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Functional/Cognitive Neuroscience – Study sections formed after ENQUIRE 2019

These are the guidelines for the study sections that will emerge from ENQUIRE cluster 11. They are the result of the ENQUIRE process plus multiple rounds of input at CSR. Guidelines for the study sections follow and are attached to the links below.

Auditory Systems (AUD)

Neuroscience of Basic Visual Processes Study Section (NBVP)

Behavioral Neuroendocrinology, Neuroimmunology, Rhythms, and Sleep (BNRS)

Biology and Development of the Eye (BDE)

Neuroscience of Interoception and Chemosensation (NIC)

Human Complex Mental Function (HCMF)

Language and Communication (LCOM)

Learning, Memory and Decision Neuroscience (LMDN)

Neurobiology of Pain and Itch (NPI)

Pathophysiology of Eye Disease 1 & 2 (PED)

Sensory-Motor Neuroscience (SMN)

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Auditory System Study Section - (AUD)

The Auditory System Study Section (AUD) reviews applications on the structure and function of the auditory and peripheral vestibular systems in human and animal models. Approaches include molecular, cellular, physiological, genetic, pharmacological, computational, behavioral, bioengineering, and neuroimaging methods. Research reviewed in this study section generally emphasizes mechanisms underlying normal and abnormal function in the auditory and vestibular systems, and/or ways to improve diagnosis and treatment of auditory and vestibular diseases.

Topics:

- Anatomy and physiology of the auditory and vestibular sensory organs.
- Auditory function and changes across lifespan, at the levels of neural circuits, cellular systems, and synaptic physiology.
- Molecular and genetic mechanisms, and gene discovery, for auditory and vestibular function, development, maturation, and aging.
- Development of clinical tools for diagnosis of auditory dysfunction, including ear diseases, hearing loss, central auditory processing disorders, tinnitus, and hyperacusis.
- Hair cell regeneration, gene therapy, drug discovery and delivery.
- Development of hearing aids and other auditory prostheses, including middle ear implants, cochlear implants, brainstem implants, and tinnitus suppression devices.
- Behavioral and psychological therapy for auditory dysfunction, such as auditory training and behavioral therapy for tinnitus.
- Auditory perception, neural correlates of auditory function.
- Computational modeling of synaptic plasticity, neural circuitry, and interactions among brain structures for auditory processing.
- The influence of attention on auditory representation and information flow in the brain. Multisensory integration when the focus is the auditory system.

OVERLAPS

Applications with a focus on neural mechanisms of integrative systems and higher order processes such as attention, cognition, learning, memory, and decision making may be reviewed by Neuroscience of Basic Visual Processes Study Section (NBVP), or in some cases Learning, Memory and Decision Neuroscience (LMDN) or Sensory-Motor Neuroscience (SMN).

Studies of the auditory system that emphasize topics including ion channels and transporters, glial physiology, cell biology, neural development and regeneration may be reviewed in the Molecular, Cellular, and Developmental Neuroscience IRG (MDCN) in study sections such as Neurotransporters, Receptors, Channels and Calcium Signaling (NTRC), Cellular and Molecular Biology of Glia (CMBG), Synapses, Cytoskeleton and Trafficking (SYN), and Neurogenesis and Cell Fate Study Section (NCF) or Neurodifferentiation, Plasticity, Regeneration and Rhythmicity (NDPR). Applications

involving auditory cues, but focused on cognition and perception in human subjects, may be reviewed in Human Complex Mental Function (HCMF).

Applications focused on gene discovery and genetic variation in hearing loss may be reviewed in AUD if centered on auditory system function; if centered on development and/or use of molecular genetic and genomic approaches Molecular Neurogenetics (MNG) or Genetics of Health and Disease (GHD) may review the application.

Applications focused on preclinical drug discovery/development for auditory dysfunction, such as medicinal chemistry, pharmacokinetics will generally be reviewed by Drug Discovery for the Nervous System (DDNS).

Language and Communication Study Section (LCOM) generally reviews studies that focus on speech perception and language processing, rather than auditory function and sound perception.

Gene and Drug Delivery Systems Study Section (GDD) reviews drug discovery and drug delivery applications for hearing loss when the emphasis is more methodological and potentially generalizable, whereas AUD reviews them when the emphasis is more specific to auditory system function.

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Neuroscience of Basic Visual Processes Study Section - (NBVP)

The Neuroscience of Basic Visual Processes Study Section (NBVP) reviews applications seeking to study the neurobiological and developmental mechanisms underlying vision and visual perception in both humans and animal models. Any animal model visual system is potentially appropriate. A broad range of approaches is appropriate including electrophysiology, anatomy, behavior, pharmacology, cell or area-specific control of neural activity, EEG, fMRI, psychophysics, invasive recordings and brain stimulation in humans, and theoretical and computational modeling.

Topics:

- Perception, including visual processing of brightness, color, form, motion, and depth.
- Studies of the structure, connectivity, hemispheric specialization, and function of brain regions potentially involved in visual perception.
- Visual information processing in the neuronal circuits from the retina to and including all visual areas of the brain.
- Visual guidance of eye movements and the impact of eye movements on perception.
- Pattern and object recognition in vision, multi-sensory integration that includes vision, and visual perceptual decision-making.
- The control and influence of attention on visual representation, computation, and information flow within the brain.
- Testable theoretical and computational modeling of visual systems with clear ties to the underlying neurobiology.
- Fundamental science that uses retinal and cortical prosthetics to understand visual function.
- The normal and abnormal development of visual neural circuits. The sensory and perceptual consequences of strabismus and amblyopia.

OVERLAPS

Applications that focus on human behavior, with limited examination of neurobiological mechanisms, may be reviewed by Human Complex Mental Function (HCMF).

Applications that primarily focus on sensorimotor integration or motor control, including motor control of eye movements, may be reviewed by Sensory-Motor Neuroscience (SMN).

Applications that primarily focus on mechanisms of learning, memory, or decision making may be reviewed by Learning, Memory and Decision Neuroscience (LMDN).

Studies with a focus on development of imaging technologies may be reviewed by ETTN P 81 (Vision Imaging, Bioengineering, and low vision technology development SEP)

Applications that focus on engineering and development of prosthetics may be reviewed by Bioengineering of Neuroscience, Vision and Low Vision Technologies (BNVT).

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Studies focused on ion channels and transporters, glial physiology, cell biology, or molecular neurogenetic approaches may be reviewed by Neurotransporters, Receptors, Channels and Calcium Signaling (NTRC), Cellular and Molecular Biology of Glia (CMBG), Synapses, Cytoskeleton and Trafficking (SYN), Cellular Mechanisms in Aging and Development (CMAD), Neurodifferentiation, Plasticity, Regeneration and Rhythmicity (NDPR),or Neurogenesis and Cell Fate (NCF).

Applications focused on visual information processing and cognition are reviewed in NBVP, while those centered on basic mechanisms of signaling in visual system may be reviewed in Biology and Development of the Eye (BDE).

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Behavioral Neuroendocrinology, Neuroimmunology, Rhythms, and Sleep - (BNRS)

The Behavioral Neuroendocrinology, Neuroimmunology, Rhythms, and Sleep Study Section (BNRS) reviews applications to study circadian rhythms and sleep, neuroendocrinology, and neuroimmunology in a behavioral context. Studies may employ genetic, biochemical, bioinformatic, molecular, anatomic, or developmental approaches. Studies typically use either vertebrate or invertebrate animal models, but relevant applications involving human subjects are also reviewed. BNRS considers applications across the lifespan including development, maturation and aging, as well as rhythmicity and plasticity in the adult.

Topics:

- Neural circuitry of circadian and other activity rhythms including pacemaker mechanisms, output pathways, and peripheral clocks.
- Neural circuit mechanisms that generate, maintain and regulate sleep, and promote arousal, including the influences of external stimuli, neuroendocrine systems, and the internal state on circadian rhythms and sleep.
- Mechanisms through which circadian rhythms or sleep affect organ systems, and normal physiological processes, such as ingestive behaviors, reproductive hormones, stress hormones, emotional states, cognition, the immune system, aging, and disease.
- Reproductive neuroendocrinology of the hypothalamic-pituitary-gonadal (HPG) axis and related circuits, with emphasis on the impact of reproductive hormones on the neural basis of reproductive, cognitive, and other behaviors.
- Stress neuroendocrinology of the hypothalamic-pituitary-adrenal axis (HPA) and related circuits, with emphasis on the impact of stress hormones on neuronal processes in affective and cognitive behaviors.
- Social/affiliative neuroendocrinology with emphasis on the impact of hormones on neuronal processes contributing to maternal, affiliative, and social behaviors.
- Ingestive behavior, including neural regulation of food and fluid intake, and whole-body energy homeostasis.
- Interactions between the nervous and immune systems with an emphasis on associated sickness, affiliative, cognitive, and depressive behaviors.

OVERLAPS

Applications focused on neuroendocrine or neuroimmune aspects of behavior associated with drugs of abuse or ethanol may be reviewed by Neurobiology of Motivated Behavior (NMB) or Neurotoxicology and Alcohol (NAL).

Applications focused on behavioral motivation associated with ingestion of food or fluids may be reviewed by NMB.

Applications focused on the neural regulation of food and fluid intake may be reviewed by Integrative Physiology of Obesity and Diabetes (IPOD) when the focus is primarily on metabolism, rather than behavioral regulation. Applications to study effects of olfaction and taste, or the microbiome on ingestive behaviors may be reviewed in Neuroscience of Interoception and Chemosensation (NIC).

Applications that focus on the mechanisms of the HPG axis and neurophysiology of hormones may be reviewed by Integrative and Clinical Endocrinology and Reproduction (ICER), while those that focus on reproductive, cognitive, and other behavioral outcomes may be more appropriate for BNRS.

Applications focused on neurobiological processes overlapping with BNRS, but centered on behavioral assays, may be reviewed in Biobehavioral Regulation, Learning and Ethology (BRLE).

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Applications focused on biological rhythms or sleep may be reviewed by Neurodifferentiation, Plasticity, and Regeneration (NDPR) when centered on cellular and molecular processes with limited behavior analysis, including Drosophila or C. elegans.

Applications focused on the basic physiology and pathophysiology of glial cells may be reviewed by Cellular and Molecular Biology of Glia (CMBG) if there is little consideration of associated behaviors.

Applications involving molecular and cellular neuroendocrinological processes may be reviewed in Molecular Neuropharmacology and Signaling (MNPS).

Applications focused on sleep or circadian rhythms in human subjects may be reviewed by Neural Basis of Psychopathology, Addictions and Sleep Disorders (NPAS) or Mechanisms of Emotion, Stress and Health (MESH), while those focused on neuroimmunology in human subjects may be reviewed by Behavioral Neuroendocrinology, Neuroimmunology, Rhythms, and Sleep (BNRS).

Clinical Neuroimmunology and Brain Tumors (CNBT). Applications focused on basic neuroimmunology are generally reviewed by BNRS whereas applications that investigate neuroimmunology in disease are generally reviewed in CNBT.

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Biology and Development of the Eye - (BDE)

Biology and Development of the Eye Study Section (BDE) reviews applications to study the basic biology of the eye and other light sensing systems. It reviews applications where the major focus is the elucidation of the fundamental biology and mechanisms important for normal visual function or non-visual light sensing systems. Basic studies of eye development are also reviewed here. Studies may use mammalian, vertebrate, invertebrate, bioengineered tissue (e.g. organoids), cell lines, and computational approaches in pursuit of fundamental knowledge.

Topics:

- Anatomy, physiology, cellular biology, molecular biology, vasculogenesis, and biochemistry that underlie the function of the ocular system.
- Control of cell signaling, cell cycle, neuroprotection, autophagy, and apoptosis.
- Ocular stem and progenitor cells and regeneration.
- Photoreceptor and retinal pigment epithelial cell biology and function, including phototransduction, visual cycle, outer segment disc morphogenesis, phagocytosis, etc.
- Retinal circuitry and signaling between photoreceptors and neurons.
- Development or morphogenesis of any part of the eye or light sensing cells.
- Basic biology of aqueous humor outflow and dynamics.
- Mechanisms of non-image forming light sensation and contributions of these systems to animal behavior.
- Development and biology of the ocular surface, cornea, lens, lacrimal and meibomian glands.
- Biology of refractive error.

OVERLAPS

There are shared interests with Pathophysiology of Eye Disease vs BDE. The basic biological studies of the eye with the focus on the fundamental processes and mechanisms are reviewed in BDE. Applications where the major focus is on etiology, pathophysiology, prevention, diagnosis, and treatment of diseases and disorders are reviewed in PED 1 & 2. Applications focused on basic biological aspects of the lens are reviewed in BDE, studying cataract are reviewed in PED 1 & 2. Normal and abnormal retinal and ocular development (not vasculature) are reviewed in BDE.

There are shared interests with Mechanisms of Sensory, Perceptual, and Cognitive Processes (SPC). BDE reviews applications addressing signaling mechanisms within photoreceptors; applications involving retinal circuitry, photoreceptor synapses, and signaling between photoreceptors and retinal neurons. Applications emphasizing circuitry beyond the optic nerve, or cognition and visual processing in the neuronal circuits are generally reviewed in NBVP.

There are shared interests with Biophysics of Neural Systems Study Section (BPNS). BDE reviews applications involving the phototransduction cascade whereas BPNS reviews applications addressing the structure/function of visual pigments and associated proteins and their biophysical properties.

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There are shared interests with Neurodifferentiation, Plasticity, Rhythmicity and Regeneration (NDPR) and Neurogenesis and Cell Fate (NCF) in some aspects of visual system development. Applications focused on ganglion cell axons outside the retina (optic nerve, visual cortex) and synaptogenesis are reviewed in NDPR. Applications about ganglion cell development, ganglion cell neuroprotection, and cell death in retina are reviewed in BDE. Early cell fate applications may be reviewed in NCF.

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Neuroscience of Interoception and Chemosensation - (NIC)

The Neuroscience of Interoception and Chemosensation Study Section (NIC) reviews applications to investigate the genetics, molecular biology, anatomy, and physiology of chemosensation and interoception in humans as well as vertebrate and invertebrate animals, including insect disease vectors. The involvement of these systems in behaviors such as ingestive or social behavior is also an area of interest. The emphasis is on integrative systems approaches to understanding normal sensory function as well as sensory pathology due to injury or disease. Studies may be basic or translational in nature and may use established or emerging model systems, including vertebrate, invertebrate, bioengineered tissue models, and computational approaches.

Topics:

- Chemosensation including olfactory, gustatory and chemesthesis.
- Olfactory and gustatory systems and extended to other types of chemical signaling, such as semiochemicals (pheromones, allomones, and kairomones).
- Chemical sampling used by cells in organ systems outside of the nasal and oral cavities, such as in the gut, kidneys, and sperm.
- Neuroanatomical and neurophysiological aspects of interoception.
- Effects of olfaction and taste, or the microbiome on ingestive behaviors and social behavior.
- Somatosensation in the context of interoception.
- Multisensory Integration: convergence and interaction among the chemosensory, somatosensory, and interoception systems related to composite sensations (e.g. flavor) and/or behavior.
- Mechanisms of olfaction, gustation, touch, and temperature sensation in disease vectors and effects on behavior.

OVERLAPS

Applications addressing development of chemosensory systems with emphases on cellular differentiation, axonal pathfinding, or synaptic function may be reviewed by Neurogenesis and Cell Fate (NCF), Neurodifferentiation, Plasticity, and Regeneration (NDPR), or Neurotransporters, Receptors, Channels and Calcium Signaling (NTRC).

Applications focused on basic cellular and subcellular properties of chemical signaling, such as ion channels, glial physiology, or molecular neurogenetics may be reviewed by NTRC, Synapses, Cytoskeleton and Trafficking (SYN), NCF or Cellular and Molecular Biology of Glia (CMBG).

Applications addressing mechanisms of integration of chemosensory signals and motor output may be reviewed by Sensory-Motor Neuroscience (SMN).

Applications to investigate somatosensation in the context of pain are generally reviewed in Neurobiology of Pain and Itch (NPI).

Applications with a focus on development of novel molecular genetic technologies to manipulate chemosensory systems may be reviewed by Molecular Neurogenetics (MNG).

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Applications that propose to target the insect olfactory system for the treatment of insect-borne disease may be reviewed by Vector Biology (VB).

Applications addressing conditioned taste aversion and other forms of learning or motivated behavior involving the chemosensory system may be reviewed by Neurobiology of Learning, Memory and Decision Neuroscience (LMDN) or Neurobiology of Motivated Behavior (NMB).

Applications addressing neural regulation of food and fluid intake, and whole-body energy homeostasis may be reviewed by Behavioral Neuroendocrinology, Neuroimmunology, Rhythms, and Sleep - (BNRS). Applications that focus on signaling pathways of ingestive behavior related to development of obesity and diabetes and regulation of metabolic homeostasis may be reviewed by Integrative Physiology of Obesity and Diabetes (IPOD).

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Human Complex Mental Functions - (HCMF)

Human Complex Mental Functions Study Section (HCMF) reviews applications to investigate a broad range of complex mental functions in humans, including attention, perception, navigation, learning, memory, cognition, decision making, executive function, and social cognition. Applications to investigate interactions between functional systems (e.g., emotion and cognition) are reviewed. Developmental, aging, and lifespan applications are covered. Approaches and methodologies include neuroimaging and electrophysiology, electrocorticography, neuropsychology, computational modeling, and non-invasive brain stimulation. HCMF reviews predominantly human subject applications with occasional consideration of other applications proposing non-human primates.

Topics:

- Perception: higher-order perceptual mechanisms for all sensory modalities; object and scene recognition; processing of spatial and temporal relations.
- Attention: attentional control and allocation; capacity and resource limitations; automatization.
- Executive Function: planning and monitoring of complex behaviors; coordination of cognitive operations; consciousness; cognitive control; goal-oriented processing; decision neuroscience.
- Learning and Memory: Encoding, consolidation, and retrieval processes; short-term, working, and long-term memory; episodic/semantic, declarative/procedural, explicit/implicit and other types of memory and their interactions.
- Knowledge and Semantics, including categorization and expert knowledge.
- Skill learning; rule induction; cognitive training, roles of instruction, and practice.
- Reasoning: deductive and inductive reasoning; mathematical and statistical reasoning; analogical reasoning,
- Computational and machine learning approaches to modeling of interactions among brain structures that affect learning, memory, and decision making in humans.
- Problem Solving: use of rules, models, strategies, and heuristics.
- Mathematical Cognition: cognitive processes (and their development) related to science, technology, engineering and math; spatial awareness, number concept.
- Navigation: driving, simulated driving, way-finding, and spatial navigation/representation; effects of age, substance use, and other factors on driving and navigation outcomes.
- Social-affective neuroscience; learning, perception, cognition.

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OVERLAPS

Adult Psychopathology and Disorders of Aging (APDA): Applications that focus on cognition in Alzheimer's Disease, Mild Cognitive Impairment, and other dementias are typically reviewed in APDA. Normative age-related cognitive change, risk for dementias, premorbid conditions, and effects of concussion are usually reviewed in HCMF.

Biobehavioral Regulation, Learning, and Ethology (BRLE): Applications that focus on basic mechanisms of learning such as classical/operant conditioning are reviewed in BRLE; animal models of learning or navigation with a predominantly behavioral orientation, or those focused on decision making in animals in the context of addiction processes, are also appropriate for BRLE.

Language and Communication (LCOM): Applications that focus on language acquisition or processing are assigned to LCOM; applications focusing on perception and cognition in other contexts will be assigned to HCMF.

Social, Personality, and Interpersonal Processes (SPIP): Affective neuroscience is an area shared by HCMF and SPIP. SPIP focuses more on questions in the areas of social and personality psychology, whereas HCMF is more focused on questions involving social cognitive neuroscience.

Applications that focus on the underlying neurobiological mechanisms of sensation, perception, attention, and cognitive function, particularly in animal models, may be more appropriately reviewed by different study sections in the IFCN IRG. For example, applications focused on the auditory system are likely to be reviewed by AUD, visual perception applications - by NBVP, circuitry-level studies of the neural basis of cognition and executive functions in animals - by LMDN, etc.

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Language and Communication - (LCOM)

The Language and Communication Study Section (LCOM) reviews applications investigating normal and disordered language and communication, and their development across the lifespan (infancy through old age), primarily in humans. Research methods include, but are not limited to, psychological experiments, naturalistic observation, linguistic and logical analyses, computational modeling, and neuroimaging studies.

Topics:

- Perception and production of spoken, written, gestural/signed, and tactile languages at the phonetic, morphological, syntactic, pragmatic and semantic levels.
- Aphasia, developmental language disorder, and other language and communication disorders: their nature, origins, developmental course, assessment, prevention, treatment, and remediation.
- Language acquisition and development across the lifespan, including bilingualism and multilingualism.
- Perceptual and cognitive processes underlying reading and writing abilities and disorders such as dyslexia and dysgraphia; interventions for reading and writing disorders.
- Neurobiological foundations underlying language and communication abilities; including speech, reading, and writing.
- Relations between language and thought; social roles and norms on use of language and other forms of communication; social-cultural influences of assessment and interventions for language and communication disorders.

OVERLAPS

Applications related to the motoric/articulatory contribution to speech and sound production and disorders such as dysfluency, articulation disorders, stuttering, and dysphonia are reviewed in Motor Function, Speech, and Rehabilitation (MFSR).

Applications focusing on auditory processing, auditory disorders, and hearing are reviewed in Auditory System (AUD). Applications focusing on audition and hearing as they relate to speech and language processes are reviewed in LCOM.

Applications focusing on language acquisition or processing are assigned to LCOM; applications on perception and cognition in other contexts will be assigned to Human Complex Mental Function (HCMF).

Applications involving language development in children with developmental disabilities, such as Fragile X or autism spectrum disorders, are generally reviewed in Child Psychopathology and Developmental Disorders (CPDD) if language development is considered as one of multiple manifestations of the disorder. Applications that focus only on language outcomes are typically assigned to LCOM.

Applications that focus on low-level visual information processing may be reviewed by Mechanisms of Sensory, Perceptual, and Cognitive Processes (NBVP). Studies with a focus on reading processes may be reviewed by LCOM.

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Learning, Memory and Decision Neuroscience - (LMDN)

The Learning, Memory and Decision Neuroscience Study Section (LMDN) reviews applications to investigate the anatomical and functional neurobiology and mechanisms of learning, memory, and decision making. It includes social/affective learning. The scope of this committee is broad and includes studies focused on the cellular and molecular changes, circuitry, and neural coding and integration that underlie learning, memory, decision making, and cognition. Studies may use established or emerging model systems including vertebrate or invertebrate animals with behavioral readouts, as well as computational approaches. Applications with non-human primates may be reviewed but human studies are generally not.

Topics:

- Anatomical pathways, functional circuits, and behavioral physiology that mediate learning and memory or decision making in normal and pathological states.
- Mechanisms and function of memory encoding, retrieval, and forgetting.
- Unconventional molecular, cellular, and biochemical concepts for memory engrams.
- Neural and synaptic correlates of learning, memory, and decision making assessed at the level of single neuron and population firing patterns, brain rhythms, and imaging in *in vitro* and *in vivo* models including awake behaving animals.
- Cellular, molecular, genetic, and epigenetic events that underlie plasticity, as they relate to learning, memory, and decision making
- Biomarkers of learning, memory, and decision making.
- Circadian influences on learning and memory.
- Effects of developmental perturbations (e.g., stress, drugs of abuse), or age-related change on learning, memory and decision making across the lifespan.
- Effects of disease and injury on the fundamental neurobiological processes underlying learning, memory and decision making.
- Neurobiological mechanisms behind normal developmental and age-related changes in learning, memory and decision making
- Circuitry-level studies of the neural basis of cognition and executive functions (other than those associated with visual, auditory, or chemosensory cues) in animal models.
- Computational, AI, and machine learning approaches to modeling of synaptic plasticity, neural circuitry, intercellular and intracellular processes, and interactions among brain structures that affect learning, memory and decision making

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OVERLAPS

Applications centered on the cellular and molecular regulation of neurons, and primarily on molecular signaling and synaptic physiology, with limited behavioral analyses, may be reviewed by Synapses, Cytoskeleton and Trafficking (SYN) or Neurotransporters, Receptors, Channels and Calcium Signaling (NTRC).

Applications focused on the use of behavioral assays to understanding learning and memory, and with limited molecular and circuit-level mechanistic analysis, may be reviewed by Biobehavioral Regulation, Learning and Ethology Study Section (BRLE).

Applications focused on the molecular, circuit-level, and behavioral regulation of learning associated with the rewarding and aversive cues, may be reviewed by Neurobiology of Motivated Behavior (NMB).

Circuitry-level studies of the neural basis of cognition and executive functions in animals are generally reviewed by LMDN. However, applications involving learning and memory, or executive functions that emphasize understanding the processing of visual, auditory, olfactory, or gustatory cues are more typically reviewed in Neuroscience of Basic Visual Processes (NBVP), Auditory System (AUD) or Neuroscience of Interoception and Chemosensation (NIC).

Applications involving learning and memory, or executive functions that are focused on understanding the visual processes, visual perception, or visual attention are generally reviewed by NBVP.

Applications focused on motor learning may be more appropriate for review in Sensory-Motor Neuroscience (SMN).

Applications focused on cognition and perception in human subjects or nonhuman primates, with emphasis on behavioral analysis and neuroimaging methods, may be reviewed in Human Complex Mental Function (HCMF).

Applications to investigate neurodegeneration not focused on mechanisms of learning and memory, are generally reviewed by Chronic Dysfunction and Integrative Neurodegeneration (CDIN). When such applications primarily investigate learning and memory processes, they are often more appropriate for LMDN.

Applications involving extensive computational and analytical modeling may be reviewed by Modeling and Analysis of Biological Systems (MABS), especially when the focus is on development of modeling methods or approaches; applications of computational approaches to problems in learning, memory, or decision making are more likely appropriate for LMDN.

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Neurobiology of Pain and Itch - (NPI)

The Neurobiology of Pain and Itch Study Section (NPI) reviews research applications on the neurobiology of pain, analgesia and itch in animals and humans. Approaches include, but are not limited to, molecular biology, genetics, anatomy, physiology, imaging and psychophysics. The emphasis is on approaches to understanding normal sensory function and sensory pathology due to injury or disease.

Topics:

- Mediation and modulation of nociception analgesia; itch and antipruritics. Discovery of novel pharmacological targets and treatments for pain and itch.
- Analysis of the critical circuitry, both spinal and supraspinal, important in pain sensation.
- Analgesics including opiates, non-opioids and other analgesics; mechanisms and clinical treatment approaches to tolerance and dependence on opioids and other drugs with abuse potential.
- Endogenous pain modulatory systems (e.g., endogenous opiates and endocannabinoids).
- Non-pharmacological approaches to pain treatment, including but not limited to, novel therapies, such as neurostimulation, and complementary and integrative approaches (e.g., behavioral interventions).
- Interaction of pain and comorbid conditions, such as anxiety, depression, sleep and other contributory factors.
- The role of the immune system and glia in pain and itch.
- Somatosensation in the context of pain and itch.

OVERLAPS

Applications involving human and/or clinical studies of pain that evaluate psychosocial factors, behavioral interventions and adjunct therapies, rehabilitation and patient outcomes may be reviewed by Behavioral Medicine, Interventions and Outcomes (BMIO).

Applications involving human and/or animal studies of substance abuse, drug tolerance, and addiction may be reviewed by Biobehavioral Regulation, Learning and Ethology (BRLE). Included also are studies of normal and abnormal behavioral development.

Applications implementing medicinal chemistry for preclinical research, drug screening and preclinical animal models, natural product development, and pharmacokinetic evaluation may be reviewed by Drug Discovery for the Nervous System (DDNS).

Applications related to cellular and molecular mechanisms of drugs of abuse, addiction, stress, and mood disorders may be reviewed by Molecular Neuropharmacology and Signaling (MNPS).

Applications related to the regulation of emotion and mood; influence of psychosocial factors in personality, affect and cognition; mechanisms of acute and chronic stress, and stress-reduction interventions may be reviewed by Biobehavioral Mechanisms of Emotion, Stress and Health (MESH).

Applications to investigate the genetics or epigenetics pain, and applications focused on gene delivery methods may be reviewed by Molecular Neurogenetics (MNG).

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Applications related to motivated behaviors, such as mediation of drug and other types of reward, mechanisms of tolerance, dependence, withdrawal, and sensitization may be reviewed by Neurobiology of Motivated Behavior (NMB).

Applications focused on spinal and supraspinal control of voluntary and autonomic motor function; vestibular system and proprioception studies; sensorimotor integration, such as extrapyramidal motor control are appropriately reviewed by Sensory-Motor Neuroscience (SMN) .

Somatosensation, when not focused on pain or itch, are more appropriate for Sensory-Motor Neuroscience (SMN) or Neuroscience of Interoception and Chemosensation (NIC).

There are shared interests with Surgery, Anesthesiology and Trauma (SAT) in the investigation of pain. Grant applications that focus on mechanisms of action and pharmacology of general and local anesthetics, and pain management, including general and local anesthesia, and anesthetic side effects may be assigned to SAT. Applications that focus on the molecular biology, anatomy, physiology, and psychophysics of pain and analgesia may be assigned to NPI.

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Pathophysiology of Eye Disease - (PED 1 & 2)

The Pathophysiology of Eye Disease Study Section (PED) reviews applications to investigate disorders and diseases of the eye. The science ranges from investigations of etiology, to pathogenesis, diagnosis, detection, treatment, and prevention of eye disorders and disease. PED reviews applications proposing to use human subjects or animal models of ocular disease to investigate pathophysiology or translational/clinical approaches. PED 1 and 2 are twin study sections that handle essentially the same set of topics, models, and approaches.

Topics:

- Etiology and pathogenic mechanisms of diseases and disorders of the retina and choroid, including age-related macular degeneration (AMD), retinopathy of prematurity (ROP), diabetic retinopathy (DR), and inherited retinal degenerations, such as retinitis pigmentosa, Stargardt's Disease, Leber's Congenital Amaurosis, etc.
- Diseases, disorders, and treatments of the ocular surface and cornea, such as wound-healing, allergies, dry eye syndrome, lacrimal and meibomian gland dysfunction, bacterial, fungal, and viral corneal infections, corneal dystrophies, Fuchs' dystrophy, keratoconus, uveal melanoma, etc.
- Understanding the pathogenesis and treatment of glaucoma (anterior and posterior) and other neuropathies.
- Neuroimmunology and inflammation associated with age-related macular degeneration, diabetic retinopathy, optic neuropathies, etc.
- All aspects of immunology, infection, and inflammation unique to the eye, such as uveitis.
- Preclinical evaluation of treatment targets and approaches, including gene therapy and stem cell-based therapy.
- Drug delivery to the ocular surface or cornea.
- Application of new technologies of imaging and visual function testing for diagnosis and monitoring of diseases and disorders of the retina and optic nerve.
- Refractive error treatments.
- Pathological aspects of retinal vasculogenesis and angiogenesis.
- Cataracts and posterior capsule opacification.

OVERLAPS

Biology and Development of the Eye (BDE) vs PED: Basic biological studies of the eye with the focus on the fundamental processes and mechanisms are reviewed by BDE vs. applications where the major focus is on etiology, pathophysiology, prevention, diagnosis, and treatment of diseases and disorders that are reviewed in PED.

Genetics of Health and Disease (GHD) vs PED: Applications strongly focused on the genetics or transcriptome functions in ocular disorders are reviewed by GHD.

Bioengineering of Neuroscience, Vision and Low Vision Technologies (BNVT) vs PED: Development of bioengineering approaches, therapeutic formulations, and drug delivery strategies for treatment of ocular disorders are reviewed by BNVT vs. testing the applicability of these approaches and therapies for the treatment of diseases and disorders of retina and optic nerve using animal models and human-subject based studies are reviewed by PED.

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Emerging Imaging Technologies in Neuroscience (EITN) vs PED: Applications focused on the development of imaging methodologies are primarily reviewed by EITN vs their use for the disorders and diseases of the retina and optic nerve are reviewed by PED.

NDPR vs PED: Applications more focused on fundamental cellular and molecular mechanisms of axonal outgrowth, and regeneration of neuronal connectivity is reviewed in NDPR vs. more translational, clinical studies related to optic neuropathies, optic nerve injuries, etc. reviewed by PED.

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Sensory-Motor Neuroscience - (SMN)

The Sensory-Motor Neuroscience Study Section (SMN) reviews applications on the anatomical and functional neurobiology of motor, sensorimotor, vestibular, and somatosensory systems. Emphasis is on integrative approaches to elucidate neural substrates of these systems employing neurophysiological, molecular/genetic, neuroanatomical, biophysical, behavioral, neuroimaging, bioengineering and computational methods. Studies may use established or emerging model systems including vertebrate or invertebrate animals, brain-machine interfaces, invasive recordings and stimulation in humans, or computational approaches.

Topics:

- Structure and function of neural systems involved in voluntary and involuntary movement, including neural control and biomechanics of balance, posture, and stance in human and animal models.
- Cortical control of reaching and grasping, motor learning.
- Studies to use brain machine interfaces or neuroprosthetics in order to understand the brain control of movement
- Investigations of sensory-motor control based on invasive recordings and brain stimulation in human subjects.
- Computational and statistical models of sensory and motor control.
- Neuronal and circuit control of vertebrate and invertebrate locomotion, including studies of motor central pattern generators, respiratory central pattern generators, and oral motor function.
- Neural control of sequential and learned movements; movement decision making.
- Integration and coordination of sensory and motor signals, including neural and biomechanical mechanisms of active whisking, escape behaviors, proprioception, birdsong vocal motor control, and learning.
- Vestibular systems studies including vestibulo-ocular reflex, vestibulo-spinal reflex, dizziness, and spatial orientation in human and animal models.
- Integration of sensory inputs and action systems, multisensory integration involving vestibular or proprioceptive senses.
- Disorders of motor control, complex and learned motor behavior in the absence of primary motor deficit, e.g. apraxia. Disorders of motor control involving the basal ganglia (e.g., dystonia) when the focus is on the basic mechanisms.
- Somatosensation; neurobiology of touch, vibrotactile and temperature sensation.

OVERLAPS

There are shared interests with Motor Function, Speech and Rehabilitation (MFSR), for example on topics of neural control and biomechanics of balance, posture and stance. Applications that investigate these topics in the context of disease or disorder, including aging are likely to be reviewed by MFSR or Musculoskeletal Rehabilitation Sciences (MRS). MFSR and MRS also typically review these topics when they are studied in the context of rehabilitation. Developmental studies of motor function are typically reviewed in MFSR. Studies that utilize invasive recordings in humans are assigned according to the science of the aims to SMN or MFSR as appropriate.

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Basic studies of motor function using neuroprosthetics may be reviewed in either Sensory-Motor Neuroscience (SMN) or Bioengineering of Neuroscience, Vision and Low Vision Technologies (BNVT), depending upon the emphasis. Emphasis on neuroprosthetic engineering is likely more appropriate for BNVT, whereas studies using neuroprosthetics as a tool to investigate sensorimotor process are more likely reviewed in SMN.

Applications primarily centered on development of neuroprosthetics may be reviewed by BNVT or MFSR, depending upon the emphasis. Those focused on devices interfacing with the peripheral nervous system or central nervous system are appropriate for BNVT, while those focused on externally-driven prosthetics or exoskeletons may be more appropriate for MFSR.

Applications addressing the role of visual feedback in motor control, may be reviewed by Mechanisms of Mechanisms of Sensory, Perceptual, and Cognitive Processes (NBVP), when primarily focused on mechanisms of visual information processing.

Applications addressing spinal cord pathology, regeneration, repair and rehabilitation, may be reviewed by Clinical Neuroplasticity and Neurotransmitters (CNNT) when focused on pathological processes, or MFSR when focused on rehabilitative approaches.

While applications focused on motor learning are often reviewed in SMN, when such applications emphasize learning and memory circuitry, more so than motor function, review in Learning, Memory and Decision Neuroscience (LMDN) may be appropriate.

While basic mechanisms for disorders of motor control involving the basal ganglia (e.g., dystonia) may be reviewed in SMN, applications focused on circuit-level mechanisms involved in Parkinson's disease particularly when the emphasis is on pathophysiological mechanisms may be reviewed by CNNT.

While basic mechanisms of cortical and cerebellar micro-circuitry involved in voluntary and involuntary movements are typically be reviewed by SMN, those involving spinal cord injury may be reviewed by CNNT.

Applications with a focus on basic cellular and subcellular properties of motor or sensorimotor systems, such as ion channels, glial physiology, or molecular neurogenetics may be reviewed by Neurotransporters, Receptors, Channels and Calcium Signaling (NTRC), Cellular and Molecular Biology of Glia (CMBG), Synapses, Cytoskeleton and Trafficking (SYN), Molecular Neurogenetics (MNG), or Neurogenesis and Cell Fate (NCF).

Applications addressing animal communication mechanisms (e.g. birdsong), in particular with primary emphasis on auditory systems function, may be reviewed by Auditory Systems (AUD).

Applications addressing the peripheral vestibular system may be reviewed by AUD.

There are overlaps in the area of spatial learning and navigation with Biobehavioral Regulation, Learning and Ethology (BRLE). Animal models of learning or navigation with a predominantly behavioral orientation reviewed in BRLE whereas animal models of navigation that emphasize circuitry or cellular/physiological mechanisms are usually reviewed in SMN.

Computational applications that emphasize formal modeling methods or the development of mathematical approaches may be appropriate for Modeling and Analysis of Biological Systems (MABS), whereas applications that emphasize the application of such models to sensory and motor control may be more appropriate for SMN.