



Opportunities and Challenges for the NIH — An Interview with Francis Collins

Robert Steinbrook, M.D.

Francis Collins, the physician and geneticist who was sworn in as the 16th director of the National Institutes of Health (NIH) in August 2009, anticipates scientific opportunities and budgetary challenges. Although the NIH received \$10.4 billion in new funding under the American Recovery and Reinvestment Act, the money must be spent by September 2010 and the institutes' budget has otherwise been relatively flat since 2003 (see graph).¹ Fiscal year 2011 begins on October 1, 2010, and prospects are uncertain.

Collins, 59, has led the Human Genome Project and directed the National Human Genome Research Institute at NIH; his laboratory has identified many important genes. He also established the BioLogos Foundation, which addresses the interface between science and faith, and wrote a best-selling 2006 book, *The Language of God: A Scientist Presents Evidence for Belief*. Some observers expressed concern that his personal religious beliefs would affect his judgments as NIH director.² When he became director, Collins resigned from the foundation, ended his involvement in public discussions about science and faith, and provided reassurances that his agenda for the institutes is scientific, not religious.

Collins has announced five priority areas: applying new technologies to the understanding of basic biology and the causes of specific diseases; translational research; putting science to work for health care reform, an area that includes comparative-effectiveness research; global health; and “reinvigorating and empowering” the research community through such means as supporting young investigators, focusing the peer review system on innovation, and seeking to achieve a “stable and predictable funding trajectory for biomedical research.”

Dr. Robert Steinbrook (rsteinbrook@attglobal.net), a national correspondent for the Journal, interviewed Dr. Collins on September 2, 2009.

Robert Steinbrook: As NIH director, what do you consider the major scientific challenges?

Francis Collins: The major challenges are to find the right balance between big science and investigator-initiated efforts and also the balance between basic and applied research. Those are two nonoverlapping categories that I know people feel a certain tension about. I do, too.

Given my history with the genome project, many people assume I will be in favor of big science. I would say yes, in the sense that big science empowers everybody, but no in the sense that you don't just do big science because it's big. The foundation of advances in biomedical research will continue to be the bright ideas of individual investigators, but if they are empowered by tools and databases and technologies that big science has made available, then we can go faster.

Steinbrook: What has been the impact of the Recovery Act on the institutes?

Collins: We went through a very difficult time from 2003 to 2008 because of the absolute flat nature of the budget for biomedical research, which, when you consider inflationary challenges for the cost of doing business, actually meant a loss of almost 20% in terms of buying power. There is an enormous pent-up demand for research funding. When we announced the challenge grants as one of the new initiatives to be funded by stimulus money, we expected that we might get 3000 or 4000 applications. We got 21,000 applications, of which we can fund probably 3%.

Steinbrook: What happens after the \$10.4 billion in funding from the Recovery Act runs out?

Collins: That is the big anxiety. There is much discussion about the NIH falling off a cliff. Scientific research is not a 100-yard dash. It is a marathon. Two years is way too short to take a cool idea and develop it to some sort of end point. The idea of revving up the engine and then taking away the gas is anomalous, to say the least. The feast-or-famine scenario has got to be the worst possible thing for medical research.

Of all the arguments for increasing the NIH budget, the one I come back to and that people most resonate with is scientific opportunity. There are unique abilities to understand the fundamentals about how life works and how disease occurs. The tools for discovery are at an unprecedented level of power and getting more powerful all the time. I am confident that we will get a very good hearing about the value of medical research.

Steinbrook: The Recovery Act provided \$1.1 billion for compar-

ative-effectiveness research, including \$400 million for the NIH. What is the role of the institutes?

Collins: The NIH has been doing comparative-effectiveness research for many years. Hundreds of studies. They didn't have the label. This is an enthusiastic participation in an area of research that is interesting and clearly



valuable in terms of the ultimate impact on public health.

Maybe 10 or 15 years ago, people could ignore the economic consequence of the failure to incorporate evidence into medical practice. But the ruckus has been raised, and whatever comes out of health care reform, it's going to have to include more incorporation of evidence. The idea that the implementation of well-proven conclusions from research can be postponed indefinitely is not going to work.

Steinbrook: Will the NIH become politicized if it takes an active role in health care reform?

Collins: That is always a risk. I am exploring this. I don't know the answer precisely. I do think the idea that NIH's responsibility for trying to influence public health ends at the point of running a clinical trial and publishing the results may be a little narrow for the climate that we are in. While we are a research organization,

and that's always going to be our focus, maybe there is more opportunity now. Our expenditures on health care can't really continue to rise above 17% of the gross domestic product, where they are right now, without huge and horrendous consequences.

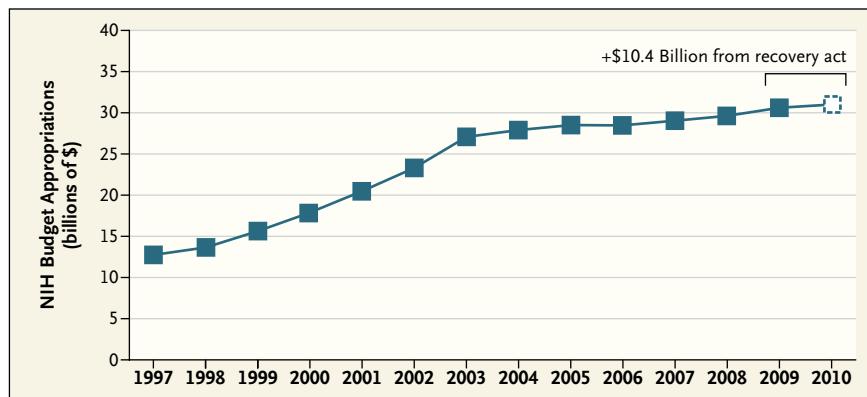
Steinbrook: What will the results of stem-cell research mean for human health?

Collins: My crystal ball is just as cloudy as everyone else's. However, the developments in understanding stem cells and how they could potentially be brought to bear for a whole host of medical problems are some of the more exciting things that have happened in the last decade. In terms of therapeutics, we are just so early on. The one clinical trial approved by the Food and Drug Administration — for spinal cord injury — is currently on hold.

Steinbrook: Before becoming NIH director, you were away from the institutes for a year and wrote a book, *The Language of Life: DNA and the Revolution in Personalized Medicine*, that will be published in January 2010. What is your take?

Collins: The term "personalized medicine" has been bandied around a lot without necessarily defining exactly what it includes or where it is going. The book presents my thoughts on what is now possible and what may become possible in the era of complete genome sequences for all, which is probably not that far away, maybe 4 or 5 years.

As part of writing this book, I anonymously had my own DNA sampled by the three companies that are doing direct-to-consumer marketing of DNA testing, because there is obviously a lot of interest in all that and I was interested, too. The laboratory side of this seems to work pretty well, because they all got the same geno-



Growth of the NIH Budget, 1997–2010.

The NIH budget request for fiscal year 2010, which begins on October 1, 2009, is \$31.0 billion, a 1.4% increase over the fiscal year 2009 budget. Congress has yet to set the final 2010 budget.

type. They were not consistent, however, in how they interpreted the results, because the field is moving so quickly. I think all the companies probably overrepresented the degree to which we already can predict people's future risk of illness and underrepresented how much of heritability has yet to be discovered. But still I have to say I found it an interesting experience and even one that caused me to think a bit about my own future health management. I wasn't quite expecting that.

Steinbrook: What do you see as the future of pharmacogenomics?

Collins: Pharmacogenomics will undoubtedly become a very compelling part of medical practice. The limiting factor right now is that oftentimes, if you are ready to write a prescription, you do not want to wait a week to find out the genotype before you decide whether you've got the right dose and the right drug. But if everybody's DNA sequence is already in their medical record and it is simply a click of the mouse to found out all the information you need, then there is going to be a much lower barrier to beginning to incorporate that information into drug prescribing. If you have the evidence, it will be hard, I think, to say that this is not a

good thing. And once you've got the sequence, it's not going to be terribly expensive. And it should improve outcomes and reduce adverse events.

Steinbrook: Elias Zerhouni, who served as the NIH Director from 2002 to 2008, responded to many concerns about financial conflicts of interest at the institutes. What are your views?

Collins: There is nothing more critical for the medical research community than its integrity and credibility. Dr. Zerhouni faced a very difficult challenge when a number of examples of personal and financial conflicts were uncovered in the intramural program. He took the action that he had to take. In many people's views, this was quite draconian, but it did settle down the Congressional and public concerns.

In the extramural community, obviously NIH is not in a position to play policeman. But as the organization that gives out grant money, we have a serious investment in making sure that it is used in a fashion that is free of any charges of conflict. NIH has had guidelines in place, but they have not always been enforced at the level that some people think they should be. I share the sense that if there are other ex-

amples out there — and we have seen some of that appearing in the press — that indicate that there are NIH-funded investigators who are in such conflicts, we need to clean that up. Otherwise, the whole field is at risk.

With regard to potential changes in federal regulations, I am very much in support of what has been done so far.³ We will be moving forward and proposing some tightening up of the system of reporting, probably in several months. I personally am in favor of the idea that sunshine is the best disinfectant. The idea of having a public database where all investigators disclose what kinds of financial arrangements they have with outside organizations is a good thing.

Steinbrook: Will the NIH create and host a comprehensive database?⁴

Collins: Potentially. That is certainly an idea under discussion.

Steinbrook: Do you have a final comment?

Collins: I think people worry that "Collins is that genome guy" and he is "going to turn the whole NIH into a big genome institute." I don't want to be seen that way. I want to be seen as the director of the entire amazing enterprise, all 27 institutes and centers with all the investigators and the science that they represent.

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