Division of Neuroscience and Basic Behavioral Science (DNBBS)

The Division provides support for research programs in the areas of basic neuroscience, genetics, basic behavioral science, research training, resource development, technology development, drug discovery, and research dissemination. The Division has the responsibility, in cooperation with other components of the Institute and the research community, for ensuring that relevant basic science knowledge is generated and then harvested to create improved diagnosis, treatment, and prevention of mental and behavioral disorders.

Through the various programs housed in its branches and offices, the Division offers support for a spectrum of relevant extramural activities. By reviewing the following program descriptions, investigators should be able to identify an appropriate contact. For each program we also provide examples of research topics, termed Areas of Emphasis, in which we currently have special interest. Neither the program descriptions nor the Areas of Emphasis are intended to be comprehensive or exclusionary. Our intent with the Areas of Emphasis is to elicit interest in key, though under-represented, research topics.

Division Offices and Branches

Office of Interdisciplinary Research and Scientific Technology (7T-TT)

Office of Research Training and Career Development (7K-TG)

Office of Human Genetics and Genomic Resources (7G-GR)

Molecular, Cellular, and Genomic Neuroscience Research Branch (73-MC)

Behavioral Science and Integrative Neuroscience Research Branch (72-NB)

Director

Steve Foote, Ph.D.
6001 Executive Blvd., Room 7204/MSC 9645
301-443-3563, sfoote@mail.nih.gov

Office of Interdisciplinary Research and Scientific Technology (7T-TT)

This Office supports interdisciplinary research centers that span and integrate different aspects of basic brain research fundamental to the mission of the NIMH. The Office also supports interdisciplinary research and the development of scientific technologies related to brain and behavioral research, including software (such as informatics tools and resources), hardware (such as devices and instrumentation), and wetware (such as novel genetic methods or bioactive and molecular imaging agents). Research and research-related activities supported by the Office cross disciplines, technologies, and theoretical approaches and frequently involve the academic and commercial sectors of the research community. The Office comprises four programs and serves as point of contact on several collaborative initiatives sponsored by multiple Institutes and Centers of the NIH.

Office Programs

Basic Neuroscience Centers Program (7T-TTC)

Neurotechnology Program (7T-TTN)

Small Business Innovation Research (SBIR) Program (7T-TTB)

Small Business Technology Transfer (STTR) Program (7T-TTT)

Collaborative NIH Initiatives

Neuroimaging Informatics Technology Initiative (NIFTI)
http://www.nimh.nih.gov/dnbbs/nifti.pdf
http://nifti.nimh.nih.gov/dfwg/
http://www.nimh.nih.gov/scientificmeetings/nifti2002.cfm

Biomedical Information Science and Technology Initiative Consortium (BISTIC)
http://www.bisti.nih.gov/

Bioengineering Consortium (BECON)
http://www.becon2.nih.gov/becon.htm

Brain Molecular Anatomy Project (BMAP)
http://trans.nih.gov/BMAP/

Contact

Michael F. Huerta, Ph.D.
Office Director
6001 Executive Blvd., Room 7202/MSC 9645
301-443-3563, mhuert1@mail.nih.gov

Basic Neuroscience Centers Program (7T-TTC)

All areas of basic neuroscience and behavioral science relevant to the NIMH mission are appropriate for support under the Basic Neuroscience Centers Program. The Basic Neuroscience Centers Program supports hypothesis-driven research centers. Each center is expected to bring the best scientific talent and resources from multiple disciplines and perspectives to address specific significant questions in basic neuroscience through interactive, synergistic projects and cores. The program includes two types of Centers. Silvio O. Conte Centers for Neuroscience Research are intended to support mature collaborative activities through the P50 center grant mechanism, while Silvio O. Conte Centers to Develop Collaborative Neuroscience Research use the P20 exploratory center grant mechanism to support similar efforts in which the collaborative arrangements are not yet fully developed.

Areas of Emphasis

- Integrative Neuroscience; or research that spans and integrates molecular, cellular, systems, and behavioral levels of analysis, deals with multiple brain regions, or uses a variety of computational and experimental neuroscience approaches.
- Effects of psychotherapeutic drugs on gene and protein expression, signal transduction pathways, neural activity and synaptic transmission, neural circuitry, and such behavioral effects as relate to brain function.

Contact

Laurie S. Nadler, Ph.D.
Program Chief
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Neurotechnology Program (7T-TTN)

The Neurotechnology Program supports basic and applied research and the development of new technologies and approaches for studying the brain and behavior. These include software (such as informatics tools and resources, tools for analyzing data, etc.), hardware (including the development of instrumentation and devices), and wetware (such as using iRNAs and other bioactive agents as research tools or molecular imaging agents or genetic approaches to labeling neural circuits or modifying circuit functions). This research is supported through a variety of grant mechanisms, including R01, R21, and R33.

Areas of Emphasis

- Tools for neuroproteomics research, especially those that produce data in the context of well-defined spatial, temporal, and conditional characteristics of the tissue examined.
- Tools, approaches, and activities that facilitate data sharing and allow for the integration of neuroscience, genetic, and imaging data and informatics technologies.
- Tools, methods, and techniques for demonstrating neuronal connectivity in humans, either in vivo or in post mortem tissue.
- Tools and approaches for non-invasive imaging of functional brain activation at millisecond temporal resolution and sub-millimeter spatial resolution.

Contact

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Small Business Innovation Research (SBIR) Program (7T-TTB)
Small Business Technology Transfer (STTR) Program (7T-TTT)

The Small Business Innovation Research (SBIR) Program (TT-B) supports research and development by small businesses of innovative technologies that have the potential to succeed commercially or provide significant societal benefit. The Small Business Technology Transfer (STTR) Program (TT-T) has the same objectives but requires academic research involvement. In this Division, the SBIR and STTR Programs support research and the development of tools related to basic brain and behavioral science relevant to the mission of the NIMH. Such tools include software (such as informatics tools and resources and tools for analyzing data), hardware (such as the development of instrumentation or devices), and wetware (such as the use of iRNAs or other bioactive agents as research tools or molecular imaging agents or genetic approaches to

label neural circuits or modify circuit functions). These programs also support drug discovery and development, as well as associated technologies (such as tools for high throughput screening or computational pharmacology approaches).

Areas of Emphasis

- Novel imaging probes to study brain structure and function at all levels, from the molecular to the whole organ, using any imaging modality (PET, fMRI, optical, etc.).
- Novel pharmacologic agents for brain research related to mental disorders, including research aimed at discovering new drugs or molecular research probes for these disorders.
- Novel screening assays for high throughput acquisition and analysis of data about behavior and the brain, from the level of genes to the level of behavior.
- Informatics tools and approaches for making better sense and use of data about behavior and the brain.

Contact

Margaret Grabb, Ph.D.
Program Chief
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Office of Research Training and Career Development (7K-TG)

The Research Training and Career Development Office supports research training at the pre-doctoral, post-doctoral, and early investigator level of career development in areas relevant to the focus of the Division. The Office thus supports research training and early career development in basic neuroscience and basic behavioral science. The primary goal of this Office is to ensure that sufficient, highly trained research investigators will be available to address basic and clinical research questions pertinent to mental health and mental illness and thereby to reduce the burden of mental and behavioral disorders. We encourage investigators to incorporate exposure to clinical problems in their training programs. Investigators are urged to review the specific research programs within the Division for information on research areas we support and then contact the director of the Research Training and Career Development Office for additional information.

Office Programs

Institutional Training Program (T32), including the Jointly Sponsored NIH Pre-doctoral Training Program in the Neurosciences

Mentored Career Development Program (K01, K08, K23, K25)

Mental Health Education Program (R25)

Individual Pre-doctoral and Post-doctoral Fellowships (F30, F31, F32)

Mental Health Education Program (R25)

Dissertation Research Grants to Increase Diversity (R36)

Areas of Emphasis

- Multidisciplinary research training that spans the breadth of the research domains supported by the Division.
- Integrative training across multiple levels of analysis (from genes to molecules to circuits to systems in humans, non-human primates, and other animals).
- Innovative educational initiatives (R25 grant mechanism).

Contact

Nancy L. Desmond, Ph.D.
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Contact for Individual Pre-doctoral and Post-doctoral Fellowships

Mary F. Curvey
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Office of Human Genetics & Genomic Resources (7G-GR)

The Office of Human Genetics & Genomic Resources supports research on the identification, localization, function, and expression patterns of genes that produce susceptibility to mental disorders (including autism and autism spectrum disorders, attention-deficit hyperactivity disorder, bipolar disorder or other related mood disorders, recurrent early-onset depression and other depressive disorders, eating disorders, obsessive-compulsive disorder or other anxiety disorders, panic disorder, schizophrenia or other psychotic disorders, personality disorders, and Tourette syndrome). Research projects supported by the Office use the following tools, technologies, and methods: DNA and cDNA arrays, gene chips, protein chips, gene expression neuroinformatics, functional genomics, mutation detection, positional cloning, genomic scans, single nucleotide polymorphisms (SNPs), imprinting, fine mapping, unstable expanding repeats, gene therapy, linkage analysis, candidate gene approaches, linkage disequilibrium, haplotype analysis, and direct and indirect association analysis. The Office also supports research that generates genomic resources for use in human and animal studies, including genome-wide projects that generate structural genetic data (such as ESTs, SNPs), cDNA clones, mutant mice, and gene expression maps.

Office Programs

Human Genetics Initiative and Genomic Resources Program (7G-GRR)

Genetic Basis of Mental Disorders Program (7G-GRM)

Areas of Emphasis

See specific program descriptions below.

Contact

Steven O. Moldin, Ph.D.
Office Director
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301-443-2037, smoldin@mail.nih.gov

Human Genetics Initiative and Genomic Resources Program (7G-GRR)

Topics of interest to this program include the development and distribution of genomic resources (such as DNA and cDNA arrays, gene chips, and gene expression neuroinformatics tools). Other areas of interest are genomic resources for use in human and animal studies, including genome-wide projects that generate structural genetic data (such as ESTs, SNPs), cDNA clones, mutant mice, and gene expression maps. This program also includes the NIMH Human Genetics Initiative, which maintains a repository of DNA extracted from immortalized cell lines and associated clinical information for use in genetic studies of mental disorders.

Areas of Emphasis

- Generation and distribution of mutant mouse strains and phenotypic data for animals with defects in neural function and complex behavior.
- Co-support of other NIH-funded research that generates structural genetic data for humans and other species.
- Using the NIMH Human Genetics Initiative to share data and biomaterials collected in various genetic studies.

Contact

Steven O. Moldin, Ph.D.
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301-443-2037, smoldin@mail.nih.gov

Genetic Basis of Mental Disorders Program ((7G-GRM)

Topics of interest to this program include the identification, localization, function, and expression patterns of genes that produce susceptibility to mental disorders (including autism and autism spectrum disorders, attention-deficit hyperactivity disorder, bipolar disorder or other related mood disorders, recurrent early-onset depression and other depressive disorders, eating disorders, obsessive-compulsive disorder or other anxiety disorders, panic disorder, schizophrenia or other psychotic disorders, personality disorders, and Tourette syndrome).

Areas of Emphasis

- Linkage analysis
- Candidate gene approaches
- Direct and indirect association analysis, including linkage disequilibrium and haplotype analysis
- Epigenetic mechanisms
- Pharmacogenomics

Contact

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Molecular, Cellular, and Genomic Neuroscience Research Branch (73-MC)

This Branch plans, supports, and administers programs of research to elucidate the genetic, molecular, and cellular mechanisms underlying brain development, neuronal signaling, synaptic plasticity, circadian rhythmicity, and the influence of hormones and immune molecules on brain function. Other supported activities are drug discovery, identification of novel drug targets, development of functional imaging ligands, development of imaging probes as potential biomarkers, testing of models for assessing novel therapeutics, and studies of mechanisms of action of therapeutics in animals and humans. Listed for each program are Areas of Emphasis. While not intended to be comprehensive or exclusionary, the Areas of Emphasis indicate interest in key, though under-represented, research topics.

Branch Programs

Functional Neurogenomics (73-MCG)

Developmental Neurobiology (73-MCD)

Signal Transduction (73-MCT)

Neuroendocrinology and Neuroimmunology (73-MCI)

Psychopharmacology (73-MCP)

Neuropharmacology and Drug Discovery (73-MCN)

Molecular Pharmacology Research (73-MCM)

Clinical Therapeutics (73-MCR)

Molecular Libraries and Imaging Roadmap Program (73-MCRM)

Areas of Emphasis

See specific program descriptions below.

Branch Chief

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Functional Neurogenomics Program (73-MCG)

The program supports research on the elucidation of gene function and gene regulatory mechanisms in vertebrate and invertebrate model organisms relevant to understanding the genomics components of neuronal development, signal transduction, synaptic plasticity, circadian rhythmicity, drug discovery, and the mechanism of action of therapeutics. Research supported by this program includes studies of DNA regulatory mechanisms; studies of the effects of changes in RNA processing and expression; and investigation of translational processes and molecular mediators responsible for functional changes within specific populations of brain cells. The Branch particularly encourages model systems aimed at analysis at all levels, from molecules to systems, and across the lifespan.

Areas of Emphasis

- Developing vertebrate and invertebrate models (mouse, fly, zebrafish, etc.) to understand the biological function of genes implicated in mental disorders.

- Developing strategies for deciphering the molecular basis of individual variations in neural and behavioral responses to environmental manipulations, including drug treatments for mental disorders.
- Identifying promoter sequences and characteristics determining temporally regulated, circuit, region, and cell-type specific gene expression.
- Identifying and characterizing the functional roles of gene regulatory components in the CNS including transcription factors, co-activators, co-repressors, enhancers, and silencers.
- Developing and applying improved molecular reagents to understand how transcriptional mediators temporally regulate gene expression in brain throughout the lifespan, in health and disease.

Contact

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Developmental Neurobiology Program (73-MCD)

This program supports fundamental research on the mechanisms of nervous system development, with emphasis on cortical and subcortical circuitry that is affected in mood, emotion, cognition, and in mental illness. This program is founded upon substantial evidence that subtle alterations in neural circuitry during critical periods in brain development underlie the etiologies of several neuropsychiatric disorders. However, a lack of clear pathophysiology and the probable involvement of multigenic and environmental influences in the etiology of psychiatric disorders make the study of these diseases less tractable than that of other neurological (such as neurodegenerative) disorders. To address this issue, the program portfolio includes studies of fundamental mechanisms underlying the establishment of functional circuitry in the developing CNS. Research supported by this program encompasses studies at the molecular, cellular, and systems levels, either in vitro preparations, model organisms, or humans.

Areas of Emphasis

- Elucidating neural changes associated with critical periods of brain development (prenatal, early postnatal, adolescent), which, if altered, may result in neuropsychiatric disease.
- Identifying spatiotemporal networks of protein expression and function underlying development of neural circuitry important for cognition, emotion, and behavior.
- Characterizing hippocampal development, including neurogenesis, in relation to neuropsychiatric disorders.
- Establishing improved models of developmental responses to therapeutic agents.

Contact

Beth-Anne Sieber, Ph.D.
Program Chief
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301-443-5288, bsieber@mail.nih.gov

Signal Transduction Program (73-MCT)

This program supports fundamental research on the molecular and cellular substrates of neuronal signaling, the factors that influence the signaling process, and the mechanisms that underlie

changes in signaling strength. Research supported by this program include studies of neurotransmitters, signaling cascades, and second messengers systems; studies of compartmentalization, targeting, and trafficking of signaling molecules; studies of pre- and post-synaptic proteins, neurotransmitter transporters, ion channels, and ion pumps; and studies of synaptic growth and synaptic plasticity.

Areas of Emphasis

- Identifying the key molecules and mechanisms that mediate changes in synaptic efficacy in the brain's inhibitory circuitry.
- Elucidating the mechanisms that underlie such key properties of psychoactive drug actions as desensitization, delayed effectiveness, and long-term efficacy.
- Identifying key protein-protein interactions associated with short and long term synaptic function and to contribute to the establishment of large-scale protein-protein interactions maps of the brain.

Contact

Chiiko Asanuma, Ph.D.
Program Chief
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Neuroendocrinology and Neuroimmunology Program (73-MCI)

The Neuroendocrinology Program supports basic neuroscience research to elucidate the cellular and molecular mechanisms whereby hormones and hormone receptors modulate signaling within brain circuits relevant to mood, cognition, and motivation. This includes studies of hypothalamic hormones, neurosteroids, corticosteroids, thyroid hormones, and gonadal steroids acting through nuclear and membrane receptors in brain and the role of nuclear accessory proteins as mediators of these responses in the intact central nervous system and in models of brain hormone action. The Neuroimmunology Program supports research aimed at identifying mechanisms whereby immune cells, cytokines, and chemokines affect basic neurobiological processes as well as behaviors related to cognition and mood. This includes studies of molecular and cellular neural signaling, glial-neural interactions, neurodevelopment, and behavioral endpoints relevant to mood, cognition, and motivation.

Areas of Emphasis

- Developing novel approaches to elucidate the neurobiological and behavioral consequences of hormonal shifts during life transitions − including adolescence, pregnancy, and postpartum.
- Developing novel tools for neuroendocrine studies including gene trapping, receptor ligands, conditional mutagenesis, and improved cellular and molecular markers.
- Identifying the genetic and cellular mechanisms by which nuclear hormone receptors and accessory proteins regulate signaling in the intact CNS and in cellular models of brain hormone action.
- Understanding mechanisms by which brain and peripheral immune mediators affect brain signaling, synaptic plasticity, cognition, and mood across the lifespan.
- Developing neuroimaging and other research tools for studying cytokine effects within brain regions implicated in mood and cognition.

Contact

Lois Winsky, Ph.D.
Program Chief
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301-443-5288, lwinsky@mail.nih.gov

Psychopharmacology Program (73-MCP)

This program supports interdisciplinary neuroscience research aimed at identifying molecular and cellular mechanisms underlying the behavioral actions of psychoactive drugs. The program focuses on identifying novel targets (genes, molecules) for therapeutic intervention in mental disorders using appropriate models and measures relevant to neuropsychiatric disorders.

Areas of Emphasis

- Identifying molecular and cellular mechanisms responsible for the differential behavioral effects of acute and chronic drugs by perinatal manipulation, sex, age, and environment.
- Identifying the neural circuitry mediating the behavioral effects of drugs.
- Developing preclinical models and measures of fundamental processes altered in mood (depression, mania) and cognitive disorders.
- Developing genetic approaches and imaging techniques to reveal critical molecules responsible for the behavioral effects of drugs.

Contact

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Neuropharmacology and Drug Discovery Program (73-MCN)

This program supports research aimed at understanding the mechanisms of action of psychotherapeutic agents; identifying novel targets for therapeutic intervention; designing and developing novel research tools (PET, SPECT, and fMRI imaging ligands); developing therapeutic agents for basic and clinical studies and for the treatment of mental disorders. Supported research includes studies of molecular pharmacology and regulation and the structural chemistry of CNS receptors, transporters, ion channels, neuropeptides, and neuromodulators; investigations into sites and mechanisms of action, pharmacokinetics, drug-drug interactions, and effects of psychoactive agents in the brain and other biological systems; and studies on the action of chronic psychoactive drugs on gene expression and function.

Areas of Emphasis

- Identifying novel targets for drug discovery using technologies for studying signaling pathways such as reverse pharmacology, gene expression profiling, proteomics, chemical genetics, and protein-protein interactions.
- Developing pharmacological tools for studying the biology of novel gene targets implicated in the pathophysiology of mental disorders.
- Understanding the mechanisms that regulate receptor oligomerization and its consequences for receptor activation and signaling.

Contact

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Molecular Pharmacology Research Program (73-MCM)

This program supports research aimed at characterizing the molecular properties of novel pharmacological research tools for the study of cells and molecular imaging. Supported research includes studies on the design, synthesis, and characterization of target-selective ligands, the identification and characterization of compounds derived from natural products, molecular modeling and computational chemistry, the isolation and characterization of endogenous ligands, and the development and evaluation of novel chemical delivery systems. The program also provides a range of research resources, including the screening of novel psychoactive compounds at CNS receptors, channels, and transporters; the synthesis and distribution of psychoactive compounds; and the assessment of promising compounds for toxicity and safety for use in human studies.

Research Resources

NIMH Psychoactive Drug Screening Program - The program provides screening of novel psychoactive compounds for pharmacological and functional activity at cloned human or rodent CNS receptors, channels, and transporters. Assays are also available for bioavailability predictions (CaCo2, MDR-1) and cardiovascular toxicity predictions (HERG, 5-HT2B). (**http://pdsp.cwru.edu/pdsp.htm**). The program also supports a database of affinity constants for ligand binding (**http://kidb.cwru.edu/pdsp.php**).

NIMH Chemical Synthesis and Drug Supply Program - The program synthesizes and distributes novel research chemicals, psychoactive drugs, and compounds unavailable to the scientific community from commercial sources. The program also supports radiosynthesis and GMP synthesis of promising candidate compounds for use in clinical studies. **http://nimh-repository.rti.org**

Toxicological Evaluation of Novel Ligands Program - The program provides toxicology and safety assessment of promising, target-selective compounds for use as imaging ligands in human studies. The program will also provide limited assessment of novel psychoactive agents for clinical research and as potential therapeutics. Toxicology and safety data generated by the program will be used to support an Investigational New Drug (IND) application to the Food and Drug Administration (FDA), and for Radioactive Drug Research Committee (RDRC) evaluation of a compound for human studies. **http://www.sri.com/pddd/nimh/nimh-tox.html**

Contact

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Contact for Research Resources

Jamie Driscoll, B.A.
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Clinical Therapeutics Program (73-MCR)

The Program supports research to understand the pharmacologic actions of therapeutic drugs and other treatments at the molecular and cellular level. The program also supports the National Cooperative Drug Discovery Groups for the Treatment of Mood Disorders (NCDDG-MD). The NCDDG-MD supports public-private partnerships to accelerate the discovery of new mechanisms of action for therapeutics used for mood disorders; to increase the availability of pharmacologic research tools for basic and clinical research; and to facilitate the development and validation of models to evaluate novel therapeutics in mood disorders.

Areas of Emphasis

- Developing and testing PET/SPECT imaging ligands for targets implicated in mood disorders in proof of concept studies as potential biomarkers of disease state and predictors of therapeutic response.
- Identifying the genetic and molecular mechanisms that contribute to individual differences in drug pharmacokinetics and pharmacologic response in normal humans.
- Establishing proof of concept studies to assess safety and tolerability of novel mechanism of action drugs in normal human subjects, especially drugs in the early stages of development for the treatment of depression and bipolar disorder.

Contact

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Molecular Libraries and Imaging Roadmap Program (73-MCRM)

The program provides infrastructure support and coordination for the NIH Roadmap Molecular Libraries Screening Centers Network and for related technology development projects. The program supports research on biological assay implementation, high throughput screening (HTS) to identify active compounds, synthetic chemistry and probe development, and informatics.

Contact

Ingrid Y. Li, Ph.D.
Program Coordinator
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301-443-5288, ili1@mail.nih.gov

Behavioral Science and Integrative Neuroscience Research Branch (72-NB)

The Branch supports innovative research − including empirical, theoretical and modeling approaches − on cognitive, affective, social, motivational, and regulatory systems and their development across the lifespan in humans, in non-human primates, and in other animals. Relevant reduced and model systems approaches are also supported. Interdisciplinary research that investigates the linkages across levels of behavioral and neural organization is especially encouraged. Research involving a variety of approaches is supported, including all those commonly employed by the behavioral science, neuroscience, genetics and computational modeling communities. Basic research in these areas provides the foundation for new insights into the nature and origins of mental and behavioral disorders and for the development of improved treatment and prevention interventions. Further details concerning branch research priorities can be obtained by reviewing the descriptions of individual programs, and investigators are urged to contact the appropriate program director for additional information. Listed for each program are Areas of Emphasis. While not intended to be comprehensive or exclusionary, the Areas of Emphasis indicate interest in key, often under-represented, research topics.

Branch Programs

Theoretical and Computational Neuroscience (72-NBT)

Circadian Rhythms, Sleep, and Regulation of Behavior (72-NBR)

Neural Bases of Cognition (72-NBN)

Cognitive Science (72-NBC)

Affect and Social Behavior (72-NBS)

Areas of Emphasis

See specific program descriptions below.

Branch Chief

Kevin J. Quinn, Ph.D.
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Theoretical and Computational Neuroscience Program (72-NBT)

The Program supports research on the development and application of realistic models for the analysis and understanding of brain function. Project areas include empirical and theoretical studies of self-organizing behavior in neuronal systems, mathematical approaches to modeling non-stationary neuronal processes, functional imaging of dynamical processes, and the modeling of all levels of neuronal processing, from single cell activity to complex behaviors. Grant applications are encouraged for research projects combining mathematical and computational tools with neurophysiological, neuroanatomical, or neurochemical techniques in order to decipher the mechanisms underlying specific neuronal and behavioral systems. This program also supports research projects focusing on understanding the computations made by nerve cells and groups of nerve cells in orchestrating behaviors.

Areas of Emphasis

- Creating biologically realistic computational models of neural processes underlying all aspects of brain activity − from single cells to networks to systems to behavior.
- Understanding how individual differences in neuronal activity (variability) are involved in the transmission and processing of information in the central nervous system.

- Measuring the associations among neurons and establishing a theoretical basis, rationale, and validation for spike sorting procedures.
- Enhancing the analysis and interpretation of local field potentials both in conjunction with and apart from neural spike train data.

Contact

Dennis L. Glanzman, Ph.D.
Program Chief
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Circadian Rhythms, Sleep, and Regulation of Behavior Program (72-NBR)

The Program supports research in humans and animals on the fundamental principles and mechanisms of bio-behavioral regulation, including the development and organization of neural and endocrine pathways leading to the expression of behavior. Specific topic areas include the basic processes, development, and regulation of motivation, sleep, feeding, play and aggression. The interaction of nervous, endocrine and gene systems with cognition, biological rhythms, stress, and social variables is of particular interest. Analysis of sex differences and basic functional neuroanatomy are important features of the program. Research supported by the program uses all available behavioral and biological methods.

Areas of Emphasis

- Identifying candidate neural mechanisms linking sleep, wakefulness, and mood disorders.
- Advancing our understanding about the function of sleep for memory and learning.

Contact

Israel I. Lederhendler, Ph.D.
Program Chief
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Neural Basis of Cognition Program (72-NBN)

The Program supports research on the brain mechanisms underlying cognition from the behavioral, systems, and cellular perspectives in humans and animals. Areas of interest include the neural bases of learning, memory, emotion, attention, intention, cognitive control, and decision-making processes. Investigation of the interactions between the neural systems mediating these different functions is of particular interest as is the use of integrative and multimodal approaches such as single and multiple-unit electrophysiology and lesion, imaging, and gene-knockout techniques. Understanding the basic neurobiology of the network of brain regions that support normal cognitive function is essential for determining how abnormalities in these systems give rise to mental illness.

Areas of Emphasis

- Understanding the direct contribution of neural activity to the hemodynamic signals measured by functional imaging.
- Uncovering the neural circuitry and mechanisms mediating the interaction between cognition and emotion.
- Understanding the functional consequences of neurogenesis on learning, memory, and other cognitive processes.

- Identifying the neural circuitry and mechanisms mediating normal reward processing and how they interact with emotion and cognitive systems.

Contact

Kathleen C. Anderson, Ph.D.
Program Chief
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Cognitive Science Program (72-NBC)

The Program supports research on the fundamental principles and mechanisms of cognition in humans and animals at the behavioral and psychological levels. Topic areas include higher-level perception, action planning and monitoring, attention, conditioning, learning, memory, knowledge, reasoning, decision-making, and executive function. The program also supports investigations of language and communication as components of the broader cognitive system. Projects may address the influence of social, affective, hormonal, and genetic factors on cognition. Empirical research may be conducted with humans, non-human primates, or other animals at any stage of the lifespan and using methods drawn from psychology, neuroscience, genetics, and related fields. Purely computational work is supported if it makes substantive contact with behavioral or physiological evidence.

Areas of Emphasis

- Applying multidisciplinary approaches to identify the fundamental architecture and computational properties of human cognition, particularly those aspects of cognition that may become dysfunctional within mental disorders.
- Pursuing behavioral and neural research on the nature and determinants of individual differences in human cognition, particularly differences relevant to understanding vulnerability to and the course of mental disorders.
- Conducting research on animal behavior that takes full advantage of current developments in the biological sciences and considers a broader range of species and behaviors.

Contact

Howard S. Kurtzman, Ph.D.
Program Chief
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301-443-9400, kurtzman@nih.gov

Affect and Social Behavior Program (72-NBS)

The Program supports behavioral science and systems neuroscience research on the fundamental principles and mechanisms of affect, social behavior, and social cognition in humans and animals. Topic areas include the basic processes, development, and regulation of emotion, mood, agonistic and affiliative behaviors, and social communication. The program also supports work on fundamental mechanisms of social information processing. Various approaches are appropriate, including those derived from the fields of behavioral science, behavioral neuroscience, social neuroscience, and affective neuroscience. A systems-oriented approach is endorsed for the neuroscience-based research in this program.

Areas of Emphasis

- Linking systematic analyses of affect and social cognition with characterizations of specific brain regions and circuitry.

- Investigating the interactions among behavioral, endocrine, and gene systems in the control of affect and complex social behaviors (such as aggression, parenting, and sexual behavior).
- Conducting systems-level research on the role of cortical mechanisms of cognition in the regulation of complex social behaviors.

Contact

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