

## **National Eye Institute - HNW**

Conducts, fosters, and supports research on the causes, natural history, prevention, diagnosis, and treatment of disorders of the eye and visual system, and in related fields (including rehabilitation) through: (1) research performed in its own laboratories and through contracts; (2) a program of research grants and individual and institutional research training awards; (3) cooperation and collaboration with voluntary organizations and other institutions engaged in research and training in the special health problems of the blind; (4) the direction of the National Eye Health Education Program; and (5) the collection and dissemination of information on research and findings in these areas.

## **Office of the Director - HNW1**

(1) Provides leadership, direction, and coordination of the Institute's programs; (2) formulates policies and provides program planning and evaluation for the Institute; (3) provides management and administrative services to the Institute; and (4) collects, develops, and disseminates information on vision and related fields.

## **Office of International Program Activities - HNW12**

Conducts the planning, management, and evaluation of the international cooperative research activities in vision disorders by: (1) serving as the NEI focal point with the Fogarty International Center and the State Department, and other Federal organizations involved in international health activities; and coordinating vision research activities under bilateral agreements between the United States and other countries; (2) maintaining liaison with international organizations involved in the prevention of blindness and vision disorders; (3) planning and implementing programs for international exchange of scientists; and (4) assuming a leadership role in fostering communications between the NEI researchers and the international scientific community.

## **Office of Administrative Management - HNW13**

(1) Plans and directs administrative management functions of the National Eye Institute (NEI) including administrative management services, management analysis and evaluation, financial management, and personnel management; (2) advises the NEI Director and the extramural and intramural program directors on developments in administrative management and their implications and effects on program management; and (3) coordinates administrative management activities in support of the intramural and extramural research programs of the NEI.

## **Extramural Administrative Management Branch - HNW132**

(1) Provides advice and/or recommendations on management and administrative policies directly to the Deputy Executive Officer and the Institute on behalf of the Extramural Research Program; (2) Plans, directs, coordinates, and provides comprehensive administrative and management support services for the Extramural Research Program; (3) Provides technical and advisory administrative services to the NEI Office of the Director and Extramural Research Program to include travel services, financial management, human resources, procurement, facility management, property management, space management, security, telecommunications, mail, payroll/time and attendance, and other general administrative functions, as necessary, to ensure the efficient and effective implementation and operation of programs; (4) develops policies, guidelines, and procedures on matters relating to Extramural administrative management and disseminates to relevant staff; (5) analyzes and prepares reports concerning administrative and management functions; (6) evaluates developments in administrative management and their implications on the Institute's mission; (7) coordinates workforce/personnel, performance management and professional development activities; and (8) maintains liaison role(s) with other service components of NIH to ensure effective coordination of procedures and services.

### **Financial Management Branch - HNW133**

(1) Conducts the financial management program of the National Eye Institute including the formulation and execution of the budget; administration of fiscal and budgetary controls; financial reporting; cost accounting for products, services, and cost comparison studies; and development of recommendations for improving the utilization of financial resources; and (2) develops financial management policies and procedures, and advises program officials in the implementation of these products.

## **Information and Technology Management Branch - HNW136**

(1) Plans, designs, develops, and maintains comprehensive computerized management information, office automation and technology systems and networks for all administrative computing within NEI; (2) consults on technology issues involving data-communications, interoperability and compatibility with other systems and networks at NIH; (3) studies feasibility of implementation of all system updates, enhancements, and replacements; (4) provides cost analysis of all changes and implementations; and (5) tracks and analyzes the scientific and programmatic content of proposed and funded research projects.

## **Management Policy and Analysis Branch - HNW137**

(1) Provides management advisory services, develops and/or provides advice and guidance on management and administrative policies and procedures and coordinates implementation throughout the Institute; (2) coordinates regular program and management reviews for the Institute, (3) provides consultation and assistance to the Office of the Director, NEI and other key officials on various management initiatives; (4) coordinates and provides advice on all organizational change proposals for the Institute; (5) coordinates and maintains the Institute's performance management systems, ethics and awards programs; (6) interprets, analyzes, and make recommendations concerning delegations and re-delegations of program and administrative authority, (7) anticipates, identifies, and coordinates the development of action plans in response to OMB, HHS and NIH initiatives; (8) develops, implements and manages administrative training and education programs for the Institute; and (9) serves as point of contact for OMB A-76/FAIR Act Inventory, OMB A-123 Management Control program, risk management, telework, FOIA, Privacy Act, Certificates of Confidentiality, NIH Census Report, Voluntary Early Retirement Authority/Voluntary Separation Incentive Payment (VSIP) and Voluntary Leave Transfer Program (VLTP), records management, security clearances and other special initiatives.



## **Intramural Administrative Management Branch - HNW138**

(1) Provides advice and/or recommendations on management and administrative policies directly to the Deputy Executive Officer and the Institute on behalf of the Intramural Research Program; (2) Plans, directs, coordinates, and provides comprehensive administrative and management support services for the Intramural Research Program; (3) Provides technical and advisory administrative services to the NEI Intramural Research Program to include travel services, financial management, human resources, procurement, facility management, property management, space management, security, telecommunications, mail, payroll/time and attendance, and other general administrative functions, as necessary, to ensure the efficient and effective implementation and operation of programs; (4) develops policies guidelines, and procedures on matters relating to intramural administrative management and disseminates to relevant staff; (5) analyzes and prepares reports concerning administrative and management functions; (6) evaluates developments in administrative management and their implications on the Institute's mission; (7) coordinates workforce/personnel, performance management and professional development activities; and (8) maintains liaison role(s) with other service components of NIH to ensure effective coordination of procedures and services.

## **Office of Science Communications, Public Liaison and Education - HNW14**

(1) Responsible for leadership and strategic development of activities to communicate information about NEI programs and accomplishments to the general public, the scientific community, the medical profession, and public advocacy groups; (2) advises the Director, NEI on effective communications strategies; (3) assists in the development of content for internal and external web sites and audiences.

## **Science Communications Branch - HNW142**

Science Communications Branch- HNW142 (1) Develops and manages a comprehensive communications program to interpret and disseminate to the biomedical community, scientific media and specialized groups, the findings of current and historical scientific research supported and carried out by the NEI; (2) develops and produces scientific publications, reports, articles, exhibits, and other scientific materials on Institute research, activities, and programs; (3) prepares written documents for the Director, NEI, to be used in editorials, publications, press releases, and policy statements to scientific organizations; (4) develops, coordinates, and manages processes and systems for updating and disseminating Institute reports, publications, and other materials for scientific communities; (5) utilizes the latest health and consumer communications strategies to translate research results to the healthcare and academic communities; (6) prepares scientific content on eye diseases for distribution via NEI scientific website; (7) plans, implements, and evaluates nationwide media campaigns and press releases to report vision research results; (8) advises institute management on NEI and NIH scientific reporting, knowledge transfer, and media relations.

## **Public Liaison and Education Branch - HNW143**

Public Liaison and Education Branch- HNW143 (1) Plans, implements, and evaluates all activities related to the National Eye Health Education Program, the first Federally-sponsored nationwide eye health education program; (2) plans and promotes nationwide eye health media campaigns for the lay public; (3) develops and oversees the NEI public website; (4) plans and implements activities related to the public liaison function of the Institute; (5) plans and directs all special projects related to health communication and education; (6) develops and produces lay publications, reports, articles, exhibits, and other materials on Institute research, activities, and programs; (7) responds to inquiries from the public, patients and families, health professionals, and the media as well as inquiries from the White House, the Department of Health and Human Services, and NIH; (8) advises institute management on all aspects and phases of NEI and NIH, health education, public information, and internal communications.

## **Office of Program Planning and Analysis - HNWI5**

(1) Provides leadership and direction to the planning, coordinating, reporting, analytical, evaluative, and legislative functions that support NEI program development, science policy formulation, and overall program direction and decision-making activities of the NEI executive staff; and (2) advises the NEI Director on policy matters pertaining to the scientific programs of the Institute.

## **Strategic Planning and Initiatives Branch - HNW152**

(1) Develops legislative proposals, monitors current legislation, and analyzes the effect of new legislation on NEI programs; and develops and executes a comprehensive program planning strategy for the Institute, including the development and periodic revision of a national vision research plan; (2) identifies and examines major issues in vision research and designs strategies to assess and evaluate them; (3) prepares recurring and ad hoc program and budget analyses in response to internal requests and those from NIH, PHS, DHHS, and other sources; and (4) conducts economic analyses of the impact of NEI-supported research on the health and well-being of the Nation.

## **Program Evaluation, Analysis and Reporting Branch - HNWI54**

(1) Maintains, revises, and improves the NEI coding system used in the internal reporting and analyses of the funding activity of eye diseases, specific research portfolios, and other scientific areas of interest; (2) maintains expertise in NIH-wide systems used in the analysis and reporting of research program activities, such as the Query View Report (QVR) System, Portfolio Online Reporting Tools (PORT) for Research, Condition, Disease, and Categorization (RCDC) analyses, and the NIH Visual Performance Suite (VPS) for GPRA activities, and compares with internal analyses; (3) designs, implements, and facilitates Institute-supported evaluation projects; (4) reviews and advises other Institute staff on evaluation studies using evaluation set-aside funding; (5) prepares recurring and ad hoc program and budget analyses in response to internal requests and those from NIH, DHHS, and other sources; (6) collects and analyzes programmatic and portfolio data to support the NEI strategic planning process.

## **Office of the Clinical Director - HNW16**

(1) Plans and supports the conduct of intramural clinical research on the cause, diagnosis, prevention, and treatment of diseases of the visual system and fosters the translation of advances in laboratory research into clinical applications. Provides infrastructure needed to promote high quality clinical research and to ensure patient safety, including protocol review, clinical informatics, and data management; (2) monitors quality assurance of the intramural clinical research program; (3) coordinates the credentialing of health care providers within the Institute; (4) administers the ophthalmology consultation service to provide ophthalmic care for patients from other Institutes; and (5) provides clinical research training for NIH staff, fellows, and students.



## **Consult Services Section - HNW162**

(1) Provides ophthalmic consultation services to all NIH intramural clinical research programs;  
(2) provides follow-up for patients enrolled in NIH studies that require ocular safety monitoring;  
and (3) delivers emergency care to NIH employees as requested through the Occupational Medical Service of the NIH.

### **Professional Services Section - HNW163**

(1) Provides contact lens fitting and consultative services to the intramural clinical research program; (2) provides low vision rehabilitative and consultation services to the intramural clinical research program; (3) provides genetic counseling consultation to the intramural clinical research program; and (4) provides a wide range of ophthalmic surgical and treatment services and consultations through the use of special volunteers.

## **Clinical Operations Branch - HNW164**

(1) Provides infrastructure for the conduct of intramural clinical research, including ophthalmic testing, protocol coordination and support, and management of all services that support outpatient clinical research; (2) provides continuing education, training, and supervision for section chiefs and other branch personnel; (3) manages the credentialing program for the affiliate staff; and (4) assists the Clinical Director, Director, DECR and Director, DIR in the planning and implementation of intramural clinical research.

## **Clinical Services Section - HNW1642**

(1) Provides ophthalmic testing and logistical support to the intramural research outpatient clinic; (2) provides supervision, training, and continuing education to ophthalmic medical personnel; (3) provides research record archival and retrieval support; and (4) provides training and supervision to research record administrator.

## **Imaging Services Section - HNWI643**

(1) Performs the medical ophthalmic digital imaging and photography services necessary for diagnosing ocular diseases and disorders, documenting ocular status and evaluating the effect of therapeutic interventions on the course of ocular diseases; and (2) maintains a digital database and photographic files for training and archival purposes.

## **Clinical Trials Coordinating Section - HNW1644**

(1) Provides clinical trials coordination support for the intramural clinical research program; (2) maintains clinical protocol records, assist clinicians in performance of protocol requirements, monitors study patients and coordinates clinical patient care; (3) assists in recruitment for clinical trials; (4) ensures adverse event data is collected and trials are conducted according to regulatory guidelines; (5) maintains and prepares study binders and documents for audits; (6) interacts with NIH Medical Records Department, Protocol Services, Clinical Center Pharmacy and off-site study collaborators as required by research protocols.

## **Clinical Informatics Section - HNWI645**

(1) Creates, implements, and maintains systems for the collection of data from the intramural clinical research program, both administrative and scientific, and provides training to users in the use of said systems. (2) Manages the integration of all research data associated with the clinical program from photographic to clinical to laboratory. (3) Interacts with physicians, technicians, photographers, clinical coordinators, data coordinating center, and other NIH institutes to facilitate clinical research data collection and analysis. (4) Provides research record archival and retrieval support.

## **Office of Translational Research - HNW17**

(1) Provides leadership and coordination to speed the development and delivery of new ophthalmic drugs, diagnostics, and medical devices to patients; (2) promotes intramural collaborations with academia and industry through the exchange of confidential information, the exchange of research materials, collaborative research, and clinical safety and efficacy studies; (3) provides intellectual property, technology transfer, and entrepreneur training to intramural investigators, reviews discovery and invention reports, and makes recommendations concerning filing of patents; (4) supports intramural and extramural translational research projects by providing regulatory and commercialization assistance; (5) initiates and manages research and development contracts that apply laboratory discoveries to clinical problems, test safety and efficacy of proposed interventions, and encourages implementation and adoption of proven interventions; (6) identifies and leverages trans-NIH translational research opportunities to increase cross-fertilization of ideas, reduce duplication, and promote access to non-appropriated financial resources and services for vision research; and (7) serves as the principal NEI point-of-contact for translational research policy issues through collaboration with the Food and Drug Administration, the Centers for Medicare and Medicaid Services, and professional organizations.



## **Office of Regenerative Medicine – HNWI8**

(1) Enabling transformative vision research through catalyzing technologies and multi-disciplinary programs. (2) Provide strategic planning, program coordination, analysis, and evaluation for Director's Initiatives (e.g. Audacious Goals Initiative, 3D Retinal Organoid Challenge, AMD Pathobiology, etc). (3) Provide support to NEI's Office of the Director on the state of emerging technologies, transformative research, and clinical outcomes that intersect with the mission of NEI. (4) Build collaborative relationships across NIH, federal agencies, and externally.

## **Office of Vision Health and Population Sciences– HNWI9**

(1) Serves as the Institute’s primary resource for resident expertise on research to understand behavioral, sociocultural, environmental, and biological factors promoting vision, eye health and well-being, predisposing to eye disease, or influencing visual function among diverse populations in public health settings, including communities, schools and worksites. (2) Provides leadership on behalf of the Institute to help set national priorities for population and health services research in eye disease and visual functioning over the course of the human lifespan, supplying technical expertise to epidemiology, statistics, and implementation research in community-based settings. (3) Coordinates program activities with other Offices, Divisions, Institutes, Federal or State agencies, and liaisons with professional, philanthropic non-governmental organizations, and the private sector in areas of shared public health interest to expand the reach of collaborations and leverage resources. (4) Fosters partnership opportunities to conduct research, exchange information, and disseminate new knowledge to preserve and protect vision, maintain eye health, and reduce eye health disparities in diverse groups, as consistent with the mission of the Institute.

## **Office of Data Science and Health Informatics – HNW1A**

(1) Serves as the Institute’s focal point for data science activities and is a primary resource for resident expertise on data and health informatics to understand behavioral, sociocultural, environmental, and biological factors promoting vision, eye health and well-being, predisposing to eye disease, or influencing visual function among diverse as well as rare disease populations; (2) Provides administrative and scientific support for the Director's Initiatives involving big data, AI development and machine learning activities. (3) Advances basic, translational, and clinical science and public health by facilitating and enhancing the sharing of research-generated data. (4) Enables impactful vision research through coordination and catalyzation of data and health informatics across multi-disciplinary vision programs. (5) Develops strategies to ensure that data are FAIR (Findable, Accessible, Interoperable, and Re-usable). (6) Provides support to NEI Office of the Director on the state of health informatics, changes to regulatory requirements, data sharing principles. (7) Develops and coordinates development of eye and vision-related Common Data Elements (CDEs) and data dictionaries across NEI studies as appropriate.

## **Division of Intramural Research - HN2**

(1) Plans and conducts laboratory and clinical research which encompasses the normal functioning and major diseases of the eye and visual system; (2) maintains an awareness of national and international research efforts in related areas, evaluates Division research efforts, and establishes program priorities; (3) ensures efficient utilization of available resources in the attainment of Institute objectives; (4) collaborates with other NEI and NIH scientists and with scientists external to the Institute; (5) provides advice to the NEI Director and senior Institute staff on matters of scientific interest; and (6) provides veterinary services to scientists within the Institute.

## **Neurobiology, Neurodegeneration, and Repair Laboratory - HN21**

The goal of **N-NRL** is to develop novel treatment modalities for blinding retinal diseases, based on the fundamental understanding of genetic defects and biological pathways underlying differentiation, homeostasis, aging and disease pathogenesis. N-NRL: (1) investigates distinct but related areas of retinal neurobiology and disease, from development, to aging, degeneration, and repair; (2) Provides mentoring and training in research for fellows and students; (3) Reports finding at national and international meetings and in professional journals; and (4) Initiates and fosters collaborative research efforts with other groups within the NEI and with researchers at NIH and other institutions. N-NNR is organized in two Sections and tree Units as described below.

## **Retinal Development, Genetics and Therapy Section - HNW212**

This section aims 1. to investigate the pathways leading to neuronal differentiation in the retina, the gene regulatory networks that dictate differentiation, maintenance and function of retinal neurons, and genetic susceptibility for retinal/macular diseases; and 2. to identify new drug targets for the development of human therapeutics. RDGT: (1) Conducts research on photoreceptor cell fate determination, synaptogenesis, homeostasis, and aging; (2) Explores regulation of gene expression and transcriptional regulatory networks in the retina; (3) Studies primary cilia biogenesis, intracellular transport and establishment of cell polarity; (4) Investigates early-onset retinal diseases (including Retinitis Pigmentosa (RP) and Leber congenital amaurosis (LCA)), and pathways of photoreceptor cell death conducting human familial studies and using mouse models of retinal disease; (5) Identifies genetic susceptibility loci and variants for late-onset complex retinal/macular diseases, including age-related macular degeneration (AMD) and diabetic retinopathy; (6) Develops paradigms for neuronal cell-based therapy and pathway-based drug targets for neurodegenerative diseases.

## **Retinal Cell Biology and Degeneration Section - HN213**

The aim of this section is to identify the cell biological processes that are defective and contribute to the pathology of retinal degenerative diseases. RCBD: (1) Investigates mechanisms of retinal degeneration caused by human gene mutations using mouse models; (2) Studies the mechanism of action of several proteins important for photoreceptor function and/or that are involved in retinal degenerative diseases; (3) Investigates the process of photoreceptor membrane renewal and its importance in photoreceptor disease mechanisms; (4) Employs gene therapy approaches to replace defective gene functions in photoreceptor cells *in vivo*.

## **Retinal Circuit Development and Genetics Unit - HNW214**

The aim of this unit is to apply molecular genetic approaches to study the development of neuronal cell types, with a particular focus on retinal neurons and their role in visual circuitry.

RCDG: (1) Combines conditional gene ablation with reporter gene replacement to visualize retinal ganglion cells (RGC) and to study the consequences of gene loss on the development of the dendrite and axon arbor of these neurons; (2) Seeks to define the circuit function of specific RGC neuronal subpopulations through mouse genetic manipulations and morphological, physiological and behavioral analysis of RGCs and mice carrying such defects.



## **Ophthalmic Genetics and Visual Functions Branch - HNWX22**

Plans and conducts clinical and laboratory research of gene expression and molecular interactions important to the eye, and applies clinically relevant research findings to the prevention, diagnosis, and treatment of diseases affecting the eye and visual system, including corneal disease, cataract, retinal diseases, and abnormalities of the visual pathways. Clinical and laboratory approaches to this research will be coordinated and training opportunities in clinical research methodology will be available.

## **Veterinary Research and Resources Section - HNWX-2**

(1) Will provide essential clinical veterinary services to the IRP. (2) Will assure that all animal research conducted within the IRP conforms to applicable USDA, PHS, and NIH regulatory requirements and guidelines. (3) Will be responsible for maintaining a centralized transgenic facility to provide a source of transgenic models for NEI research investigations. (4) Will provide NEI investigators with training in the proper utilization of animals in research as well as training in the technical aspects of animal manipulations. (5) Will conduct collaborative and independent research in support of NEI's expanding intramural and extramural animal research programs. (6) Will develop new animal models through the use of transgenic and other advanced technologies.

## **Ophthalmic Clinical Genetics Section - HNWX222**

(1) Will conduct independent research on disabling inherited diseases of the eye. (2) Will report findings at national and international meetings as well as in publications in professional journals. (3) Will train technical and professional scientists to perform research in the area of Ophthalmic Clinical Genetics.

## **Human Visual Function Core – HNW224**

(1) Conducts independent research in collaboration with and in support of NEI clinical investigations of retinal function as well as the function of the visual pathways in the brain. This research will focus on, but not be limited to, the normal and abnormal function of the retina and visual pathways as well as the effect of therapeutic interventions used in the treatment of retinal disease and disorders of the visual pathways. (2) Mentors trainees (e.g., postdoctoral fellows, graduate students, post-baccalaureate students, as appropriate) (3) Reports findings at national and international meetings and in professional journals. (4) Initiates and fosters collaborative research efforts with other groups within the NEI and NIH and with researchers at other institutions when such arrangements would further the research goals of the Section.

## **Ophthalmic Molecular Genetics Section - HNW227**

(1) Will conduct independent research on molecular genetics of diseases of the eye. (2) Will report findings at national and international meetings as well as in publications in professional journals. (3) Will train technical and professional scientists to perform research.

## **Pediatric, Developmental, and Genetic Ophthalmology Unit – HN228**

(1) Seeks to understand the pathogenesis of inherited eye diseases, particularly those that affect children, including the genetics of uveal coloboma (2) Designs new treatment and/or prevention strategies for inherited eye diseases (3) Identifies novel treatments for the vision loss associated with oculocutaneous albinism (OCA) (4) carries out translational research, applying molecular, cellular and genetic data with comprehensive clinical characterization of patients.

## **Ocular and Stem Cell Translational Research Unit – HNW229**

(1) Conducts translational research on diseases affecting the retinal pigment epithelium (RPE) using induced pluripotent stem (iPS) cell technology; (2) Develops new improved methods for differentiating iPS cells into fully-polarized and functional RPE cells for cell-based therapy and *in vitro* disease analysis; (3) Generates iPS cells from patients with retinal degenerative diseases (Best disease, AMD, & L-ORD) and differentiate those iPS cells into RPE to study disease processes *in vitro*; (4) Develops high throughput screening methods using iPS cell derived RPE cells to identify novel compounds with therapeutic potential for retinal degenerative diseases; (5) Studies human RPE development using the iPS cell technology.

## **Ophthalmic Genomics Laboratory – HN22A**

(1) A CLIA-certified laboratory that serves as the clinical molecular genetics core of the Ophthalmic Genetics and Visual Function Branch (OGVFB) of the NEI. (2) In support of the OGVFB and eyeGENE, the OGL conducts genetic testing on clinical research samples. (3) Specific activities include: OGVFB and eyeGENE protocol-related patient biospecimen accession, DNA extraction and storage, and maintenance of LI MS-database; Sample shipment for OGVFB and eyeGENE samples; Genetic testing research, including Sanger and Next-Generation Sequencing.



## **Section on Epithelial and Retinal Physiology and Disease - HNW22B**

Conducts basic research aimed at elucidating the cellular and molecular mechanisms of epithelial function and regulation. Particular focus will be on epithelia from eye, lung and breast. We will use a variety of *in vitro* and *in vivo* techniques to study disease processes mediated by an alteration in epithelial function or regulation. Emphasis will be on the retinal pigment epithelium (RPE) and the development and evaluation of new animal models of retinal disease. The Section will interact extensively with other intramural and extramural investigators and with pharmaceutical and biotech companies. The goal in all of these experiments is to provide the basis for a therapeutic approach to a host of diseases that adversely affect the retina/RPE interface. Specific areas of interest: (1) Functional characterization of genes involved in age related macular degeneration (AMD) and other RPE-mediated pathologies. (2) Gene transfer techniques will be used to introduce a variety of different transgenes into human RPE to alter the magnitude and direction of fluid transport across the epithelium. (3) Elucidation of the cellular and molecular mechanisms involved in RPE-mediated pathology. The main focus will be on a family of proteins that are responsible for fluid transport across the RPE. (4) Development of rodent models of retinal detachment and macular edema to test pharmacological interventions against a variety of pathologies that cause abnormal fluid accumulation in the distal retina. (5) AMD is a leading cause of blindness for people over the age of 60. The most devastating form of this disease is characterized by choroidal neovascularization (CNY). We have developed an animal model of CNY and it will be used to evaluate a variety of anti-angiogenic compounds. Several of these compounds have already been tested and others will be studied. (6) Focus on translational approaches based using pharmacological and gene-based therapeutic tools. (7) The Section will continue to provide scientific training in epithelial physiology and in the cell biology of retinal disease.

## **Clinical and Translational Imaging Unit – HNW22C**

(1) Conducts translational and fundamental research related to imaging ocular tissues. (2) Establishes and maintains a state-of-the-art facility appropriate for clinical and basic research activities. (3) Collaborates with clinical and basic research staff to advance the mission of the Ophthalmic Genetics and Visual Function Branch (OGVFB) and NEI IRP. (4) Mentors trainees (e.g., postdoctoral fellows, graduate students, post baccalaureate students, as appropriate) in the area of advanced ocular imaging techniques. (5) Reports findings at national and international meetings and in professional journals. (6) Initiates and fosters collaborative research efforts with other groups within the NEI and NIH and with researchers at other institutions when such arrangements would further the research goals of the Unit.

## **Medical Genetics and Ophthalmic Genomics Unit (MGOG Unit) - HN22D**

Plans and conducts research to better understand, diagnose, and treat hereditary diseases affecting vision and the eye. A range of developmental biology and molecular genetics approaches are combined with clinical research practice. Findings will be disseminated through professional conferences and publication in journals. Scientists and clinicians will receive training in the practices of laboratory and clinical research.

## **Translational Research Core – HN22E**

Conducts translational research aimed at developing new cell and gene therapy, and small molecule or biologics-based drugs for various forms of retinal degenerative diseases. Particular focus will be on developing small and large animal models to test a small molecule, biologic, and cell or gene therapy, develop tools and methods to deliver these therapies to the back of the eye, and develop non-invasive and live outcome measures and histological procedures as readouts to test efficacy of these potential therapies. The Core will interact extensively with other intramural and extramural investigators and with pharmaceutical and biotech companies. The goal in all of core is to provide the basis for a therapeutic approach to a host of diseases that adversely affect the retina/RPE interface. Specific areas of interest: (1) Developing small and large animals models relevant for age related macular degeneration (AMD) and other RPE/retina-mediated pathologies. (2) Develop delivery techniques to introduce various types of potential therapies to the back of the eye. (3) Develop methods to image and track the potential effect of these therapies on the eye. (4) Develop novel histological procedures to study retina and ocular healthy post-necropsy after treatment of various therapeutic candidates. (5) Train NEI staff of any and all of the above mentioned approaches.

## **Molecular Structure and Functional Genomics Section - HN2-3**

The principal mission of this section is to apply insights in protein structure and function to new data from genome projects, gene discovery and gene expression studies in the eye. The object is to move from DNA sequence data to an understanding of function in normal and disease states. Particular targets will be genes and proteins implicated in tissue-preferred function, aging and cell survival in retina and related eye tissues. State-of-the-art molecular biology techniques will be employed to identify and map novel genes. Computer graphics molecular modeling will be used to investigate protein structure, and recombinant proteins will be expressed for collaborative structure determinations using x-ray crystallography and NMR. Animal models, including transgenic and homologous recombination "gene knockout" mice will also be used to identify functions and mechanisms of expression. The section will interact with groups involved in ocular gene therapy and macular and photoreceptor gene expression

## **Laboratory of Sensorimotor Research - HNW24**

(1) Plans, conducts, and directs basic and applied research on the sensorimotor organization of the visual system associated pathways, including normal brain function, dysfunction, and plastic change through a multi-disciplinary approach consisting of physiological, behavioral, psychophysiological, and anatomical methods; and (2) conducts clinical research in ophthalmology by applying neuroscience concepts of the visual system and associated pathways.

Conducts studies using nonhuman primates and humans to understand brain circuits underlying the perception of color as well as cognitive processes and behaviors that involve color vision processing.

## Neural Modeling Section – HN245



## **Neuronal Networks Section - HN247**

(1) Conducts independent research on the functions and mechanisms of neuronal networks in the basal ganglia which control eye movements and on the disorders of those neuronal networks; (2) provides training in research for fellows and students; (3) reports findings at national and international meetings and in professional journals; and (4) initiates and fosters collaborative research efforts with other groups within the NEI and with researchers at other institutions when such arrangements would further the research goals of the Section.

## **Vision Section - HN248**

(1) Conducts independent research on the mechanisms by which cortical neurons signal information about external stimuli, and how these signals support visual perception; (2) provides training in research for fellows and students; (3) reports findings at national and international meetings and in professional journals; and (4) initiates and fosters collaborative research efforts with other groups within the NEI and with researchers at other institutions when such arrangements would further the research goals of the section.

### **Eye Movement and Visual Selection Section - HNWX24A**

- (1) Understands the role of cortical and subcortical structures in the control of visual attention;
- (2) develops new optogenetic techniques to manipulate behavior in non-human primates; (3) develops model systems for manipulation visuo-spatial attention in rodents.

## **Unit on Visual Decision Making (UVDM) – HN24B**

Conducts research using mice, nonhuman primates and humans aimed at understanding the mechanisms in the brain that are responsible 1) for extracting and representing task relevant visual information, 2) for changing these representations in different behavioral contexts, and 3) for driving decisions that rely on this visual information.

## **Laboratory of Immunology - HNW27**

(1) Plans, directs, and conducts basic and applied research in (a) the clinical disease process in patients with ocular inflammatory disease; (b) the question of immune circuitry, and how best these networks can be dissected; (c) basic immune mechanisms in laboratory models of ocular inflammatory disease; and (d) evaluation of the role of exogenous agents in their role in ocular inflammatory disease; and (2) provides training opportunities in clinical immunology as they relate to vision research.

## **Immunoregulation Section - HN273**

Conducts research related to the immune circuitry, and how best these networks can be dissected. Investigates immunomodulation with immunologically action agents in laboratory models and clinical applications

## **Experimental Immunology Section - HN274**

Conducts research in basic immune mechanisms in laboratory models of ocular inflammatory disease, including uveitogenic agents and their components.

## **Immunopathology Section - HN276**

(1) Will be responsible for the preparation and analyses of animal and human tissues that are either normal or affected by a wide range of disorders, particularly immunological diseases. (2) Will provide specialized support to the Laboratory of Immunology's diverse scientific endeavors. (3). Will offer histologic and pathologic evaluations of the effects of diseases on the ocular system. (4) Will offer histologic and pathologic evaluations of effects of experimental therapies that may effectively arrest or prevent the ravages of ocular inflammatory diseases. (5) Will serve as an information resource for the entire Intramural Research Program, National Eye Institute.



## **Molecular Immunology Section - HNW279**

Conduct basic research aimed at elucidating molecular mechanisms that underlie etiology and susceptibility to intraocular inflammatory diseases. Emphasis will be on mechanisms of ocular inflammation and identifying risk factors for developing uveitis.

## **Clinical and Translational Immunology Unit - HN27A**

The major goal of the Clinical and Translational Immunology Unit is understanding the mechanisms involved in immune mediated eye diseases and related systemic diseases and development of innovative diagnostic and treatment approaches. The scientific focus of the unit is to characterize critical inflammatory and metabolic pathways in uveitis with the goal of identifying candidate biomarkers and novel mechanistic targets for therapeutic intervention

### **Laboratory of Retinal Cell and Molecular Biology - HNW28**

(1) Plans, directs and conducts research on the normal and abnormal functioning of the retina, the optic nerve and adjacent structures, and in retinal diseases, particularly those of a genetic nature or due to aging of the retina and/or eye. This includes research on biochemical, molecular and cellular mechanisms in the inner and outer neural retina and retinal pigment epithelium (RPE) that are of relevance to both normal visual function and to ocular disease. (2) Obtains knowledge of fundamental processes that can ultimately be translated into rational strategies for therapeutic interventions to prevent and/or treat retinal disease.

## **Molecular Mechanisms Section - HNW286**

(1) Conducts research into the molecular mechanisms, function and regulation of retina- and retinal pigment epithelium (RPE)-specific lipid, retinoid and carotenoid metabolic and signaling pathways.(2) Cooperates with other investigators in the LRCMB, both intramural and extramural, where appropriate, to understand the role of these pathways in human ocular diseases and to develop rational therapies for such diseases. (3) Provides training to pre- and post-doctoral fellows and staff in biochemistry, molecular biology, and animal model studies.

## **Mechanisms of Retinal of Diseases Section - HNW287**

(1) Conducts basic research on the molecular mechanisms of aging with particular emphasis on the role of oxidized lipids and sterols in age-related macular degeneration, using in vivo models and small molecule antagonists to elucidate these processes. (2) Focuses on understanding the complex interactions between aging, genetic and environmental factors that lead to chronic inflammation. (3) Interacts with other groups within the NEI and the NIH as well as with extramural scientists who share similar interests.

## **Protein Structure and Function Section - HNW288**

(1) Conducts basic research on the molecular mechanisms of aging with particular emphasis on the role of oxidized lipids and sterols in age-related macular degeneration, using in vivo models and small molecule antagonists to elucidate these processes. (2) Focuses on understanding the complex interactions between aging, genetic and environmental factors that lead to chronic inflammation. (3) Interacts with other groups within the NEI and the NIH as well as with extramural scientists who share similar interests.

### **Retinal Ganglion Cell Biology Section - HNW289**

(1) Conducts basic research aimed at elucidating the molecular mechanisms of glaucoma, emphasizing the development of new animal models of glaucoma and exploitation of existing animal models to characterize molecular changes in the eye tissues involved in glaucoma. (2) Interacts extensively with other investigators in the LRCMB, the Office of the Clinical Director, intramural and extramural community with a common goal of identifying new genes involved in glaucoma, developing diagnostic tools for early detection of glaucoma and new treatments of glaucoma. (3) Develops new diagnostic and therapeutic tools for glaucoma. (4) Emphasis on stem cell therapy as a new approach to glaucoma treatment. (5) Provides training to NEI staff, postdoctoral and predoctoral students. (d) Functional characterization of genes involved in glaucoma. The main focus will be on a family of olfactomedin-related proteins, including myocilin and recently identified optomedin. (e) Development of new diagnostic and therapeutic tools for glaucoma. (f) The section will continue to provide scientific training in the molecular biology of glaucoma to NEI staff, postdoctoral and predoctoral students.

## **Neuronal-Glial Interactions in Retinal Disease Unit - HNW28A**

(1) Conducts independent research on microglia motility in the retina, and on the role of chemokine signaling through the chemokine receptor, CX3CRI, in the modulation of microglial activity in structural plasticity, chemoattraction, and vascular interactions (vasculogenesis, vascular repair, and neovascularization); (2) provides training in research for fellows and students; (3) reports finding at national and international meetings and in professional journals; and (4) initiates and foster collaborative research efforts with other groups within the NEI and with researchers at NIH and other institutions.



## **Imaging Core Unit - HN2-9**

(1) Utilizes and develops state-of-the-art tissue preparation, imaging, and image analysis procedures in collaborative research projects; (2) provides training in biotechnology for students, fellows, and principal investigators; (3) participates in collaborative research projects with other groups within the NEI, NIH, and other institutions; (4) reports newly developed means of tissue preparation and imaging as well as research findings at national and international meetings and in professional journals; and (5) assesses technical research needs and recommends recruitment of the appropriate staff and acquisition of the equipment needed to meet those needs.

## **Flow Cytometry Core - HNW2-C**

(1) Provides flow cytometry analytical and sorting equipment and services to the NEI Intramural community. (2) Develops and utilizes state-of-the-art sample preparation, data acquisition and analysis, and sorting procedures in collaborative research projects. (3) Provides training to students, fellows, and principal investigators on sample preparation, staining, and post sort handling. (4) Assesses technical research needs and recommends recruitment of the appropriate staff and acquisition of the equipment needed to meet those needs. (5) Practices and teaches effective flow cytometry-specific laboratory safety practices.

## **Histology Core - HN2-D**

(1) Performs histopathology and cytology on patient materials and autopsy eyes; (2) performs routine histology and transmission electron microscopy on animal and human specimens; (3) assists with immunohistochemistry on histological sections; (4) assists and collaborates with investigators who conduct molecular pathological research; (5) collaborates with laboratories inside and outside of NEI; and (6) provides training for technical staff, fellows and students.

## **Genetic Engineering Core - HNW2-E**

(1) Provides state of the art technology in genetically engineered model development and colony management. (2) Provides technical platforms for reprogramming and transdifferentiation in ocular biology and pathology (3) designs and develop targeting and transgenic constructs of various types for regular gene knockout, conditional gene knockout, gene knockin, and transgenic; (4) develops genetically altered and germline competent mouse embryonic stem cell (ES) lines; (5) develops gene targeted mice through blastocyst injection, and transgenic mice through pronuclear injection. (6) provides a wide range of colony management services which includes breeding services, PCR DNA analysis, cryopreservation of embryos and sperm, rederivation services, and assisted reproduction techniques; (7) assists in iPS cell production and ES cell isolation from various mouse models; (8) manages projects in ocular cell transdifferentiation; (9) collaborate with laboratories inside and outside of NEI; (9) provides training for technical staff and post-doctoral fellows.

## **Ocular Gene Therapy Core - HNW2-H**

(1) Conducts research on adeno-associated virus (AAV)-based gene therapy vectors, develops AAV vectors for the treatment of ocular diseases, and develops clinically viable, small rrioleculeregulated gene therapeutics; (2) collaborates extensively with foreign and domestic research institutions; (3) presents findings in peer-reviewed scientific journals and at scientific meetings; and (4) provides training for Post Doctoral Fellows and undergraduate students.

## **Retinal Neurophysiology Section - HN2-J**

(1) Conducts independent research on electrical signaling pathways in photoreceptors in the ground squirrel retina, on the morphological and functional alterations of retinal synapses of the ground squirrel during hibernation and on the protective mechanisms by which the retinal photoreceptors survive hypoxia and hypothermia; (2) provides training in research for fellows and students; (3) reports findings at national and international meetings and in professional journals; and (4) initiates and fosters collaborative research efforts with other groups within the NEI and with researchers at NIH and other institutions.

## **Visual Function Core - HN2-L**

The Visual Function Core at the NEI provide a wide range of phenotyping techniques, including but not limited to electroretinography, optical coherence tomography, and behavioral tests. The Visual Function Core develops innovative technologies and provides services to the NEI scientific community and to researchers throughout NIH.

## **Neuro-Immune Regulome Unit (NIRU) – HNWX29**

- (1) Conducts independent research on understanding and controlling neurodegenerative disorders including Alzheimer's disease and Age-related macular degeneration via studying networks of regulatory elements and transcription factors in innate and adaptive immune cells using mouse models and iPSCs. (2) provides training in research for fellows and students; (3) reports findings at national and international meetings and in professional journals; and (4) initiates and fosters collaborative research efforts with other groups within the NEI and with researchers at NIH and other institutions



### **Division of Extramural Science Programs - HNWX**

(1) Plans and directs programs of grant, cooperative agreement, and R&D contract support for basic and applied clinical research, training, and career development, concerning the blinding eye diseases, visual disorders, mechanisms of visual function, preservation of sight, and the special health problems and needs of individuals who are partially-sighted or blind; (2) plans and directs a program of research training and career development in scientific areas relevant to vision research; (3) advises the Director, NEI, regarding basic vision research activities, and coordinates with other NEI components to accomplish Institute objectives; (4) helps establish and implement Institute program priorities and makes funding recommendations consistent with the maximum utilization of available resources; (5) prepares reports and analyses to assist the Director and advisory groups in carrying out their responsibilities; (6) consults with voluntary health organizations, professional associations, scientific societies, and other groups in identifying research needs and in developing and coordinating activities needed to carry out the Institute's mission.

## **Division of Epidemiology and Clinical Applications - HN4**

(1) Plans, develops, and conducts human population studies concerned with the cause, prevention, and treatment of eye disease and vision disorders, with emphasis on the major causes of blindness. This includes studies of incidence and prevalence in defined populations, prospective and retrospective studies of risk factors, natural history studies, clinical trials, genetic studies, and studies to evaluate diagnostic procedures. (2) Carries out a program of education in biometric and epidemiologic principles and methods for the vision research community. This program consists of courses, workshops; a fellowship program for ophthalmologists, publications, and consultation and collaboration on research. (3) Provides biometric and epidemiologic assistance to National Eye Institute (NEI) intramural and extramural staff and to vision research workers elsewhere. The assistance ranges from consultation to collaboration as Co-investigators.

## **Epidemiology Branch - HNW42**

Plans, develops, and conducts human population studies concerned with causation and prevention of eye disease and vision disorders, with emphasis on the major causes of visual impairment, including studies of incidence and prevalence in defined populations, prospective and retrospective studies of risk factors, genetic studies, and studies to evaluate diagnostic procedures.

### **Clinical Trials Branch - HN43**

Plans, develops, and conducts studies to describe the natural history and to evaluate the efficacy of therapy of eye diseases and vision disorders.

## **Retinal Disease – HN431**

Focuses on the clinical study of human outer retinal disease (AMD, drug toxicity and monogenetic retina disease) to provide insights into disease pathogenesis and to develop outcome measures for clinical trials. The goal is to utilize knowledge obtained from natural history studies to execute interventional clinical trials that can reveal a therapeutic effect changing disease course. Current research studies include longitudinal psychophysical studies of patients with a range of AMD severities, clinical studies of hydroxychloroquine-induced retinal toxicity, late-onset retinal degeneration (LORD) and early phase interventional trials of retinal vein occlusions, X-linked retinoschisis and retinitis pigmentosa.

## **Biostatistics Branch - HNW44**

Analyzes and interprets data from clinical and epidemiologic studies of vision disorders and eye disease; consults on design, conduct, and analysis of these studies; and develops and extends biostatistical methodology with application to vision research.

## **Statistical Methods and Analysis Section - HNW442**

Analyzes vision research data through application, modification, and development of biostatistical methodology.

## **Division of Extramural Activities - HNWS**

(1) Provides overall guidance on mandated functions required by NIH-wide administration and management; (2) provides leadership and direction to all aspects of management; and (3) oversees the management of functions NIH-wide program areas including management policy, management assessment, program integrity, and additional support services.



## **Scientific Review Branch – HNW82**

(1) Plans and directs all NEI initial peer review activities; (2) develops application and initial review guidelines relating to the various NEI research support mechanism, and evaluates new procedures for improving the quality and timeliness of the review process; (3) represents the Institute on trans-NIH committees and working groups concerned with initial review policies and procedures; (4) maintains liaison with other NIH components regarding peer review policy and procedures; (5) represent NEI at scientific meetings and other gatherings of the scientific community with respect to review policy and procedures; (6) conducts special projects as requested by the Director, Division of Extramural Research.

### **Grants Management Branch – HNWX83**

(1) Plans and directs the grants and cooperative agreement management activities of the Institute; (2) ensures that all awards are made in accordance with applicable statutes, regulations, and policies; (3) evaluates and monitors the business management capability and performance of applicant and grantee organizations; (4) prepares extramural program operating budget projections and monitors expenditures on an ongoing basis; (5) provides operational and logistical support for the receipt and processing of applications and awards, maintenance of official files, and for the preparation of National Advisory Eye Council-related materials; (6) maintains effective internal controls as specified in OMB Circular A-123.

## **Neuro-Immune Regulome Unit (NIRU) – HN2A**

- (1) Conducts independent research on understanding and controlling neurodegenerative disorders including Alzheimer's disease and Age-related macular degeneration via studying networks of regulatory elements and transcription factors in innate and adaptive immune cells using mouse models and iPSCs. (2) provides training in research for fellows and students; (3) reports finding at national and international meetings and in professional journals; and (4) initiates and foster collaborative research efforts with other groups within the NEI and with researchers at NIH and other institutions