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Life Sciences' Stewardship of Science

Philip M. Smith

Public support for U.S. federal expenditures for basic research gained momentum with the science and technology breakthroughs that contributed to the Allies' victory in World War II. After World War II, the Korean and Cold Wars concentrated research appropriations in the Department of Defense (DOD). DOD research expenditures were massive from 1950 to 1990. They included not only direct investments in weapons and intelligence systems but support of the underlying science, centered in physical sciences and engineering.

What is less well remembered today is that DOD's basic research investments were broadly based, ranging far beyond the physical sciences and engineering into the life and social sciences. Through its service research offices and the Advanced Research Projects agencies, DOD also fostered interdisciplinary research in promising new areas, such as computation, and developed new modes for the performance of research, as in university materials research laboratories. The large investment in the physical sciences also contributed indirectly to medical science and health care, giving rise to many technologies used today.

"Today's life scientists...will increasingly guide...U.S. basic research policy in the 21st century."

The life sciences now account for more than 50 percent of U.S. federal investment in basic research. Biomedical research funding has followed a pattern of steady significant growth over four decades, and the National Institutes of Health (NIH) have slowly come to dominate that funding. Today's strong federal support for the life sciences is warranted, because biomedical research is on the cusp of a revolution in preventative medicine and treatment. Nevertheless, today's overall research budget is increasingly out of balance. Federal funding of many fields in the physical sciences and engineering is down substantially since 1993 (9 to 36% in real terms in fields such as chemistry, physics, and electrical and chemical engineering). This loss, if continued, will imperil advances in these disciplines and endanger the continued flow of valuable discoveries and technologies that have been important to biomedical research and health care.

National science and technology (S&T) policy over the past four decades has largely been led by physical scientists who first gained national experience in World War II. They crafted policies for broad investment in basic research and infrastructure, including the life sciences. As we enter the 21st century, biological scientists must assume broader leadership responsibilities in S&T policy, and they must speak out about the importance of support for all disciplines, including the physical sciences and engineering. NIH's Harold Varmus and the National Science Foundation's Rita Colwell recognize the imbalance in the current federal research portfolio and have begun advocating increased investment in all areas of research.

Their leadership is to be commended, but it is not enough. Government, organizations, institutions, and industry can and should do more to bolster all basic research. NIH must set the example by much more broadly supporting innovative interdisciplinary research embracing all science, just as DOD did when it was the prime funder of R&D. Some of this has already begun in NIH's cross-institute bioengineering initiative and in prospective increased NIH support of information technology for biocomputation. Similar initiatives should be launched in other areas of the physical sciences and in the social and behavioral sciences. Funding for these initiatives should become a much larger percentage of NIH's overall expenditures.

The life science professional societies must speak broadly for basic research and not just argue their own disciplinary cases. Disease advocacy groups must also articulate the case for the physical sciences in their work with the public and before Congress. University leaders and corporate executives must make the case for investment in all research disciplines. Most of all, biologists in the laboratory—working scientists and their students—need to appreciate that their research rests on the legacy not only of the life sciences but also the physical and other sciences. Today's life scientists and the next generation they are training must be the national leaders of the future who will increasingly guide all of U.S. basic research policy in the 21st century.

The author is a partner at McGeary and Smith in Washington, DC. Over the past 25 years, he directed the National Research Council and served as an associate director in the Office of Science and Technology Policy. E-mail: pmsmith@nas.edu