

## Diversity in Science: The Importance of Mentoring

A disproportionate number of underrepresented minorities come from low socioeconomic backgrounds and face difficulties in gaining access to quality education and resources. Progress in increasing the number of minorities earning Ph.D.s has been slow. My home institution, the University of California, San Diego (UCSD), does a good job of encouraging minority admissions, but we lose a factor of 2 at each step of the educational ladder: About 20% of undergraduates are minorities; the proportion drops to ~10% in biomedical science Ph.D. programs and to ~5% in the postdoctoral community. Only a fraction of minority postdocs are entering academia. Why is the representation of minorities at the higher levels of academia so dismal? There are many factors that contribute to the failure of academia to recognize, recruit, and retain the most talented minorities in science. Some certainly involve perceptions of inadequacy and cultural bias. Among the solutions is to recognize that all students can benefit from help and guidance. I attribute much of my success in academia to great mentoring.

### Beyond the Bounds of Comfort

I come from a family of migrant farm workers who harbor a strong work ethic. My grandparents were illiterate, and neither of my parents graduated from high school. I am only the second in my family to finish college and the first ever to live away from home. I grew up harvesting produce with my family in the rural outskirts of Stockton, CA. The work was hard and the pay was minimal. As a young child, I accompanied my mother to a farm worker rally where Cesar Chavez spoke. I remember the sound of feet stomping, the shouts of “Viva la Huelga!” and the feelings of belonging but not really knowing what it all meant. The smell of fertile peat dirt and ripe tomatoes and images of Mexican farm workers are vivid childhood memories.

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I liked school from an early age. My early life was good, but I knew money was tight. I was also aware that we often “did without.” My father’s absence made growing up difficult, and adolescence was chaotic, particularly for my older brothers. I sought refuge in school, and I was fortunate to have crossed paths with supportive teachers who kept me on the right track. I also had the great advantage of having an older sister who defied tradition, stayed in school, and graduated from college. I followed in her footsteps.

My transition from home to college 50 miles away at the University of California, Davis, was tough. I was thrust into a world that was wildly different from what I knew. I went home often on weekends to relieve feeling alienated. I eventually adjusted to college life, experienced success in school, gained confidence, and began to excel. I also discovered science, in the person of Professor Antoni Oppenheim, the father of one of my high school teachers. He was an engineer and invited me to visit his lab at University of California, Berkeley. He also introduced me to an undergraduate research program at Lawrence Berkeley National Laboratory and helped me get an internship, where I worked every summer during college. During these summers, I lived in a small cottage at the Oppenheim’s home in North Berkeley and I learned firsthand what the life of a professor was like. I began to realize that education was a route to a different life. I became passionate about research and decided that I too wanted to be a scientist! Professor Oppenheim was from an educated Polish family, immigrated to the U.S. after World War II, and was my first scientist-mentor who believed in me and ardently supported my scientific pursuits.

### More Mentors Who Believed in Me

After finishing college at the University of California, Davis, I entered the biomedical sciences Ph.D. program at UCSD. Now farther from home than ever, I needed time to adjust



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to the not entirely comfortable culture of graduate school. I completed my dissertation with Professor Joan Heller Brown, under whose tutelage I learned how to do science and how to think like a scientist. I also began to develop an interest in G protein-coupled receptors (GPCRs). Joan Heller Brown was the kind of mentor I needed. She was friendly, nurturing, and always radiated confidence in my abilities as a scientist. Her belief in my work fueled my desire to succeed in science, and I thrived under her guidance.

I then moved to the University of California, San Francisco (UCSF) to pursue postdoctoral studies with Professor Shaun Coughlin, who had just discovered the thrombin receptor, a unique GPCR activated by proteolysis. At UCSF I was exposed to both the marvelous and the cutthroat sides of academic research. I worked alongside colleagues who came from privileged backgrounds, had trained at the most elite institutions, and were fiercely competitive. We shared the same passion and desire to do great science. This commonality forged many great friendships that endure to this day.

With success in the lab, I began to realize that I was as smart and capable as my peers despite my different upbringing; I felt as though the playing field was now level. Shaun provided phenomenal mentorship by example. He challenged us to do rigorous and creative research: Careless work was unacceptable. My response was to develop the type of scientific work ethic that enabled me to be an independent and successful investigator. I credit my work ethic to these early training experiences with Shaun. I also realized that my own drive, confidence, and passion for science were necessary to sustain me in this frequently severely competitive, harshly critical, and incredibly satisfying career, and they do.

Despite vastly different backgrounds, I never felt that my mentors had lower expectations for me or treated me differently than any other trainee. In fact, my mentors showed trust and faith in me. Indeed, I was often held to a high standard, since they knew I would get the job done. I now have the same expectations of all of my trainees, regardless of their backgrounds,

since rigorous training will only increase their chances of success in science.

Rigorous training entails demanding high standards and providing support to achieve these standards. The most rigorous scientific training for minority scientists is crucial: When a minority scientist does not meet the highest standard, her/his entire community is often perceived as inadequate.

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### **Working in the Ivory Tower**

After postdoctoral training at UCSF, I accepted my first faculty position at the University of North Carolina at Chapel Hill (UNC) as a tenure-track assistant professor in 2000. I was promoted to associate professor with tenure in 2005.

UNC was an ideal environment, but as time passed, I desired to be closer to my family and to work in a more diverse academic institution. Hence I jumped at the opportunity to relocate to UCSD and accepted a position in the Department of Pharmacology in 2008. In my view, the excellent scientific environment at UCSD will enhance my research initiatives; the diverse demographics in

California will enhance my efforts to recruit more minorities into the professoriate.

I have been a faculty member for eight years and now devote most of my time to research and to interacting with scientists at all levels. I have also served on many graduate admissions committees and faculty search committees. I have experienced firsthand the misconceptions that many academics have of individuals who are simply different than they are. It is difficult to challenge such ideas when the group is largely homogeneous, i.e., typically male and white.

UCSD has made significant progress in bringing a number of outstanding women to the faculty ranks, a step in the right direction. But further work is needed to enrich the faculty of our academic institutions with individuals from diverse backgrounds. We need to attract faculty who more accurately reflect the demographics of the cities and states in which we live. To this end, I am becoming active in the San Diego Institutional Research and Academic Career Development Award program. This postdoctoral

training program, sponsored by the National Institute of General Medical Sciences, NIH, supports the development of young minority professors. Diversity enriches the educational experience and strengthens communities. It is critical for our economic competitiveness and sustainability.

### Education and Mentorship Crucial

I remain the only one of my family to live away from Stockton. I currently live with my partner, an elementary school teacher, in an urban community of San Diego. I have dozens of nephews and nieces who mostly live in poverty, and are smart but lack access to quality education. For the most part their lives do not include activities that are compatible with success in school. I talk with them about the importance of education and try to provide them with experiences that go beyond their daily existence. My hope is that they will realize the opportunities that education can offer them.

There is no clear path to follow to rise above poverty, but my experience shows that support in seeking and finding access to education, and crossing paths with the right mentors, can have a profoundly positive effect on the course one follows. We all have amazing potential. ■

—JoAnn Trejo, Women in Cell Biology Committee

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Francesco Ramirez • Lisa Tannock • Alexander Clowes

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Elaine Davis • Dianna Milewicz • Robert Mecham

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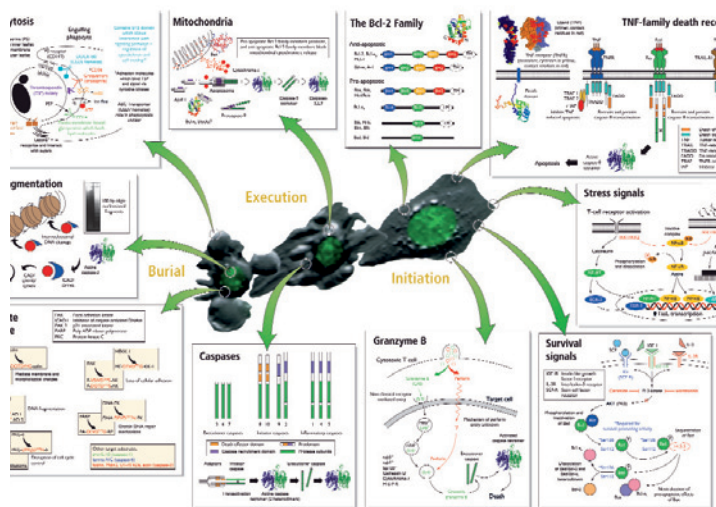
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