The 2016 edition of the Basic Cardiovascular Sciences (BCVS) Scientific Sessions was held from July 18 to July 21 in beautiful (and hot!) Phoenix, Arizona. This year’s program was put together by Program Co-chairs Raj Kishore (Temple University), Jay Zhang (University of Alabama), and Maria Kontaridis (Beth Israel Deaconess Medical Center). The meeting attracted ≈600 attendees representing 23 countries. Around 370 abstracts were submitted and presented at the conference. Invited speakers represented institutions from the United States, Canada, Europe, Asia, Latin/South America, and Saudi Arabia.

Meeting opened with remarks from Dr Steven Houser, President of American Heart Association, highlighting American Heart Association’s mission to support basic sciences and discovery research. One of the highlights of the meeting was a keynote lecture delivered by Nobel Laureate Dr Brian K. Kobilka (Stanford University) on the opening day (Figure 1). Dr Kobilka’s talk focused on providing structural and mechanistic insights into G-protein–coupled receptor signaling and its implications for drug discovery. He emphasized the physiological role of G-protein–coupled receptors’ signaling, and his hope that a better understanding of G-protein–coupled receptor structure and function will eventually lead toward development of efficient drugs for a variety of diseases. Dr Kobilka’s research ethics and his love for science as a whole were a treat to watch and an inspiration for all the young fellows at the conference.

The quality of science presented at the meeting was incredible, with 15 sessions focused at highlighting research pathways toward development of cardiovascular therapeutics. Each day sessions were focused on a broad array of topics that included systems biology, genetics/genomics, cardiac signaling, cardiac fibrosis and remodeling, cardiac regeneration, cell death and aging, cardiac development and congenital disease, tissue engineering, inducible pluripotent stem cells, cardiac cell therapy, and exosomes. The seminars were then followed by poster presentations at the end of each day, highlighting new and unpublished scientific advances (Figure 2).

Figure 1. Brian K. Kobilka, MD, discusses “Structural Insights into GPCR Signaling: Implications for Drug Discovery” at Basic Cardiovascular Sciences Scientific Sessions 2016. Photo © AHA/Todd Buchanan 2016.

Dr Steven Houser, President of the American Heart Association, presented interesting work about acute exposure of isoproterenol resulted in a reversible myocyte injury without cardiac regeneration.

Dr Jefferey Molkentin from Cincinnati’s children hospital presented about a myofilament tension model predicting hypertrophic and dilated cardiomyopathies in mice and further reported that this model could also predict human cardiac phenotypes from data generated while using induced pluripotent stem cell–derived human myocytes from familial cardiomyopathy patients. This tension-based model will have potential to drive pharmacological treatment options for patients with cardiomyopathy-associated disorders.

Dr Anthony Rosenzweig (Beth Israel Deaconess Medical Center) presented his work about cardiac microRNA-222, which was found to be upregulated in exercise models and induces cardiomyocyte hypertrophy and proliferation through...
effects on the cell cycle inhibitor p27, as well as HIPK1 (homeodomain interacting protein kinase 1) and HMBOX1 (homeobox containing 1), acting upstream of CITED4 (CBP/p300-interacting transactivator with ED-rich carboxy-terminal domain 4). He proposed that microRNA-222 was necessary for exercise-induced cardiac growth in vivo, and genetic overexpression of microRNA-222 was sufficient to protect the heart against dysfunction and adverse remodeling post cardiac injury.

Several other talks offered novel perspective in the molecular mechanisms underlying cardiac adverse remodeling. Moreover, updates were provided on the current research on noncoding RNAs, GRK (G-protein–coupled receptor kinase) signaling, PKG1α (protein kinase G) signaling, and CaM (calmodulin) kinases and their implications for cardiac remodeling.

Understanding the molecular basis of many cardiac diseases has been hampered by lack of an appropriate in vitro cell culture model that accurately mimics human disease phenotypes. In this respect, Dr Joseph Wu from Stanford University presented his work on how to recreate heart disease in a dish using induced pluripotent stem cell technology. Other talks reported novel technologies in human genetics, tissue engineering, and gene-targeted manipulation, disease modeling with inducible pluripotent stem cells. These findings in the near future promise to influence modern cardiovascular medicine on several fronts: molecular understanding of pathological mechanisms, early diagnosis, drug development, and effective treatment.

This year’s session on stem cells and cardiac regeneration was phenomenal. Dr Roberto Bolli (University of Louisville) presented his work about cardiac progenitor cell therapy in post-myocardial infarction rats. The study showed cardiac progenitor cell transplantation attenuated left ventricular remodeling and cardiac dysfunction, but importantly, the effects sustained for more than a year after cell transplantation. These findings strongly support the safety and clinical utility of cardiac progenitor cell therapy, paving the way for future research endeavors. Others talks in the session, focused on different types of cell/progenitor cells, and the overwhelming conclusion suggested cell therapy as an efficient strategy.
to improve cardiac function in an injured heart, which is extremely encouraging. Further insights into the mechanisms involved in stem cell–mediated cardiac repair are the focus of future research.

The topic of exosomes was a feature of this year’s meeting. Exosomes are bioactive small particles released by cells ranging from 30 to 150 nm and are involved in multiple cellular functions. This concept was illustrated by Dr Howard Rockman from Duke University who demonstrated that AT1R-enriched exosomes are released from the heart under conditions of in vivo cellular stress to likely modulate vascular responses to neurohormonal stimulation. Other talks focused different stem cell–derived exosomes from embryonic stem cells and CD34* stem cells and their efficacy for inducing cardiac repair. Similarly, investigators presented evidence on a cardioprotective role for circulating exosomes and their potential to be used for diagnostic and prognostic biomarkers studies. Findings from these studies hold great therapeutic value, and exosomes from different cell types can serve as vehicles for a targeted therapy to treat cardiovascular disorders and other diseases.

Every year, BCVS holds an Outstanding Early Career Investigator Award competition with the aim to support and spawn careers of promising early career faculty from their respective scientific domain. This year’s finalists were Fabrice Jaffre (Beth Israel Deaconess Medical Center, Boston, MA), Sadia Mohsin (Temple University, Philadelphia, PA), and Junko S. Warren (University of Utah, Salt Lake City, UT; Figure 3). All the presentations and quality of research work were exceptional and speaks volumes for the rigorous selection criteria for the competition. Sadia Mohsin was declared winner of the 2016 Outstanding Early Career Investigator Award. In addition, based on the scientific merit of the abstracts, new investigator travel awards were awarded to 15 students and postdocs and 11 Cardiovascular Outreach Awards, aimed at encouraging minority early career investigators and students to participate in meeting. Additionally, 10 abstracts from early career scientists were chosen for oral presentations, giving young scientists an opportunity to present their work with more seasoned investigators.

Early career development workshop was incredibly well attended and well received. Dr Saumya Das and Dr Sarah Franklin organized the first career development session that featured 3 speakers. Dr Nicole H. Purcell from University of California San Diego, Dr Timothy McKinsey from University of Colorado, and Jonathan Schultz from *Circulation Research* presented their views on career development in academia, industry, and publishing paths. Dr Konstantinos Drosatos from Temple University and Dr Ivonne H. Schulman from University of Miami chaired the second career development workshop. Dr Burns C. Blaxall gave a terrific talk about the importance of mentorship and networking. As we all know, American Heart Association is a tremendous resource where networking opportunities are numerous. In this perspective, BCVS conducted a particularly interesting event titled “speed networking event with faculty participants,” where 19 different faculties talked to young scientists (one to one) interested in moving in right direction in academia and beyond.

Finally, BCVS 2016 honored Dr Arnold Katz whom we lost early this year through a moving tribute paid to him and his work by Dr Joseph Hill.

In conclusion, this year’s BCVS meeting was successful with high participation and impeccable presentations and discussions on cutting-edge basic cardiovascular research. Block your calendars for next year BCVS in Portland, Oregon, July 7 to 13, 2017.
Basic Cardiovascular Sciences Conference 2016: Pathways to Cardiovascular Therapeutics
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