What will be the next best thing in cardiovascular research?" This was the loaded question recently posed in a panel discussion at the American Heart Association Council on Basic Cardiovascular Sciences (BCVS) 2017 Scientific Sessions, held in Portland, OR, from July 10 to 13. The panelists made clear the challenge to predict the next major breakthrough, with most scientists in the room hoping it would evolve from their own research endeavors. Despite our inability to predict the future and the notion that most substantial discoveries are made serendipitously, several notable highlights in the conference programming reiterated the paths that will inevitably lead to the next greatest research successes in the field (Figure).

Diverse and Multidisciplinary Studies

The meeting encompassed >400 scientific abstracts on an array of research topics, including cardiac fibrosis, oxidative stress, metabolism, arrhythmias, heart failure signaling, RNA biology, and novel therapies, with many studies spanning and integrating multiple disciplines involving molecular, genetic, and physiological methodologies. A number of important model systems were highlighted, including advances in human induced pluripotent stem cell–derived cardiomyocytes, new models of heart failure with preserved ejection fraction—an area of emerging interest considering the increasing prevalence of this morbid condition—and genetic-based minipig models of hypertrophic cardiomyopathy. Clearly, the field’s interest in improving “bench-to-bedside” research continues to grow. This diversity in approaches and concepts signifies that our research community continues to cast broad nets in search of the next best thing, and panelists noted this as positive, acknowledging that many research avenues show promise but no single one shows enough to justify major refocusing of our conglomerate scientific efforts. Instead, continued collaboration and engagement is needed to understand how our broad research efforts interrelate and fit into the big picture.

Expanding “-Omic” and “Big Data” Integration Into Research

The field has made great strides in incorporating large-scale approaches and data sets along with advanced computational analyses to deeply interrogate cardiovascular disease. Heaps of data of varying kinds are pouring out of an array of biological systems, including expansive patient networks and animal and cellular models in the laboratory (relevant reviews1,2). Despite significant advances in defining genetic and environmental risks, cellular pathways of interest, and more thoroughly characterizing the heart’s “-omics” (eg, transcriptomes, proteomes, metabolomes, and interactomes), sustained efforts are needed to continually expand the application of “big data” and related technologies more broadly throughout our strong base of basic science laboratories. On this front, meeting organizers arranged several new focused workshops to convey the power of integrating high-content -omics methodologies and bioinformatics into wet lab research. Perhaps one of the next best things in cardiovascular research will be the emergence of “hybrid” investigators with both wet lab and computational skills. With an understanding of the biological concepts, these scientists will open new doors by learning to program (eg, scripting in Perl or R languages), allowing them to efficiently manipulate, analyze, and integrate the breadth of big data, which can point to new hypotheses that they themselves can subsequently test in wet lab experiments. Indeed, many of the next
greatest discoveries will likely result from effective scientific integration and translation across bedside, big data, and bench themes.

Scientific Rigor, Reproducibility, and Transparency

The conference also presented a special session on “Ethics, Open Science, Reproducibility, Unconscious Bias and All That Jazz,” touching on important topics related to recent National Institutes of Health initiatives aimed at improving the overall quality of scientific research. A recent study published in Circulation Research revealed that a significant lack of methodological rigor (e.g., not randomizing participants, blinding analyses, or adequately determining group sizes) is likely at the root of the field’s plague of irreproducible data. Considering the detrimental effects this has on science and the public’s view of scientific research, investigators ardently need to take steps in continuing to discuss and work toward resolving problems of this nature, as was achieved in this session. The goal is to minimize the risk of building “houses of cards” based on weak and unreliable experimental evidence, while moving toward building scientific foundations on which the next best thing in cardiovascular research can be realized.

Brave Ideas

The BCVS 2017 Scientific Sessions keynote lecture was delivered by Dr Calum MacRae, who gave an overview of his team’s strategy for moving toward the eradication of coronary heart disease. Last year, Dr MacRae and his collaborative network successfully competed for the One Brave Idea award (sponsored by the American Heart Association and Verily, with support from AstraZeneca), earning an impressive $75 million to conduct a multiphase exploration of patient cohorts and big data to identify critical genetic, cellular, and molecular factors that would allow future identification of patients at high risk of developing coronary heart disease later in life. Although most scientists in the room were dreaming of such funding, several agreed with Dr MacRae that this was “not enough” considering the scope of the studies and the breadth of the research team needed to tackle them. Dr MacRae noted that his intention is to further spread the resources among the research community to ensure that the ultimate benefit is bestowed on coronary heart disease patients. Only time will tell whether this unprecedented program and research endeavor will yield the next best thing in cardiovascular research. Nonetheless, the spirit of this award encourages others to think boldly and creatively about prevalent morbidities, to focus on patients, and to hope for similar future large-scale funding ventures to prevent these diseases from devastating society.

In summary, the BCVS 2017 Scientific Sessions were marked by considerable enthusiasm and highlighted many exciting new findings and approaches in basic science and translational research, along with special-topic workshops and sessions that offered insight into some core components that will contribute to significant future breakthroughs in the field. Although nobody could confidently say what the next best thing in cardiovascular research will be, perhaps the answer for attendees is quite simply, “the upcoming BCVS Scientific Sessions.”

Disclosures

None.
References


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