

Blueprint Thematic Initiatives

The NIH Neuroscience Blueprint initiatives are based upon fundamental themes in neuroscience research that cross Institute and Center boundaries. Blueprint grants are awarded each year to encourage exploration and gain new knowledge in the areas of neurodegeneration during disease and aging (FY2007), neurodevelopment throughout the life span (FY2008), and neuroplasticity from the molecular to the behavioral levels (FY2009).

Neurodegeneration

Programs funded by grants in this group promote the development of research tools, resources, and training activities to accelerate progress in neurodegeneration research. Neurodegeneration occurs in disorders such as Alzheimer's and Parkinson's disease, in macular degeneration and other disorders of sight and hearing, in drug and alcohol abuse, and in mental disorders and chronic pain. In at least some of these conditions, nerve cells die as a result of common insults, which could include free radical damage, excitotoxicity, aggregation of abnormal proteins in cells, and programmed cell death. Therapeutic strategies that target these common mechanisms have the potential to act as the basis for treatments for a variety of neurological diseases and injuries. As the population ages, the impact upon society of diseases associated with neurodegeneration will become even larger without better prevention and treatment. Developing strategies to prevent degeneration of neurons and to promote a healthy nervous system is a smart and strategic way to approach the treatment of these disorders.

Funded Programs:

Biomarkers for Neurodegeneration

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Individual Postdoctoral Fellowships in Neurodegeneration Research

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Short-Term Interdisciplinary Career Enhancement Awards for Neurodegeneration Research

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Therapeutics Delivery for Neurodegenerative Diseases

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Neurodevelopment

Understanding how the nervous system develops provides insight into inherited disorders of the nervous system and developmental disorders such as cerebral palsy and autism, and also sheds light on the vulnerability of the developing brain to many types of insults. In addition to developmental disorders that become apparent during early postnatal life and childhood (e.g., mental retardation, autism, learning disorders), it is becoming increasingly clear that neurological and behavioral disorders that begin later in life, such as Parkinson's disease or schizophrenia, also have developmental antecedents. The study of neural development encompasses many levels of analysis, from



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molecular to behavioral research, and ranges from animal models to human studies. An improved understanding of neurodevelopment—and a perspective that views aging and disease within that context—will have profound implications for the treatment of brain disorders. Programs in this group are focused on areas of neurodevelopment that will benefit from accelerated strategic investments, especially in the creation, expansion, and distribution of tools and resources, and in the implementation of guidelines for advancing model systems of neurodevelopment.

Funded Programs:

BRAINdev and Centers for Evaluation of Neurodevelopmental Antibodies

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High-Throughput Collection of Gene Expression Data in Developing Rhesus Macaque Brain

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Tools and Techniques for Elucidating and Manipulating Neural Circuit Development

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Neuroplasticity

In the last two decades, mounting evidence has indicated that the adult nervous system has remarkable plasticity; in other words, the capacity to adapt to experience. It is capable of forming new connections in response to injury and it also stores stem cells that can differentiate into almost every cell of the nervous system. Discovering how to harness this plasticity holds the promise of novel therapeutic approaches for disorders as diverse as stroke, addiction, and post-traumatic stress disorder. Equally important evidence suggests that another aspect of brain plasticity may contribute to conditions such as dystonia, epilepsy, chronic pain states, drug and alcohol dependence, and depression. Understanding neural plasticity at all levels—from molecules and cells to physiology and behavior—has broad implications for treating neurological disease. Programs funded in this group are meant to accelerate research in this area by developing new tools to monitor and manipulate nervous system plasticity.

Funded Program:

Probes and Instrumentation for Monitoring and Manipulating Nervous System Plasticity

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