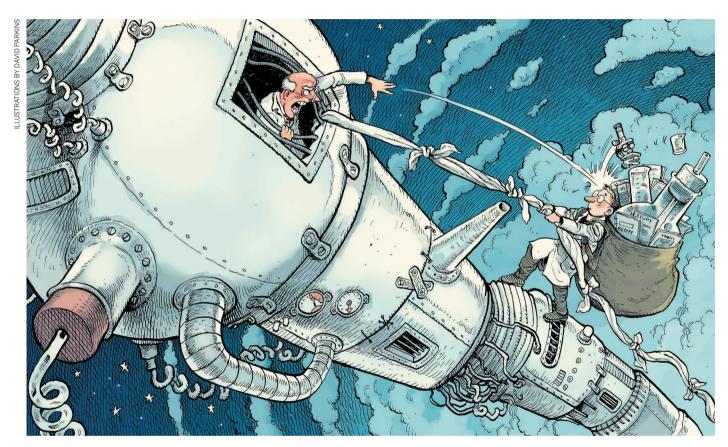
COMMENT

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Stop blocking postdocs' paths to success

Lab heads should let junior researchers take their projects with them when they start their own labs — it drives innovation and discovery, argues **Ben A. Barres**.

Postdocs are the engines of scientific progress. Typically poorly paid despite their three to seven years of doctoral training, they might labour in a postdoc lab for another four to nine years before moving to a more independent and remunerative career. What are they owed in return?

One type of postdoc maltreatment is rarely discussed, despite its prevalence and importance — should a postdoc be able to take their research project with them when

they set up their own lab? And if so, should that new principal investigator (PI) be free from direct competition on that project with his or her former mentor? In my view, the answer to both questions is yes. Such 'project porting' is crucial for the success of young scientists and should be a fundamental right for postdocs.

This is such a touchy topic that it is only now that I feel comfortable writing about it. I am at the end of a long academic career and dying of stage four pancreatic cancer. I think it's time for the academic community to start openly discussing the issue of research freedom for postdocs (or lack of it).

Opinions will vary, but different strategies could enable PIs and postdocs to handle the issue more constructively. At the very least, trainees looking for a postdoc job need to find out about the policies of potential mentors before selecting a lab, and assess the

implications that these policies could have for their independent success

WHO OWNS WHAT?

Most mentors at the PI level have policies on research ownership. Unfortunately, many postdocs fail to ask what these policies are, either through lack of forethought or because they assume that it will not be an issue. Some mentors, if asked, warn prospective postdocs that they will not be free to take their projects with them to their own labs. (The meaning of 'project' may vary depending on the mentor, from the postdoc's specific research question to the entire subject area of the mentor's lab.) Others permit postdocs to retain their projects on moving, but then directly compete on the same

A postdoc is formally free to work on any project in his or her own lab. But those that spurn

their advisers' wishes risk losing their support — something that is usually crucial for winning junior investigator awards and other types of funding, or when trying to obtain a promotion, say from assistant to associate professor.

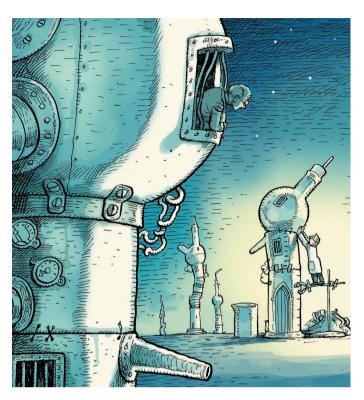
So what is wrong with an adviser asking a postdoc to begin a different project on setting up their own lab?

Doing so assumes that a given topic is owned by the adviser and that the adviser can control who works on it. This is insulting to the postdoc, who in most cases has earned co-ownership by pushing a project forward with ideas and hard work.

Most importantly, when it comes to obtaining a faculty position or funding for a newly independent laboratory, having compelling preliminary data greatly increases the chances of success. Such data are most feasibly obtained from the final stage of a postdoc, or from research in the same area in a new lab. In addition, having to start work in an entirely different area makes it harder to achieve tenure because of the short tenure clock. Over time, the best faculty members will often launch projects in new areas, but this typically happens only after a lab is established.

Another strategy is to allow a postdoc to start a project in their final year that they can then take with them. In my experience, however, postdoc training periods are already so long and it takes so much effort to get papers published that there is rarely time for a postdoc to make headway before starting their own lab.

If a mentor lets a postdoc retain their



project but continues to work on the same question, this doesn't solve the problem. In most cases, there is simply no way that a young person starting a lab can compete successfully with their former mentor. Established labs have an endless stream of excellent postdocs; new labs typically get started with graduate students, who take longer to train and to do meaningful experiments.

COMPETITOR CLASH

I believe that not allowing postdocs to take projects with them, or competing with them when they do, harms science. It is well known among senior investigators that mentors who are ungenerous to their trainees have a lower rate of trainee success, and their area of research suffers as a result. By contrast, generous mentors soon find that their trainees dominate a given field, and that together they can rapidly move it forward.

For instance, the neurobiology department at Stanford University — where I hold a professorship — has a long tradition of caring about mentorship. All faculty members allow their postdocs to take projects on to their own labs, free from competition. On analysing lists of trainees, I found that nearly 70% of our postdocs over the past 25 years have gone on to run their own academic labs and to achieve tenure. Anecdotal evidence suggests that the US national average is less than 10%. Indeed, in any given field, one can easily think of outstanding scientists who also manage to be generous mentors with no sacrifice

to the quality of their science.

If preventing postdocs from porting projects to their own labs is so detrimental to young researchers and to science, why do so many PIs do it? Highly competitive lab leaders wishing to become the best in their field can feel that they are working on a half-eaten pie if they focus on a research question to which others are contributing. They may imagine that their chances of winning a Nobel prize or other prestigious award are lessened if there are too many contributors to a field. Or they can understandably feel they have invested their entire careers in developing a project area, whereas the postdoc has invested only a few years and relies on building on the PI's previous work.

Some may even be concerned that science could be harmed if PIs stop working on a project that has been taken to another lab by a postdoc. A young PI

may be less likely to make advances than an accomplished, well-funded lab would be.

I am not persuaded by any of these arguments. In fact, I think that keeping the whole pie for oneself is sheer gluttony.

I don't believe that science is better off as a completely open competition. Pitting large, established research groups against the nascent labs of young scientists is not fair. And, as in business, monopolies act against the welfare of the whole by preventing innovation. Indeed, in my view, established labs can stifle creativity in their field even as they flourish. Young labs are much more likely to bring new ideas and to question dogmas. Worse, excessively competitive behaviour drives many talented young researchers out of science altogether.

Allowing a postdoc to retain a project does not mean that the PI leaves the field; it just means that they don't assign the obvious next research step to their subsequent postdoc. As a PI myself, I will admit that this approach sometimes seems painful. Discoveries typically result from the years of effort my lab has put into a project and a postdoc's contributions. Often, the immediate next steps are exciting — it is tempting to keep going. Moreover, starting an entirely new project is always challenging, because you first need to obtain sufficient preliminary data to win funding. But with mentorship, there is a time when you must make the welfare of your trainee the highest priority. As with good parenting, I believe that one should give to one's trainees until it hurts to do so.

With every step forward in science,

more questions are raised than have been answered. In my case, there is no end of interesting and unexplored avenues about glial cells and their roles in health and disease. In fact, one of my greatest frustrations is that there are questions in my field for which I will not discover the answer during my lifetime. It is a great consolation to know that I have trained many terrific young scientists, who, in their own labs, will keep exploring these areas long after I am gone.

GOOD TRACK RECORD

For all of these reasons, graduate students who hope to one day have their own labs need to take great care in selecting their postdoctoral mentor (B. A. Barres *Neuron* **80**, 275–279; 2013). The best mentors serve as strong role models when it comes to doing creative and rigorous science. They are also highly generous people who are willing to give their postdocs academic freedom, the long hours needed to teach them how to design good experiments, and continued support long after their trainees have left, for instance by providing recommendation letters or advice.

Graduate students should investigate the training track records of labs of interest, and discuss these labs with their PhD advisers, programme directors and thesis committee members. All prospective postdocs would be wise to explicitly ask potential mentors (as well as the mentors' previous trainees) what their policies are. In fact, all should be aware that when hiring committees assess an individual postdoc's prospects for future success, they routinely consider whether the applicant is from a lab that allows postdocs to retain projects and, if so, whether that lab is known to directly compete with its former trainees.

Many ungenerous mentors are also highly accomplished scientists. They are often tenured and run successful labs that add stature to their universities and bring in large amounts of funding. So it is not surprising that university leaderships generally overlook poor mentoring. Instead, everyone in biomedical science should strive to reward high-quality mentorship and to protect young scientists.

I think that the topic of research ownership should be included in ethics courses, such as those now mandated by the US National Institutes of Health (NIH) graduate training grants.

Indeed, funding agencies worldwide should do more to ensure postdoc welfare. In the United States, the NIH's Pathway to Independence (K99) Award is a step in the right direction. Postdocs must formulate specific aims for their own laboratories as part of their funding applications. This prompts them to begin early discussions

with their mentors about what they will do on completing their training. Similarly, the K01 Postdoctoral Mentored Career Development Award from the US National Institute of Neurological Disorders and Stroke funds postdocs to work on a project that they can take with them when they start their own labs.

I believe that the major funders of postdoc fellowships, such as the European Molecular Biology Organization and elite funding foundations, should mandate that postdoc fellows be free to take their projects when they move on to their own laboratories. Given that competition for these fellowships is intense, why shouldn't funders and foundations support the postdocs who are most likely to be successful in their own labs?

For graduate students looking to select a postdoctoral mentor, a helpful step would be for the NIH and other funding organizations to make lists of all trainees from training-grant applications available through a public database. These lists would greatly assist prospective postdocs by allowing them to see the training track record of each lab they are considering. In the

"Why should we honour those who don't support science's next generation?" United States, the National Postdoctoral Association could assume this responsibility (information on funded grant applications is public information that

the NIH must disclose on request).

Importantly, grant-review committees should consider training track records during evaluations of applications from established labs. It is encouraging that the Howard Hughes Medical Institute (a non-profit medical-research organization in Chevy Chase, Maryland) has started to put more emphasis on a mentor's training record as one criterion when making decisions about renewing funding. Similarly, I believe that an individual's training track record should be factored in when considering the award of prestigious science prizes. Why should we honour those who don't support science's next generation?

Right now, PIs wishing to take advantage of their postdocs can act with impunity. In this increasingly competitive world, where it is harder than ever for young scientists to get off to a good start in their own laboratories, it is incumbent upon us as a community to ensure that those to whom we hand the baton are treated equitably.

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