nature chemical biology

Going global?

Increasing international interest in research at the chemistry-biology interface has spurred the creation of new scientific journals, university departments, scientific societies and funding initiatives centered on chemical biology. The electronic age has fostered the growth of international collaboration and communication in this emerging field. Most chemical biology laboratories thrive on the contributions of an international cast of researchers joined by common scientific interests. In an environment where diverse scientific viewpoints and worldviews come together, cosmopolitan research groups offer an effective milieu to advance research frontiers.

Despite their many advantages, international research teams can be challenging for principal investigators to build and maintain. Furthermore, students who choose to pursue their PhD or postdoctoral studies in a foreign country face potential language, cultural, immigration and financial barriers. Given the importance of training young scientists for increasingly global careers in science, the chemical biology community needs to think creatively about how to encourage and support greater international scientific exchange.

European and Asian graduate students and postdoctoral scientists have traditionally been the most open to international training. There are probably many reasons for this high geographic mobility, including a scientific culture in the home countries that encourages international experience. Many established researchers in Europe and Asia have benefited from PhD or postdoctoral studies abroad, and these investigators are strong proponents of international training for their students.

In the United States, more than half of postdoctoral scientists are not citizens or permanent residents (*Enhancing the Postdoctoral Experience for Scientists and Engineers*, National Academy Press, Washington, DC, 2000). US research success and productivity depend heavily on this specialized labor force, and many challenges remain to improving opportunities for visiting scientists. Numerous reports have highlighted the increased scrutiny given to international scientists seeking US visas to engage in research or attend conferences since the events of September 11th, 2001 (*Nature* **431**, 231, 2004). As a result, the sustainability of the pipeline of international scientific researchers to the United States remains in question (*Nature* **438**, 541, 2005). Equally vexing to US principal investigators has been the lack of fellowship support for postdoctoral or graduate researchers who are not US citizens. Agencies such as the National Institutes of Health (NIH) and National Science Foundation (NSF) fund pre- and postdoctoral fellowships, but application is restricted to US citizens or permanent residents. NIH Institutional Training Grants have similar restrictions. Thus, investigators must commit funds from overhead-bearing grants, university accounts or external awards, which do not have strict citizenship requirements, for the support of international researchers. However, a new extramural grant program, recently announced by the NIH, offers some hope that US funding agencies are becoming sensitive to the necessity of recruiting top international scientists at early stages of their careers. The NIH Pathway to Independence Award (http://grants.nih.gov/grants/guide/pafiles/PA-06-133.html), beginning in 2006, will support scientists as they make the transition from the postdoctoral research bench to independent research careers. Awardees will be supported through their postdoctoral studies and into their first permanent research position, for up to five years. Although other similar programs exist (for example, the Career Awards in the Biomedical Sciences from the Burroughs-Wellcome Fund: http://www.bwfund.org/programs/biomedical_sciences/career_background.html), the new NIH program takes the important step of allowing applications from noncitizens who pursue their research in US labs. Although this is an advance for international scientists seeking careers in the United States, private and public funding agencies worldwide should develop new mechanisms to attract top scientists to their nations, in an effort to expand the global network of researchers.

In contrast to the large numbers of international scientists who seek research opportunities in the United States, it is uncommon for American scientists to venture to other countries for scientific training (*Science* **289**, 867, 2000). Concerns about language proficiency may be an impediment, but other factors play a role. In many biology and chemistry departments in the United States, graduating PhDs with designs on postdoctoral positions abroad are often discouraged from pursuing them by their colleagues and mentors. A common argument is the perceived difficulty of finding a permanent position upon returning home. However, examples abound of chemists and biologists who studied abroad and established themselves either in new locations or back in the United States. American principal investigators should more actively encourage students to consider international studies and provide guidance when these scientists return to the country or continue their careers abroad. Funding challenges also limit the number of US scientists involved in labs outside the country. A few granting organizations, such as the Human Frontier of Science Program (http://www.hfsp.org), provide fellowships that allow postdoctoral mobility. However, it is generally much more difficult to receive money for training outside of the United States. Perhaps cross-national programs, such as the Invitation Fellowships that are cosponsored by the Japanese Society for the Promotion of Science (JSPS) and the US NSF and support research by US scientists in Japanese laboratories, offer a model to encourage American researchers to consider opportunities outside the United States. The US government and funding agencies should expand these new models by, among other things, easing restrictions on Americans doing research abroad and providing funds for repatriation to ease the process of finding a job when these scientists return to the United States.

The chemical biology community has much to gain by being international, rather than insular. We welcome your Correspondence on how to expand international research opportunities at our website: http:/www.nature.com/naturechemicalbiology. ■