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Diversity through equity and inclusion: The responsibility belongs to all of us

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ABSTRACT Despite the recognized benefits of diversity and the decades of programs targeted at increasing diversity in science, technology, engineering, mathematics, and medicine, the underrepresentation of historically excluded groups continues due to persisting systemic inequalities. It is imperative that we reassess our current recruitment strategies and reimagine our campus and workplace environments to provide an inclusive and equitable culture that is free of institutional barriers, affording equal opportunities for each individual to succeed, thrive, and be their whole self. For too long this vision has been the fight of a heroic few, but it must become the fight of all in order to achieve true change. I am working toward, and look forward to, a future where contributing to diversity, equity, and inclusion is fully integrated into the core mission of our institutions and is an expectation for all of us.

“It is not our differences that divide us. It is our inability to recognize, accept, and celebrate those differences.” —Audre Lorde

I am honored and grateful to receive the Günter Blobel Early Career Award from the American Society for Cell Biology (ASCB). As a graduate student, I was fortunate enough to receive a travel award through the ASCB Minorities Affairs Committee that allowed me to attend the 2005 ASCB annual meeting. I recall my first meeting as both a daunting and exhilarating experience, and I excitedly attended talks from my science heroes. Over the years, the excitement of the annual meeting has never faded



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for me, and it now feels much like a reunion of friends and colleagues. I have also come to appreciate that ASCB is much more than just the annual meeting—it is a community of amazing cell biologists and it is *our* community! Everything has come full circle and I am privileged to be a member of the ASCB Minorities Affairs Committee, striving to pay it forward to students from diverse backgrounds and to cultivate an inclusive community where we all feel that we belong and are welcomed.

During a typical year, I would take this opportunity to discuss my path to become a cell biologist and how I became fascinated by lipid droplets, offer some tips for success in science

and research, and perhaps wax poetic about the power of collaboration and mentorship. However, I think we can all agree that 2020 is not a typical year. Our world continues to reel from the impact of the COVID-19 pandemic and we are in the midst of the Black Lives Matter movement, the fire for this anti-racism revolution rekindled by the needless and heartbreaking deaths of George Floyd, Breonna Taylor, and so many others. These events, which are just the most recent examples of all too common racially motivated violence, shine a light on our reality born out of a legacy of racism that permeates all aspects of our society. It is an understatement to say that our scientific community is not exempt from these systemic injustices, biases, and inequalities. To gain some small insight into the scope of the problem, we only need to look towards the

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Abbreviations used: ASCB, American Society for Cell Biology; DEI, diversity, equity, and inclusion; GRE, Graduate Record Examination; HBCUs, historically black colleges and universities; HHEs, high-Hispanic-enrollment institutions; MOSAIC, Maximizing Opportunities for Scientific and Academic Independent Careers; PEERs, persons excluded because of their ethnicity or race; STEM, science, technology, engineering, mathematics, and medicine.

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#blackintheivory and #blackinivory hashtags on Twitter and recently published stories (Simmons, 2020) that chronicle the lived experiences of our black colleagues—the microaggressions, implicit and explicit bias, tokenism, etc. It is with these current events as the backdrop that I focus this essay on the need for systemic change and the importance of achieving diversity through equity and inclusion in science, technology, engineering, mathematics, and medicine (STEMM).

WHAT IS DIVERSITY AND WHY SHOULD WE CARE ABOUT IT?

Diversity refers to differences within a group (Gibbs, 2014), which can include, but are not limited to, differences in race, ethnicity, disability, nationality, socioeconomic stratum, gender, gender identity, and sexual orientation. Numerous studies agree that historically excluded and marginalized groups such as Blacks/African Americans, Latinx, American Indians, Alaska Natives, Native Hawaiians and other Pacific Islanders, women, and persons with disabilities continue to be underrepresented in STEMM (National Academies of Sciences, Engineering, and Medicine, 2019; National Center for Science and Engineering Statistics, 2019). For example, in 2017, in the fields of science and engineering, women received 41% of research doctorates despite composing 51.5% of the population, and persons excluded because of their ethnicity or race (PEERs) received 11% of research doctorates despite composing 27% of the population (National Center for Science and Engineering Statistics, 2019; Asai, 2020). Furthermore, there continues to be a lack of diversity in departmental faculty, editorial and scientific advisory boards, academic and industry leadership positions, award recipients, conference speaker lists, and the list goes on.

Why is diversity important? A common argument for diversity is a business model, that a variety of opinions and perspectives leads to more creative problem-solving and innovation (National Institutes of Health, 2019). In addition, due to the changing demographics in the United States and the increase in historically excluded groups, diversity enables a field to better utilize the full talent pool. Perhaps this is the most compelling argument for some audiences, particularly those driven by achieving maximum market success. However, the moral argument is just as important, and it is often not given adequate weight. We should not simply value the increase in success brought by diversity, we should value an equitable and just system that provides equal access to opportunities, recognizes talent is distributed across all groups independent of identity, and acknowledges each of us are human beings deserving of dignity.

RECRUITMENT AND RETENTION: SUCCESSES AND FAILURES

Despite decades of programs aimed at increasing diversity, underrepresentation and exclusion remain issues at all levels of academia (Gibbs *et al.*, 2016; NIH, 2019). Excuses are easy to find, and often assumptions that have been thoroughly debunked are raised as explanations for exclusion, such as that there are insufficient numbers of qualified candidates or that PEERs have less interest in scientific research (Poody and Asai, 2018). These excuses avoid blame and are the easy way out. The path that scientists from well-represented groups and in positions of power must take is difficult because it requires facing the reality of why underrepresentation persists, acknowledging biases and contributing to a system that perpetuates inequities, and implementing innovative solutions to overcome the problem. The problem is not insurmountable, but it requires making a choice to do the work required to solve it.

Although the rate of progress continues to be glacial, there have been increases in representation of historically excluded groups at the bachelor's and doctoral degree levels. We should celebrate these hard-won successes! Some of these successes are due to terrific programs directed at the recruitment and persistence of students at the undergraduate level (Estrada *et al.*, 2016), such as the University of California (UC) Berkeley Biology Scholars program (Matsui, 2018), the University of Maryland Baltimore Meyerhoff Scholars program (Maton *et al.*, 2016), and the Louisiana State University hierarchical mentoring program (Wilson *et al.*, 2012). Successful programs such as these should be valued, provided with long-term financial support by the *campus* instead of unpredictable extramural sources, and used as models for the construction of similar programs at other universities (Sto Domingo *et al.*, 2019). Widespread undergraduate summer research programs have also been successful in providing research experiences to students from diverse backgrounds (Lopatto, 2004, 2007; Seymour *et al.*, 2004; Ghee *et al.*, 2016), but it is important to emphasize that these programs are not a substitute for addressing institutional barriers and for building an inclusive culture. Historically black colleges and universities (HBCUs) and high-Hispanic-enrollment institutions (HHEs) continue to play vital roles, training a large portion of Black or African American, Hispanic, and Latinx students who go on to doctoral training in science and engineering fields (National Center for Science and Engineering Statistics, 2019). The much-needed evolution of graduate program admissions strategies to be equitable and inclusive may also lead to increases in the recruitment of students from diverse backgrounds. For example, the Graduate Record Examination (GRE) is a standardized test widely employed by universities in the United States for graduate admissions, despite data indicating that it is a poor predictor of success in graduate school and is a barrier to the admission of historically excluded groups, particularly when cutoff scores for admission are employed (Miller and Stassun, 2014; Petersen *et al.*, 2018). Many graduate programs have removed the GRE from the criteria considered for admission, and some of these programs can be found on Twitter by searching for #GREExit and #GREexit hashtags. Instead of an overreliance on standardized tests with poor predictive value, we need to implement holistic assessments that examine both academic aptitude and other competencies that are central to success as a scientist, such as perseverance, adaptability, creativity, and potential. Grades and test scores are never a determining factor when I recruit new members to my lab, and I have argued against the undue weight given to these criteria in admission to graduate programs. I find that a passion for science and “distance traveled” conveyed through personal statements and conversations are much better predictors of success as a scientist. This hiring strategy has allowed me to recruit an amazing and diverse group of scientists from all walks of life, and I could not be prouder of the members of my lab and their accomplishments.

While representation has increased at the bachelor's and doctoral degree levels (though clearly not enough), we have largely failed to increase the representation of historically excluded groups within the professoriate and within independent NIH-funded investigators (Heggeness *et al.*, 2016; Li and Koedel, 2017; Meyers *et al.*, 2018; National Center for Science and Engineering Statistics, 2019). Why is this? Controlling for many factors, recent studies find that programs and policies focused primarily on increasing the supply of talented PEERs (i.e., increasing the “pipeline”) will not make an adequate impact on diversity at the faculty level (Gibbs *et al.*, 2014, 2016). In addition, while PEERs exhibit higher contributions to scientific novelty, their contributions are more likely to be discounted and less likely to lead to faculty positions (Hofstra *et al.*, 2020). These studies highlight

the importance of examining discriminatory institutional barriers (e.g., research evaluation and hiring practices) and addressing inclusive and equitable cultures (or the lack thereof) that exert differential pressures on social identity, career selection, and persistence. I am excited to see the recent emergence of several innovative programs to improve diversity at the faculty level. Some examples include the Maximizing Opportunities for Scientific and Academic Independent Careers (MOSAIC) (K99/R00 and UE5) and the Howard Hughes Medical Institute Hanna Gray Fellowship programs. Not only do these awards provide financial support during postdoctoral training and the initial years as independent faculty, but they also offer opportunities for training and development of professional skills that are imperative to the success of early faculty. The MOSAIC UE5 program also provides support to organizations (e.g., the ASCB) that impart mentorship, networking, and training to the MOSAIC K99/R00 scholars, and requires investigators and administrators from the scholars' home institutions to engage in mentoring/diversity, equity, and inclusion (DEI) training and planning for systemic change at their universities. Thus, these programs aim to move beyond the deficit-based, "fix the victim" model and impart systemic change in institutional culture and policies. The impact that these programs will have on representation of historically excluded groups within the professoriate remains to be seen, but I am encouraged by these efforts.

We may not all be able to participate in these recruitment and retention programs, but those of us already in hiring positions can immediately assess our current approaches to faculty hiring and make changes to embrace best-in-practice methods that facilitate the equitable recruitment of scientists from diverse backgrounds (Bhalla, 2019). Some key improvements in faculty recruitment strategies include using active advertising approaches such as soliciting applications directly from PEER scientists, requiring and valuing DEI statements, using rubrics, and employing broad recruitments and cluster hires (Bhalla, 2019). I applaud departments that recognize the problem and are experimenting with new strategies to reduce bias in recruitment and to increase equity and diversity. At UC Berkeley, a recent life science cluster search heralded changes to how faculty searches are performed and put excellence in DEI on par with excellence in research, based upon the understanding that the two are not mutually exclusive and both are essential to the campus community. Search committee members evaluated each candidate's understanding of the issues, record of engagement, and plans for advancing DEI as a faculty member and a portion of the chalk talk during the on-campus interview was used to discuss the candidate's plans to contribute to DEI efforts.

Critical to the success of these recruitment efforts to diversifying the student body and professoriate is the retention and support of recruited individuals (Bhalla, 2019; Termini and Pang, 2020). For example, the transition to faculty as well as tenure and promotion remain major barriers. Transparency in the tenure process and faculty mentoring committees are one way to help support faculty in navigating this challenging and often convoluted process. It should also be taken into consideration that faculty from historically excluded groups face bias in teaching evaluations as well as publication and funding success (Heggeness *et al.*, 2016; Helmer *et al.*, 2017; Kuehn, 2017; Fan *et al.*, 2019; Peterson *et al.*, 2019; Wittman *et al.*, 2019). In addition, care must be taken to not overburden faculty members. Often in an effort to achieve diversity, historically excluded individuals are called upon for a higher amount of service than other faculty members. Expectations for service should be equivalent. If faculty are contributing at a higher level to DEI efforts, this should be valued and their contribution to other aspects of service and teaching adjusted, though not at the expense of

opportunities critical to advancement. Some institutions, such as Pomona College and UC Los Angeles, are leading the way in formalizing tenure and promotion requirements that include evaluation of contributions to DEI in teaching, scholarship, and service (Jaschik, 2016; UCLA, 2019). This is certainly an exception. When I was hired, I was told that "you can be the best teacher in the world, but that is not going to get you tenure," clearly establishing research as the sole priority. I agree that research excellence is absolutely required, but I do not think that this needs to be mutually exclusive with excellence in DEI and teaching. Our institutions have a long way to go to achieve an inclusive environment, and it will not happen without education and work.

WHAT CAN WE DO AND HOW CAN WE MAKE A DIFFERENCE? ACKNOWLEDGE, LISTEN, EDUCATE, ACT

Recent events have again shone a light upon the ugly truth of racism that permeates our society, but there is genuine interest from our colleagues and students who want to get involved and make an impact. This is a critical time to have conversations on how best to harness this energy to achieve maximal results. For all of us, it is important to acknowledge the problem of exclusion, to listen to a wide range of voices in our field (e.g., the new "Voices" series of essays in *Molecular Biology of the Cell*; Welch, 2020), to educate ourselves, and to participate in ongoing efforts to promote DEI. Let's move beyond the often empty pledges on social media, and make the effort to cultivate real change in our communities. Some actions that we can take are as follows:

- Seek out training and education about DEI. Learn about micro-aggressions, microaffirmations, stereotype threat, imposter syndrome, tokenism, and cultural competency in teaching and mentorship. There may be opportunities to gain such training on campus through campus divisions of equity and inclusion, ASCB Minorities Affairs Committee programs, workshops, and presentations (Segarra *et al.*, 2017, 2020), and diversity-focused conferences, such as SACNAS and ABRCMS.
- Require annual training in aspects of inclusion, belonging, diversity, and cultural awareness for all faculty.
- Promote and amplify individuals from historically excluded groups by inviting them to speak during seminar series and conferences and by nominating them for awards.
- Ensure that there is diversity in panels, committees, seminars, conferences, editorial boards, and leadership positions.
- Demand that university leadership value DEI efforts with program funding and as part of the appointment and promotion criteria for all faculty.
- Get involved in existing programs on campus and contribute to the development of new programs. Learn about the programs that have succeeded on other campuses and adopt successful paradigms.
- Have conversations about DEI. If possible, participate in moderated workshops on DEI that question our assumptions and force creative thought regarding new solutions.
- Involve students in decision making and value their opinions. There is often more diversity at the student level than at the faculty level.
- Employ evolving best-in-practice procedures for recruitment and retention of students, staff, and faculty.
- Redefine what excellence and merit mean for students and faculty to include contributions to DEI.

- Enact new, evidence-based, sustainable approaches to improve DEI that have measurable outcomes that can be assessed and improved upon over time. Do not be afraid to make changes and do not be paralyzed by the fear of making a mistake.
- Promote and embrace inclusive teaching methods, such as including readings and discussions of discoveries by scientists from historically excluded groups.

FINAL PERSPECTIVE

I would like to end on a hopeful note. Current events provide momentum to an ongoing movement to make systemic changes to achieve diversity, equity, inclusion, and justice. I am heartened by the amazing and tireless individuals at the forefront of this fight against systemic inequalities and racism. I am also encouraged by the progress that has been made. As a biracial American born to first-generation parents of Filipino and German ancestry, I can look back and see that not so long ago there were states where it would have been illegal for my parents to be married. That was changed just over 50 years ago by *Loving v. Virginia*, which ruled that state laws forbidding interracial marriage were unconstitutional. We should remember our history and keep fighting for the equitable and just future that we deserve. For too long this has been the fight of a few; it must now become the fight of all of us.

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