

Huntington's Disease

Making a Difference Today

An estimated 30,000 Americans, or 1 person in 10,000, are living with Huntington's disease, or HD. It affects men as well as women, often striking in adulthood, between the ages of 30 and 50, and occasionally in people as young as 2 or as old as 80.

The symptoms of Huntington's disease may be subtle at first. A person notices they are more irritable or forgetful. They may find themselves fidgeting, stumbling, or making movements they can no longer control. Then, slowly the disease takes a devastating turn. Over a period of years, this progressive neurodegenerative disorder robs a person of their physical and cognitive capacities, and can profoundly affect their behavior.

HD takes its toll on families too, as patients increasingly depend on others for their care. Treating patients is also costly and, as the disease progresses, people with HD are no longer able to work and eventually become totally dependent on others for their care.

HD is estimated to cost society more than \$2 billion annually.

Research Leads to Diagnostic Test

Fortunately, research has greatly advanced scientists' understanding of the disease and how it functions. Researchers discovered that in HD, a faulty version of a gene produces a flawed protein that causes cell damage and destruction in the brain's basal ganglia and cortex. This can affect coordination, thought, perception, and memory.

The government spurred an effort to track down the genetic cause of HD in the late 1970s, which led to the discovery of the first genetic marker for HD—and the first for any genetic disorder—in 1983. This allowed researchers to pin down where to continue their search for the specific gene causing HD.

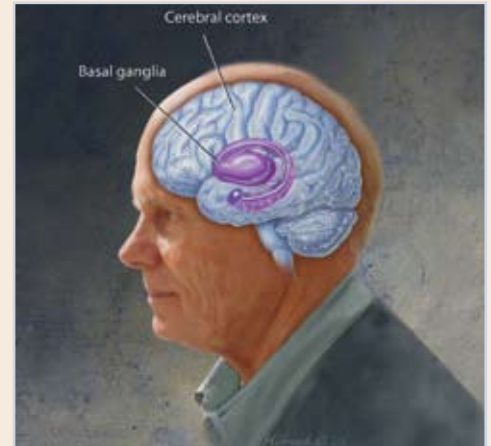
Ten years later, a collaborative group of six teams funded partly by the National Institutes of Health (NIH) did indeed find this gene, one of several exciting discoveries during the federally sponsored Decade of the Brain. Based on this finding, researchers were then able to develop a direct genetic test that can confirm whether an individual has inherited the gene.

Continued Advances in Treatment

Researchers supported by government funds have made great strides in understanding HD, and among the first fruits were a diagnostic tool. As a next step, scientists are examining methods to treat the disease.

For example, research supported in part by NIH funding has indicated the effectiveness of HDAC inhibitors, substances that support the production of vital proteins, in fruit flies and mice that model the disease. Currently, scientists are testing them in people.

Also, researchers are pursuing potential treatments with genetic techniques such as RNA interference, which prevents genes from producing harmful proteins.



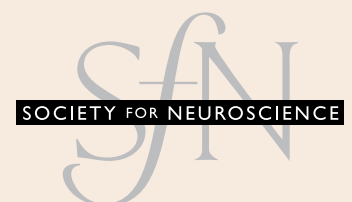
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Continued funding for research could lead to:

- The creation of new therapies that may be able to slow or possibly prevent the development of HD.
- A better understanding of how the disorder develops.
- Insight on how to treat related disorders that affect the function of the brain and nervous system.

For more information please email brss@sfn.org.

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Making a Difference Tomorrow

Already, studies funded by the National Institutes of Health (NIH) have played a major role in increasing scientists' understanding of Huntington's disease (HD). Thanks to the 1993 discovery that a single abnormal gene leads to HD, the outlook for those living with the disorder is steadily improving. This discovery, the fruit of federally funded research, has resulted in the development of a direct test that can help confirm a diagnosis. Even with these advances, however, treatments are still desperately needed for those with HD.

Did you know that:

- Some 30,000 Americans are living with HD, and another 200,000 are at risk of developing the disease, according to the Huntington's Disease Society of America.
- HD is estimated to cost the United States, directly and indirectly, more than \$2 billion each year.
- The symptoms of HD tend to appear between the ages of 30 and 50.

Continued funding for research is critical for the development of treatments, and perhaps even a cure, for HD.

Research Brings Hope for the Future

In a major advance toward a treatment, researchers have started to determine how the abnormal HD gene leads to the degeneration and death of brain cells that characterize HD. For example, some federally funded work suggests that the defective protein produced by the HD gene interferes with gene activity that normally helps healthy cells survive.

Scientists found that drugs termed HDAC inhibitors appear to counteract these gene activity problems and increase survival in animals that model HD. The drugs, for example, reduced brain cell damage and improved movement abilities. Based on these findings, researchers are testing an HDAC inhibitor in about 60 patients with HD.

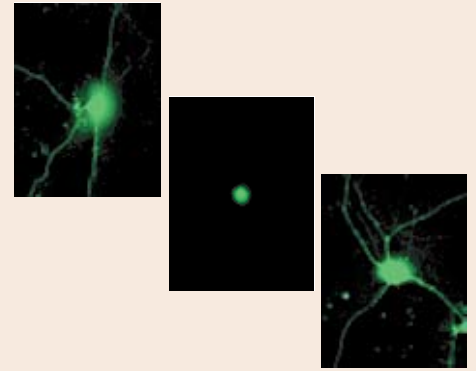
Researchers funded in part by NIH are testing other compounds and a treatment technique known as RNA interference that could potentially target the abnormal HD gene product directly. RNA interference shuts down protein production in select genes, "silencing" them and blocking their effects. Recently, researchers tested an RNA interference technique that targeted the abnormal human HD gene in mice that model the disorder. They found that the technique prevents some of the physical symptoms and brain abnormalities caused by HD.

These and other advances could improve care in the future and help patients live a longer, healthier life.

Hope for Other Diseases

In addition, researchers are finding that common mechanisms are at work in a number of different neurodegenerative diseases, such as HD, Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis (ALS). Therefore, federally funded HD research could aid in the development of treatments for many common disorders and improve the lives of countless Americans.

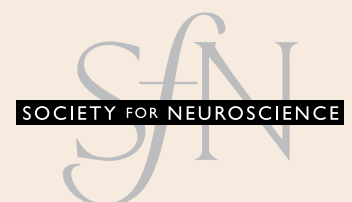
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Federally funded researchers are bringing to light the effects of the defective HD gene on nerve cells. A normal nerve cell is on the left. In the middle, a nerve cell showing the effects of the HD gene product is shrunken, and the normal thin cell extensions have retracted. On the right, a nerve cell treated to counteract the abnormal gene activity caused by HD is healthy.

Already research has led to:

- The identification of the HD gene, which has made a diagnostic test possible.
- A better understanding of how this faulty gene leads to degeneration of the brain's cells.
- Evidence that drugs such as HDAC inhibitors hold promise for treating HD.



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