US stands to lose a generation of young researchers

March 11 2008

Five consecutive years of flat funding the budget of the National Institutes of Health (NIH) is deterring promising young researchers and threatening the future of Americans' health, a group of seven preeminent academic research institutions warned today.

In a new report released here, the group of concerned institutions (six research universities and a major teaching hospital) described the toll that cumulative stagnant NIH funding is taking on the American medical research enterprise. And the leading institutions warned that if NIH does not get consistent and robust support in the future, the nation will lose a generation of young investigators to other careers and other countries and, with them, a generation of promising research that could cure disease for millions for whom no cure currently exists.

The report, "A Broken Pipeline" Flat Funding of the NIH Puts a Generation of Science at Risk," was co-authored by Brown University, Duke University, Harvard University, The Ohio State University, Partners Healthcare, the University of California Los Angeles, and Vanderbilt University.

It profiles 12 junior researchers from institutions across the country who, despite their exceptional qualifications and noteworthy research, attest to the funding difficulties that they and their professional peers are experiencing. These researchers are devising new ways to manipulate stem cells to repair the heart, revealing critical pathways involved in cancer and brain diseases, and using new technologies to diagnose and

treat kidney disease.

The 20-page report follows up on a related report released by a group of academic institutions in March 2007 “Within Our Grasp—Or Slipping Away" Assuring a New Era of Scientific and Medical Progress.” That report, issued by a similar group of nine institutions across the country, showed how stagnant NIH funding was slowing discovery and squandering the significant opportunities for breakthroughs that past investment has put within reach.

“This is a real problem, discussed at almost every meeting one attends on campus, that can’t be simply dismissed,” said Drew Faust, Ph.D., President of Harvard University. “This is about the investment that America is – or is not – making in the health of its citizens and its economy. Right now, the nation’s brightest, young researchers, upon whom the future of American medicine rests, are getting the message that biomedical research may be a dead end and they should explore other career options —and in too many cases, they’re taking that message to heart. The President’s latest budget proposal that calls for another year without an increase will only make the problem worse.”

The “Broken Pipeline” report focuses on the effect that recurring flat funding is having on young researchers in particular. Junior researchers—typically assistant and associate professors who are trying to establish their own research laboratories—are getting a much smaller piece of the NIH funding pie to conduct their medical investigations, the report says. However, competition for limited resources is affecting scientists at every point of the academic research pipeline.

Between 1998 and 2003, the Clinton and Bush Administrations and Congress doubled the budget of the NIH, an effort that, in many ways, transformed many fields of biomedical research. This happened through the completion of the human genome project, and the creation of

powerful new tools that provide a window into biological systems unavailable in the past resulting in, among other things, breakthroughs in cancer diagnosis and treatment that have caused cancer rates to fall.

However, in 2003, the budget increases stopped and, since then, the NIH has experienced a 13-percent drop in real purchasing power. As a result, research progress has slowed, and leading researchers' new ideas for funding are stuck at a toll-gate that only allows one in ten grants to be funded upon first submission. Rejected grants, that must be revised and resubmitted, are clogging the system, creating a queue in which young researchers feel they are at the back of the pack and are much more worried about getting funded than in the past.

"There's been a lot of discussion in the last year about the negative impact of the tight NIH budget on senior researchers and their labs," said Robert Golden, M.D., Dean of the University of Wisconsin School of Medicine and Public Health. "But it appears that junior investigators may be having the toughest time in this fiscal climate. They're competing for funding with established researchers, who are their mentors, and finding that the financial support just isn't there, or that they can't afford to support themselves while writing and rewriting grant proposals."

"The feedback I received from one reviewer was that my ideas were 'very innovative and had the potential to make a big impact, but they were too risky,'" says Tricia Serio, Ph.D., Assistant Professor, Department of Molecular, Cellular Biology, and Biochemistry, Brown University. "To succeed in reaching our goals, we need the freedom to try risky things, to develop new approaches and techniques." Dr. Serio's research is focused on progressive brain diseases, like Alzheimer's, Huntington's, Parkinson's, and Creutzfeldt-Jakob (mad cow). She was named one of America's top biomedical researchers by the Pew Charitable Trusts in 2003.

Fewer resources means that NIH is experiencing a backlog in high-quality research proposals, and too few are getting funded. In fact, the overall success rate for NIH research project grants dropped from 32 percent in 1999 to 24 percent in 2007. Thus, only about one in four original research applications to the NIH is being funded, and many of those are only partially funded, and only after lengthy delays and cumbersome reapplications.

“Reviewers told us we have good data, a strong team, and well-thought-out experiments. We didn’t get funded just because there were others going for their second and third round who were waiting in line,” says Jill Rafael-Fortney, Ph.D., Associate Professor in the Department of Molecular and Cellular Biochemistry at The Ohio State University, who is working on a new treatment for heart failure.

Highlights of how flat funding is affecting research:

-- In 1990, young researchers received 29 percent of R01 grants (the premier NIH research grant needed to establish a researcher’s credibility and independence). By 2007, that dropped to 25 percent.
-- While the success rate has dropped for all R01 applicants, it is particularly low— only 18 percent— for first-time applicants.
-- First-time RO1 recipients also are older. The average age is now 43, up from 39 years in 1990.

As a result, scientists who review NIH proposals have become more conservative when judging the merits of funding research projects. They are demanding more evidence of eventual success of proposed theories prior to approving funding and inadvertently changing the way science is being conducted, discouraging innovative, big ideas in favor of safer approaches for incremental progress to scientific discovery.

“With this tight funding situation, I’ve stepped away from the riskier

stuff," says Pampee Young, M.D., Ph.D., Assistant Professor of Pathology, Vanderbilt University. "My salary and that of everyone in the lab is dependent on my getting grants. You become very savvy to what is fundable." Dr. Young's research is focused on using adult bone marrow stem cells to block the growth of tumors and to also repair damaged heart muscle.

Young investigator, Anil Potti, M.D., Assistant Professor of Medicine at Duke University says that the funding situation is hurting patients who are looking to research to help with their conditions. "I don't worry about the difficulty of getting funding from NIH for myself. I worry more about what it means in terms of patient care. The whole [grant] cycle can take 12-18 months, and that's if you're successful on the first or second try. In the meantime, I'm seeing patients every day who could benefit from this research." The work of Dr. Potti and his colleagues involves new methods to diagnose and treat lung cancer and was named one of the top science stories of 2006 by Discover magazine.

Source: Brokepipeline.org