The Postdoc Apprenticeship

Postdoctoral scientists have played an essential—and sometimes unheralded—role in advancing discovery research in the life sciences for more than a century. Introduced by the Johns Hopkins University shortly after its founding in 1876, the postdoctoral fellowship was intended to provide a relatively brief period of mentored research and training for new doctoral recipients. Over the past half century, it’s become an almost mandatory experience for any scientist hoping to pursue an academic career. For many, this apprenticeship has also grown longer and the rewards at its conclusion—a faculty appointment and the funding to chart an independent research direction—less certain.

For most labs, the selection and mentoring of postdocs is critical for success. Indeed, if you do a quick survey of Hughes labs, you will find that most of the people doing the science are postdocs. So with this issue of the HHMI Bulletin, we begin a two-part series on the postdoctoral experience. Our first part focuses on how scientists recruit and mentor their postdoc colleagues. The second part—slated to appear in the May 2011 issue—looks at the experience from the perspective of the postdocs.

My own path was somewhat unusual. While still a graduate student, I had the good fortune to become a junior fellow at Harvard University, which gave me a valuable degree of independence (and funding) at Harvard and later at the Cold Spring Harbor Laboratory. Jim Watson, whose lab I joined, was one of those rare mentors who did not put his name on papers published by his graduate students and postdocs unless he had been directly involved in the work—even if it had been inspired or highly directed by him. So, even though I received a great deal of help along the way, the first paper I published in Cell carried my name alone. That’s an experiment today’s postdocs are not eager to attempt for fear they won’t be taken seriously by scientific journals, and few if any mentors have been able to continue Watson’s generous authorship tradition.

During my early years as an independent scientist at the University of California, Berkeley, graduate students dominated my lab. As my research program picked up steam, the lab reached a critical inflection point and a transition to postdocs. Today, the ratio of postdocs to graduate students is about 2:1. What do I look for? Someone highly self-motivated—with raw talent, bold thinking, and fearlessness—who may well have trained in a field that’s outside my own because, for the health of the lab, we all need to keep learning and growing. I am very upfront about expecting something exceptional. But I also commit to providing the time and resources to make that possible. After all, for anyone to undertake a risky project, they need to be given the freedom to fail or change direction, time to pick themselves up, and the resources to start over. There’s perhaps no better example than Linda Buck, who used a second postdoctoral position in Richard Axel’s Columbia University lab to conduct the research for which they shared the 2004 Nobel Prize in Physiology or Medicine.

Many features of the scientific landscape have changed over the past three decades, but one shift has made things particularly difficult for postdocs: scientific publishing. What was once considered a publishable unit—that is, a reasonable-sized scientific story that a single graduate student or postdoc can accomplish in two or three years—has morphed into something else entirely. Now, generating enough pioneering data to warrant a paper in a top-tier journal like Cell or Nature can take four to five years, often requiring multiple rounds of review and with much of the hard-earned data relegated to “supplemental figures.” Thus, even the most successful postdoc must wait up to five years to start looking for a job and another 18 months for the pieces to come together.

This is where the relatively long-term, stable support given to Hughes investigators has made a significant difference. They have the flexibility in managing resources to give postdocs time and freedom to pursue risky, groundbreaking work—something that would be more difficult if the lab’s only funding were more short term or limited. Yet HHMI’s contribution is a virtual drop in the bucket compared with the National Institutes of Health and the National Science Foundation. Unfortunately, the budgets of these federal agencies are being subjected to unrelenting pressure. In the coming years, it will be critical for us all to continue emphasizing the importance of science and technology to the culture and economy of the United States. It’s an essential enterprise that rests quite literally in the hands of a pool of talented U.S. and international postdoctoral researchers.