical trials that may be optimized in the future to arrive at more meaningful conclusions. **Buddha Dawn** (University of Kansas Medical Center) summarized the ever-growing body of evidence from numerous meta-analyses that supports the efficacy of bone marrow cell therapy in patients with ischemic heart disease. The benefits of bone marrow cell therapy on cardiac parameters, although modest numerically, are able to impact key clinical outcome measures, including patient survival, he emphasized. Next, **Paul Kincade** (Oklahoma Center for Adult Stem Cell Research) described the major accomplishments of Oklahoma Center for Adult Stem Cell Research, particularly in the area of research funding. This was followed by an excellent overview of surgical regenerative approaches for cartilage repair and arthritis symptom relief in Europe and the United States by **Daniel Saris** (Utrecht University). Finally, **David Prentice** (Charlotte Lozier Institute) summarized the

well-established benefits of adult stem cell therapy for bone marrow transplantation, the current status of various stem cell initiatives across the world, and the roles of the Food and Drug Administration and other regulatory and governmental entities in this process. He finished by highlighting the potential significant therapeutic options that may ultimately emerge from this nascent field.

A notable strength and a unique feature of this stem cell meeting was the highly synergistic confluence of science, academia, politics, and faith focusing on benefits for the patient. Overall, the 2017 meeting provided a great opportunity for trainees, scientists, physicians, policymakers, and members of industry to interact in a collegial and relaxed atmosphere. Consistent with the previous 4 meetings, aside from the outstanding scientific contents, the 2017 meeting was also richly accented by social events, including a barbecue dinner (a Kansas City must) and a fun bowling event that was thoroughly enjoyed by speakers and other participants.

In summary, the 2018 Midwest Conference on Cell Therapy and Regenerative Medicine was a success on every account. The organizers would like to take this opportunity to express their sincere appreciation and gratitude to all speakers, staff, and the audience for their enthusiastic help and participation. The next Midwest Conference on Cell Therapy and Regenerative Medicine is scheduled for September 14 and 15, 2018, at the same venue. We hope to see you there!

Sources of Funding

The annual conference and this article were supported in part by funding from the State of Kansas made available to the Midwest Stem Cell Therapy Center through Kansas Statute (KS Stat § 76–839).

Disclosures

None.

KEY WORDS: exosomes ■ heart failure ■ Kansas ■ regenerative medicine ■ stem cells

Circulation Research

JOURNAL OF THE AMERICAN HEART ASSOCIATION



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Circ Res. 2018;123:21-23

doi: 10.1161/CIRCRESAHA.118.310765

Circulation Research is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

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Print ISSN: 0009-7330. Online ISSN: 1524-4571

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World Wide Web at:

<http://circres.ahajournals.org/content/123/1/21>

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