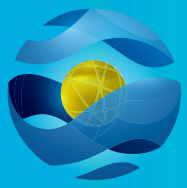


FASEB

Federation of American Societies for Experimental Biology

www.faseb.org

Federation of American Societies for Experimental Biology

Federal Funding

for Biomedical and Related Life Sciences Research

FY 2015

Executive Summary

The Federation of American Societies for Experimental Biology (FASEB) is composed of 26 societies with more than 115,000 members, making it the largest coalition of biomedical research associations in the U.S. FASEB enhances the ability of scientists and engineers to improve the health, well-being and productivity of all people through their research.

Investment in biomedical and biological research generates new knowledge, improved health, and leads to innovation and long-term economic growth. But we have lost ground in recent years. Research appropriations have been stagnant and have not kept pace with rising costs or international competition. Last year, research budgets were cut, further delaying progress and discouraging a generation of talented young scientists who are key to our future.

We must halt the decline in investment and prevent further harm to the research enterprise that has made us the global center of innovation and the envy of nations worldwide. This report presents FASEB's fiscal year (FY) 2015 funding recommendations for the following five critical federal research agencies:

- ***National Institutes of Health (NIH)***
  FASEB recommends a minimum of $32.0 billion for NIH in FY 2015
- ***National Science Foundation (NSF)***
  FASEB recommends a minimum of $7.6 billion for the NSF in FY 2015
- ***Department of Energy Office of Science (DOE SC)***
  FASEB recommends a minimum of $5.4 billion for the DOE SC in FY 2015
- ***Veterans Affairs Medical and Prosthetic Research Program (VA)***
  FASEB recommends a minimum of $621 million for the VA Medical and Prosthetic Research Program in FY 2015
- ***United States Department of Agriculture (USDA)***
  FASEB recommends a minimum of $335 million for the USDA Agriculture and Food Research Initiative (AFRI) in FY 2015

Introduction

Investment in research has helped protect this nation during wars and in peacetime. It has been a key component of our economic success, and has led to improvements in the quality of our lives that other nations strive to emulate. However, this progress is now threatened. In recent years, appropriations for our research agencies have failed to keep up with rising costs. Uncertainty about funding levels and the government shutdown have caused immense harm to ongoing projects and wasteful delays. Implementation of indiscriminate, across-the-board spending reductions in FY 2013 as a result of sequestration compounded the existing problems, stopped essential research, and forced many scientists to give up promising research careers.

This derailment is compounded as other countries expand their investments in research and development (R&D). Between 1995 and 2011, the U.S. share of global R & D expenditures declined from 43.0 percent to 36.9 percent, while China's grew from 2.5 percent to 17.9 percent. Over the same time period, the U.S. contribution to the production of science and engineering articles fell from 34.2 percent to 25.7 percent of the world total.[1]

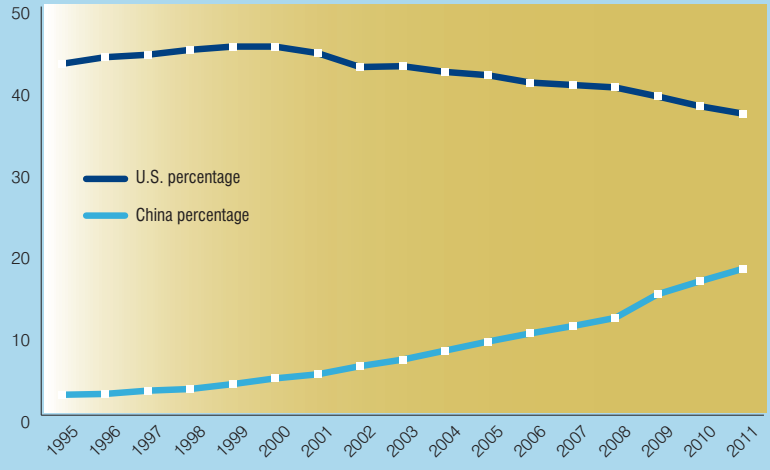
Only the federal government can provide the sustained investment needed to ensure a broad-based, world-class research enterprise that will meet our nation's needs in the 21st Century. The private sector is suitably focused on short-term objectives yielding appropriable results, and charitable foundations lack the funds and the broad perspective required to sustain a diversified and broad-based national research enterprise. Federal investment is critical because it supports research into basic processes that, in turn, are used by the commercial sector for product development. Translating new knowledge from basic science into practical applications is an expensive, high-risk, and often decades-long process that does not fit the business plans of either commercial or philanthropic groups.

The opportunities for progress have never been greater. Developments in cutting-edge science and engineering have given us new tools that are accelerating the process of discovery and increasing the opportunities for innovation. Discoveries in one discipline are being used to advance understanding in other fields. Newer and faster technologies are generating new insights into basic biological processes that are leading to new applications in health, agriculture, energy, and defense.

We should not abdicate the leadership that made the U.S. the most innovative nation in history. The cost is too great. The future depends on our ability to meet our nation's medical, energy, and technological needs. Sustained, predictable, and increased investment in basic science provides the path forward to continued improvements in health and economic competitiveness.

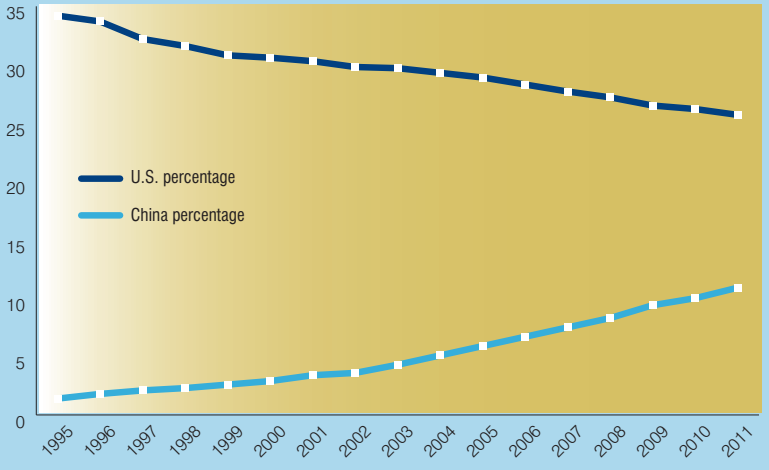
[1] Ibid

U.S. and China R&D Expenditures as Percentage of Total for Major R&D Supporting Nations/Regions*



* U.S., European Union, China, Japan and Korea
Source: National Science Board, *Science and Engineering Indicators,* 2012 and 2014

U.S. and China's Share of World's Science and Engineering Journal Articles



Source: National Science Board, *Science and Engineering Indicators,* 2012 and 2014

National Institutes of Health

The National Institutes of Health (NIH) is the largest source of funding for medical research in the world. Eighty-five percent of NIH funds are distributed through competitive grants to more than 300,000 scientists employed at universities, medical schools, and other research institutions in all 50 states and nearly every congressional district. In 2013, all of the U.S. recipients of the Nobel Prize in Physiology or Medicine and Chemistry were funded by NIH over the course of their careers and join the other 144 NIH-supported Nobel Laureates to date. The agency is also the home of the world's largest hospital totally dedicated to clinical research.

NIH has produced an outstanding legacy of important discoveries that have improved health, saved lives, and generated new knowledge. Many of these advances arose from investigations designed to explain basic molecular, cellular, and biological mechanisms. In addition, research supported by NIH led to innovative technologies and created entirely new global industries resulting in economic growth and new, high-tech jobs.

As a result of the prior investment in biomedical research funded by NIH, we have reduced the toll of many diseases. For example, U.S. death rates from heart disease and stroke have decreased by more than 60 percent, the rate of acute hepatitis B has been reduced by 80 percent, and the proportion of older people with chronic disabilities has dropped by one-third. Research funded by NIH helped develop new treatments that have significantly reduced the transmission of human immunodeficiency virus from mother to child, and identified the genes that are responsible for more than half of the 7,000 rare diseases known to affect humans. This has expanded our understanding of the molecular roots of various cancers and led to important insights into how microbial communities affect a range of chronic diseases including obesity, diabetes, and heart disease.

NIH-supported research is continuing to produce the insights that are needed for tomorrow's improvements in health and clinical care. A few examples of recent discoveries include:

- ***Advances in Treating Melanoma:*** Years of basic research supported by NIH have provided insights into biologic changes that occur in the development of cancer, including the observation that a protein called b-Raf appears in a mutated form in more than 50 percent of melanomas, the most aggressive form of skin cancer. Studies showing that this protein plays a critical role in melanoma led pharmaceutical companies to develop drugs to inhibit mutant b-Raf. These drugs can shrink metastatic cancer, thus improving quality of life, and prolonging survival in the majority of patients with advanced melanoma who harbor b-Raf mutations. Since most of these patients eventually relapse and die from their disease, studies are underway to understand why melanomas become resistant to treatment. It is hoped that this will lead to new treatments that can overcome or bypass resistance, with the goal of achieving long-term remissions and cures.

- ***Developing Structure-Based Vaccines:*** Respiratory syncytial virus (RSV) is responsible for nearly seven percent of deaths of infants less than 12 months of age. It also causes death and disability in the elderly. NIH-funded research has illuminated many aspects of RSV infection and pathogenesis, yet an effective vaccine has remained elusive. Recently, investigators made a breakthrough by determining the three-dimensional structure of an RSV protein required for cell entry. This structural information was then used to design a stabilized vaccine antigen that elicited high titers of protective antibodies in mice and non-human primates. In the next few years, this promising vaccine candidate will be tested in clinical trials, and it is hoped that this structure-based approach to vaccine design will be successful for other viruses, such as HIV-1.

- ***Testing New Anti-Inflammatory Drugs:*** In the 1990's, NIH supported a few academic researchers to study molecules called glycans for their function in inflammation, the process the body uses to fight infection. In 2013, these studies came to fruition with the first tests of a new anti-inflammatory glycan-based drug. The initial test was to fight inflammation during the painful crises that occur in sickle cell disease. Both children and adult patients who got this treatment had shorter disease crises, spent less time in the hospital, and needed fewer narcotics for pain relief. This new drug that will benefit tens of thousands of people in the U.S. each year could never have been developed without NIH's investment in exploratory basic research.

- ***Harnessing the Immune System to Fight Cancer:*** *Science* magazine named cancer immunotherapy—using the immune system to attack tumors—as the 2013 Breakthrough of the Year. The early work that led to the development of immunotherapy was made possible by NIH-funded research on many basic biologic processes, including the biology of T cells, a family of cells that are

critical to the immune system. Researchers discovered that when a certain receptor on the outside of T cells is activated, cells cannot mount an effective immune response. They then reasoned that if an antibody blocked the activation of this receptor, T cells could be induced to attack tumor cells. Ongoing clinical trials testing antibody immunotherapies in individuals with certain types of cancer recently reported encouraging results. Nearly 30 percent of kidney cancer patients and 17 percent of lung cancer patients in the trial experienced a 50 percent reduction in the size of their tumors.

Further Progress Depends on Sustained Investment

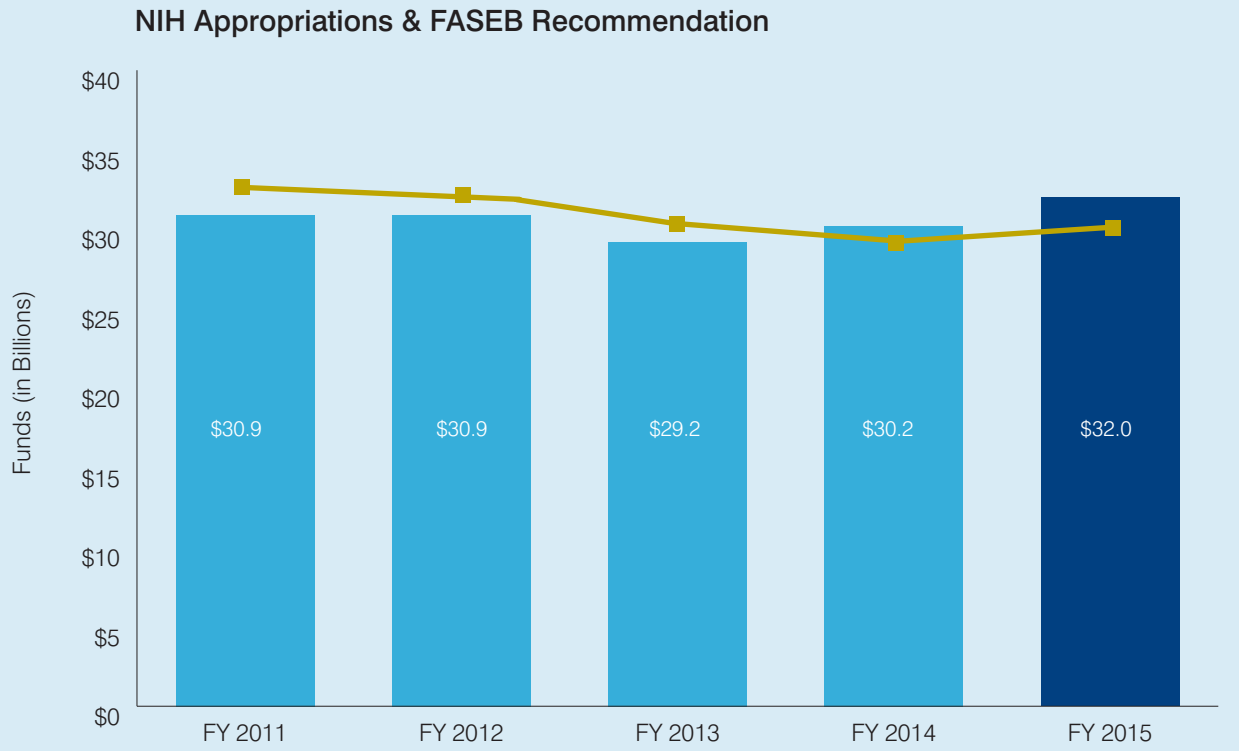
The broad program of research supported by NIH advances our understanding of the nature of living systems and enables us to apply that knowledge to the improvement of human health. In a recent op-ed in *The Washington Post,* NIH Director Francis S. Collins, MD, PhD, wrote, "Biomedical research is at a critical juncture—a moment of exceptional opportunities that demand exceptional attention if their promise is to be fully realized."[1] But without continued support for basic biomedical research, Dr. Collins fears that we will miss out on new discoveries that will give us the next generation of cures and therapies for such conditions as Parkinson's disease and Alzheimer's disease, as well as a universal vaccine to protect adults and children against all flu strains without needing an annual shot.

While the opportunities to increase our understanding of complex diseases and develop new therapies are unprecedented, a decade of flat-funding followed by $1.55 billion in sequestration cuts in FY 2013, have taken a significant toll on NIH's ability to support research. In constant dollars (adjusted for inflation), the FY 2013 budget for NIH was at its lowest level in thirteen years. The number of competing R01-equivalent grants, the primary mechanism for supporting investigator-initiated research, awarded each year fell by 27 percent between 2003 and 2012. The current situation is decimating the ranks of our scientific workforce by causing productive scientists to seek alternative careers and discouraging talented trainees from pursuing jobs in academic research. It voluntarily surrenders our already threatened future leadership in medical research.

Increasing the NIH budget to $32.0 billion would continue the effort begun by Congress in FY 2014 and fully restore the funding that was lost to sequestration. It would support vital initiatives to train the next generation of scientists, and also support at least 600 additional competing research project grants.

As a first step toward a multi-year program of sustainable growth, FASEB recommends a minimum of $32.0 billion for NIH in FY 2015.

[1] Collins, F. (2013, December 24). Investing in the Nation's Health at NIH. *Washington Post.*



National Science Foundation

The National Science Foundation (NSF) funds basic research across many disciplines: basic biological science; computer and information sciences; mathematical and physical sciences; social and behavioral sciences; and engineering. It is the only federal research agency dedicated to advancing all fields of fundamental science and engineering. The NSF Graduate Research Fellowship Program annually awards approximately 2,500 three-year fellowships to outstanding graduate students pursuing advanced degrees in science, technology, engineering, or mathematics. These fellowships support the education and training of the next generation of researchers, ensuring a robust and competitive workforce. NSF graduate research fellows have become leaders in the scientific community and 200 of the U.S. Nobel Laureates in the sciences received NSF funding over the course of their careers, including the 2013 prize winners in Physiology or Medicine, Chemistry, and Economics.

Progress in science and technology is becoming increasingly interdisciplinary, as discoveries in one field fuel progress in another. As a result, the broad research portfolio of NSF will be critical for our nation's capacity for innovation and essential for our prosperity, quality of life, and national security.

Recent examples of exceptional NSF-funded research include:

- ***Harnessing More Solar Energy:*** Researches have developed a new material for solar panels that is cheaper, more efficient, and can harness energy from visible and infrared light, unlike previous materials that could only use ultraviolet light. The new material increases efficiency by absorbing and converting six times the energy of its predecessors. Researches are currently scaling up the prototype to a full size solar panel for implementation on the national power grid.[1]
- ***New Microscope Detects the Movement of Atoms:*** Researchers have developed a new electron microscope that can detect the movement of atoms and molecules. The cutting-edge technology allows users to observe the fundamental transformations of matter: chemical reactions and the electric charges of interacting atoms. The new microscope has immediate applications in the clean energy industry, development of nanotechnology, and countless other scientific endeavors.[2]
- ***Preventing Post-operative Infections:*** Infection at the surgical site is one of the most common types of post-operative complications, which lengthens hospital stays and increases healthcare costs. Scientists with NSF support have developed a new antibiotic coating for surgical sutures. Lab tests have shown that the new coating is 1,000 times more effective at preventing infection than previous coatings, and even prevents the spread of staphylococcus aureus, the variety of "staph," that frequently causes virulent post-surgical infections.[3]
- ***New Storm Radar Saves Lives:*** Researchers are building an advanced radar network to detect severe storms earlier. Using novel algorithms, the network can generate information faster and with more geographic specificity, enabling first responders to take action before a storm hits. Researchers are currently testing the system in southwestern Oklahoma and Dallas/Ft. Worth, Texas. Once it is broadly implemented, the system will reduce injuries, enable first responders to be more effective, and save lives.[4]

[1] http://www.anl.gov/articles/new-material-solar-panels-could-make-them-cheaper-more-efficient

[2] http://msutoday.msu.edu/news/2013/new-microscope-captures-movements-of-atoms-and-molecules/

[3] http://www.nsf.gov/pubs/2013/nsf13079/nsf13079.pdf

[4] http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=126919&org=CISE

- ***Preserving Bat Colonies to Protect the Ecosystem:*** Agricultural pests cost the U.S. farm industry over $1 billion per year in lost crop yield and additional cost of pesticide use. NSF-funded researchers studied bat colonies in the cotton and corn growing region of southern Texas and found that bats are valuable to farmers because they consume insects that destroy crops, reducing the need to use pesticides. Protecting bat colonies in crop-growing regions will both decrease pesticide cost to farmers and reduce the presence of chemicals on food people eat. NSF also funds critical research into the causes and possible solutions to the catastrophic declines occurring in some bat populations in eastern North America.[1]

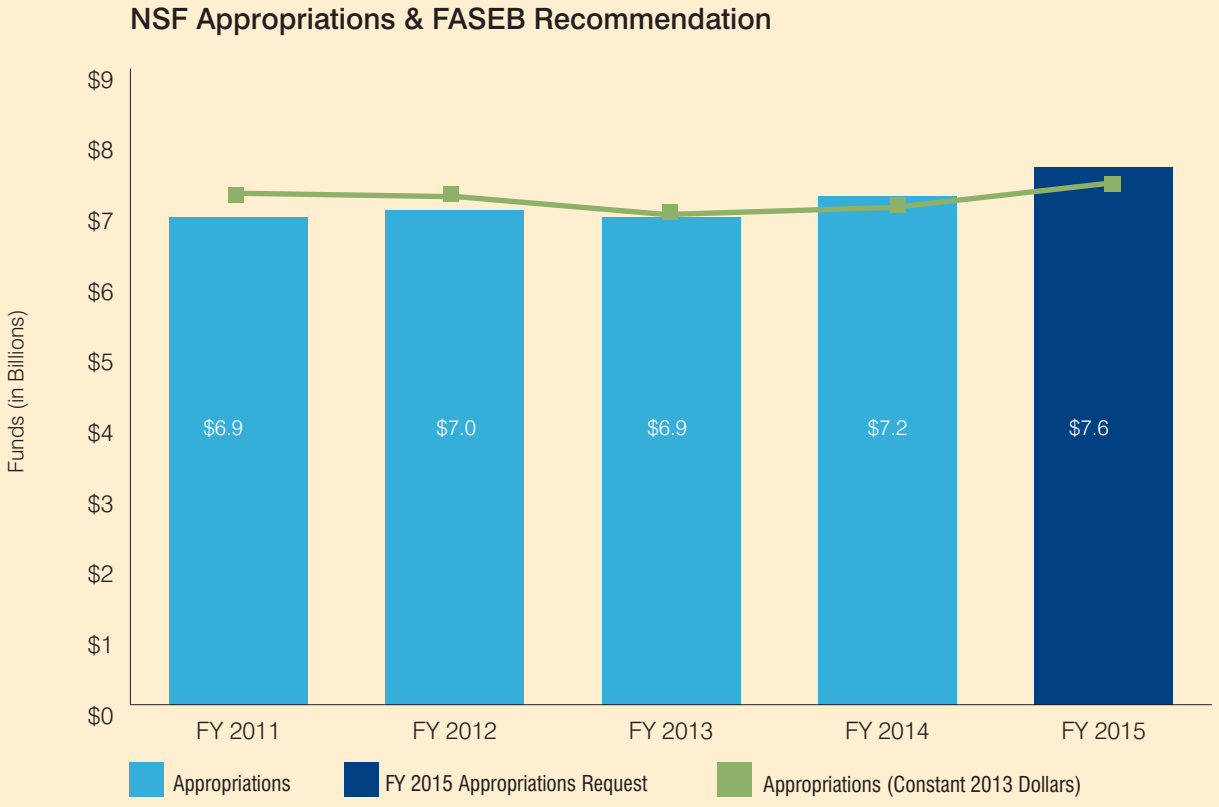
Maintaining Global Leadership

Scientific and technological advances are more critical than ever to keeping our nation internationally competitive by spurring the innovations that fuel economic growth. NSF's broad portfolio of fundamental research expands the frontiers of knowledge, opening the way to these innovations. Moreover, through its education and training initiatives, NSF ensures that the U.S. will continue to have an unrivaled scientific and engineering workforce as the next generation of knowledge leaders.

NSF-funded research leads to major scientific breakthroughs, many of which provide the basic knowledge that stimulates innovation in other federal agencies and the private sector. We must build on prior NSF investment and support the agency at an adequate funding level to advance discovery, encourage and train the next generation of scientists and engineers, and retain our position as the global leader in innovation.

In FY 2015, FASEB recommends a minimum of $7.6 billion for the NSF. This is the level that the America COMPETES Act authorized for the agency for 2011 and is an important first step in returning to a model of sustainable growth.

[1] http://www.nsf.gov/discoveries/disc_summ.jsp?org=CISE&cntn_id=112602&preview=false



Department of Energy
Office of Science

The U.S. Department of Energy's Office of Science (DOE SC) is the principal federal agency supporting fundamental energy research and is the nation's largest supporter of basic research in the physical sciences, providing funding for research at over 300 institutions in all 50 states. The DOE SC also funds and manages ten of the seventeen world-class DOE national laboratories, which provide over 29,000 government, university and industry scientists with access to supercomputers, x-ray light sources, and sophisticated technologies for nanoscience and genome sequencing. Serving as unique resources for academic and government scientists, the large-scale scientific technologies at DOE SC labs are also critical to the research and development capabilities of over forty Fortune 500 companies including GE healthcare, Ford Motor, Boeing, and Pfizer and dozens of small businesses.

Recent highlights from DOE SC-funded scientific research include:

- ***Developing a Longer Lasting Battery:*** During normal use of an electrode battery, tiny cracks develop in the surface, reducing its lifespan. Researchers have created a polymer coating that heals these tiny cracks as they occur, dramatically increasing the lifespan of the battery. So far, researchers are able to extend the life of the battery by ten times, and hope to improve this even more with further refinement of the material.[1]

- ***Engineering More Precise Light Sensors:*** Photodetectors, or light sensors, are used in an extremely broad range of disciplines from positron emission tomography (PET) scanners in medical imaging to scanning shipping containers for homeland security purposes. Researchers have developed a manufacturing process for large scale photodetectors that both increases precision by one hundred times, as well as produces large scale sensors more cheaply. Produced through a collaboration of several universities, Argonne and Fermi National Labs, and industry, the new photo detectors have direct application to reduce cost of the High Energy Physics Program within DOE, and to increase precision of detecting nuclear materials for national security purposes.[2]

- ***Producing Cheaper Biofuels:*** At the DOE Bioenergy Science Center, with collaboration from the Oak Ridge National Laboratory and eighteen partner institutions, scientists have developed a method to eliminate the need to "pretreat" plant matter during the production of biofuels. Pretreatment involves using chemicals to break down some of the plants tougher fibers in order for the next steps of hydrogen production to begin. Pretreatment is typically the most expensive step in producing plant-based biofuels. The new method includes using a bacterium—originally discovered over twenty years ago—to break down the plants tough fibers

[1] https://www6.slac.stanford.edu/news/2013-11-17-scientists-invent-self-healing-battery.asp

[2] http://science.energy.gov/news/featured-articles/2013/11-06-13/

and catalyze the beginning of hydrogen production as well. This single mechanism bioprocessing is a major step to market-ready plant-based biofuels.[1]

- ***Generating New Pathways to Clean Energy:*** Researchers at Argonne National Lab have discovered a new method of generating hydrogen for use as clean, renewable fuel. Capitalizing on a well-known reaction using titanium dioxide, scientists added bacteria found in the salt flats of the Western U.S. to help catalyze a stronger output. The titanium/bacteria mix outperforms most other systems for hydrogen production, as well as using only sunlight and salt water for the basic chemical reaction. This marriage of technology and nature brings us ever closer to a sustainable energy future.[2]

Providing Unique Resources to the Scientific Community and the Nation

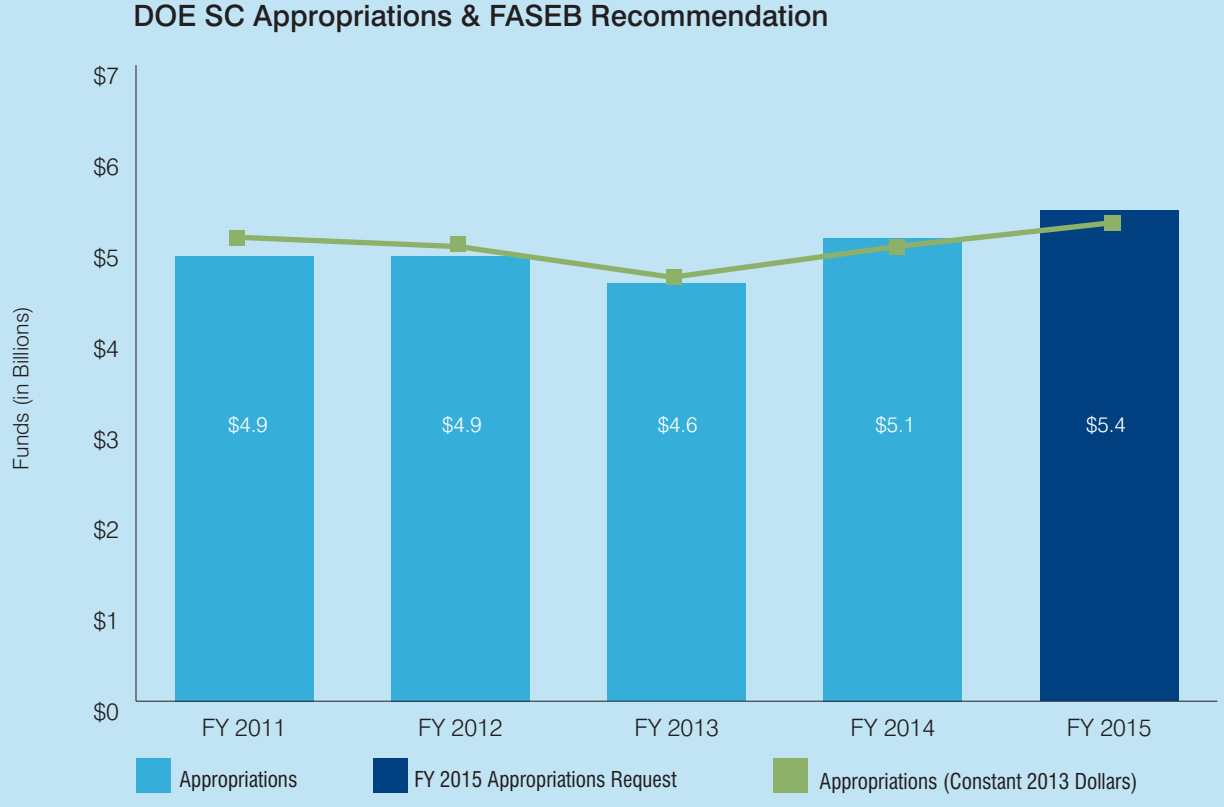
DOE SC-funded scientists and engineers are making extraordinary discoveries in all areas of energy research that improve human and environmental health, spur economic growth, and strengthen national security. National labs advance strategic U.S. goals and create a research infrastructure unlike any other in the world—a system that makes efficient use of advanced instrumentation and technical expertise by increasing access for researchers across the nation without duplication of resources, minimizing costs to the nation and individual institutions.

With its crucial mission and unique research facilities, investment in DOE SC programs should be one of our highest research priorities. DOE SC-funded facilities benefit the entire research community, both public and private, by providing unparalleled scientific and technological capabilities. Now is the time to provide robust federal funding for the fundamental energy research required to build a secure and sustainable energy future.

To promote sustainability and maintain the unique system of national laboratories, FASEB recommends a minimum of $5.4 billion for the DOE SC in FY 2015. This is the level authorized for DOE SC in 2011 by the America COMPETES Act, and should represent a return to the commitment of sustainable increases in this critical research program.

[1] http://science.energy.gov/discovery-and-innovation/stories/2013/127042/

[2] http://www.anl.gov/articles/microorganisms-found-salt-flats-could-offer-new-path-green-hydrogen-fuel



Veterans Affairs Medical and Prosthetic Research Program

Providing the highest quality health care is our obligation to military veterans who have made sacrifices to serve our country. The Department of Veterans Affairs (VA) Medical and Prosthetic Research Program is the primary federal research effort focused on improving healthcare for our nation's veterans. More than 70 percent of VA researchers are also clinicians who provide direct patient care, allowing the agency to quickly translate discoveries in the laboratory to health care improvements benefitting veterans and civilians alike. VA's research goals focus on a wide range of health issues facing injured soldiers returning from combat as well as those who served in past conflicts.

VA-funded research has produced significant returns from advancing basic knowledge about disease mechanisms and detection to the development of new treatments and therapies. The groundbreaking achievements of VA investigators have contributed to advancing the standard of care in the U.S. A few recent examples include:

- ***Testing a New Treatment for Eradicating Malaria:*** Malaria kills more than one million people worldwide every year, and is a threat to military personnel stationed in Afghanistan and other parts of the world. The disease is difficult to treat because of the complex life-cycle of the mosquito-borne parasite and because all strains have developed resistance to current therapies. VA researchers devised an experimental therapy designed to kill the mosquito-borne parasites that cause malaria. Preliminary animal trials have shown that the new drug is effective and can be given orally in a single, low dose.[1]

- ***Gaining New Understanding of Risk for Prostate Cancer:*** Researchers found that veterans who reported coming in contact with Agent Orange were 52 percent more likely to have prostate cancer, with one in six having a fast-growing, life-threatening form of the disease. Knowing a veteran's Agent Orange exposure status could be used to increase surveillance and develop more effective treatments for those at risk for aggressive tumors.[2]

- ***Using Telemedicine to Treat Hypertension:*** A medical management program delivered by nurses through telephone consultations and follow-up has been effective in reducing the risk for veterans with hypertension and diabetes to develop retinal disease. Using special devices, these veterans sent blood pressure readings to doctors and nurses three times a week. With this information, the doctors and nurses on the study team adjusted medication regimens according to clinical guidelines for their individual medical conditions. In addition, nurses encouraged the veterans in the study to take their medication regularly and to make healthy lifestyle choices.[3]

- ***Improving Early Diagnosis of Alzheimer's Disease:*** Researchers refined tests that are commonly used in Alzheimer's disease clinical trials to detect the presence of amyloid in the brain. Researchers determined that measuring amyloid in cerebrospinal fluid obtained by lumbar puncture was nearly as effective as using an imaging test that costs several thousand dollars per person to detect the presence of amyloid. These findings have rapidly accelerated progress in early diagnosis, including the identification of pre-clinical Alzheimer's, an early form of the disease characterized by amyloid in the cerebrospinal fluid but no symptoms of memory impairment. Early diagnosis may be key for preventing rapid progression of this devastating disease.[4]

- ***Reducing the Cost of Care for Patients on Ventilators:*** A VA-funded clinical trial proved it is possible to use a tracheostomy collar to wean individuals off a ventilator four days faster than an alternative method of slowly decreasing the air pressure supply to their lungs. Caring for patients on ventilators is expensive and often takes place in specialized hospitals. Reducing the number of days a patient is on a ventilator has the potential to save long-term health care costs. This was the first large-scale study comparing different ways to wean patients from ventilators.[5]

[1] http://www.research.va.gov/currents/may13/may13-07.cfm

[2] http://www.research.va.gov/resources/pubs/docs/researchcurrents_summer2013.pdf, pgs. 5-6.

[3] http://www.research.va.gov/resources/pubs/docs/researchcurrents_summer2013.pdf, pg. 16.

[4] http://www.research.va.gov/currents/mar-apr13/mar-apr13-01.cfm

[5] http://www.research.va.gov/currents/feb13/feb13-10.cfm

New Medical Challenges and Higher Demand for Services is Straining Resources

Veterans returning from combat in Iraq and Afghanistan are seeking treatment for complex medical conditions, including multiple limb loss, extreme psychiatric disorders, and other chronic conditions that will require years of ongoing care. Funding above the current level is needed to develop improved prosthetic technologies and new treatments for traumatic brain injury, significant body burns, eye damage, and mental health disorders.

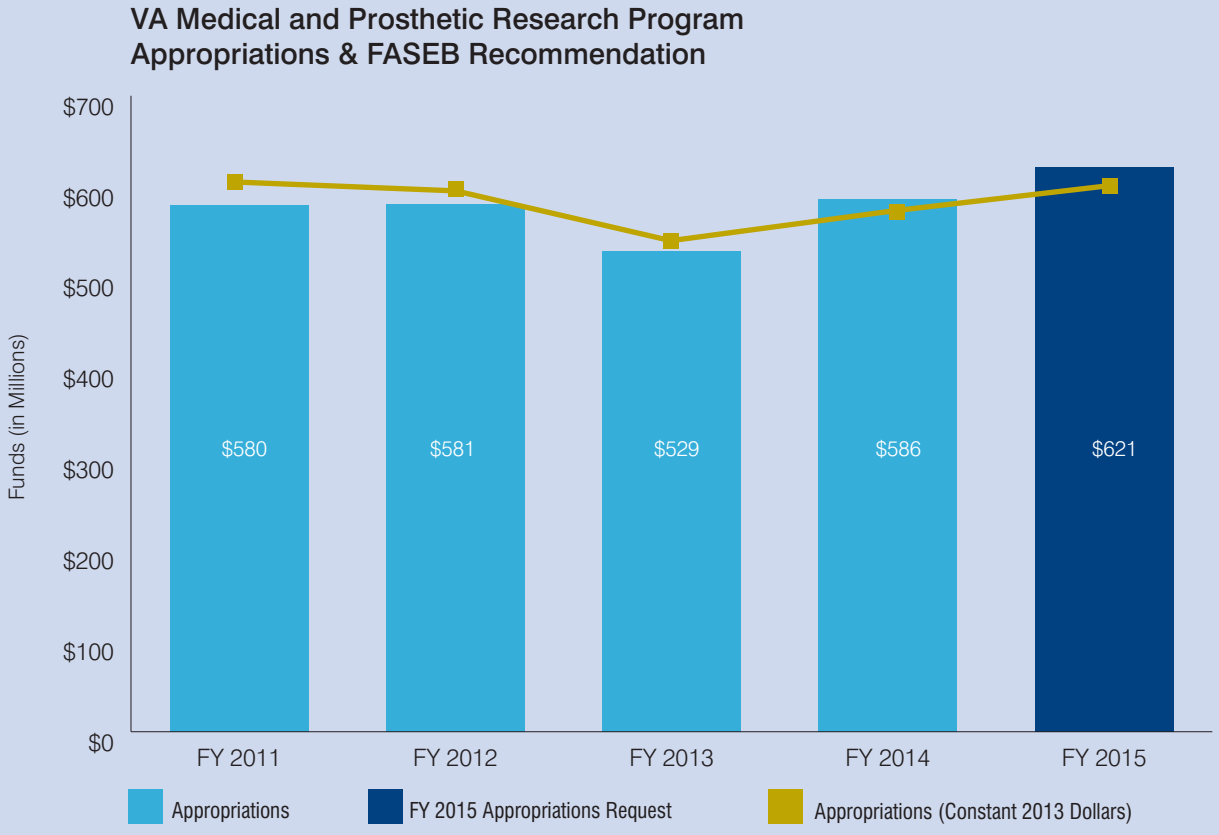
Increased funding could support research to address pain among veterans who suffer from blast injuries. Current approaches to pain treatment often do not provide complete relief to patients. Resources are also needed for the Million Veteran Program (MVP), a multi-year effort to develop one of the world's largest databases of genetic and health information. The goal of the MVP is to better understand how genes affect health and illness in order to improve care.

To sustain ongoing research efforts and address the growing needs of our service members, the VA Medical and Prosthetic Research Program will need an increase of at least $38 million over the current level. Predictable funding enables the VA to stabilize its planning and maintain the cadre of physician-scientists and researchers who provide direct care for veterans and develop treatments that meet their unique needs.

Although the budget of the VA Medical and Prosthetic Research Program grew by $100 million between FY 2008 and FY 2010, it has languished since then. At the same time, the number of veterans receiving compensation for service-connected disabilities rose by 16.5 percent.[1]

FASEB recommends funding the VA Medical and Prosthetic Research Program at a minimum of $621 million in FY 2015 to address the health care problems of the growing veteran population.

[1] http://www.vba.va.gov/REPORTS/abr/2012_abr.pdf



United States Department of Agriculture
Agriculture and Food Research Initiative

The Agriculture and Food Research Initiative (AFRI) is the preeminent competitive grants program of the U.S. Department of Agriculture (USDA), facilitating collaborative, interdisciplinary research at universities and private research institutions across the country to address significant societal challenges such as food safety and security and the need for sustainable agriculture practices. AFRI generates knowledge in the essential food, nutrition, and agricultural sciences and translates these discoveries into practice. AFRI also encourages young scientists to pursue careers in agricultural research by providing research funding for more than 1,500 of the nation's most promising pre- and postdoctoral scholars in agricultural, nutrition, and food sciences.

Examples of promising recent USDA-funded research include:

- ***New Environmentally Friendly Products:*** Wood adhesive, used to make plywood and various other composite materials, is traditionally a noxious, petroleum based compound. Researchers at the University of Oregon have successfully developed a nontoxic and environmentally friendly alternative made from soybean flour. Using the new wood adhesive reduced hazardous air pollutant emissions at production facilities by 90 percent.[1]
- ***Increasing Food Safety:*** AFRI-funded researchers have developed a new two-step process to eliminate E. coli bacteria contamination from spinach. The process involves using ultrasound waves and a chemical washing treatment to eliminate 99.99 percent of bacterial presence from fresh spinach. Industry is exploring ways to broaden the use of this process for other fresh fruits and vegetables to reduce contamination and increase consumer safety.[2]
- ***Improving the Health of Honeybees:*** Honeybees, an integral part of the agriculture system, pollinate over 130 fruit and vegetable crops in the U.S. Over the past several years, the honeybee population has been declining due to Colony Collapse Disorder (CCD), which has tripled the cost of maintaining beehives. An AFRI-funded research team has identified the varroa mite as a

[1] http://www.nifa.usda.gov/nea/ag_systems/pdfs/farm_bill_2013.pdf

[2] http://www.nifa.usda.gov/nea/ag_systems/pdfs/farm_bill_2013.pdf

key cause of CCD helping honeybee breeders to choose variants that protect against the disorder.[1]

- ***More Efficient and Effective use of Fungicides:*** Delivering safe, healthy fruit to market is the goal of every grower, but the task is not without challenges. Traditionally, growers must estimate the best time to apply fungicide and how much to use to protect their plants from fungal rot. AFRI-funded researchers have developed a web-based prediction tool to help growers determine how much fungicide to use and when to apply it. Already, the system has helped growers to reduce fungicide use by 50 percent, increasing fruit safety for consumers and increasing profits for growers.[2]

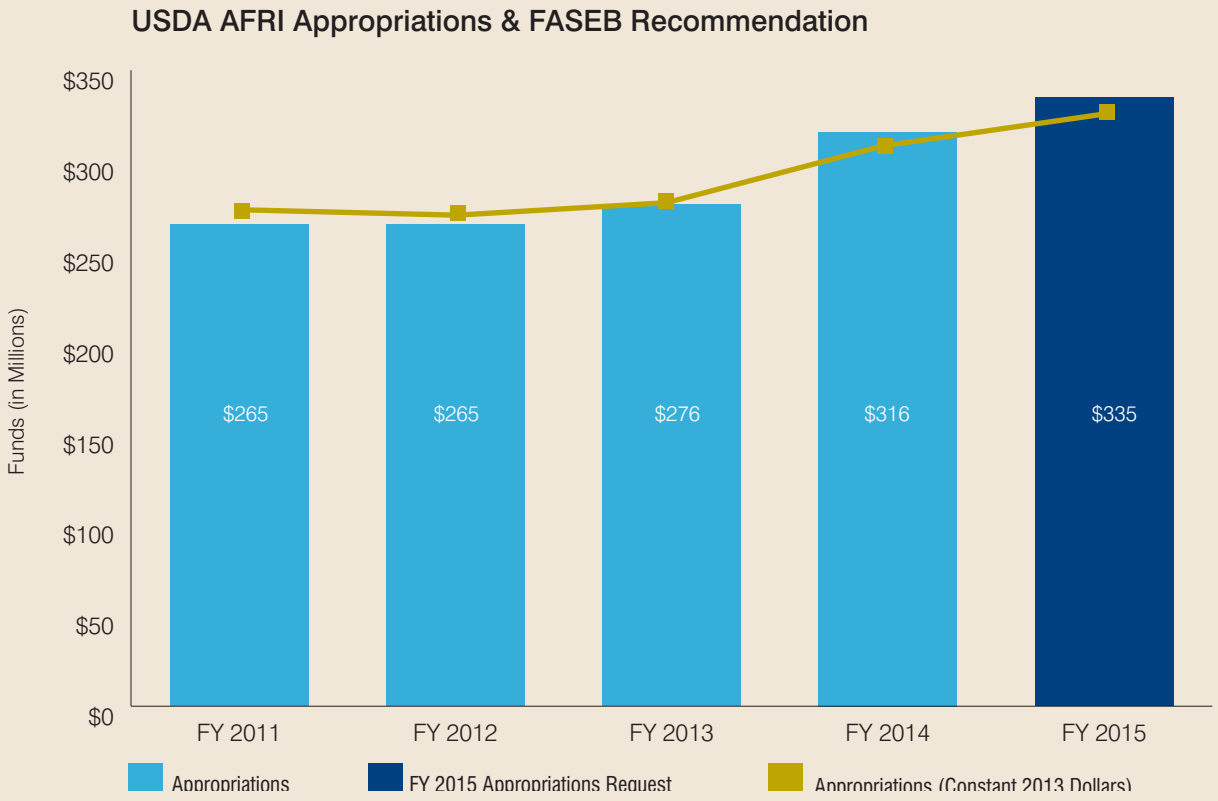
Realizing the Potential of Agricultural Research

With an increasing world population, demand for innovative food and agricultural products has never been greater. Agricultural, nutrition, and food scientists are developing more abundant, nutritious food, creating new biofuel materials and other crops, and designing more sustainable agriculture practices. AFRI research and education programs support the translation of cutting edge science into solutions for some of the greatest challenges facing humanity.

Agricultural research directly benefits all sectors of society and every geographic region of the country. The food, nutrition, and agriculture industries rely on federal funding for basic scientific research that leads to the development of innovative products that industry can bring to market, as well as programs that train the next generation of agricultural researchers. With the critical mission and the growing need for improved agriculture, AFRI is significantly underfunded. The AFRI budget has stagnated since the program was established, never reaching the authorized funding level of $700 million in the 2008 Farm Bill.

FASEB recommends a minimum of $335 million for AFRI in FY 2015 as part of a sustained commitment to investment in the critical field of agricultural research, with an ultimate target of the authorized level of $700 million.

[1] http://www.nifa.usda.gov/nea/ag_systems/pdfs/farm_bill_2013.pdf
[2] http://www.nifa.usda.gov/nea/ag_systems/pdfs/farm_bill_2013.pdf



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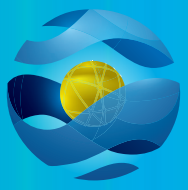

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