

NOMINATION

HEARING

BEFORE THE

COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS

UNITED STATES SENATE

ONE HUNDRED SEVENTH CONGRESS

SECOND SESSION

ON

ELIAS A. ZERHOUNI, OF MARYLAND, TO BE DIRECTOR OF THE
NATIONAL INSTITUTES OF HEALTH

APRIL 30, 2002

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NOMINATION

TUESDAY, APRIL 30, 2002

U.S. SENATE,
COMMITTEE ON HEALTH, EDUCATION, LABOR, AND PENSIONS,
Washington, DC.

The committee met, pursuant to notice, at 10:02 a.m., in room SD-430, Dirksen Senate Office Building, Hon. Edward M. Kennedy (chairman of the committee) presiding.

Present: Senators Kennedy, Mikulski, Wellstone, Gregg, and Warner.

The CHAIRMAN. The hearing will come to order.

This is a very special day for our committee. There are a lot of important matters that this committee concerns itself with, but I think that every member of this committee and all Americans take a great sense of pride in our National Institutes of Health, and the one who serves as head of that institution has a very special responsibility and a very special honor.

So we are looking forward to considering someone today who has been extremely highly recommended and is very highly qualified, and we are looking forward to having that hearing in just a few moments.

My friend and colleague, Senator Gregg, has an extremely important conflict and wanted to be here at the opening, so I would ask him if he would be good enough to say a word, and then we will move ahead and recognize my colleagues, and I will make a brief comment, and then we will get on with the hearing.

OPENING STATEMENT OF SENATOR KENNEDY

The CHAIRMAN. We are glad they are all here. Very good and very impressive that they are all here.

I have just a few comments on the importance of this hearing and the position to which Dr. Zerhouni has been nominated.

If confirmed, he will become the first NIH Director in this new century of the life sciences. The NIH budget increased to more than \$27 billion this year. These funds support research and training in thousands of research institutions across the Nation and around the world. Leading the NIH is an awesome responsibility that will determine the quality of life for millions and millions of Americans for many years to come.

NIH research ranges from studies of microscopic structures in living cells to investigations of patterns of disease in entire populations. NIH research not only gives us information about what keeps us healthy or makes us sick, but it reveals new insights into who we are as human beings.

The advances made by NIH research in just the first 2 years of this new century are extraordinary, and the future promises still greater wonders. Already in this century, NIH research has helped map the human genome. No less important than these basic genetic studies are recent findings from NIH scientists that structured lifestyle changes can significantly reduce the risk of diabetes, sparing millions of Americans from this deadly disease.

The impact of NIH research on human health is incalculable. Life expectancies have risen dramatically over the last century, and some scientists believe that the first human being to live to be a productive 150-year-old is already alive today.

Never before have the challenges for NIH been greater. The anthrax attacks of last fall taught the Nation what many of us knew already—that powerful techniques of modern biology can be used not only to heal, but to harm. Just this week, The Brookings Institute published a risk assessment showing that one million Americans could die in a major biological attack.

NIH must provide the leadership required to develop new medical weapons in the battle against terrorism. I know that good progress is already being made in the race to develop better vaccines against smallpox, anthrax, and other dangerous pathogens. We should give our full support to those vital research projects.

As clinical research has grown in size and complexity, the challenges it poses for human subject protection have likewise increased. Many members of our committee have been concerned by the strains in the current system. NIH will have an important role to play in restoring confidence in clinical trials, and I look forward to making progress on this important issue in a bipartisan way.

Today we have the opportunity to hear from Dr. Zerhouni his vision for meeting the challenges and seizing the opportunities of this new century of life sciences.

Elias Zerhouni is a living example of the American dream. He arrived from Algeria with little else but his medical training—and a desire to help his fellow human beings facing disease. I believe that all of us on this committee can agree that his contributions have been extraordinary.

As a researcher, Dr. Zerhouni has contributed new methods for imaging living tissues that are in use in hospitals around the Nation. As a skilled administrator, he has demonstrated leadership and vision time and time again at Johns Hopkins. He has revitalized the medical school's Clinical Practice Association. He has worked skillfully with scientists, business leaders, and elected officials to create a thriving biotechnology park.

Most recently, he established the groundbreaking Institute for Cell Engineering. At this remarkable new facility, scientists are exploring the potential of stem cells to alleviate some of the most deadly diseases we face as a Nation. The stem cell research conducted at the new institute is already providing new insights into therapies for Parkinson's disease, spinal injury, diabetes, and other serious illnesses.

I would like to extend my thanks and the thanks of this entire committee to Dr. Ruth Kirschstein who has served so effectively as acting director since the departure of Harold Varmus. She has

served in this important position with great dedication and skill, to the great benefit of NIH and the Nation.

It is a pleasure to welcome Dr. Zerhouni to this committee, and I look forward to working closely with him in the days to come.

OPENING STATEMENT OF SENATOR GREGG

Senator GREGG. Mr. Chairman, let me first thank you for expediting this hearing on this nomination and for your willingness to move the nomination through in such a prompt manner, which I think is extremely important.

It is a pleasure to have the doctor here today before us. As the chairman has alluded to, the NIH is the flagship agency in the area of health, not only for our Nation, but for the world. There is no question that the National Institutes of Health is the institution that everyone around the world looks to as the source of ideas, thoughts, and a legitimate, fair arbiter of what is right in the area of science and especially in the area of health science.

So your willingness to take this post over is something that we very much appreciate. You have a tremendous background, and certainly Johns Hopkins' loss is the Nation's gain. I notice that you are joined by your wonderful Senators from Maryland who will obviously reflect on Maryland having such a fine son, but I just want to say that I strongly support your nomination, and I look forward to working with you.

You have a big challenge. You have a unique challenge, as we were mentioning earlier, in the process of the Federal Government. Most Government agencies do not have enough money. Your agency is getting so much money so fast, the question is how to most efficiently use it, because the Congress has made a commitment to double the funding for NIH, and it will be doubled as of this year, and those new dollars need to be placed where they can do the best for our country.

I happen to have always been a supporter of the belief that you folks should be making the decisions, not the Congress, on where those dollars should be going. We give you the dollars, and we know that with your leadership, they will be well-spent, and it certainly would be my goal to give you the freedom and flexibility to effectively use these resources to better the health of not only the American people but, really, of the world population.

I thank you.

The CHAIRMAN. Thank you very much, Senator Gregg.

I have a comment, but I will withhold for just a moment, recognizing that you are accompanied by two of our colleagues who are very highly regarded and respected by this committee and by all of our members.

Senator Mikulski is a very energetic member of our committee who spends a great deal of time and effort and energy on many matters, but none is closer to her than the NIH.

And our friend and colleague of many years, Senator Sarbanes, has been a strong supporter and an eloquent spokesman on the floor of the Senate for ensuring that we are going to be able to take advantage of the great breakthroughs in prescription drugs and other matters and make sure that they will be accessible and available to people.

So you have two very good friends who understand the importance of the NIH, believe in it, and are here to add a word of support.

I would recognize Senator Mikulski.

Senator MIKULSKI. I would be happy to defer to the senior Senator.

Senator SARBANES. No. Please go ahead.

OPENING STATEMENT OF SENATOR MIKULSKI

Senator MIKULSKI. Good morning, Senator Kennedy, and thank you very much for convening this hearing in such an expeditious way.

Mr. Chairman, I am so proud that Maryland is home to the National Institutes of Health and home to some of the best and brightest researchers in the world. I am also pleased that Maryland is the home of Dr. Elias Zerhouni, the President's nominee to lead the National Institutes of Health.

Dr. Zerhouni has been a member of the Johns Hopkins University Medical School team since 1975. He was a radiology resident, a faculty member, and then went on to become chair of the department of radiology.

Born in Algeria, he trained as a radiologist at the University of Algiers School of Medicine. He is currently executive vice dean of the Johns Hopkins Medical School. He recently led an effort to create the Institute of Cell Engineering at Hopkins to explore the promise in that very important area.

Dr. Zerhouni has had a most impressive career already. He has the skill and the technical and scientific expertise to turn medical research into tools and treatments that actually improve patients' lives. He has developed techniques that are used to diagnose cancer and cardiovascular disease. His research has given radiologists a way to tell the difference between benign and cancerous masses in the lungs. He invented a biopsy technique to diagnose suspicious lumps found on mammograms and replaced painful, invasive surgery.

He is an innovative thinker and a successful entrepreneur who has turned his scientific discoveries into successful businesses that translate his high-intake radiology research into new services for patients.

Now he has the opportunity to bring his scientific capability, his managerial expertise, and his entrepreneurial spirit to the public sector.

I look forward to hearing Dr. Zerhouni's vision for the direction of the NIH and then for the committee to move in a deliberative way.

Before I yield to my senior colleague, I would also like to take this opportunity to thank Dr. Ruth Kirschstein for the outstanding job that she has done as Acting Director of the National Institutes of Health. For over 2 years, she has guided this agency during its transition time of not only more funds, but how to make wise use of taxpayers' dollars to turn that into the basic research that then adds promise in finding cures and ways of dealing with disease.

Dr. Kirschstein and her team have served with steadfastness, tenacity, and have really been very good stewards of the NIH mis-

sion, and I believe that as we move through this transition, this committee, this Congress, and this Nation owe Dr. Kirschstein a debt of gratitude for her stewardship.

Thank you, Mr. Chairman.

[The prepared statement of Senator follows:]

PREPARED STATEMENT OF SENATOR MIKULSKI

Thank you for calling this prompt hearing on the vitally important nomination of Dr. Elias Zerhouni (e-LEE-as zer-HOON-knee) for Director of the National Institutes of Health (NIH).

The position of NIH Director is critically important to the public health of the United States but it has been vacant for over 2 years. I also want to acknowledge the excellent work of Acting Director, Dr. Ruth Kirschstein who has done an outstanding job. I am pleased that Maryland is home to the NIH.

I am proud to be part of the bipartisan effort to double NIH's budget over 5 years. Investing in cutting-edge research saves lives. Bringing new discoveries from the lab to the patient's bedside, helps Americans live longer and better.

The NIH Director oversees this life-saving medical research.

CRITERIA

My criteria for looking at each nomination are competence, integrity, commitment to the mission of the agency. I look forward to hearing from Dr. Zerhouni today about his vision and qualifications.

COMPETENCE

As head of the largest biomedical research organization in the world the NIH Director must be respected by the research and scientific communities. Management expertise is essential for the next NIH Director. NIH will fund almost 35,000 research project grants this year. Congress has almost completed the doubling of NIH's budget over 5 years. NIH has a budget of \$23.3 billion and about 18,000 employees. The NIH Director must have strong management skills and leadership to manage this investment wisely. Translating research from the lab to the patient.

INTEGRITY

Highest standards for transparency, honesty, and accountability especially as NIH deals with complex, potentially lifesaving research. Serving the public good.

COMMITMENT TO THE MISSION OF THE AGENCY

Understanding new knowledge that will lead to better health for everyone. Cutting edge research that leads to new treatments and potential cures. Training researchers for today and tomorrow. Communicating medical information to the public so that the public can take advantage of NIH's discoveries.

CLOSING

I know Dr. Zerhouni as a dean at the Johns Hopkins University. We met again recently to talk about his vision for the NIH. Dr. Zerhouni is a dynamic and entrepreneurial person who brings significant experience from his years at Johns Hopkins University. I am looking forward to hearing from Dr. Zerhouni today. I will evaluate Dr. Zerhouni—as I do each and every nominee—based on his competence, integrity, and commitment to the mission of the agency.

Thank you again, Mr. Chairman, for convening this hearing on this critically important nomination to the health of this country.

The CHAIRMAN. That is certainly true. I see the doctor here in the audience, and I think all of us are very well of the professionalism and the many courtesies that have been extended to all of us who are interested, and we thank her very much.

Senator Sarbanes.

OPENING STATEMENT OF SENATOR SARBANES

Senator SARBANES. Thank you very much, Chairman Kennedy.

First, I would like to echo the comments of my colleague Senator Mikulski with respect to Dr. Kirschstein. We very much appreciate the really very significant contribution she has made and the great skills she showed in her tenure as acting director of NIH.

I am very pleased to come this morning and have this opportunity to help present Elias Zerhouni to the committee.

This really encapsulates the American story, I think. Dr. Zerhouni was born in a small mountain town on the then-French Algeria western border. In a family of eight children, he moved with his father, a teacher of mathematics and physics, to the suburbs of the capital city of Algiers, where he obtained his education through medical school at the University of Algiers School of Medicine.

At 24, he came to the United States, to Johns Hopkins Medical Center in Baltimore, where he began as a radiology resident in 1975, just over a quarter-century ago. He became chief resident in 1978, a member of the faculty, conducted research on computer tomography, which led to the development of CT densitometry, a technique to give radiologists a way to distinguish accurately between benign and malignant nodules in the lungs. It was a major step forward.

He then went on to do a number of other very important scientific advances, actually combining his medical ability with his interest in mathematics and physics.

He became eventually the head of the Department of Radiology at Johns Hopkins, after doing some very impressive research. In early 1977, he was asked to serve as executive vice dean for clinical affairs and president of the Clinical Practice Association while continuing as director of radiology.

In this position, he showed tremendous administrative ability, and I want to underscore that because obviously, the NIH directorship involves or requires tremendous administrative skills.

He led efforts at Johns Hopkins, which we regard as the premier medical institution actually in the world, to restructure the School

of Medicine's Clinical Practice Association. He developed a comprehensive strategic plan for research. He helped reorganize the school's academic leadership. And he has worked with the local community and elected officials to develop a biotechnology research park and urban revitalization project near the Johns Hopkins medical campus.

Anyone who has made any effort to do something of that sort knows the kinds of skills that are required to build a consensus in order to move forward in an endeavor of that sort.

So I think we have a rare find here, a very highly skilled medical researcher, one committed to science and yet with these very impressive human skills in terms of being able to organize complex operations, draw people to work together in a consensus way to carry out important projects.

Bill Brody, the president of Johns Hopkins University, and actually, Dr. Zerhouni's predecessor as chairman of the department of radiology, said about him, and I quote: "One who often sees solutions clearly where others only see problems." We can use somebody like that in the Government at any time, if I may say so. Brody went on to say about him that: "He keeps an open mind unencumbered by the biases of others."

So I think we have a rare opportunity here to put in at NIH as its director, and of course, we all deeply appreciate the important tasks at NIH; we know there are now a number of institutes without directors that need to be filled. As has been pointed out by Senator Gregg, there has been a significant infusion of money into NIH by the Congress, and of course, we are very anxious that this money be put to good use. So I am very pleased to join with Senator Mikulski.

I might just add a personal note. My wife had the pleasure of teaching one of the Zerhouni children, and I have to tell you of the very positive impression she formed about the Zerhounis on the basis of that experience. So I guess I am here also to tell you that he has been an extraordinary—he and his wife, who is, of course, a pediatrician—that they have been extraordinary parents as well.

So I strongly urge his confirmation to the committee. I think that NIH will be in very good hands, and we are looking forward to NIH continuing to make the significant progress which it has over the recent years.

The CHAIRMAN. Thank you, Senator Sarbanes.

Was it Adam whom your wife taught?

Senator SARBANES. No. It was their daughter, Yasmin.

The CHAIRMAN. Very good.

Let me say a word, and then I will ask Dr. Zerhouni to introduce his family. I spot his mother here, too, which is a very, very special honor for us. We know how proud she must be.

Would you be good enough to stand, Mrs. Zerhouni, so we can recognize you and welcome you?

[Applause.]

The CHAIRMAN. We all know how important mothers are.

Before I ask Dr. Zerhouni to introduce the other members of his family, I will just make a very brief comment, and I would invite my colleagues to remain, although I know they have other responsibilities.

But while they are here, Dr. Zerhouni, maybe you could introduce your family. The Senators might have to leave, and I think it is important, so if you would be good enough to do that.

Dr. ZERHOUNI. It is my pleasure to do that, Senator.

First, I would like to introduce my wife, Nadia, who is a pediatrician and works in the International Adoption Clinic at Johns Hopkins actually helping international adoptions from the medical standpoint.

The CHAIRMAN. Very good.

Dr. ZERHOUNI. This is my son Will, who is a second year medical—that is, law student—I wish he were a medical student.

[Laughter.]

The CHAIRMAN. I do not know how you escaped, Will.

Dr. ZERHOUNI. He is at Harvard, and he is in his second year.

The CHAIRMAN. He is also in the Institute of Politics at the Kennedy School, which he reminded me of, which is a wonderful thing to take an interest in public policy.

Dr. ZERHOUNI. Yes.

And then, my son Adam, who is a junior at Severn High School and still looking at what he is going to do in the future.

The CHAIRMAN. Thank you very much for being here, Adam.

Dr. ZERHOUNI. And my daughter Yasmin, who just graduated from Columbia, and is actually going for her master's in education. She is very interested in teaching young children, so this is what she is going to be doing.

The CHAIRMAN. There is a great need, and that is a wonderful ambition. Good for you, Yasmin.

Thank you very much, Dr. Zerhouni.

Dr. ZERHOUNI. Senator, if I may, I would like to also introduce two other people. Mr. Rusala is my best friend from sixth grade onward. We have been keeping in touch for the longest time, and he decided to come here from Algeria to be with us for this opportunity.

The CHAIRMAN. You are very welcome.

Dr. ZERHOUNI. And Marion is my son's fiancée, and she is from Memphis, TN.

Senator MIKULSKI. Mr. Chairman, if I might, before Dr. Zerhouni begins, could we give Dr. Kirschstein a round of applause.

The CHAIRMAN. Certainly. Would you be kind enough to stand, Dr. Kirschstein?

[Applause.]

The CHAIRMAN. I see my friend and colleague Senator Warner has joined us. Would you like to say a word, Senator?

OPENING STATEMENT OF SENATOR WARNER

Senator WARNER. Thank you, Mr. Chairman.

Just a brief word. As a matter of fact, the question is often put to me: What is that part of Senate life that you find most enjoyable? It is the reward that we have by the opportunity to meet individuals like yourself, Dr. Zerhouni.

You very thoughtfully came to my office, where we shared a long and in-depth discussion on a wide range of subjects. My interest, of course, stems from my father, who devoted his life to medicine

and to research, and coincidentally, Johns Hopkins was an institution with which he had an affiliation.

Mr. Chairman and others, this individual, if I may say is Exhibit A regarding America's immigration policies, and you come to us at a time when we are looking at those policies. You came to this Nation not familiar with its language and have now risen to the very top of those who have goals and seek to achieve them.

It is so refreshing, Mr. Chairman, to have this opportunity. I have been in the Senate now for some 24 years and have been a strong supporter of the institution to which I am sure you will be confirmed to take over, and I have often viewed it as sort of the "Supreme Court." It is the court of last resort for those individuals who have not been given any hope for life because of the complexity or the unusual nature of their afflictions and their disease.

To have an inspirational person like yourself leading that institution, giving that hope, and hopefully in some instances, finding an answer to preserve life and continue it—I suppose, Mr. Chairman, if I had to summarize this remarkable American in one word, it would be "humility." He reflects that characteristic.

I wish you luck, Dr. Zerhouni, and I have only one word of advice—do not exhibit too much humility when you deal with the Congress—just go at it with both fists and get everything you can get.

Thank you very much.

The CHAIRMAN. Dr. Zerhouni, we will hear from you now, please.

**STATEMENT OF ELIAS A. ZERHOUNI, M.D., NOMINATED TO BE
DIRECTOR, NATIONAL INSTITUTES OF HEALTH, BETHESDA,
MD**

Dr. ZERHOUNI. Thank you, Mr. Chairman.

It is a great pleasure for me to be here, and I want to thank Senator Mikulski and Senator Sarbanes for the nice introduction.

Senator Kennedy and members of the committee, I am honored to appear before you today as President Bush's nominee for the directorship of the National Institutes of Health.

If confirmed, I am looking forward to working with Secretary Thompson and Congress to best serve the institution that has made our country the undisputed leaders in the biomedical sciences.

You have heard about my background, and I will not repeat that. I worked hard, I was amply rewarded, and I ended up being in a position at Johns Hopkins where I was able throughout my career to interact with biomedical scientists from the most basic to the most clinical.

Through that, and through my research and the developments that I did and the interactions that I had, I learned two things. One was that I could not succeed unless I was able to inspire and lead groups of multidisciplinary scientists, because in my field, you could not succeed unless you had biologists, physicians, and physical scientists working together.

I also gained some new perspectives about what it is that research should be in the 21st century, and I would like to share that with you.

First, I have become convinced that only further fundamental discoveries will help us meet the challenges of the health care system that we face today and the challenges facing us in that system. That is an important point, because it means that we still have to make discoveries to perhaps facilitate the way we deliver health care.

Second, we need to bring the fruits of our research to clinical testing more rapidly and enhance our ability to prevent and detect disease much earlier than in the past.

Third, I believe that biomedical research in 2002 is at a turning point that may require new strategies. To illustrate that point, I would like to show you a device here that has been developed through the use of robotics technology, imaging technology, molecular chemistry, and computer chip-making technology.

This device is known as a DNA chip. Amazingly, with one experiment, a scientist using this device can identify which of the thousands of human genes are active in any one biological sample.

Only a few years ago, it would have been impossible to ask the questions that we are able to ask with these revolutionary technologies at a rate and on a scale that is unprecedented in history.

You might think that this is great progress, and it is. But now let me show you the challenge that we face and how much more we have to do.

I have here a very tiny needle, and I would like you to think about the tip of this needle. The tip of this needle is actually several times larger than any one, single cell in the human body. Yet that single cell contains all of the human DNA—not just a subset, as in this DNA chip. It also contains the entire molecular machinery that translates that DNA into all the complex molecules and networks of molecules that are interacting within our body to make us what we are.

Today we have discovered the component parts of that cell. The real challenge for the 21st century is to understand how all these parts fit together on a microscopic scale. This is by far the most formidable scientific problem ever faced by mankind, and I believe, as you said, Senator, that it will define the 21st century.

Progress will increasingly depend on multidisciplinary teams of scientists. The future team will have to encourage cross-cutting initiatives. We need to continue to train, recruit, and retain the best talent in biomedical research, because in the final analysis, it is always that creative spark of the unique individual that leads to new knowledge and real progress.

Sometimes, this new knowledge will raise deep moral issues. Throughout history, tensions have always developed between science and society whenever a scientific discovery challenges our deeply-held beliefs. The resulting debates can be polarizing, and I have the interesting privilege of coming before you at just that time, Senator.

What, then, should be the role of the NIH Director in that regard?

I have told several of you Senators during my visits my thoughts about that. First and foremost, I believe that disease knows no politics. The NIH, as a public agency at the vanguard of the fight against disease, is to serve all of us. I believe that the NIH and

its director should not be or be made to be factional, but must always remain factual.

My role as NIH Director will be to inform the debate by developing and communicating the most objective scientific data. The NIH Director should actively promote the necessary research within the policy guidelines laid out by the President and in strict compliance with all laws passed by Congress.

As executive vice dean at Johns Hopkins, I was instrumental in creating an institute for cell engineering, primarily because I was concerned about the lack of any Federal funding to advance the fundamental research needed in this new and fledgling field.

This is why I believe that in the current state of science, the August 9 policy set by the President was an important advance. For the first time, it allowed NIH funding for stem cell research, something which had not been done under previous administrations.

We still have to go on, but there is another important topic that all of you have raised. That is, after years of effort from you, Senators, and the rest of the Members of Congress, the doubling of the budget is almost here, to be completed, as proposed by President Bush. This occurred despite all the difficulties faced by the Nation. And during my visits with you, I was impressed by your strong support for NIH, but I also heard loud and clear your wish to see these resources managed effectively.

I will work hard to develop the information necessary to put to best use the hard-earned resources of American taxpayers. I will do my best to work with Congress to accomplish this goal.

I also would like to take this opportunity to acknowledge the outstanding service of Dr. Ruth Kirschstein, who is with us today, the acting director of NIH; and also that of Dr. Harold Varmus, the immediate past director. Both have been very helpful to me during this process.

I would like to especially thank my wife and family for their constant and understanding support.

Finally, Mr. Chairman, as an immigrant, I am very touched by being here today, because it says something about our great country that no other country can say about itself.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Zerhouni may be found in additional material.]

The CHAIRMAN. Thank you very much for an excellent statement.

Obviously, once you gain the responsibility for leadership at the NIH, you will have a good deal more information in terms of the strengths and challenges presented. But what can you tell us about what you hope to be able to achieve as director, based upon your own views about the agency now?

Dr. ZERHOUNI. Senator, I think the most important role of the director right now is to reestablish morale and momentum and the vision and energy to recruit NIH institute directors and recruiting to key positions that will make the agency even more effective than it has been.

The second, I think, is to try to work with Congress and with all parties to understand better the dynamics of research and research resources and try to match the research resources that we are given with the capacities of the system and the opportunities in

science and the priorities that are set at the same time. I think this is probably the biggest challenge for the new director, that is, to learn how to set priorities properly, Senator.

The CHAIRMAN. So it is obviously important to get the talent into the agencies, into places where that is necessary, where the vacancies are. Do you have any broader sense about changes or directions in which you would like to take the agency now, or are you waiting until you get out there? What can you tell us about any changes that you might want to see at the agency?

Dr. ZERHOUNI. I can tell you some, Senator. I obviously do not know all the ins and outs of the agency at this point, but one thing that is clear is that science is evolving at such a pace and in such a way that cross-cutting initiatives need to be encouraged.

Science has converged whereby many fields of science now apply to many diseases, and I think it will be important for the new director to find ways of enhancing that interaction.

The second thing that I believe is important is to identify what are the bottlenecks for science today, both at the fundamental level—one of them, for example, is access to the new technologies that I described in my opening statement. We need to have our scientists throughout the country have access to national resources that will facilitate their research.

The other is in the translation of that research into clinical reality.

Those are probably the most important priorities that we need to look at early on. I do not have a specific plan of action, Senator, but I certainly will look along those lines.

The CHAIRMAN. One of the essential functions of NIH, as you mentioned, is to provide the best scientific information to Congress and the public, and you reiterated that in your comments. Nowhere is this more important than on the complex issue of stem cells and cloning. We are all aware that you must carry out the administration's policy, but can you assure the committee, the Congress, and the American people that you will provide the objective scientific information on cloning and other scientific issues regardless of whatever political winds may be blowing?

Dr. ZERHOUNI. I think my statement reflected that. I mean, I have lived by that principle before, and I will continue to live by that principle. I think science is to be open and transparent. It has to fit certain quality standards such as peer review and replication by others, but all of that should be shared transparently and with everyone, as I told you in our visits.

The CHAIRMAN. We heard in this committee a few days ago about the serious gaps in our current protections for human subjects in research, and we are working on bipartisan legislation to fill those gaps. Volunteers simply will not participate in essential research without the confidence that their rights and their safety are protected.

Can you tell us what you believe should be the role of the NIH in strengthening human subject protections?

Dr. ZERHOUNI. I think, Senator, that you are touching on a very, very important issue. I think this issue can really slow down medical progress if not handled well. It has, as you said, been generated by the marked increase in clinical trial needs that we have.

The NIH, in my personal view—and we had a tragic experience at Hopkins where we unfortunately lost a volunteer during a clinical trial—the one thing I learned about that is that in human research protection, we have to change the emphasis from research to protection. And to do that, we need to change the culture more than just the regulations and how to cross the t's and dot the i's.

That is something that we found at our institution, and the NIH should play a major role in the training and the development and the qualifications of those engaged in clinical trial research to almost ingrain that culture of safety within the conduct of clinical research—within the context, obviously, of the regulations.

The CHAIRMAN. Well, we want to work closely with you on this. We are working through these policy issues, and we will certainly value your insight.

On the issue of clinical research, you have been a leader throughout your career in translating breakthroughs in the laboratories into advances in patient care. Have you given thought to how NIH can strengthen its role in this kind of patient-oriented clinical research?

Dr. ZERHOUNI. Clinical research is a challenge. It is actually more difficult than most people think it is. I have been a clinical researcher, and I have worked with clinical researchers, and one of the things that is not always appreciated is that clinical research evolves into a full ecosystem that relates to the health of academic health centers independent of their research activities. And in academic health centers today, the clinical scientist is challenged because there is a need for productivity and not necessarily the support that they need to engage in the clinical research that we would like done.

So I think that in clinical research, Senator, maybe we need to take a step back and look at the total ecosystem to make sure that we encourage young people to find major satisfaction in conducting clinical trials.

Again, I do not have the specific answer, but certainly I look at it at that level.

The CHAIRMAN. If my colleague would yield, I just have a few other areas that I would like to touch on. One is on disease prevention. While the NIH has made astonishing progress in diagnosing and treating diseases, millions of American still suffer from diseases that are preventable.

Do you think that the NIH has any role in researching disease prevention?

Dr. ZERHOUNI. It has to have a role, Senator. If you look at the statistics, for instance, on diabetes, the fast rise in incidence should be characterized as a pandemic. This is not something that we can ignore, and in many ways, many of the diseases that we suffer from are often almost self-inflicted because of lifestyles and dietary intake and other characteristics.

How we do the research to address these aspects of behavioral modification, a better match between what we know about the genetics of disease in the environment in which we live, the better we will be able to prevent these preventable diseases. There are diseases that we cannot prevent for sure, but in regard those that are preventable, we need to do a lot more than we are doing, par-

ticularly in terms of the drivers of behavior that lead people to really hurt themselves.

The CHAIRMAN. I think this is an enormously important area that we do very little on, and we are interested in finding ways of working with you in this area as well.

There is a final area that I would like to get your reaction on. Throughout your distinguished career, you have made many contributions in biomedical imaging and engineering. As you know, there is now a new NIH institute devoted to these disciplines. I do not know if you have any vision for the new institute; do you believe that to be effective, the new institute will have to be connected to the existing NIH institutes? Do you have a view about that?

Dr. ZERHOUNI. I certainly do, Senator. I was also a radiologist and participated in trying to create a structure at NIH that would respond to the needs of imaging sciences.

I think that what we are facing here is a profound issue that is not specific to imaging in my mind, and that is the issue that whenever you develop an area that is cross-cutting across all the different institutes, you have difficulties in in fact promoting and developing that area of science.

Obviously, the answer is creating an institute, and in many ways, what I have been saying all along is that the Nation has one need, and that is that typically at NIH in the past, we have done what we call hypothesis-driven research; unless it had an application to a particular disease, you could not really get funded. But in many ways, these new areas, these emerging technologies, not just imaging, by the way—and I do not consider imaging to be just clinical imaging; I look at it at the most fundamental level, for example, imaging cells and imaging molecules and finding out how they interact with each other—but there are other technologies like this that are emerging in bioengineering, like nanotechnology. I described to you the minute world of the cell. Well, we are going to have to develop minute technologies in order to observe that world. To me, that is the role of these institutes.

If I had a choice, I could call it the “Institute for Emerging Technologies” or “Emerging Biomedical Technologies,” imaging being a very, very important part of it. So it fits within the greater context, Senator.

The CHAIRMAN. Senator Mikulski.

Senator MIKULSKI. Thank you very much, Mr. Chairman.

I ask unanimous consent that my full opening statement be included in the record.

The CHAIRMAN. Without objection.

Senator MIKULSKI. I would like to go on to some questions, but before I do, one point. While I have been very active, Dr. Zerhouni, in promoting the doubling of the NIH budget, I have also been active in doubling the National Science Foundation budget. And Senator Kit Bond, my Republican counterpart, and I have had a particular focus on nanotechnology—you and I have had some discussions on this—and we see that this is a big breakthrough.

Dr. Zerhouni, I would like to go to page 2 of your testimony, in which you talk about three areas from your perspective on the biomedical sciences. You are convinced that “only further fundamental

discovery will allow us to meet the health care challenges, bring the fruits of our research to clinical testing more rapidly,” and that “the new century calls for new strategies.”

Could you elaborate on each of those and perhaps give some examples of what you mean and how you would like to operationalize this perspective, including also the extramural aspects of NIH.

Dr. ZERHOUNI. Sure. Thank you for this important question, Senator.

First of all, when I talk about “fundamental discovery will allow us to meet the health care challenges,” I start there because of my personal experience at Johns Hopkins. I was really involved in looking at all aspects of the delivery of health care, and it became very apparent to me that many of the things that we do today can be improved at the margin. With managed care or better performance improvement, engineering, reengineering methods, we could improve the delivery of care by maybe 10 or 15 percent—I do not know what the number is—but it is not revolutionary.

The only thing that would revolutionize health care in my mind would be if you were able to find ways of limiting the amount of time anyone has to go to the hospital. After all, good health is not seeing the doctor.

In that context, when you look back and you say, well, let us think about science, I will give you one example of why fundamental discoveries will be needed. Cancer—we already know, for example, that many genes are affected in a cell becoming cancerous. The fundamental discoveries that I am talking about will be those related to finding what are the multiple pathways that you need to affect at once to change the outcome of cancer.

It is almost like fighting a war. There is no magic bullet. You cannot just go in and destroy the bridges one day and the harbors and the airports; you have to attack all of that at once.

How to do that is becoming the challenge.

Senator MIKULSKI. I have only five minutes, so could you go on to the clinical research and requiring new strategies? I think we understand that there has to be emphasis on the basic research as well as disease-specific and that there is a continual interaction between the two; isn't that right?

Dr. ZERHOUNI. Absolutely.

Senator MIKULSKI. Do you want to talk about the move to clinical testing more rapidly and how you see that, if you can, and also the new strategies. What would be some of the new strategies?

Dr. ZERHOUNI. Well, on clinical testing, I think we talked about the challenges of clinical trials and clinical research, and clearly, we need to find a quicker pathway from discovery to clinical testing, and I really believe that the number of discoveries that are made, the number of molecular targets that we have identified over the past 5 years, requires us to think through how we get to that, in particular if we are going to test multiple drugs at once.

In terms of new strategies, as I described, science is changing. There is a convergence of science, and that convergence will require us to rethink what are the basic infrastructure needs of this new science. For example, access to biological samples is a very important part of research today. You need to have access to these cells. You need to have access to these molecularly well-characterized

samples of cells or other biological materials. And the NIH has started to do this because it realizes that it is stumbling block.

I will give you another example of new strategies. Scientists in the laboratories today suffer from one limitation, and that is not having access to molecules easily to test against their biological problems. It would be very helpful, Senator, if we could develop rapid access to our scientists to be able to have that.

Senator MIKULSKI. First of all, those are very interesting scientific strategies. One of my areas of concern is the ability to think across institutes, and today is not the day to go into that level of detail, Doctor; I think it is more broad-brush. But NIH is composed of 27 institutes and centers, and some offices. The reason that we have an Office of Research on Women's Health and not a center was so that women's health is in every center and institute. So we are going to also look for new management strategies. As gifted and talented as our scientific community is at NIH, there is a tendency to think smokestack—this is my area, and somebody else should go to the meetings. So that is something that we will come back to on another day.

Let me go to the issues around staff. There are about 18,000 people who work at NIH. You have everything from your own fire department to Nobel Prize winners. It is a very important challenge. In terms of the scientific as well as the support staff, I am interested in what thoughts you might have at this time, both for recruitment and retention of outstanding people, and I am also very concerned about the whole issue of the ability to recruit minorities. This has been a big issue just in terms of the scientific community generally. I chair the subcommittee that funds NSF, and this has been a significant challenge of encouragement.

So on recruitment and retention, how do we get new people, a new demographic profile, and how do we get new thinking. When I came over to Hopkins to talk to the newly-endowed chair on breast cancer that Harriet Lagam and others did, I also talked with some of the young scientists, more the upstart crowd, the new start crowd, about the difficult time they had getting research money because they were not established.

So if you could comment on all of the above—knowing that this is the first of what I hope will be many conversations. You will face it if confirmed; Dr. Kirschstein, Dr. Varmus, and Dr. Healy faced it. We have had ongoing conversations in this area.

Dr. ZERHOUNI. Senator, this is a very appropriate and important point that you make. Even in medical schools we face the same issue, as you know. I am looking forward to working with you on these issues. There is no easy answer, but there are answers.

Senator MIKULSKI. So you do not have any today.

Dr. ZERHOUNI. I do not have any today, Senator. I would be willing to comment, but I was just mindful of your time, Senator.

Senator MIKULSKI. And I think the White House has also told you do not break new ground and do not break any knuckles today. [Laughter.]

Dr. ZERHOUNI. No—I can certainly comment if you give me the time; absolutely.

Senator MIKULSKI. Yes. Why don't you take just a few minutes and then we will turn to my colleague, and I will wait for a second round.

Dr. ZERHOUNI. That would be fine, Senator. I did not mean to not respond; I just wanted to be careful of the time.

First of all, let me say this. I think the issue of diversity is a very important issue. When you look at the statistics—and we looked at our statistics at Johns Hopkins—what you find is that in the pre-graduate and graduate training programs, the composition is more diverse than what you see later on. That loss of talent is to me the number one problem we have to look at—why is it that even though we train, we do not retain?

So one thing that I will focus on is the retention mechanisms that we use, because as you said—and you are right—it is difficult to break in. It took me 5 years to break into being funded at NIH. That issue of retention—because we have the means and we have the slots to train people—the problem we have is that they get trained, and then there is a selection process that occurs, and that, Senator, I think is the first step. If you do not have role models who will entice newer scientists to come into the field along with those role models, you will never get that pump primed.

So I have a very specific sense about it, and that is that we need to absolutely understand why it is that we can, to an extent, create more diversity up front and less at the back end.

Managing a complex organization between fire trucks and Nobel Prizes is very difficult, as you know. It is essentially combining corporate management with academic cultures, and that is very hard to do. I do not think anyone has the answer, by the way, Senator, in terms of how to best manage an enterprise like this. It is a day-to-day fight, finding the right people to manage those enterprises.

Senator MIKULSKI. Thank you, Dr. Zerhouni.

I am going to now yield to my colleague, Senator Wellstone. But you see, you are exactly what I am talking about, and even going to our own beloved institution of Johns Hopkins, when I was a young social worker at Catholic Charities, I knew that there were no African American physicians at Johns Hopkins. Fifty years ago, Hopkins had a quota in terms of Jewish physicians being on their faculty. Now that is gone. We see Levi Watkins and Ben Carson and Dr. Vogelstein and so on—and you, as a man of the Muslim faith and an immigrant from a medical school in Algiers. You know how snobby our medical establishment can be. The fact that you were able to do this shows that we are making progress.

I really believe, as you—I know from our one-on-one conversations your passion for an opportunity ladder and an open door to talent and your own experience. Even our own beloved institution had to eliminate barriers for people to participate and to bring their talents to the clinical and research table.

I would hope, presuming you are confirmed, that this could be one of the challenges that we really look at—not only for new ideas, but for that new talent where everyone is welcome and everyone is supported to be able to bring the new ideas.

With that, Senator Wellstone, let me turn to you.

Senator WELLSTONE. Thank you, Madam Chair, and welcome, Dr. Zerhouni.

Dr. ZERHOUNI. Thanks, Senator.

Senator WELLSTONE. I followed your questions, and I personally think the last question or comment that you made may have been the most important, and I would like to associate myself with the words of Senator Mikulski.

Welcome, and I enjoyed having a chance to meet with you as well, Dr. Zerhouni.

I want to ask three specific questions that we covered when you came by the office. We passed the Muscular Dystrophy Care Act, and I talked with you some about Duchenne's disease. It has been very moving work, and I have found that when you work with the parents of these children, and they are so hopeful, and you pass something, my fear is that you pass it, and there is not the follow-up or the follow-through, and for them, of course, time is not neutral.

The House Energy and Commerce Committee predicted that if you implemented the provisions of the legislation—the Muscular Dystrophy Care Act—it would require about \$56 million additionally, and that was for fiscal years 2003 to 2006. I was disappointed to learn that the NIH estimates for fiscal year 2003 on all muscular dystrophy was only \$25.4 million, which is only \$2 million more than 2002 funding—and this was before the passage of this Act.

By the way, this Act set up a center of excellence with a focus on Duchenne's disease, because it had fallen between the cracks.

Given the provisions of this legislation as well as the significant number of families and individuals afflicted by one of the nine muscular dystrophies, do you believe that NIH's commitment to this disease is as balanced as it should be, and what additional resources do you envision NIH investing in properly implementing the provisions of this legislation?

I do not want to pin you down specific by specific; I just want to get some sense for these families as to whether you—because I believe you will be the director—will have a very strong commitment to the resources for the research.

Dr. ZERHOUNI. Well, Senator, as I said during our discussion, my instinct is always to try to understand the total requirements for advancing the research in that field, and I think the Act provides for that.

I am not familiar with the details of implementation. I understand that the NIH is trying to implement the MD Care Act. I will certainly look into that and get back to you as I get into this job if confirmed. But I have to tell you that my heart is where you are.

Senator WELLSTONE. Well, it starts with the heart, and I appreciate that. Maybe what I would ask you is if, at the appropriate time, perhaps there could be a meeting with some of these parents, if you would be willing to meet with the community and sit down at the table. I think that would mean everything to them.

Dr. ZERHOUNI. Certainly.

Senator WELLSTONE. Could I get that commitment from you?

Dr. ZERHOUNI. Certainly, Senator.

Senator WELLSTONE. That would be very helpful.

You know, some of this work truly translates into personal terms, and I appreciate it.

Quickly on this one, because we touched on it, all the research that is being done in the mental health—and for that matter, also substance abuse—NIMH, NIAA—I want to just find out whether you see yourself as active in promoting the additional research. The President said yesterday that he was committed to full mental health parity, and I believe that we are going to move on that. I think part of the reason for that is the citizen groups, but part of it has been the research that has really broken through some of the stigma, saying this is really an identifiable, diagnosable, and treatable disease.

So can I get some sense from you—and we covered this, but—

Dr. ZERHOUNI. Actually, as I indicated to the committee before, I do believe that in fact, the impact of mental health in itself is a significant burden on society, and many times, the burden is hidden, as you know.

But in addition to that, I think that all the sciences of behavioral modification, behavioral sciences, social evaluation of the milieu into which we evolve as individuals and human beings and in relation to diseases that are in many ways driven by our own behavior, we need to really understand better, because as I mentioned, epidemics like diabetes are profoundly related to mental processes, and we need to do more research in that; there is no question that we need to do that.

Senator WELLSTONE. I appreciate that, and on a personal note, I have one other quick question.

I would say to Senator Mikulski and you that, actually, years ago, my brother had a severe mental breakdown and wound up at Johns Hopkins, and probably that first year of treatment was what saved him—although it took my parents 20 years to pay off part of the bill, which is part of the problem; there is not the coverage, which we are hoping to change.

My last question is on Parkinson's disease, and I do not think you will disagree. Scientists tell us—and when I say us, this community—that it is perhaps the most curable brain disorder, that there is a lot of potential here, and that with adequate research, in 3 to 5 years, we could have a cure. They also say that discoveries in Parkinson's also spill over to Alzheimer's, spinal cord injury, ALS, Huntington's disease—you name it. So I am interested in the question of stem cell research, because this is key.

Researchers have argued that the 78 stem cell lines available through the President's policy are not sufficient to pursue the therapies for diseases such as Parkinson's and diabetes and spinal cord injury. They say that greater diversity in the number of lines will be needed for them to meet the promise of research.

In your capacity as director, how will you ensure that researchers have the necessary supply of stem cell lines to develop treatments and cures, and if necessary, will you recommend that the President's policy be broadened to include additional lines?

Dr. ZERHOUNI. Well, in terms of where the science is today—and I know a little bit about stem cell research; I organized the institute at Hopkins—there is no question that there is a lot of fundamental research that needs to be done before even considering which pathways we are going to take for cures.

Fundamentally, the process by which DNA is programmed and reprogrammed is not well-known, and that needs to be done. Now, when you talk about the 78 cell lines, let me point out to you, for example, that a lot of research can be done on the limited number of cell lines when they are well-characterized. In fact, what I am saying is the same in other fields of research. For example, if you look at the human genome, how many DNAs do we have in the human genome that we are using to do our research? It is a closely-held secret, but we know the number is two to six individuals, and actually, in the last *New York Times*, one of the individuals said "I am one of them."

So you can do a lot when you have these lines, and in embryonic stem cell research in mice for 20 years, there have been a number of cell lines—about 20—that have been used for fundamental research for understanding the mechanism to know where you go next.

Now, to the second part of your question, it becomes evident through this research that there are pathways to develop cures and so on. I will be the first one to assemble that information, to get the experts to give that information, to provide that in the sense of well-established scientific facts, and share that with everyone.

Senator WELLSTONE. I appreciate it. I am not sure whether it was a "yes" or "no" answer, and I am not a scientist, so I appreciate it—I am in politics and public affairs—but I do not think it was quite the commitment that I was hoping to hear, but I will follow up with you on it; okay?

Dr. ZERHOUNI. That would be fine.

Senator WELLSTONE. Thank you.

The CHAIRMAN. Dr. Zerhouni, you talked about establishing a national molecular library at NIH. Why is that important? What will that mean for researchers?

Dr. ZERHOUNI. Again, this is a concept that we discussed in our interview, and it is an idea that has evolved from my experience at Hopkins. I do not know all the ins and outs of how to do it, so with that caveat, let me describe to you what I believe is needed.

When we look at our research and our researchers, we have tremendous ability, through technologies like this one, to identify which proteins and which genes are actually affected by disease, but we do not have the molecules to affect those pathways. And scientists have a difficult time accessing molecules for research—not for therapy, not for drugs, but for research—out of the molecular libraries that are available in the world.

One step that I know that our scientists at Hopkins, basic scientists, have mentioned to me as an important step forward—and I agree—would be to have a national resource where any scientist with a catalog of the appropriate molecules that would be known to affect genetic pathway "X" or biological pathway "Y" in such a way that over time, we will build a library that will allow us to go from fundamental discovery to clinical testing much faster. That is the idea, but again, this is my own and not tested and vetted by other colleagues.

The CHAIRMAN. It is enormously interesting, and I could listen to your answer two or three more times to try to get a better han-

dle on it, but I think it is very exciting and something that deserves a good deal of thought.

Senator MIKULSKI, is there anything further?

Senator MIKULSKI. Just one other issue. As you can see, we liberal arts graduates are trying to hang in there. [Laughter.] Just a question on page 3 of your testimony, Dr. Zerhouni, about the Institute for Stem Cell Engineering at Hopkins.

If we go to the third paragraph from the bottom on page 3, you say, "I was instrumental in creating an Institute for Stem Cell Engineering primarily because I was concerned about the lack of Federal funding to advance the fundamental research still needed in this promising, but fledgling, field."

Question: What was and is the Institute for Stem Cell Engineering? You cite in its creation the lack of Federal funds to advance fundamental research. In your perspective, are Federal funds still lacking, and should Federal funds be available?

Dr. ZERHOUNI. At that time, I was aware of the progress that was made by Dr. John Gerhart in particular at Hopkins. I also realized from talking to many scientists at the time that they were shying away from entering this exciting field.

Senator MIKULSKI. And tell us what year you established the institute.

Dr. ZERHOUNI. We started working on establishing it in 1999, and we succeeded by 2001, because I had to raise funds for it through philanthropy.

At the time, basically, the scientists would tell me, "I do not want to go into this field because there is no Federal funding. I would have to depend on commercial funding from a company, and there are lots of strings attached to that."

So I said, "Well, we need get into this field, we need to understand the fundamental mechanism of this differentiation of cells into different tissues, and I will work to try to get an institute up and going," because I needed two things—one was the resources, but also the multidisciplinary teams working together.

Without Federal funding, it is hard for me to see how you develop a field of science in our country. So I do believe that Federal funding is needed.

Senator MIKULSKI. Then you go on and say that the President's policy is an important breakthrough and that you will work with whatever rules the Congress passes. Hopefully, Congress will be as forward-thinking as you have been in establishing this institute.

I think that clarifies that paragraph.

Dr. ZERHOUNI. Thank you, Senator.

The CHAIRMAN. I want to thank the doctor very much for his presence and congratulate him and congratulate the President for this nominee. This has been extremely interesting for all of us, and I certainly look forward to strong support of the nominee. I think our Nation is very fortunate, as is the world, to have his services to lead this great institution.

It is my intention to call our committee together after the first vote tomorrow afternoon to positively affirm and report out the nominee, which I expect will be done tomorrow; and then, it is my intention to urge our Majority Leader to move forthwith, hopefully in the next day or so, to have Senate confirmation.

I would like to insist on a vote, so that you know what overwhelming support you have. It is nice to have that once in a while.

So I thank you very much, Dr. Zerhouni, for your presence here today and your response to our questions. We thank your family for being here.

The committee stands in recess.

[Additional material follows.]

ADDITIONAL MATERIAL

PREPARED STATEMENT OF ELIAS A. ZERHOUNI, M.D.

Senator Kennedy, Senator Gregg and members of the committee:

I'm honored to appear before you today as President Bush's nominee to the directorship of the National Institutes of Health.

If confirmed, I am looking forward to working with Secretary Thompson, an enthusiastic supporter of science and Congress to best serve the institution that has made our country the undisputed leader in Biomedical Research.

I'd like to share with you some of my background and then tell you about my vision for the NIH.

I was born in a small town in Western Algeria. My father was a math and physics teacher who gave me a love for the sciences.

At age 22, I saw the first published image of a CT scan, and decided that medical imaging would be the perfect field for me as it combined medicine, physics and computer science.

In 1975, a few weeks after our wedding, my wife Nadia and I came to this country, to Johns Hopkins, where I encountered an extraordinary environment for innovation and discovery and great mentors who helped me become the physician, teacher and scientist I am today.

My research led me to develop new imaging methods for lung cancer and cardiac diseases, some of which led to less invasive surgery.

I made some inventions and had the good fortune to see a few of them translated successfully from the "bench to the bedside."

Throughout my career, I realized the importance of inspiring and leading groups of multidisciplinary scientists because, in my field, progress cannot be made without biologists, physicians and physical scientists working together.

I built a successful clinical and research division and learned how to be entrepreneurial when necessary.

I was given progressively larger areas of responsibility, first as Chairman of the Department of Radiology and later as Executive Vice Dean of the Johns Hopkins School of Medicine.

Through these experiences I've interacted with the entire spectrum of biomedical scientists from the most basic to the most clinical.

This led me to develop a certain perspective about where we stand today in the biomedical sciences:

First, I have become convinced that only further fundamental discovery will allow us to meet the healthcare challenges facing us.

Second, we need to bring the fruits of our research to clinical testing more rapidly and enhance our ability to prevent and detect disease much earlier.

Third, I believe that biomedical research is at an important turning point that may require new strategies.

Let me show you a device developed by combining robotics, molecular chemistry, imaging and computer chip manufacturing technologies. In my hand, I hold what's known as a DNA chip. It can determine in a single experiment which of several thousand human genes are active in a biological sample.

Only a few years ago, it would have been impossible to ask the questions we're now able to explore on a scale unprecedented in history.

Obviously, we've made great progress, but let me show you how much more we have to do. Look at the tip of this needle; it's several times larger than any cell in our body.

Yet that single cell contains all of the human DNA, not just a subset like this DNA chip does, and it also contains the entire molecular machinery necessary to transcribe and translate that DNA into all the complex networks of interacting molecules that make us what we are.

Today, we've discovered most of the parts of our biological systems.

Now we need to go on a journey to understand how all these parts fit together in health and in disease: this is, by far, the most formidable scientific problem ever faced by mankind.

Progress increasingly will depend upon fields of science beyond medicine and biology. The scientific team of the future will be multidisciplinary. We need to encourage cross-cutting initiatives.

We need to continue to train, recruit and retain the best talent in biomedical research because in the final analysis it is always the creative spark of the unique individual that leads to new knowledge and real progress.

Sometimes this new knowledge will raise deep moral issues as we're now witnessing. Throughout history, tensions between science and society have developed when a scientific discovery challenges deeply held beliefs.

The resulting debates can be polarizing, and I have the interesting privilege of coming before you at just such a time.

What then, should be the role of the NIH director in that regard?

As I've told several of you, "disease knows no politics." The NIH, a public agency at the vanguard of the fight against disease, is to serve all of us.

The NIH and its director should not be, or made to be, factional, but must always remain factual.

My role as NIH director will be to inform the debate by developing and communicating the most objective scientific data. The NIH director should actively promote the necessary research within the policy guidelines laid out by the President, and in strict compliance with all laws passed by Congress.

As Executive Vice Dean at Johns Hopkins, I was instrumental in creating an institute for stem cell engineering, primarily because I was concerned about the lack of any Federal funding to advance the fundamental research still needed in this promising, but fledgling, field.

This is why I believe that, in the current state of science, the August 9th policy set by the President was an important advance.

For the first time it allowed NIH funding for stem cell research, something which had not been done under previous administrations.

On another important topic, I and many others were pleased to see the doubling of the NIH budget you started by 1998, and soon to be completed as proposed by President Bush. This occurred despite all of the difficulties faced by the Nation.

During my visits with you, I was impressed by your strong support for NIH.

But I also heard, loud and clear, your wish to see these resources managed effectively. I will work hard to develop the information necessary to optimize the hard earned resources of American taxpayers. I will do my best to work with Congress to accomplish this goal.

I'd like to take this opportunity to acknowledge the outstanding service of Dr. Ruth Kirschstein the acting director of NIH and also that of Dr. Harold Varmus the immediate past director. Both of whom have been very helpful to me during this process.

I'd like to especially thank my wife and family for their constant and understanding support.

Finally, Mr. Chairman, as an immigrant, I am deeply touched by being here today, because it says about our great country what no other country can say about itself.

I would be pleased to answer any questions you may have for me.

[Whereupon, at 11:15 a.m., the committee was adjourned.]