

BIOMEDICAL RESEARCH FUNDING

NIH Uncovers Racial Disparity in Grant Awards

It takes no more than a visit to a few labs or a glance at the crowd at a scientific meeting to know that African-American scientists are rare in biomedical research. But an in-depth analysis of grant data from the U.S. National Institutes of Health (NIH) on page 1015 in this issue of *Science* finds that the problem goes much deeper than impressions. Black Ph.D. scientists—and not other minorities—were far less likely to receive NIH funding for a research idea than a white scientist from a similar institution with the same research record. The gap was large: A black scientist's chance of winning NIH funding was 10 percentage points lower than that of a white scientist.

The NIH-commissioned analysis, which lifts the lid on confidential grant data, may reflect a series of slight advantages white scientists accumulate over the course of a career, the authors suggest. But the gap could also result from “insidious” bias favoring whites in a peer-review system that supposedly ranks applications only on scientific merit, NIH officials say.

The findings have shaken NIH. “I was deeply dismayed,” says Director Francis Collins: “This is simply unacceptable that there are differences in success that can't be explained.” With NIH Deputy Director Lawrence Tabak, Collins has authored a response on page 940. “Now we know, and now we have a chance to do something about it. The leadership here is absolutely committed to making that happen,” Collins says.

News about the gap is drawing a mix of reactions from the African-American biomedical research community and others (see sidebar). Some are puzzled, some are shocked, and some say the results are no surprise. “We've known anecdotally for some time that African Americans are not as successful at getting R01s,” the type of NIH grant typically held by independent investigators, says Wayne Riley, president of Meharry Medical College in Nashville, Tennessee, and chair of the Association of Minority Health Professions Schools. Raynard Kington, an African-American former NIH deputy director, now president of Grinnell College in Iowa, and last author of the

study, says: “This shouldn't be news. What it should be is a wake-up call.”

NIH officials say this analysis began a few years ago after they became concerned that minority scientists appeared to be less successful in winning grants. Although peer reviewers are not informed of an applicant's ethnicity, NIH administrators have access to such information through the investigator's profile, which includes self-reported personal information. Initially, NIH looked at awards to top-tier research institutions and found little disparity; then it decided to inves-

STUDY AT A GLANCE

83,188 R01 applications from Ph.D.s analyzed

40,069 Unique Ph.D. investigators

1149 R01 applications from black Ph.D.s

337 Expected awards to black applicants if same success chance as whites

185 Actual awards to black applicants



Seeking answers. Donna Ginther and Raynard Kington probed why grant success rates were lower for black scientists.

study further. In 2008, the agency contracted with Discovery Logic/Thomson Reuters and research economist Donna Ginther of the University of Kansas, Lawrence, to do a modeling study. Ginther, who has previously focused on the participation of women in science, combined NIH grants data for 2000 through 2006 with Thomson Reuters' publications data and a National Science Foundation (NSF) database that tracks Ph.D.s. The study focused on NIH's award of a new R01, which often launches a career.

The initial surprise was that R01 proposals from black Ph.D. scientists (including 45% non-U.S. citizens) were extremely rare. They totaled only 1.4% of all applications, compared with 3.2% for Hispanics and 16% for Asian scientists. (By contrast, African Americans make up about 13% of the U.S. population.) About 60% of all proposals were deemed good enough to be scored; the rest were turned away with no score. Among highly scored grants, minority groups were funded just as often as white scientists. But when Ginther's team included both scored and nonscored proposals, they found stark differences: While 29% of applications from whites were funded, only 25% of Asian applications were and only 16% of those from black scientists (see table). In raw numbers, only 185 of nearly 23,400 funded R01 grants were from black Ph.D. scientists—less than 1%.

Ginther's team sought to account for possible confounding factors, including the applicant's training, publication record, previous research awards, type of institution, and country of origin. “We did everything but read the proposals,” Ginther says. The difference in grant success rate for Asians, 87% of whom were not U.S. citizens, disappeared when only U.S. citizens were included. This makes sense, Kington says, because difficulties with English might make it challenging for native Asians to write a strong proposal.

But for black applicants, even after accounting for the large number of non-U.S. citizens within that group, a 10-percentage-point gap remained because their proposals were more likely to be unscored or receive a low score. “It's shockingly different,” Ginther says. While agreeing that “the general conclusion is probably right,” University of Chicago professor emeritus and biostatistician John Bailar cautions that the exact size of the gap is “in question” because Ginther's team used incomplete data and relied on “a lot of big assumptions,” such as linear scaling of data.

Why didn't black scientists' proposals do as well? One possibility is that more of the applications were of lower quality, Ginther says. She and her co-authors suggest that white scientists may enjoy a “cumulative advantage” in grant-writing—for example, through better access to mentors and research collaborations. Still, if that were the explanation, there should have been a gap for Hispanic scientists, too, suggests biologist Richard Morimoto of Northwestern Univer-

A Minority Viewpoint

Although a study published today in *Science* (p. 1015) raises the specter of potential racial bias in grant reviews at the U.S. National Institutes of Health (see main text), several black biomedical scientists who've served on NIH study sections say they've seen no direct evidence of this.

"I must say, race never comes up in discussion," says Floyd Wormley Jr., a microbiologist at the University of Texas, San Antonio, who serves as a standing member on NIH's AIDS-associated Opportunistic Infections and Cancer study section. "In my experience, most of the time, you do not know the nationality, and oftentimes you don't know the gender, of the person writing the grant. Race is never an issue. ... We only grade the science."

When the community of scientists within a field is small enough, however, it's possible to tell who's who based on biographical information within the proposal, says Squire Booker, a molecular biochemist at Pennsylvania State University, University Park, who recently served on NIH's Macromolecular Structure and Function study section. "I know a lot of them," he says, "and so I'll know which ones are minority scientists." But Booker is quick to point out that that knowledge has never publicly factored in to any reviews in which he's participated.

Chester Brown, a pediatric geneticist at Baylor College of Medicine in Houston, Texas, who reviewed grants for an ad hoc study section on cellu-

lar aspects of diabetes and obesity, says that although race never came up in his section's review discussions, he can't rule out that knowing a grant applicant was a member of a minority group might unconsciously influence his decision—in a positive direction. A more likely explanation for the race gap, Brown suggests, is that young black scientists have a harder time finding mentors to whom they can relate; as a result, they may not receive as much training or guidance in grant writing. "There just aren't as many faculty that look like us," Brown says.

The mentoring issue cuts both ways, Wormley notes. The time constraints imposed by serving on minority recruitment committees and mentoring students often leaves precious little time for minority scientists to do their own research. "As an underrepresented minority, you want to give back," he says. "But as one minority scientist told me once, 'You do no one, especially other minorities, any good if you don't get tenure.'" Make no mistake, he says: Receiving an R01 is essential to success in the biomedical field at a research university: "If you do not get an R01, you probably will not make tenure."

—MICHAEL PRICE

Michael Price is a writer with *Science Careers*.

Online

sciencemag.org

S Extended companion article in *Science Careers* (<http://scim.ag/R01RaceGap>) and discussion on *ScienceLive* (http://scim.ag/chat_minorities)

sity in Evanston, Illinois.

Another possibility is that some reviewers infer the race of an applicant from clues, such as the college attended or the name. That knowledge could influence assessments, Collins says. "I would like to believe that flagrant, intentional racism is rare," but "more subtle kinds of bias can't be ruled out," Collins says.

One expert on racial inequality, economist Samuel Myers of the University of Minnesota, Twin Cities, calls for the same type of comprehensive analysis to be done for NSF; overall funding rates for black scientists who apply for NSF grants are about 4 percentage points lower than for whites, according to the agency's own data since 2002. "It's not a high percentage, and we don't know how statistically important it is, but we do track it," says NSF spokesperson Maria Zacharias. Looking only at research grants "would reveal a much larger disparity," Myers suggests.

Publicizing that young black scientists have such a hard time winning NIH's R01s, some leading black biomedical scientists say, may unfortunately make things worse. The paper "could have a chilling impact on our ability to mobilize and inspire young people," says Reed Tuckson, executive vice president of UnitedHealth Group in Minnetonka, Minnesota. James Hildreth, dean of the college of biological sciences at the

University of California, Davis, says that at historically black universities, there's already "an intimidation factor" about submitting research proposals to NIH. "Many have the presumption that it won't be evaluated objectively or fairly." Now those fears may be warranted, Hildreth says. Adds neuroscientist Erich Jarvis of Duke University in Durham, North Carolina: "Sometimes it's good to be naive."

minorities in a new program that allows early-career scientists to participate in study sections to learn about the process. Mentoring could make a big difference, too, says Freeman Hrabowski, president of the University of Maryland, Baltimore County: "Even for the best of the best, we need to be giving more support." NIH is setting up two committees, one internal and one external co-chaired by Tuckson, to brainstorm about solutions.

NIH also plans to take a closer look at its training programs aimed at filling the minority scientist pipeline. The agency has a variety of programs meant to expand that pipeline, but a 2005 National Research Council study co-chaired by Bailar found that NIH wasn't compiling the data it needed to show they were working (*Science*, 20 January 2006, p. 328). The fact that black scientists submitted less than 2% of all Ph.D. applications for R01s and

that investigators from outside the United States made up nearly half of that indicates that African Americans are "even more underrepresented than we had thought," Kington says.

NIH also hopes to explore another troubling finding: Black scientists benefit less from training programs than white scientists do when they apply for an R01. "A lot of questions remain to be answered," says study co-author Walter Schaffer of NIH.

—JOCELYN KAISER

Ph.D. GRANT APPLICANTS AND FIRST R01 AWARDS 2000–06

Race	Number of applicants	Percent of applications	Number of awards	Award probability
Native American	41	0.0%	12	29.3%
Asian	13,481	16.2%	3430	25.4%
Black	1149	1.4%	185	16.1%
Hispanic	2657	3.2%	746	28.1%
White	58,124	69.9%	17,017	29.3%
Other	99	0.1%	27	27.3%
Unknown	7637	9.2%	1964	25.7%
Total	83,188	100.0%	23,381	28.1%

NIH intends to figure out what's responsible for the R01 success gap with some experiments, such as conducting reviews with no identifying information about the applicant. NIH may also have reviewers and staff undergo tests to learn about implicit biases. "We can probably never remove all of these factors that might unconsciously be influencing the assessment," Kington says, but "I'll be happy if we can do better."

To help black scientists craft stronger proposals, NIH will make an effort to include

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Jocelyn Kaiser

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