

PERSPECTIVES & OPINIONS

A black and white portrait of Jack E. Dixon, a middle-aged man with short, light-colored hair, smiling warmly. He is wearing a dark suit jacket over a light-colored button-down shirt. The background is dark and out of focus.

Jack E. Dixon

SCIENCE
TRENDS

SCIENCE TODAY REQUIRES A
BROADER SET OF TOOLS.

Paul Fellers

The life of a researcher is not what it used to be, according to Jack E. Dixon. HHMI's vice president and chief scientific officer thinks scientists today face a more complex, more interesting venture than when he first set up his laboratory 30 years ago. At the same time, he says, young investigators must contend with a funding system that rewards "safe science" and saps creativity.

How has science changed?

When I first started in science it was possible to be at the top of your game by focusing intently on one narrow area. Today, we have new fields of study—molecular biology, genomics, stem cell biology—that pull so many scientific specialties together. Now scientists have to be willing to move into areas where they are less knowledgeable. Science today requires a broader range of skills than in the past, which is what makes it more complex and also more interesting.

This new complexity requires scientists to collaborate and be much more interactive to address scientific questions. The very best people must be better at communicating not only with researchers in their fields, but also with scientists in a broad range of fields. That is exciting because it means you are constantly challenging yourself. Research also appears to be moving at a faster pace.

Is anything important lost when scientists do less themselves and do more with reagent kits and other prepackaged tools?

Sure. I don't know of any lab director or principal investigator who is not concerned about this. Those who use kits know how to mix things together to get results, but they often don't know the biochemistry or the molecular biology that went into putting that kit together. If the experiment doesn't work, they don't really understand why. The kits are a blessing and a curse. However, it's a genie that's out of the bottle and it's clearly not going back in—kits are here to stay.

What is the short-term—and long-term—impact of the slowdown in federal funding for biomedical research?

Scientists spend a lot of time writing and rewriting grant applications—time better spent working in their labs or

thinking creatively about solving biological problems. Without reliable funding, that lab is unstable. We have people with a tremendous amount of training—undergraduate, graduate, and postdoctoral training—who have become faculty members and they can't get a shot at using that training because they spend a large chunk of time applying for funding or having their grants turned down by funding agencies.

I would argue that isn't a good use of time for people to repeatedly rewrite a grant rather than conduct the research proposed in it, especially when one considers that extraordinary breakthroughs are often reported by younger scientists.

Are you seeing a different impact on young investigators and seasoned investigators?

The grant situation affects both groups. When I was chair of the biological chemistry department at the University of Michigan Medical School, I used to say there were two times in a scientist's career when he or she needed special attention: at the beginning and near the end. Young scientists are full of energy and ideas they want to try out. Yet, the percentage of grants going to investigators under age 40 has dropped from 27 percent in 1995 to 17 percent in 2005. This bleak funding outlook has a devastating effect on a young person's morale, confidence, and productivity.

Looked at another way, the average age for a scientist with a Ph.D. to get a first research project grant from the National Institutes of Health (the RO1 grant) is 42. To put that into perspective, HHMI President Tom Cech would have been awarded his Nobel Prize before he received his first RO1. My mother had a saying: pennywise and pound foolish. I think that applies to this situation where you effectively take away the 10 most productive years in a scientist's career.

INTERVIEW BY LISA SEACHRIST CHIU. *Jack Dixon, a chemist by training, maintains an active research program at the University of California, San Diego.*