Basic Cardiovascular Sciences Conference 2009
Molecular Mechanisms of Cardiovascular Disease

Christopher P. Baines, Tracy J. Pritchard

The 2009 edition of the Basic Cardiovascular Sciences (BCVS) Conference was held at the end of July in the beautiful (and hot!) setting of Lake Las Vegas, Nevada. This year’s program was put together by Tom Force, Jeff Molken, Issei Komuro, and Helmut Drexler, with Santhi Ganesh, Steve Houser, Richard Lee, Ronglih Liao, and Rong Tian rounding out the program committee. The meeting attracted a record-breaking 476 attendees, 154 of which were from 23 countries other than the United States. More than 200 abstracts, selected on the basis of merit, were presented as posters.

For this year’s plenary lecture, Eric Olson introduced the Nobel Laureate Joseph Goldstein and reviewed Dr Goldstein’s remarkable accomplishments in 2 different areas of science (cholesterol homeostasis and receptor endocytosis). This was then followed by Dr Goldstein’s lecture, which was a wonderful retrospective of his life in science.

The level of the science presented at the meeting was top notch, with 11 sessions on the mechanisms involved in heart failure and hypertrophy with an emphasis on new emerging signaling pathways. Each day included seminars on a variety of topics including mitochondria, notch signaling, hypertrophic signaling, genetics, apoptosis, microRNA, gene therapy, fibrosis, and stem cells.

Although many talks were outstanding, there were some particularly fascinating presentations. Gerald Dorn (Washington University) presented an update on his continuing work on Nix, a member of the proapoptotic Bcl2 family, which included some particularly provocative data. He reported that in addition to interacting with Bax/Bak at the mitochondrion, Nix also localizes to the sarcoplasmic reticulum, where it induces Ca2+ release. This in turn induces mitochondrial permeability transition and, subsequently, cell death. Thus, this crosstalk between sarcoplasmic reticulum and mitochondrial Nix appears to be a novel mechanism by which Nix coordinates cell death.

Kenneth Walsh (Boston University, Mass) discussed the intertissue communication mediated by muscle-released factors called “myokines.” He reported that transgenic Akt activation in skeletal muscle increased fatty acid oxidation in the liver, and reversed fat deposition in obese mice. Dr Walsh postulated what myokines actually confer these remote organ phenotypes, with two likely candidates being activin βA and follistatin-like 3. He went on to show that both of these myokines are regulated by cardiac injury and that activin promotes cell survival whereas follistatin-like 3 is detrimental.

Stephen Engelhardt (Technische Universität München) presented work on the potential therapeutic possibility of antagonists in heart failure as supported by his work on miRNA-21 in heart failure and cardiac fibrosis. miRNA-21 shows the strongest upregulation of all miRNAs in heart failure, primarily in cardiac fibroblasts from failing hearts. miRNA-21 modulates extracellular signal-regulated kinase (ERK) activity, which affects cardiac cell function, and also Sprouty, which controls fibroblast survival. Together, this impairs cardiac function and facilitates fibrosis, and antagonist-21 prevents cardiac fibrosis and can even reverse preexisting fibrosis. Thus, these antagonists could be promising therapeutic molecules for the treatment of heart failure.

Bruce Gelb (Mount Sinai Medical Center, New York) talked about his work examining mutations in the tyrosine phosphatase, Shp2 and their role in pathogenesis. He showed that expression of a gain-of-function Shp2 mutant, found in Noonan’s syndrome, increased the number of wing veins in Drosophila. This was associated with increased ERK activation, and the wing phenotype could be blocked by inhibition of the ERK signaling pathway. Surprisingly, a loss-of-function Shp2 mutant, found in LEOPARD syndrome, induced exactly the same phenotype and ERK activation as the active Shp2 mutant. These results help explain how opposite mutations in Shp2 can cause very similar clinical disorders.

It was particularly gratifying to see so much new, unpublished data being presented. Let’s face it: this is ultimately the goal of such meetings, to present new data and directions aimed at stimulating the progress of the field. Unfortunately, this seems to happen less and less these days. The seminars were then followed by poster presentations at the end of each day.

In addition to the stellar talks and posters, there was also a lunch presentation by Michael Lauer, Director of the Division of Prevention and Population Sciences at the National Heart, Lung, and Blood Institute (NHLBI), who addressed concerns by attendees over budgetary issues at NHLBI and the NIH in general. He also outlined future directions. Following this, attendees met in small groups to ask questions of former and current study section heads and reviewers at the NHLBI (Drs Artman, Houser, Sussman, Leri, Force, and Molkentin).

One of the criticisms often leveled at scientific conferences, especially by younger researchers, is that the program...
often consists of “the same old guys presenting the same old thing.” However, this year, the organizers made a concerted effort to provide more junior, up-and-coming scientists the opportunity to present their science. Thanks especially go to the symposia chairs Drs Houser, Rockman, Robbins, Bers, Murry, McNally, Bishopric, Seidman, Drexler, and Benjamin, who agreed to only moderate, allowing inclusion of 18 individuals on the program who had not spoken at prior BCVS meetings. This led to a greater variety in the type of research being presented. Just as importantly, it enabled the “younger crowd” to gain more exposure, a necessary step for the success of any research program. For example, there was a spotlight Young Investigator session, where William Pu (Children’s Hospital, Boston, Mass) and Aarif Khakoo (MD Anderson, Houston, Tex) gave presentations of their work.

This commitment of the BCVS to the development of young cardiovascular scientists was further emphasized by the annual Early-Career Investigator competition. This year’s finalists were Michael Davis (Emory University, Atlanta, Ga), Shigeki Miyamoto (University of California, San Diego), and Peiyong Zhai (University of Medicine & Dentistry of New Jersey). As always, the quality of the science and the presentations were exceptional, with Dr Miyamoto ultimately being declared the recipient of this year’s award. In addition, the BCVS also gave out travel awards to 20 student and postdocs whose abstracts received the highest scores. Just as importantly, 2 Cardiovascular Outreach Awards, aimed at encouraging minority early career investigators and students to participate in meeting, were awarded to Medet Jumabay (University of California, Los Angeles) and William Lester (University of Kentucky, Lexington).

One of the strengths of this meeting (and, indeed, of previous BCVS meetings) was the laid-back, congenial atmosphere. This greatly fostered the interaction between delegates, further facilitating the exchange of ideas, helping to establish collaborations, and just generally getting to know one another. In particular, it created an environment where younger scientists, especially students and postdocs, could meet with more established researchers (an absolutely essential part of career development), and this was very much in evidence.

The highlights of the social program were a reception in honor of the departing Editor-in-Chief of Circulation Research, Eduardo Marbán, and a slide show at the Council Dinner by the organizers in which the organizers and many of the speakers and moderators were paired with “celebrity” look-alikes.

In summary, this year’s meeting continued the high standard of excellence set by previous BCVS conferences, both in terms of the science and of the development of our younger constituents. Save the date for next year’s meeting in Rancho Mirage, Calif, which is being organized by Peipei Ping and Gerald Dorn. We hope to see all of you there!