

Life Science Funding Recommendations

of the **American Society for Microbiology to Congress for Fiscal Year 2018**

**Statements supporting Biomedical and
Life Science Research and Public Health
for the following federal agencies:**

National Institutes of Health

Centers for Disease Control and Prevention

Food and Drug Administration

National Science Foundation

US Department of Agriculture

Department of Energy

Department of Defense



AMERICAN
SOCIETY FOR
MICROBIOLOGY

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The American Society for Microbiology (ASM) is the largest single life science society, composed of over 50,000 scientists and health professionals. The mission of ASM is to promote and advance the microbial sciences. This booklet provides policy and funding recommendations of the ASM for life sciences research and public health programs supported by the National Institutes of Health (NIH), Centers for Disease Control and Prevention (CDC), Food and Drug Administration (FDA), National Science Foundation (NSF), US Department of Agriculture (USDA), Department of Energy (DOE) and the Department of Defense (DOD).



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National Institutes of Health

The ASM urges Congress to continue its bipartisan support for biomedical research as it considers the FY 2018 budget for the National Institutes of Health (NIH). We join with the Ad Hoc Group for Medical Research in recommending that Congress appropriate at least \$2 billion above FY 2017 in addition to funds included in the 21st Century Cures Act. This proposed level of NIH funding would help ensure that biomedical research continues to discover new cures, treatments and preventions for the infectious and chronic diseases causing human illness and death. Over the past decade, NIH has lost over 20 percent of its capacity to fund research because of budget cuts, sequestration and inflationary losses.

NIH supported scientific capabilities protect against health threats like infectious diseases and help safeguard our national security. Mobilization against the Zika virus, the national strategy against drug resistant pathogens, new understanding of the human microbiome, and the search for vaccines against Ebola, Zika, HIV and other pathogens are recent examples of the unique contributions of NIH research. The fact that previously unknown diseases continue to emerge and that old diseases like tuberculosis still persist is a convincing argument for preparedness

against any and all health threats and a mandate for consistent federal support for NIH research.

Last year, it took months for the requested supplemental Zika funding to be approved by the Congress. It is critical that our federal health agencies can access additional resources immediately in the face of impending threats like emerging infectious disease. The ASM has previously recommended the establishment of a permanent federal fund dedicated to preparing for and responding to such threats. The proposed fund should contain at least \$2 billion in new funding, be located at the Department of Health and Human Services, and be accessible to the NIH and multiple other federal agencies that protect public health and safety against unanticipated or large scale disease outbreaks.

Infectious diseases remain among the leading causes of mortality and morbidity in the United States and worldwide. The National Institute of Allergy and Infectious Diseases (NIAID), the National Institute of General Medical Sciences (NIGMS) and the other NIH institutes and centers are leaders in cutting edge research areas like biosensors and genomics that protect our nation and benefit the American public. NIH institutes and centers contribute to national and global health



initiatives like those to reduce antibiotic resistance among microbial pathogens, maintain defenses against bioterrorism, or eliminate infectious diseases like polio and malaria.

In recent months, NIH supported researchers reported advances that included promising results in a clinical study of a new malaria vaccine, the launch of clinical trials for vaccine candidates to prevent Zika virus infection, a “big data” analysis integrating digital information with traditional surveillance techniques to more quickly identify infectious disease outbreaks, and a new rapid assay to screen thousands of drugs that might be useful against pathogens resistant to multiple therapeutics.

Over 80 percent of NIH’s annual budget is spent outside its own laboratories, funding research and training in all 50 states and the District of Columbia. In FY 2016, NIH helped support nearly 2,400 research organizations, including academic institutions, hospitals, and research institutes. NIH provides the majority of federal support for all university R&D efforts. NIH funding is invaluable in training scientists and other technical personnel, and it facilitates access to state of the art research tools like high throughput screening of candidate drug compounds and the CRISPR gene editing technique.

The ASM is concerned that the persistently low success rate for new and competing NIH research grants (< 20%) forced by budgetary constraints will slow future discovery and collaborations in science and technology. The shrinking industry pipeline of biomedical innovations has been an economic reversal in recent years, exemplified by a decline in discovery of novel therapeutics against increasingly drug resistant pathogenic microbes. US healthcare expenditures (estimated >\$2.5 trillion/year) make biomedical innovation even more urgent as potential solutions to human morbidity and mortality. It is crucial that NIH continues its ongoing partnerships with private industry, other federal agencies, and numerous public research institutions.

Arguments for increasing research funding in FY 2018 also include the slowing growth in US biomedical R&D spending in relation to other key nations, as well as our declining global biomedical market share. As the world’s largest public source of biomedical funding, NIH programs contribute considerably to our nation’s global prominence in biomedicine and biotechnology. NIH funding shortfalls impinge efforts to not only protect public health but also stimulate the US bioeconomy. NIH funding directly supports an estimated 400,000 plus



jobs in the US biomedical R&D enterprise. Agency appropriations also indirectly benefit millions employed in industries built upon NIH innovations, such as biotechnology, pharmaceuticals and suppliers of R&D technologies.

The recommended NIH budget increase of \$2 billion would strengthen the unparalleled NIH tradition of leveraging scientific discovery to

improve public health and generate economic returns on federal support of biomedical research. The ASM appeals to Congress to continue its strong endorsement of biomedical innovation by steadily increasing the NIH budget for research and training programs. Science and technology are valuable investments in public health, biomedical advances, national security and economic growth. ■





Centers for Disease Control and Prevention

The ASM asks that Congress approve the FY 2018 budget for the Centers for Disease Control and Prevention (CDC) to a level of at least \$7.8 billion. As the nation's leading health protection agency, the CDC has immense responsibilities to identify and respond to emerging pathogens, to improve vaccines, to help solve foodborne outbreaks, and to ensure that we are prepared for the next potential deadly disease. CDC plays a key role to counter challenges like the spread of diseases by globalization, emerging drug resistant pathogens, biothreats to national security and disease causing contaminants within our complex food supply.

CDC activities are unique in the US public health system. The agency protects communities by providing services not performed by other agencies and by collaborating with local, state, federal and international stakeholders. The ASM is concerned that fluctuating or inadequate budgets will disrupt ongoing CDC functions that safeguard the nation, such as extensive disease surveillance networks, preventive education for health care providers and the general public and science based threat identification at CDC laboratories and in the field. Threats like emerging pathogens and sporadic food contamination are, and always will be,

significant and constant obstacles to the nation's health and safety.

Among CDC's hallmark capabilities are the agency's skillful rapid responses to emerging microbial pathogens, like those mobilized to counter the arrival in this country of Zika virus. During 2015, Zika emerged as the cause of wide-spread illness in Brazil with links to newborns' microcephaly and CDC personnel prepared for Zika's eventual spread north. In January 2016, CDC activated its Emergency Operations Center to help coordinate the US response to Zika, issued international travel notices and released its first Zika related clinical guidance on testing women and infants. Other CDC actions followed, including investigating domestic transmission of mosquito borne Zika virus in Texas and Florida, confirming US cases of sexual transmission, developing diagnostic tests and distributing them to roughly 100 countries, implementing vector control strategies, establishing Zika reporting systems and more.

CDC responses to Zika in this country are potent reminders of the resources and effort necessary to counter new and emerging health threats. Unfortunately, CDC preparations last year also included months of waiting for Congress to approve requested emergency



Zika funding. The ASM strongly advocates for a permanent, earmarked rapid response fund for federal agencies to access quickly against unanticipated threats like Zika or Ebola infection and other microbial outbreaks. This proposed Rapid Response Reserve Fund should contain at least \$2 billion in new funding and should be located at the Department of Health and Human Services, to be accessed as needed by federal agencies responsible for US public health such as CDC and the NIH. Past experiences with disease outbreaks like SARS show how critical it is to respond fully and immediately to impending threats, to save lives and prevent excessive economic losses.

CDC initiatives have reduced the numbers of healthcare acquired infections, prevented new cases of childhood diseases like measles, halted outbreaks caused by contaminated fresh produce and other foods and alerted its public health partners to newly identified diseases. Surveillance data from CDC show that this level of vigilance must continue with strong funding from the Congress. As examples, one in six Americans becomes sick every year from contaminated foods and there are nearly 20 million new US cases of sexually transmitted diseases. Cases of chlamydia, gonorrhea and syphilis

are rising. Over 1.2 million Americans live with HIV infection, 1 in 8 undiagnosed.

The CDC leads national and international campaigns against increasing numbers of microbial pathogens resistant to available antimicrobial drugs. Federal investments against antimicrobial resistant (AR) infections should be expanded through greater resources for the CDC and its partners in the National Action Plan for Combating Antibiotic Resistant Bacteria (CARB). The ASM considers these infections to be among the greatest challenges to the nation's health today. For example, of the 820,000 US gonorrhea infections each year, about 246,000 are resistant to one or more commonly used antibiotics. Cases of AR infections in health-care facilities are rising, including the 9,000 caused annually by highly resistant *Enterobacteriaceae*. The CDC estimates that preventing AR infections and improving antibiotic prescribing could save 37,000 lives over five years.

Increased funding for the CDC budget is necessary to sustain the agency's science based activities at levels needed to fully safeguard against health and biosecurity risks, whether relatively common foodborne illnesses or newly emerging pathogens just identified as potential threats. Each CDC



program must have adequate FY 2018 funding to readily access the latest computing, communication and laboratory technologies and to maintain research and training activities. The CDC provides experienced field investigators, laboratory facilities, educational resour-

es and guidance documents to all sectors of public health and national security. Its partnerships with industry, governments, academia, research institutions, healthcare workers and others extend across the country and around the world. ■



Food and Drug Administration

The ASM recommends that Congress increase funding for the Food and Drug Administration (FDA) by at least 3 percent for FY 2018, raising the agency's budget authority to \$2.8 billion by adding \$78 million. The proposed level is needed to support the many FDA programs that protect the nation's public health and safety. We also urge that Congress make available the additional \$60 million needed by FDA to implement specific provisions of the 21st Century Cures Act passed by Congress last year.

The ASM urges Congress to reject the Administration's proposal to offset a third of the FDA's appropriated budget with an increase in medical product industry user fees. FDA's core responsibilities, safe and effective medical products and safe foods, should be supported by federal funding. Industry user fees have always been intended to supplement, not replace, federal funding for FDA. In addition, the drug and device industries have already completed user fee agreement negotiations with FDA, setting the appropriate amount of industry fees to support FDA reviews.

FDA regulatory, educational and research programs must be consistently and adequately funded. FDA is charged with ensuring the safety, effectiveness and security of human and veterinary drugs, vaccines

and other biological products for human use and medical devices, both domestic and imported. It also is responsible for the safety and security of the nation's food supply, dietary supplements, products emitting electronic radiation and cosmetics and for regulating tobacco products. FDA regulated products account for about 20 cents of each consumer dollar. Ensuring their safety and efficacy affects our daily lives as well as the US economy.

It is essential that Congress provide strong, continuing funding in FY 2018 for the FDA. Agency responsibilities continue to expand steadily because of legislation like the 21st Century Cures Act and the Food Safety Modernization Act (FSMA) passed by the Congress in 2011. Each year, FDA is a key participant in newly launched federal initiatives such as those promoting precision medicine or combating antibiotic resistant infections. Growing demands on FDA resources also are being pushed by the increasingly complex landscape of US health care and the bioeconomy, burgeoning volumes of domestic and imported consumer goods, our highly diverse food supply and marketplace globalization.

We urge Congress to support FDA's access to the latest science and technology when performing its regulatory duties, strengthening FDA capabilities like those de-



ployed during the nation's response to emerging Zika virus. In 2016, FDA issued a new guidance on deferring blood donations from individuals exposed to Zika virus, and another with recommendations to reduce potential Zika transmission from human cells and tissues. It then approved a rapid test to screen blood donations for Zika virus. The agency had expedited its availability as an investigational new drug, an example of how FDA partners with industry and other agencies to respond rapidly to health emergencies. FDA scientists announced a new mouse model developed at FDA laboratories to accelerate development of Zika vaccines and therapeutics.

Other science based actions taken last year by FDA further expanded the nation's health care product pipeline, including approvals of two drugs for hepatitis C, a new treatment for inhalation anthrax and a vaccine to prevent cholera for travelers. FDA also advanced the Precision Medicine Initiative with draft guidances for oversight of next generation DNA sequencing tests. In 2016, FDA finalized its rule revising annual reporting requirements for all antimicrobials used in animals intended for human consumption or food producing animals, to further ensure judicious use of medically important therapeutics. It also cleared for marketing the first test to detect

carbapenem resistant *Enterobacteriaceae* in clinical samples, to more quickly detect resistant pathogens in patients. In February, FDA cleared the first test of patient levels of the protein procalcitonin to guide antibiotic use in sepsis and respiratory infections. The same day, it approved marketing the first rapid test to identify bloodstream pathogens and provide antibiotic sensitivity information.

The ASM urges Congress to provide adequate support in FY 2018 to sustain FDA's oversight of the vast, complex food supply in the United States. The FDA is primarily responsible for 80 to 90 percent of our food, with the USDA safeguarding the remainder. This protection is being compromised by increasing proportions of the food supply imported from other countries, a population more susceptible to illness and diets with more raw foods. The most recent federal estimates indicate about 48 million people, or 1 in 6 Americans, get sick each year with foodborne illness. Of these, 128,000 are hospitalized and 3,000 die. In 2015, FDA estimated that related health care costs reached about \$36 billion annually.

The ASM urges Congress to support FDA's mission to safeguard the nation's health, facilitate discovery of new products and stimulate global competitiveness in science and technology. ■



National Science Foundation

The ASM recommends that Congress approve a budget of \$8 billion in FY 2018 for the National Science Foundation (NSF), about 4 percent above the FY 2016 enacted level. We ask that Congress continue its bipartisan support of the only federal Agency that funds all fields of science and engineering. To ensure US global leadership in science, Congress should sustain the agency's congressionally mandated mission "to promote the progress of science; to advance the national health, prosperity, and welfare; and to secure the national defense." Investments in NSF have consistently benefited the public interest with scientific discoveries, helping elevate the United States as a global leader in R&D driven achievement.

NSF funding is vital to basic research and education programs throughout the country, stimulating discovery in both public and private sectors that clearly vitalizes our domestic economy and global competitiveness. Industries related to biotechnology, biomedicine and computing are powerful examples of the importance of basic research across all disciplines. Emerging fields like nanotechnology and biomanufacturing owe a great deal to NSF funded researchers. Annual NSF appropriations finance one quarter of all federally funded research at US colleges and univer-

sities in all 50 states, the District of Columbia and Puerto Rico.

The NSF plays a unique role in furthering basic knowledge and training the nation's crucial R&D workforce. Over 90 percent of the NSF budget funds research, education and related activities primarily as competitive extramural grants or cooperative agreements, distributed to more than 1,800 colleges, universities and other institutions. To date, 223 Nobel Prize winners have benefited from NSF support. In FY 2017, NSF plans to support the activities of over 360,000 researchers, postdoctoral fellows, trainees, teachers and students. Of the more than 50,000 grant proposals expected, the agency anticipated awarding 12,000 grants across a range of disciplines. The FY 2018 budget must be able to sustain this level of NSF involvement in resolving problems like antibiotic resistant pathogens, emerging infectious diseases in food producing plants and animals and threats to national security.

Analyses of the US economy and its driving forces, as well as global markets based upon science and engineering, consistently emphasize the need for robust R&D expenditures and idea generating programs. Annual NSF budgets support nearly 70 percent of nonmedical basic biology research



at US academic institutions. Much of this nation's rapidly developing bioeconomy is being fueled by NSF enabled innovations. NSF also provides nearly 90 percent of federal funding for university based computer science research, as well as about one-third of federal funding for basic engineering research at colleges and universities. Other disciplines like chemistry and mathematics likewise benefit immensely from NSF support. Agency funding sustains 12 Science and Technology Centers (STCs) across the country, multidisciplinary incubators for innovation and training environments for scientists and engineers. The four STCs funded last September are dedicated to improving particle beam technology, creating tools to develop living "bioreactors," building the basics of mechanobiology and advancing real time functional imaging at the nanometer and atomic scales. Created in 2011, NSF's I-Corps program trains researchers to assess the commercial potential of their discoveries, guiding the creation of more than 320 companies thus far. Since 2013, NSF's small business innovation research (SBIR) program has helped launch nearly 1,300 high-tech startups and small businesses, with recently established companies in cutting edge areas like robotics, medical diagnostics and instrumentation technologies.

NSF's Directorate for Biological Sciences (BIO) supports an impressive diversity of training opportunities and studies on how humans and other animals, plants and microorganisms thrive and interact. Like other NSF directorates, BIO regularly partners in cross cutting programs with researchers in chemistry, engineering, mathematics, computer sciences and more. It also collaborates with other government and non-government entities on large-scale research projects; for example, the Ecology and Evolution of Infectious Diseases (EEID) program with the NIH and the USDA. In 2016, EEID funded nine rapid response grants to counter the spread of Zika virus infection. Basic biology underlies national initiatives like those against cancer and foodborne illnesses, as well as the federal strategy to understand and utilize microbiomes, the collective microorganisms in, on and around plants and animals.

The NSF directorates excel in identifying research areas that could transform public health, food security or emergent economic sectors like biomanufacturing. One current example is the discovery by NSF funded researchers of the gene editing technique CRISPR-Cas9, now used widely in genetics research and expected to greatly



influence medicine, agriculture and biology based industries. NSF funded discoveries reported in the past year could similarly help reshape future science and technology, including a web based model revealing specific properties of the outer membranes of bacteria resistant to multiple drugs, a new tool in drug discovery; an “instantaneous fluorescence polarization” microscope that detects the position of individual molecules in living

cells; patented “bioelectrodes” in bacterial biofilms that generate electricity thought scalable to industrial levels; a newly designed genetic switch to more effectively boost bacterial production of commercially valuable chemicals by turning off competing metabolic pathways; and an engineered bacterium that synthesizes highly conductive nanowires made of amino acids. ■



US Department of Agriculture

The ASM recommends that Congress approve \$420 million in FY 2018 for the Agriculture and Food Research Initiative (AFRI) at the US Department of Agriculture (USDA). Mindful of current budgetary constraints, the level of funding requested is considerably lower than the \$700 million authorized by Congress when it established AFRI in the 2008 Farm Bill, re-authorized in 2014. The ASM appreciates the Administration's support of agriculture research in its FY 2018 preliminary budget, but believes the proposed \$420 million is necessary to further AFRI funded research, education and extension activities.

The AFRI program in USDA's National Institute of Food and Agriculture distributes competitive grants principally to land grant universities and tribal colleges, to advance agriculture related science and technology, workforce development and public education. Despite US agriculture's enormous impact on the nation's standard of living, the federal share of agriculture R&D shrinks each year. By 2010, private sector R&D funding had surpassed public support, a trend that will negatively affect future innovation and agriculture based economies. AFRI supported basic research is long term. Training and public education supported by AFRI are not duplicated by research and

development in industry. Federal funding for agriculture research is falling behind that of other nations emerging as direct competitors in the global marketplace.

Multiple analyses show that agriculture R&D has large returns on investment, both societally and economically. Since WWII, the total agricultural output in the United States has grown by about 170 percent, despite falling numbers of farmers and ranchers and declining acres in production. Besides growing abundant food for US consumers, US agriculture exports more than 20 percent of its annual production, which includes soybeans, corn, wheat and beef. USDA forecasts estimate FY 2017 agriculture exports will reach \$134 billion, with China as the largest market followed by Canada and Mexico. Those forecasts also estimate that the annual production value of the agriculture sector in FY 2017 to be nearly \$400 billion. These impressive metrics are largely innovation driven, built on the foundations of basic and applied research aimed at increasing productivity and product safety.

The ASM urges Congress to recognize the broad significance of funding R&D programs related to agriculture. In the Agricultural Act of 2014, the Congress identified the USDA's key research priorities:



agricultural economics and rural communities; agricultural systems and technology; animal health and production and animal products; bioenergy, natural resources, and environment; food safety, nutrition, and health; and plant health and production and plant products.

AFRI funding is essential to many of the extramural researchers seeking answers in these vital areas.

AFRI supported studies underlie USDA strategies to stop threats to our food supply and public health, to develop food production, to preserve natural environments like our forests and to help sustain the nation's global competitiveness.

AFRI funding contributes to nationwide initiatives like those against emerging infectious diseases or antibiotic resistant microbial pathogens. It plays an important national security role countering threats to the vast and potentially vulnerable US food supply. AFRI also helps educate thousands of undergraduate, graduate and postdoctoral students each year for careers in the agricultural, food, natural resource and human sciences, which are academic and labor sectors persistently understaffed.

Research across various sciences, engineering, mathematics and technology, as well as by the agriculture producers themselves, collectively advances the complicated R&D enterprise linking productivity

and US agriculture. Protecting animal, plant and human health and preserving prolific environments like timber and croplands commonly dictate multidisciplinary approaches. Often collaborations among agencies and/or between public and private research sectors are necessary. Access to the latest in science and technology within specific disciplines can be crucial to making discoveries, both in basic knowledge and in marketable products. Examples are today's emergent areas of nanotechnology and agriculture related industries like biomanufacturing that are building the US bioeconomy.

AFRI funded researchers are improving detection and prevention of potential foodborne illnesses caused not only by these regulated foods, but throughout the massive farm to table food continuum. Other researchers continue to identify new ways to prevent animal diseases like avian influenza and plant diseases like citrus greening disease, many with origins overseas and the potential to devastate agriculture based economies.

The ASM urges Congress to support the R&D innovations that advance US agriculture productivity, safeguard our food supplies and rural environments and help sustain the nation's prosperity. ■



Department of Energy

The ASM recommends that Congress sustain robust funding for the Department of Energy (DOE) Office of Science's exceptional research programs and unique user facilities. The DOE Office of Science sponsors research at more than 300 universities, operates 10 of DOE's 17 national laboratories and is the single largest supporter of basic research in the physical sciences. DOE innovations in computing, genomics, chemistry, nanoscience, measurement, imaging and more have enormous benefit to the study of microorganisms as well as their practical uses. The ASM is deeply concerned that the Administration's proposed FY 2018 budget would significantly weaken the Office of Science's support for some of the nation's most innovative and economically valuable discoveries in science and technology.

The Office of Science directly funds more than 20,000 researchers in chemistry, physics, biology, environmental science, materials science, mathematics and computer science at both DOE and non-DOE laboratories. More than 30,000 researchers from universities, government laboratories and industry are able to utilize cutting edge equipment at user facilities overseen by the Office of Science. These facilities provide world class computing, photon and light

sources, imaging and measuring instruments, genome sequencing, particle accelerators, high power lasers, nanoscience tools and other capabilities that often are one of a kind.

The DOE Office of Science portfolio comprises six interdisciplinary programs that strengthen national security, the domestic economy, global competitiveness and innovation for future progress, and includes: Advanced Scientific Computing Research, Basic Energy Sciences, Biological and Environmental Research, Fusion Energy Sciences, High Energy Physics, and Nuclear Physics. The following DOE laboratories operated by the Office of Science have generated significant advances benefiting the country: Ames Laboratory, Argonne National Laboratory, Brookhaven National Laboratory, Fermi National Accelerator Laboratory, Lawrence Berkeley National Laboratory, Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Princeton Plasma Physics Laboratory, SLAC National Accelerator Laboratory and Thomas Jefferson National Accelerator Facility.

The Office of Science's Biological and Environmental Research (BER) program has successfully encouraged multidisciplinary approaches to genomics, microbiome studies and the development of bioprod-



ucts driving the increasingly robust bioeconomy. BER managed facilities include the Joint Genome Institute (JGI), a world leader in genomics and high throughput DNA sequencing that also provides user access to non JGI researchers. The JGI facility currently sequences over four trillion genome base pairs each year, providing massive databases and tools to help achieve genomics' vast industrial, biomedical and other applications.

BER funding supports research studies ranging from the molecular level to community or field scale, utilizing disciplines that include microbiology, geochemistry, atmospheric and aquatic chemistry and systems biology. Examples of BER supported basic research reported in the past year are:

- High-field nuclear magnetic resonance spectrometers at BER's Environmental Molecular Sciences Laboratory corroborated new computational methods to design synthetic peptides, a major advance in peptide-based drug discovery beyond the limited number of naturally occurring peptide structures.
- BER funded university scientists created a new genetic code for *Escherichia coli* bacteria,

demonstrating genome wide engineering can yield microbial strains that produce new proteins and thus potentially valuable bioproducts with industrial uses.

- A team of DOE and non-DOE researchers used high-resolution mass spectrometry and high performance computing to develop a new technique for studying microbial proteins as they are modified over time by their environment and how changes manifest at the microbial community level.

The Biological and Environmental Research program funds the Bioenergy Research Centers that seek to provide the basic science knowledge to advance the production of transportation fuels and chemicals from the nonedible or lignocellulosic portion of plant biomass. Over the past 9 years, knowledge produced from these centers formed the basis of over 500 invention disclosures, negotiated more than 100 licenses or options and spawned the formation of more than a dozen startup companies. This remarkable rate of technology output illustrates the long term economic return on investment from taxpayer money that can be derived from mission relevant Office of Science programs.



Congress has traditionally supported the Office of Science's open access user facilities, where researchers can expand the boundaries of their disciplines using resources otherwise inaccessible. DOE funding for investigators working in their own laboratories has similarly pushed forward multiple areas of science, technology, engineering and mathematics. The Office of Science supports training for the

nation's next generations of scientists, engineers and other tech workforces. This education effort serves not only university students but also K-12 students and educators. The ASM urges Congress to refuse drastic, shortsighted budget cuts for the Office of Science and instead support creative thinking and research that is so important to the nation. ■





Department of Defense

The ASM asks Congress to support the biomedical research and health protection programs within the Department of Defense (DOD) when approving the DOD's FY 2018 budget. These programs contribute daily to our national security by ensuring healthy military forces at home and during deployment and by defending against biothreats. Their activities include those against infectious diseases that can seriously undermine troop readiness. Examples are DOD's disease surveillance systems and DOD funded development of new diagnostics, therapeutics and vaccines. The DOD programs protect about two million active and reserve US military personnel, which not only directly strengthens military defenses but also protects civilians by halting infectious disease and discovering widely applicable biomedical advances.

In its FY 2018 budget, Congress has an opportunity to reinforce the DOD R&D facilities responsible for the health, safety and performance of our military, including the Naval Medical Research Center (NMRC), the Naval Research Laboratory (NRL), the US Army Medical Research Institute of Infectious Diseases (USAMRIID), the Walter Reed Army Institute of Research (WRAIR) and the Uniformed Services University of the

Health Sciences (USUHS). DOD programs of particular interest to ASM include WRAIR's Center for Infectious Disease Research with eight target areas: entomology, HIV, malaria, viral diseases, preventive medicine, translational medicine, bacterial diseases and veterinary services. Another example is US-AMRIID's role as lead laboratory for biological defense research, including outbreak investigations and medical countermeasures like its candidate vaccines against plague, hantavirus, Ebola and botulism.

DOD funded research has made valuable contributions that include vaccines and field ready diagnostics, innovative treatments for wound infections under difficult conditions and assays to identify unique threats like antibiotic resistant pathogens. With more than 270,000 DOD employees working overseas, protecting American health must include studying illnesses globally. In the past year, DOD has reported its studies on pathogens typically found elsewhere; e.g., Ebola genetics, Zika viruses, leishmaniasis, malaria vaccine testing, inhalational anthrax, chikungunya virus, Venezuelan equine encephalitis and Bolivian hemorrhagic fever. Collaborations with other US agencies, foreign health departments, and international researchers also help



combat illnesses in both military and civilian populations.

DOD efforts in biomedicine, infectious disease prevention and control, case surveillance systems and medical technology development are critically important to the

nation. We urge Congress to support DOD programs and facilities tasked with protecting the health of the US military and preventing biological threats. Their actions undoubtedly help safeguard US military readiness and national security. ■



The background of the page is a close-up, slightly blurred image of the American flag, showing the stars and stripes. The flag is oriented vertically, with the top of the flag on the left side of the page.

ASM Public Policy Information

To learn more about Congress, funding for FY 2018 or to communicate with your congressional delegation, please visit the American Society for Microbiology's Public Policy Page:

<http://www.asm.org/policy>



**AMERICAN
SOCIETY FOR
MICROBIOLOGY**

Office of Public Affairs
1752 N Street, NW
Washington, DC 20036

phone: 202-942-9209

fax: 202-942-9335

e-mail: publicaffairs@asmusa.org

Web : <http://www.asm.org/policy>
