NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE

Address:
National Institute of Neurological Disorders and Stroke
National Institutes of Health
Building 31, Room 8A52
31 Center Drive MSC 2540
Bethesda, MD 20892-2540
Web site: www.ninds.nih.gov

Director:
Story C. Landis, Ph.D.
(301) 496-9746 (phone)
(301) 496-0296 (fax)
E-mail:
sl122c@nih.gov

Legislative Contact:
Paul Scott, Ph.D.
(301) 496-9271 (phone)
(301) 480-9172 (fax)
E-mail: ps199u@nih.gov

Mission:
The National Institute of Neurological Disorders and Stroke (NINDS), one of the 27 research institutes and centers that comprise the National Institutes of Health, has occupied a central position in the world of neuroscience for more than 50 years. Neurological disorders, which number more than 600, strike an estimated 50 million Americans each year, exacting an incalculable personal toll and an annual economic cost of hundreds of billions of dollars in medical expenses and lost productivity. Common disorders such as Parkinson's disease, Alzheimer's disease, multiple sclerosis, stroke, and epilepsy are well known. Many other neurological disorders are rare.

To reduce the burden of neurological disease — a burden borne by every age group, every segment of society, and people all over the world — the NINDS supports and conducts research on the normal and diseased nervous system, trains investigators in the neurosciences, and seeks better understanding, diagnosis, treatment, and prevention of neurological disorders. To carry out this mission, the institute relies on both clinical and basic research. Clinical research applies directly to disease detection, prevention, and treatment, such as studies of brain imaging techniques and trials to test new drugs or surgeries for brain disorders. Basic research pursues an understanding of the structure and activities of the nervous system. The knowledge gained from this research creates the foundation for diagnosing and treating neurological disease.

NINDS also funds research training and development to help build the next generation of neuroscientists, and serves as a prime source of neurological information for scientists, clinicians, and the public.

Selected Achievements and Initiatives:
NIH Neuroscience Blueprint: Diseases of the nervous system pose a significant public health and economic challenge, affecting nearly one in three Americans at some point in life. Understanding how the nervous system develops, works, and ages — in health and disease — is the goal of neuroscientists. To accelerate the pace of discovery and understanding in neuroscience research and reduce the burden of nervous system disorders, the National Institutes of Health (NIH) recently announced a new intra-agency partnership, called the Neuroscience Blueprint. The Blueprint will increase collaborative research and information-sharing among 14 NIH institutes and centers that conduct or support research on the brain and nervous system.

Over the past few years, NIH's neuroscience institutes and centers have increasingly joined forces through initiatives, working groups, and programs focusing on resources and scientific issues, including predoctoral training, gene expression, pain, stem cells, neurodegeneration, and integrating intramural neuroscience research. The Blueprint will build on this foundation, making collaboration a day-to-day part of how the NIH does business in neuroscience.

While each NIH institute or center will continue to independently carry out the basic and disease-specific research unique to its mission, the Blueprint

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targets those neuroscience challenges that are best met collectively, using the full spectrum of NIH expertise. The Blueprint effort began by identifying cross-cutting neuroscience research that bears on the missions of all of the institutes and centers. Three unifying scientific themes emerged as critical for accelerating progress: development of the nervous system throughout the life span; neurodegeneration from disease and aging; and plasticity of the nervous system (the ability of the nervous system to change in response to the environment, experience, injury, and disease).

The Blueprint will initially focus on tools, resources, and training that can build on existing research programs. A major emphasis will be integration of neuroscience across all levels of analysis, from molecules through cells to the functional systems responsible for perception, thinking, emotion, and behavior. The Blueprint will accelerate the translation of basic neuroscience discoveries into better ways to treat and prevent nervous system diseases.

Huntington's Disease: In a recent NINDS-supported study, researchers found evidence that abnormal protein clumps — called inclusion bodies — in neurons from people with Huntington's disease (HD) prevent cell death. This finding helps to resolve a longstanding debate about the role of inclusion bodies in HD and other neurodegenerative disorders and may help investigators find effective treatments for these diseases.

HD results from genetically programmed degeneration of nerve cells in certain areas of the brain. The role of inclusion bodies has long been controversial. Some studies suggest that they may be a critical part of the disease process, while others indicate that they are merely bystanders in the process.

In this study, researchers used a specially designed microscope to examine neurons that contained a version of the huntingtin protein that causes HD. The huntingtin was fused to green fluorescent protein, a widely used marker that allows researchers to see where proteins accumulate. The researchers found that many neurons with the mutated HD gene died without forming inclusion bodies. The formation of inclusion bodies actually prolonged neurons' survival and lowered their overall risk of death. The researchers also examined the level of mutant huntingtin protein spread throughout the neurons, outside of inclusion bodies. They found that neurons with larger amounts of mutant huntingtin died more rapidly than cells with less of this protein. The amount of mutated protein decreased in other parts of the cell when inclusion bodies formed. Taken together, these findings suggest that inclusion bodies lock up mutant huntingtin and keep it from interfering with the rest of the neuron in ways that can trigger cell death. These findings provide evidence that inclusion bodies in HD help neurons cope with toxic proteins and avoid neurodegeneration.

Appropriations History
($ in thousands)

FY 2001	$1,175,854 (+14.2%)
FY 2002	$1,326,666 (+12.8%)
FY 2003	$1,456,476 (+9.8%)
FY 2004	$1,501,207 (+3.1%)
FY 2005	$1,539,448 (+2.5%)

Extramural Research Project Grants
(Includes SBIR/STTRs)

FY 2001	2,597
FY 2002	2,770
FY 2003	2,849
FY 2004	2,905
FY 2005	2,762

Success Rate — Research Project Grants

FY 2001	32%
FY 2002	29%
FY 2003	30%
FY 2004	25%
FY 2005	20%

Research Training Positions Supported

FY 2001	612
FY 2002	704
FY 2003	718
FY 2004	778
FY 2005	794

Research Centers

FY 2001	47
FY 2002	49
FY 2003	61
FY 2004	62
FY 2005	67