Testimony by Dr. Barry Lentz
Director of Biophysics at the University of North Carolina at Chapel Hill
Chapel Hill, North Carolina

Representing the Biophysical Society

Before the House Appropriations Subcommittee on Labor, Health, and Human Services, Education and Related Agencies, United States House of Representatives

Concerning FY 2007 Appropriations for the National Institutes of Health

Submitted for the written record

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Thank you, Mr. Chairman, for the opportunity to testify here today. My name is Barry Lentz and I am President of the Biophysical Society as well as a professor and Director of Biophysics at the University of North Carolina at Chapel Hill. My research focuses on the mechanism of membrane fusion and on the role of lipids in regulating blood coagulation. My work on membrane fusion is disclosing the mechanism by which lethal viruses such as HIV and influenza invade cells and will ultimately allow us to determine how neurotransmitters are released at nerve endings, which could lead to treatment of many neurological diseases. My work on blood coagulation has led to an entirely new view of how blood clot formation is triggered by wound damage. This new understanding could produce new technologies for controlling bleeding both in the operating room and on the battlefield. Both of these projects have been funded for over twenty years by the NIH, and before that very basic work leading to them was funded by the NSF.

I am here on behalf of the Biophysical Society, a professional, scientific society representing nearly 8000 scientists throughout the United States and the world. Our members teach and conduct research in colleges, universities, laboratories, government agencies, and industry. My testimony today will focus on the critical importance of funding for the National Institutes of Health (NIH). The Biophysical Society strongly urges this subcommittee to increase the federal investment in biomedical research. Specifically, the Society supports the recommendation of the Ad Hoc Group for Medical Research Funding, which calls for the Congress to add 5% to the NIH budget over its FY 2006 funding. This would make the total appropriation $30 billion. Even in these admittedly difficult fiscal times, one must maintain the seed corn. This increase is needed to sustain our world leadership in biomedical research and innovation and to continue to improve health outcomes for our citizens.

The NIH received a small cut in its budget in 2006, the first decrease in the Institutes' budget in over 30 years. The President has requested level funding for NIH for FY 2007. When inflation is taken into consideration, NIH will actually see a decline in its purchasing power. As a result, NIH projects a decline in the number of research projects it funds for the third year in a row, as well as a 2% decrease in the size of each project grant. Under the President's proposed budget, only 9300 new projects would be funded, which is over a 1000 less than the number awarded in 2003.

Meanwhile, India, China, Southeastern Asia, and even Europe are increasing their investments in science education and research. This realization has led to the President's American

Competitiveness Initiative, which calls for a doubling of the U.S. federal investment in physical sciences research to keep America competitive. I can assure you that continued and increasing investment is also needed in biomedicine to keep the U.S. competitive. Singapore has built "Biopolis", a $3.5 billion biotech city. China is building its own NIH. We must compare our science budgets not to our own past budgets, but to what is needed to compete on the world's new playing field. We have already seen our manufacturing plants go overseas; do we want our biotechnology and pharmaceutical companies to relocate elsewhere also?

Ultimately the leadership of the biotechnology and pharmaceutical industries will move their businesses to where the most and the best scientific workers are receiving the scientific training on which those industries depend. Today that is the United States, but trends in place suggest that will not continue to be the case, unless we act now to vigorously support the infrastructure on which the biomedical industries depend. And that infrastructure is the basic biomedical research being conducted at universities and laboratories across the country and funded by the NIH.

The greatest impact of the decreases at NIH will be felt at the universities and research facilities located in your home states and districts. Eighty-five percent of the NIH budget is spent on extramural research, that is, research being conducted all across the nation. Scientists located in every state and in all the congressional districts represented by the members of this subcommittee rely on these grants to conduct their research, run their laboratories, and pay the post-doctoral researchers and graduate students working with them.

It is in these labs, located in your hometowns, that research projects are being scaled back and new projects postponed. Significantly, multi-interdisciplinary grants are being scaled back, and it is interdisciplinary effort that leads to the most dramatic advances in biomedical instrumentation and therapies. Beyond these payoffs, biomedical research supports and maintains a trained technical workforce that our nation and your home states need to compete.

Our time is too short today to talk about the many advances we have seen and the many opportunities we have yet to realize in biomedicine in the United States. My own research represents the result of collaboration between a physical chemist and two clinical hematologists and has led to an improved way of detecting and diagnosing Lupus and the coagulation disorders that accompany this, which will lead to improved treatment of these disorders. On a broader scale, the sequencing of hundreds of genomes from bacteria, plants, and animals, including humans, and the identification of the structures of thousands of proteins has brought us to a major crossroads of discovery. Though we now can identify the 30,000 genes and the four times as many proteins that make up the human genome, we do not know what a third of those genes do or how their protein products interact.

Just last week *Science* magazine reported that biotech companies are racing to be able to sequence a genome for $1000. To put that in perspective, the first sequencing of the human genome six years ago cost $300 million. With the ability to inexpensively and rapidly look at an individual's genetic makeup, scientists will be able to use genomic sequencing to understand how diseases work in our bodies, and doctors will be able to tailor treatments for each patient's particular condition, thus increasing efficacy. There is already at least one drug on the market

being used successfully on the basis of genomic information—women with a specific genetic form of breast cancer respond well to this drug, while women with other types of breast cancer do not. It will take concerted efforts by dedicated physicists, computational scientists, chemists, mathematicians and biologists to realize the promise of individualized medicine. With wise and continued support for basic science, this is not a century way, but may likely be seen in our lifetimes—even mine!

This new treatment for breast cancer that I just mentioned is just one example of how NIH expenditures on the development of techniques and tools for studying molecules and proteins serve as a vital foundation for creating the drugs and therapies that ultimately make their way into the marketplace to enhance and even save the lives of Americans. It is also an example of how investments in basic research at the interface of the physical and life sciences can lead to advances in medicine years later.

The 5% increase we respectfully request for the National Institutes of Health is far less than what is needed to sustain the U.S. investment in biomedical research. The increase in 2005 did not keep up with inflation, and the decrease in 2006 cut the agency's purchasing power even further. We request 5% in recognition of the extremely limited discretionary dollars this subcommittee has to work with and with the hope that real increases will be forthcoming when the budgetary outlook improves. Funding for biomedical research is an investment in our future that we cannot afford to pass up.

Thank you for providing me the opportunity to testify this morning. I will happily attempt to answer any questions you may have.

Curriculum Vitae for Barry R. Lentz

EDUCATION:
University of Pennsylvania, BA in Chemistry, 1966
Cornell University, PhD in Biophysical Chemistry, 1973
University of Virginia, Postdoctoral Work in Membrane Biophysics, 1973-1975

POSITIONS:

1965-66	Research Technician with Dr. Phillip George, Department of Chemistry, University of Pennsylvania, Philadelphia, PA
1966-73	NIH Predoctoral Fellow with Dr. H.A. Scheraga, Department of Chemistry, Cornell University
1972	Visiting Scientist, Biophysics Department, Weizmann Institute of Science, Rehovot, Israel
1973-75	National Institutes of Health Postdoctoral Fellow with Dr. T. E. Thompson, Department of Biochemistry, University of Virginia, Charlottesville, VA
1975-81	Assistant Professor of Biochemistry and Nutrition, University of North Carolina School of Medicine, Chapel Hill, NC
1981-88	Associate Professor of Biochemistry and Nutrition
1988-present	Professor of Biochemistry and Biophysics
1995-present	Director, UNC Program in Molecular and Cellular Biophysics
1996-1999	Faculty Director, UNC Macromolecular Interactions Facility

HONORS:
National Institutes of Health Postdoctoral Fellow, 1973-75
Established Investigator of the American Heart Association, 1979-84
Elected Fellow of American Association for the Advancement of Science, 2001
Emily Grey Award, Biophysical Society, 2005
115 articles published in reviewed journals

SERVICE:
Reviewer for numerous scientific journals including Biochemistry, BBA, Biophys. J., etc.
Member of the NSF Biophysics Panel, 1987-1988. Adhoc for various NSF and NIH panels.
Member of NIH Biophysics & Biochem.-B Study Section, 1988-1992; Reviewer Reserve since 1992.
Biophysical Journal Editorial Board, 1998-present; Associate Editor, 2002-present.
Elected Chair of the Membrane Structure and Assembly Subgroup of the Biophysical Society, 1999.
Faculty Council of the University of North Carolina, 1976-1979; 1994-1999.
Administrative Board of the UNC Graduate School, 1991-1998; Program Review, 1992-1998.
Elected Member of Council of the Biophysical Society, 2002-2005.
Chair, Minority Affairs Committee, Biophysical Society, 2002-2005.
Course Director, Branson Summer Course in Biophysics for Minority Students, 2003-present.
Executive Board of the Biophysical Society, 2004-present.
President, Biophysical Society, 2006-present.

FINANCIAL DISCLOSURE STATEMENT
Pursuant to House Rule XI, Clause 2(g)

Barry Lentz

1) "Lipid Regulation of Thrombin Generation"
Principal Investigator: Barry R. Lentz; 30% effort
Agency: NIH
Type: RO1 (1-RO1-HL072727-01); Period: 7/1/04-6/30/08; $275K direct costs year 1.

2) "Molecular and Cellular Biophysics Training Program"
Principal Investigator: Barry R. Lentz
Agency: NIH
Type: T32 (1-T32-GM08570) Period: 7/1/00-6/30/2005
This is a training program. Dr. Lentz is the PI (10%) and Director of the Program in Molecular and Cellular Biophysics.

3) "Microstructural Heterogeneity in Membranes". A renewal of this grant has been submitted.
Principal Investigator: Barry R. Lentz; 30% effort
Agency: NIH
Type: RO1 (5-RO1-GM32707-19); Period: 4/1/02-3/31/06, extended one year; $186.7K plus $74.3K emergency equipment funds. Renewed funding requested.

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4) "To provide travel support for foreign speakers at the Biophysical Society Workshop (co-sponsored by NICHD) on 2-18-2006 in Salt Lake City, Utah."
Principal Investigator: Leonid Chernomardik, on behalf of the Biophysical Society
Agency: NIH
Grant number: 263-MK-603897
$4000, February 2006

5) "Branson Summer Course in Biophysics for Minority Students"
Principal Investigator: FASEB
Agency: Subgrantee of FASEB; NIH
Type: T36-GM08637, FASEB MARC Course Grant
$33,691.94, summer 2004

Biophysical Society Members

To the best of their knowledge, Biophysical Society staff estimate that over 85% of Biophysical Society members receive grants from federal agencies to support their work and/or education. The primary funding agency for these members is the National Institutes of Health. Biophysical Society members also receive financial support from the National Science Foundation, the Department of Energy, NASA, the Department of Education, and the Department of Defense.