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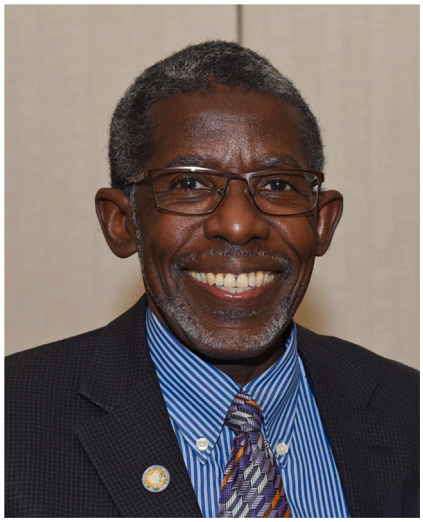
Q&A

# E. Dale Abel, MBBS, DPhil, David Geffen School of Medicine, University of California, Los Angeles

Dr. E. Dale Abel is recognized for his significant contributions to our understanding of the interface between metabolic and cardiovascular disease. He is a leader, mentor, and champion of equity, diversity, and inclusion in science. In this interview with *Cell*, he discusses his research, what Juneteenth means to him, and the critical role mentorship plays in securing our scientific future.

## Biography

Dale Abel is the William S. Adams Distinguished Professor and Chair, Department of Medicine, David Geffen School of Medicine and UCLA Health. He graduated with distinction from the University of the West Indies School of Medicine; obtained a DPhil from Oxford University as a Rhodes Scholar; trained in internal medicine at Northwestern University, where he was chief resident; and trained in endocrinology at Beth Israel Deaconess Medical Center, Harvard Medical School. Dr. Abel was Chair of the Department of Medicine and Director of the Fraternal Order of Eagles Diabetes Research Center at the University of Iowa, holding the François M. Abboud Chair of Medicine, and the John B. Stokes III Chair in Diabetes Research. Dr. Abel has made seminal contributions to the role of altered mitochondrial metabolism in the pathophysiology of diabetic cardiomyopathy, and his laboratory has elucidated critical roles for insulin and IGF1 signaling in cardiac health and disease. His recent work has focused on mitochondrial mechanisms that mediate inter-organ crosstalk in the pathophysiology of insulin resistance and mitochondrial pathways linking metabolism with increased risk for atherothrombosis. Dr. Abel's laboratory has been funded by the National Institutes of Health, the American Heart Association, the American Diabetes Association, and the Juvenile Diabetes Research Foundation. He is an elected member of the American Association of Physicians (AAP), the American Society for Clinical Investigation (ASCI), the American Clinical and Climatological Association (ACCA), the National Academy of Medicine (NAM), and the National Academy of Sciences (NAS). Dr. Abel is past President of the Endocrine Society and the Association of Professors of Medicine.



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## Could you tell us about your research?

My lab works at the interface of metabolism and cardiovascular disease. We have characterized pleiotropic roles of cardiomyocyte insulin signaling in the regulation of mitochondrial energetics, autophagy, and cardiac hypertrophy. We have described the contribution of altered cardiac glucose and pyruvate metabolism as contributors to heart failure pathophysiology. We have studied contributions of ROS-mediated mitochondrial uncoupling in diabetes-related heart failure and have elucidated contributions of glucose transport and mitochondrial dynamics to platelet biology and activation in pathophysiologic states such as diabetes. We are also interested in mechanisms by which mitochondrial dysfunction in one organ may regulate systemic metabolic homeostasis via release of novel circulating factors.

## What are the challenges or exciting questions in your field?

In a complex organ like the heart, there are intricate interactions between distinct cell types such as fibroblasts, immune cells, endothelial cells, and cardiomyocytes in the pathophysiology of heart disease. Our understanding of altered metabolic signaling in these compartments and how crosstalk occurs between them remains incomplete. The ability to determine metabolic flux at single-cell resolution could represent a significant advance that could move the field forward in a manner analogous to the way in which single-cell RNA-seq continues to provide new insights. At the organismal level, it is becoming increasingly clear that inter-tissue communication via circulating mediators that include classical and novel hormones and signaling via cellular components such as extracellular vesicles will continue to shape our understanding of metabolic homeostasis. Ultimately, we hope that some of these advances will inform strategies to prevent and reverse the adverse cardiovascular consequences of cardiometabolic disease.

## How do you find inspiration, particularly during challenging times?

I find inspiration in a world view grounded in my upbringing and personal beliefs that my sojourn on this planet is not solely to advance my own interests but to ensure that I leave it a better place than I found it. Thus, I derive gratification by investing in others who should ultimately succeed me and persuading them that selfishness is ultimately counterproductive. As such,

I am inspired by witnessing the success of others, particularly when it arises from an attitude of generosity to their mentees. I am motivated by seeing my own trainees succeed in their careers and by witnessing their commitment to the highest levels of personal integrity. The spark of curiosity that comes from an unexpected observation and the growth in resilience that occurs when setbacks are viewed as opportunities both inspire me.

**Do you have a role model in science or medicine? If so, who and why?**

I have had many role models in my journey in science. Their contributions have varied from teaching me the value of persistence to the importance of generosity and collaboration. My positive role models have been those who have stopped to spend their time sharing how they think about and approach a scientific problem. They have showed how they communicate their ideas and shared the gems that have contributed to their success. I have appreciated those role models who would not settle for mediocrity while using their high standards not as a bludgeon but as a goal achievable through active partnership.

**How do you mentor the next generations, and could you also tell us about the FLARE program?**

I believe that perhaps the most important contribution that we can make as scientists is to ensure that we develop and nurture a robust pipeline of new talent to secure the future of our field. As a mentor, I work with my junior colleagues to initially ascertain their personal goals and aspirations. I use this as a starting board to tailor the mentor-mentee relationship. What I bring to the table are opportunities to pursue interesting experiments and build a broad scientific network, as well as a willingness to impart skills such as communication, including effective writing, that are essential for establishing credibility in our scientific fields. I push my trainees to think independently and become increasingly comfortable with uncertainty, while honing their problem-solving skills.

I have been privileged to lead the FLARE program (Future Leaders Advancing Research in Endocrinology) since its inception more than a decade ago. With funding from the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), we have trained nearly 200 early-career scientists by equipping them with tools and skills that have increased their likelihood for long-term success. The FLARE program was built on the premise that recruitment, training, and retention of a diverse biomedical and clinical workforce is an essential component of any comprehensive approach aimed at addressing health disparities. Importantly, while several organizations, including professional societies, develop trainee-focused programs, relatively few focus on the unique needs of minorities underrepresented in life sciences, specifically throughout critical career transitions in biomedical and clinical research.

The Endocrine Society developed the FLARE program, a multi-faceted professional development training program for minority graduate students, postdoctoral fellows, and early-stage faculty involved in endocrine-related research. The program seeks to actively foster the professional development of these early-stage investigators to enhance their preparedness for career advancement within research-based institutions and the scientific community at large, while helping to develop them as future leaders of the Endocrine Society itself. Program components include a leadership training workshop, a mentoring network to build relationships between FLARE fellows and dedicated mentors, a Society-based internship, and an alumni symposium. Fellows selected for the internship participate in one of the Society's governing committees, engage in a mentored peer-review experience in our scientific journals, and develop mentoring skills by engaging with undergraduate students participating in the Society's summer research fellowship program and visiting minority serving institutions to give seminars and host mentoring workshops. The FLARE Program also collaborates with other established diversity and outreach initiatives, such as the Keystone Symposia Fellows Program and the Network of Minority Research Investigators of the NIDDK, which provide additional opportunities for networking and career advancement in addition to identifying mentors and new FLARE faculty.

**What are your thoughts on team building in science? How do you build a scientific team in a new laboratory?**

I am a strong proponent of harnessing collaborations and teams to address scientific questions. We are constantly experiencing a dramatic increase in sophistication of tools and models with which to address fundamental questions in biology and science. There are levels of expertise and sophistication that a single scientist or trainee can no longer embody. Moreover, bringing diverse perspectives into problem solving is more likely to yield creative solutions. The issues of rigor and reproducibility remain pernicious challenges to the field with incalculable costs and risk of harm. I believe that highly functioning teams that are committed to ethics and integrity can provide additional checks and balances that will contribute toward bias mitigation, data validation, and protection against data manipulation. I have recently written about team building to advance science.

**What does Juneteenth mean to you? What does it mean in the context of STEMM?**

Growing up in post-colonial Jamaica, we were keenly aware that most of our ancestors were forcibly brought to the island aboard slave boats from Africa. Indeed, there was open dialogue about the legacy of slavery and an annual Emancipation Day holiday that celebrated the heroism of many who fought, died, and advocated for the abolition of slavery in Jamaica. So, emigrating to the United States, I was intrigued and perplexed by the reticence to enter into discourse around issues of slavery—the ugly legacy of segregation and other facets of institutional racism likely contribute to this. As such, it was personally gratifying when Juneteenth was recognized as an official holiday to mark the day when the final group of recently emancipated slaves learned that they were freed. I view the recognition of Juneteenth as an opportunity to educate ourselves and each other regarding the legacy of slavery and segregation that continues to influence many facets of life in the United States. This is not about finger pointing but a time for self-reflection regarding the impact that our past has had and continues to have on policies

and structures in society and to examine ways to remove barriers that may still exist.

I share a personal reflection about Juneteenth that I originally wrote for my blog at the University of Iowa, which underscores the reality of slavery in my own family.

"Juneteenth commemorates the final emancipation of enslaved Black people in the United States in 1865. Slavery was abolished in Jamaica, the land of my birth, in 1834. My maternal grandparents, Phillip Baker and Ina (Lillian) Haynes, were both born in 1909, and my paternal grandparents, John Abel and Eva Henry, were born respectively in 1909 and 1911. I have reliable records on my maternal side. Philip's father, Philip (Sr.), was born in 1867, and Lillian's grandfather, John Haynes, was born in 1849. John Haynes's father was a slave. Thus, Juneteenth gives me pause to reflect on what freedom means, particularly in the present moment when we are witnessing the awakening of a recognition that there is much work that remains to create a truly equitable society. I recently held a listening session for members of my lab to talk about our feelings and reactions to racism. Word got out, and the group expanded to a broader listening session for trainees and colleagues within the Diabetes Research Center. In the end, a diverse group of individuals representing many cultures, ethnicities, and races contributed to a powerful conversation… These forums for dialogue are one step to create an environment of mutual understanding and respect that will improve our university, department, and community."

**Over the course of your career, what DEI-related changes have you witnessed in science and medicine?**

When I began my training in science nearly 37 years ago, it was clear that most scientists in North America were White men. Moreover, the general approach to success in science was one predicated on the assumption that it was based exclusively on one's individual ability and creativity without recognizing or rewarding efforts focused on mentoring and career development. Over the ensuing three decades, I have witnessed an increasing recognition of the importance of investing in the future, securing and maintaining a pipeline of talent, and ensuring that entry into science is available not only to a privileged few. I note that, although there has been a significant increase in the number of women pursuing careers in science, it will take some time before gender parity is achieved within the senior ranks of science, particularly in academia. I have also witnessed a growing recognition of the need to provide targeted mentorship to individuals who are from ethnic and other backgrounds that are under-represented in science. There is increasing, although not universal, comfort within the scientific community in recognizing the importance of being proactive to provide opportunities for increasing the number of underrepresented minorities in science and medicine. However, we have a long way to go, as indicated by recent studies examining, for example, barriers to medical school entry in the United States for underrepresented minorities (see here and here).

I was very fortunate to be supported during my early-career training by a fellowship from the Harold Amos Minority Medical Faculty Foundation. This program has spawned many leaders in academic medicine, including institute directors at the NIH, deans of medical schools, university presidents, department chairs, and division directors. These results validate the program's approach, which is characterized by early identification of senior mentors, who are major leaders in academia and have provided critical lifelong mentorship to hundreds of Amos fellowship awardees over the years. More recent programs, such as the Hannah Gray Fellowships of the HHMI and the Keystone Symposia Fellows program among others, also share these goals. The NIH has made various investments over the years in programs that seek to increase and sustain a diverse pipeline in biomedical research. I would argue that, as valuable as many of these programs are, they scratch the surface of a deeper problem, which is ensuring that exposure to science, technology, engineering, math, and medicine (STEMM) begins and is available in elementary and middle school.

**Do you feel that racism in STEMM has personally impacted you? If so, would you be willing to share any experiences you've had?**

Growing up in Jamaica, I was never raised to believe that the color of my skin was an impediment to achieving my loftiest aspirations. As such, I was not intimidated by situations in which I was in the minority because I genuinely believed that my achievements would speak for themselves. During my training as a graduate student, resident, and post-doctoral fellow, I was fortunate to have mentors and advisors who believed in me and provided me with challenges and opportunities with which to thrive. Challenges that I encountered were not necessarily linked to racist structures, but to institutional structures that failed to appreciate or support effective mentoring. That said, as I have increased my role as a mentor to under-represented minorities on a national scale, it is very apparent that my experience has not been uniformly shared. As such, I have found myself advocating for others and changing structures and systems in ways that counter the narrative that many people of color have internalized through their lived experiences. Many of those whom I advise and mentor have shared with me experiences in which they have felt devalued within the scientific community because of their race or background and the potentially devastating setbacks that these experiences have had on their lives and careers. My approach has been to provide them with tools and strategies to advocate for themselves more effectively and to intervene, if necessary, on their behalf.

**What would you say to people who think that scientific and biomedical journals should "stick to the science" and avoid featuring DEI-related content?**

The notion that, as scientists, we should focus on scientific questions in the quest of new knowledge and ignore the consequences of barriers that limit diversity in life sciences is flawed. I know that there are many who believe that meritocracy in science is not biased and does not contribute to lack of diversity. But what my colleagues might not realize is the value of role models who can demonstrate to those from disadvantaged backgrounds that success is possible. By openly discussing issues of equity and diversity, scientific journals are an important channel to put the many conversations about the importance of diversity in the life sciences front and center and thereby advance values of which all of us should

be aware. Moving our community toward a perspective of seeking to increase opportunity for those who will come after us should be an essential element of our quest for new knowledge and the recognition that those discoveries bring to our laboratories.

**Why are publications that address DEI, mentoring, career and professional development, and STEMM education important in science and medicine?**

We would be shortsighted if we were to believe that there will always be many others to replace us when our career ends. In many recent conversations that I have had with trainees across the country, there is a general perspective that pursuing careers in science and discovery, particularly in academia, is becoming increasingly difficult, challenging, and not worth the effort. This is consistent with what many senior researchers are also seeing when it comes to recruiting post-doctoral trainees to their laboratories. These challenges are amplified by individuals who believe that being minoritized only puts additional barriers and hurdles to succeed in academic science and medicine. When we do not recognize these warning signs, which threaten the future vitality of our fields, we do so at our peril. When we stop addressing barriers to advancement and professional development, and the importance of ensuring that we pay attention to increasing diversity of those who populate the pipeline, we could witness a gradual but sustained reduction in creativity and innovation. If you talk to many who have succeeded in science, a common theme for them is the value of the spoken words, opportunities provided, and mentorship, formal and informal, that inspired them to persevere and take the next steps. We cannot take this for granted, and as such, the role of journals in keeping a spotlight on the importance of career development and supporting the career-development needs of our increasingly diverse community of students and trainees is essential.

**How could scientific and biomedical publishers better support and engage with historically Black colleges and universities (HBCUs), institutions serving historically minoritized communities, and tribal colleges and universities (TCUs)?**

HBCUs and TCUs do not have the resources of other higher-learning institutions. Therefore, scientific and biomedical publishers should commit themselves to ensuring open access of their content to these institutions by baking this into their business model. Second, journals have a unique perspective of seeing the broad landscape of those who are contributing to their content. As such, they are uniquely poised to leverage this knowledge to create networks and identify opportunities that could be leveraged to generate opportunities for collaborations between highly resourced and less-resourced communities to provide innovative ways to enrich the training experience of students at these institutions. Some journals have piloted mentorship programs for early-career investigators to be involved in peer review. This could represent a wonderful opportunity for exposing trainees to the elements that govern high-quality scientific publications, including experimental design, rigor, and reproducibility. Many scientific journals are publishing arms of professional scientific societies. As these societies increase their focus on DEI, they could allocate space within their publications to highlight and amplify these efforts. Journals not affiliated with professional societies should seek collaborative opportunities with societies or institutions to align some of their content with these goals.

**Do you have any thoughts as to what are the chief remaining barriers to achieving true equity, diversity and inclusion in STEMM? What are the solutions to overcoming them?**

Effective science education starts in elementary school. Exposing young minds to the spark of discovery and equipping them with tools that will drive curiosity should be engrained into curricula at a very early stage in our schools. It is a sad reality that investment in science education is woefully inadequate in the United States. Moreover, the patchwork of funding for our education system, often linked to the value of homes within neighborhoods in which these schools exist, creates disparities in resource allocations that disproportionately impact those who live in less affluent neighborhoods where individuals of color are overrepresented. Failure to address these inequities in opportunity will only exacerbate the qualification gap when it comes to successfully matriculating into college or university to formalize career-defining training in STEMM. Second, individuals who come from communities that are under-represented in science and medicine will benefit from early exposure to these opportunities as high school students and undergraduates, not only for the technical and didactic input that will arise from such exposure but also by fostering the soft skills and network building that will enable them to successfully navigate the challenges inherent in developing a successful scientific career. Finally, for those of us who are successful, we should create a culture of "paying it forward," where recognition is based not simply on the quality of our publications or the impact of our discoveries but also on how we have actively contributed to mentoring, training, and supporting the next generation of innovators who are becoming increasingly diverse.

## DECLARATION OF INTERESTS

E. Dale Abel is employed by the University of California, Los Angeles. He has received compensation for serving on an external advisory board for Amgen and as a member of the review committee for the Pfizer-supported Aspire Scientific Grant Program to support research in obesity.

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