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Like many physician-scientists, I started my research career in earnest during my fellowship training, which for me was an endocrinology fellowship in the 1990s. These were relatively early days in the era of using mouse genetics to elucidate in vivo biology and to model disease. The expectation was to obtain a K08 clinical investigator award and then leverage that work into an R01 grant. The traditional approach at that time was to focus on a scientific question that could be used to define your reputation in the field. In my case, my research centered on glucose transport (1, 2) and insulin signaling in the heart (3), largely based on insights gained from my prior work generating cardiomyocyte-restricted deletions of these metabolic regulators. I made the case that these murine models could inform the pathophysiology of diabetic cardiomyopathy, which at the time was beginning to be recognized as a distinct cardiovascular complication of diabetes. When I moved to the University of Utah in 2000 as an assistant professor, I presented a vision of developing a research program based on elucidating the contribution of changes in insulin signaling and glucose metabolism to diabetes-related heart failure and obtained individual grant funding from the NIH, the American Diabetes Association, and the American Heart Association to continue these studies as the sole principal […]

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It takes a village: lessons from collaborative science

E. Dale Abel

Department of Internal Medicine and Fraternal Order of Eagles Diabetes Research Center, Roy J. and Lucille A. Carver College of Medicine, University of Iowa, Iowa City, Iowa.

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From silos to consortia
Shortly after arriving at the University of Utah, I had my first encounter with a collaborative funding mechanism. My friend Henry Ginsburg at Columbia University once told me, “There never was an RFA [request for applications] that he would not take out on a date!” My first RFA “date” presented itself in October of 2000. My division chief and academic mentor, Don McClain, had an uncanny knack (that continues to this date) for identifying collaborative funding mechanisms to build and support resources. He shared with me an RFA for a consortium to study mouse models of diabetic complications. The goal of this RFA was to use the U01 cooperative research grant mechanism to bring together up to six centers to assemble a crossdisciplinary Mouse Models of Diabetic Complications (MMDC) Consortium to develop innovative mouse models that closely mimic the diverse human complications of diabetes. We thought it was a long shot, but went for it. I would not be writing this if we had not become members of this initial consortium that brought together groups from the University of Utah, the University of Michigan, Vanderbilt University, Mount Sinai, Rockefeller University, Columbia University, Duke University, and UCLA.

The U01 program required collaborative interactions among the centers to advance the missions of the consortium. I initially chafed at the idea of science by committee, but quickly came to understand the value of openly sharing data and obtaining consensus that was based on our best understanding of the strengths and weaknesses of each model. Moreover, these interactions led to the formation of meaningful collaborations, many of which continue to this day. After the first five years of the MMDC, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) renewed the RFA to broaden the scope into animal models of diabetes complications. We competed again and remained in the Consortium, which had expanded to include additional institutions such as the University of North Carolina, the University of California, San Diego, Case Western, the University of Washington, and others. At the end of this second five-year cycle, this consortium was restructured as the Diabetes Complications Consortium, which now focuses on supporting novel research into modeling diabetes complications via a pilot grant program. The impact of this collaborative network has been immense, with more than 1000 publications, sharing and dissemination of animal models and standardized protocols, and sponsorship of scientific meetings. Collectively, these efforts significantly advanced our understanding of diabetic complications to a much greater extent than could have been achieved on the basis of individual groups working in silos.

I was hooked! As a result of insights gained in our laboratory linking mitochondrial dysfunction with diabetic cardiomyopathy and knowledge gleaned from the MMDC about the intersection of obesity and diabetes in the pathophysiology of heart failure in diabetes, another RFA came to my attention in 2002 on the pathophysiologic mechanisms of obesity-associated cardiovascular disease. Although this was not a U01 grant, the program leadership at the National Heart, Lung, and Blood Institute (NHLBI) fostered and encouraged interactions between other grant awardees that, like my experience with the AMDCC, continued to lead to productive collaborations that truly advanced our understanding of diabetes and obesity-related heart failure. Since that time, I have taken multiple other RFAs on “dates” and have participated in five collaborative research initiatives sponsored by the NIH (including grants focused on thrombotic and hematologic disorders; sex hormone–induced thromboembolism; and collaborative interdisciplinary team science in diabetes, endocrinology, and metabolic diseases) and strategically focused research networks sponsored by the American Heart Association. I have subsequently been funded in three multi-PI R01s. It should be clear by this track record that my personal research journey has benefitted immensely by participation in collaborative research.
As chair of a research-intensive department of medicine and director of an interdepartmental research center, some of the greatest successes, both in terms of scientific productivity and opportunities to train the next generation of scientists, have been anchored in collaborative research networks. Three notable examples (among many) in my department have been the impact of longstanding project grants in cardiovascular pathology initiated by Francois Abboud; our interdisciplinary program in lung biology spearheaded by Michael Welsh; and the Center for Access and Delivery Research and Evaluation (CADRE), a Health Services Research program funded by the Department of Veterans Affairs, led by Eli Perencevich. A common characteristic of these networks has been their ability to spawn entire generations of successful investigators in their respective fields.

Perspectives
The integrity of science is based on rigorous peer review of our work and ideas. An important consequence of participation in collaborative scientific networks has been the opportunity to have colleagues within the network actively participate in the evolution of a project. Their input during project updates has refined projects, consequentially increasing the rigor of findings once they are reported. My experiences in multiple collaborative scientific networks have shaped a perspective that it is far more important to collaborate to get our science right than to get our findings published first. Let me share with you one recent experience that speaks to that ethos. Through our participation in the Strategically Focused Research Network on heart failure, we generated mice with loss of pyruvate transporters in the heart and observed an interesting effect on ventricular remodeling. I came to learn through a mutual collaborator that another laboratory had obtained similar findings, so we got in touch and agreed to openly share and discuss our findings with a view toward coordinating the submissions of our initial research findings. A few months later at an international meeting after giving a talk where I discussed some of our findings, a postdoctoral fellow from a laboratory in the UK approached me and asked me to visit her poster, where she shared with me similar studies that they were undertaking. Having learned this, to me the issue was clear. The two was had to become a threesome. We therefore openly shared our findings and collaborated on joint submissions, which culminated in a recently published trifecta (10, 15, 16). I believe that our decision to collaborate and to publish independent findings that support a common hypothesis is a powerful representation of the impact of collaborative research in promoting rigor and reproducibility. There will now be little doubt regarding the mechanisms linking mitochondrial pyruvate import with cardiac remodeling. Long live collaborative networks!

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Address correspondence to: E. Dale Abel, 169 Newton Road, 4312 PDBB, Iowa City, Iowa 52242, USA. Phone: 319.384.4684; Email: DRCAdmin@uiowa.edu.