THE PRUSINER-ABRAMSKY RESEARCH AWARDS

IN CLINICAL & BASIC NEUROSCIENCES

The Hebrew University of Jerusalem
Board of Governors 2021
For a BETTER WORLD

OCTOBER 2021

The prestigious Prusiner-Abramsky Research Awards in Clinical and Basic Neuroscience by The Orion Foundation honor Professors Stanley Prusiner and Oded Abramsky.

The awards are intended for outstanding researchers from all fields of basic clinical neurosciences at The Hebrew University and the Hadassah University Medical Center.

DR. ASSAF HONIG

Department of Neurology
Hebrew University
Hadassah Medical School

Expanded treatment options for diseases of the Cerebrovascular system

DR. NINA FAINSTEIN

Department of Neurology
Hebrew University
Hadassah Medical School

The role of resident brain Neural Precursor Cells in the pathogenesis of Alzheimer disease.

DR. HAITHAM AMAL

School of Pharmacy, Faculty of Medicine

An integrative multiomics platform towards the development of diagnostic models and identifying therapeutic targets for autism spectrum disorder

DR. ARIEL GILAD

Department of Medical Neurobiology
Faculty of Medicine

Brain-wide cognitive maps in health and disease

PROF. STANLEY B. PRUSINER, M.D.

Stanley B. Prusiner, M.D., is Director of the Institute for Neurodegenerative Diseases and Professor of Neurology at the University of California, San Francisco (UCSF), where he has worked since 1972. Born in Des Moines, Iowa, in 1942, he spent his childhood there and in Cincinnati, Ohio. He received his undergraduate degree and medical training at the University of Pennsylvania and his postgraduate clinical training at UCSF.

From 1969-72, he served in the U.S. Public Health Service at the National Institutes of Health. He is the author of over 500 research articles and the book Madness and Memory.

Prof. Prusiner is a member of the U.S. National Academy of Sciences, the Institute of Medicine, the American Academy of Arts and Sciences, the American Philosophical Society, and a foreign member of the Royal Society of London. He is the recipient of numerous prizes, including the Potamkin Prize for Alzheimer's Disease Research of the American Academy of Neurology (1991); the Richard Lounsbery Award for Extraordinary Scientific Research in Biology and Medicine from the National Academy of Sciences (1993); the Gairdner Foundation International Award (1993); the Albert Lasker Award for Basic Medical Research (1994); the Paul Ehrlich Prize from the Federal Republic of Germany (1995); the Wolf Prize in Medicine from the State of Israel (1996); the Keio International Award for Medical Science (1996); the Louisa Gross Horwitz Prize from Columbia University (1997); the Nobel Prize in Physiology or Medicine (1997); and the U.S. National Medal of Science (2009).

Prof. Prusiner's groundbreaking research on prion diseases, beginning in the late 1970s, led him to propose an explanation for the cause of bovine spongiform encephalopathy ("mad cow" disease) and its human equivalent, Creutzfeldt-Jakob disease, for which he was awarded the Nobel Prize. In this work, he coined the term prion (derived from "proteinaceous" and "infectious") to refer to a previously undescribed form of infection caused by the self-propagation of alternatively folded proteins.

His research has elucidated a fundamental understanding of the proteins underlying such illnesses as Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis (ALS) and PrP prion diseases. These advances in understanding the molecular, genetic and cellular basis of neurodegenerative diseases have fuelled progress toward the development of targeted drug therapies.

PROF. ODED ABRAMSKY, M.D., PH.D.

Oded Abramsky was born in Jerusalem and received his M.D. and Ph.D. degrees from The Hebrew University of Jerusalem. He completed his residency in neurology at Hadassah University Hospital, where he was later appointed Head of the Neuroimmunology Unit (1982) and Chairman of the Neurology Department (1988-2005). He was appointed Professor of Neurology at Hebrew University-Hadassah Medical School in 1982, holding the Israel S. Wechsler Chair in Neurology. He served as Dean of the Faculty of Medicine of The Hebrew University (1992-96) and subsequently was appointed Chairman of the Agnes Ginges Center for Human Neurogenetics at Hadassah University Medical Center.

Prof. Abramsky has been actively involved in many aspects of medical research and holds prominent positions in numerous professional organizations concerned with both clinical practice and medical research. He was Chief Scientist of the Israel Ministry of Health (1987-1992), Chairman of the National Medical Research Organization, and served as Chairman of the Israel National Council for

Research and Development. He is an Honorary President of the Israel Society of Neuroimmunology; Honorary Member of the American Neurological Association; Member of the Institute of Medicine, National Academy of Sciences (USA); Fellow by Distinction of the Royal College of Physicians (FRCP); and Member of the Israel Academy of Sciences and Humanities, among many other affiliations. In 2008, the Oded Abramsky Chair in Neuroimmunology was established in his honor by Biogen USA at the Hadassah University Medical Center.

Prof. Abramsky's clinical and scientific research focuses on autoimmune neurological diseases. He was a pioneer in the field of neuroimmunology and demonstrated immune pathogenesis in various neurological diseases of the central and peripheral nervous systems and muscle. Indeed, he proved that myasthenia gravis (MG) is an autoimmune disease, and showed the beneficial effect of corticosteroids and chemotherapy on induced experimental MG. His research served as a guideline to successful immunotherapy of MG and many other autoimmune diseases.

1St Prize Researcher

ASAF HONIG

Dr. Asaf Honig carried out his medical residency in the Department of Neurology at the Hadassah Medical Center and then completed a two-year clinical fellowship in cerebrovascular diseases at the University of British Columbia where he researched cerebral small vessel diseases.

He is presently an Attending Physician at the Stroke Unit, Department of Neurology, Hadassah-Hebrew University Medical Center, where he attempts to introduce new technologies to treat stroke patients. The daily clinical work has highlighted the current gaps in the knowledge of cerebrovascular diseases and the urgent need for ongoing research in the fields of neurocritical stroke care and secondary stroke prevention. Through his research in Vessel-Wall-Imaging MRI, he is elucidating underlying stroke etiology.

RESEARCH DESCRIPTION

In his research, he applies new imaging techniques such as Vessel Wall Imaging MRI (VWI-MRI) and neuroradiological assessment of cerebral small vessel disease to better understand underlying stroke mechanisms. VWI-MRI can detect different pathological processes in the cerebrovascular vessel wall such as an active atherosclerotic plaque, vasculitis associated inflammatory process and focal dissection of the vessel. Thereby VWI-MRI can assist in attributing the correct underlying stroke etiology and guide patient treatment. Moreover, a radiological VWI-MRI follow-up can reveal the degree of lesion activity and thus allow for a more tailored treatment.

In addition to helping patients regain patient functional independence, he is eager to improve cognitive outcomes for patients who underwent stroke. MRI analysis of various cerebral small vessel disease biomarkers provides additional insights into the nature and degree of underlying pathophysiological process. Strategic lacunar infarct location, such as in the thalamus or hippocampus areas, can result in episodic memory impairment. Multiple microinfarcts and their location can suggest an active cerebral small vessel disease that can result in a rapid cognitive decline. Multiple microbleeds and their respective location can differentiate between longstanding hypertensive arteriopathy and Cerebral Amyloid Angiopathy, thereby allowing a better risk stratification for intracranial bleeding. The degree of perivascular spaces can point to an ongoing degenerative brain process.

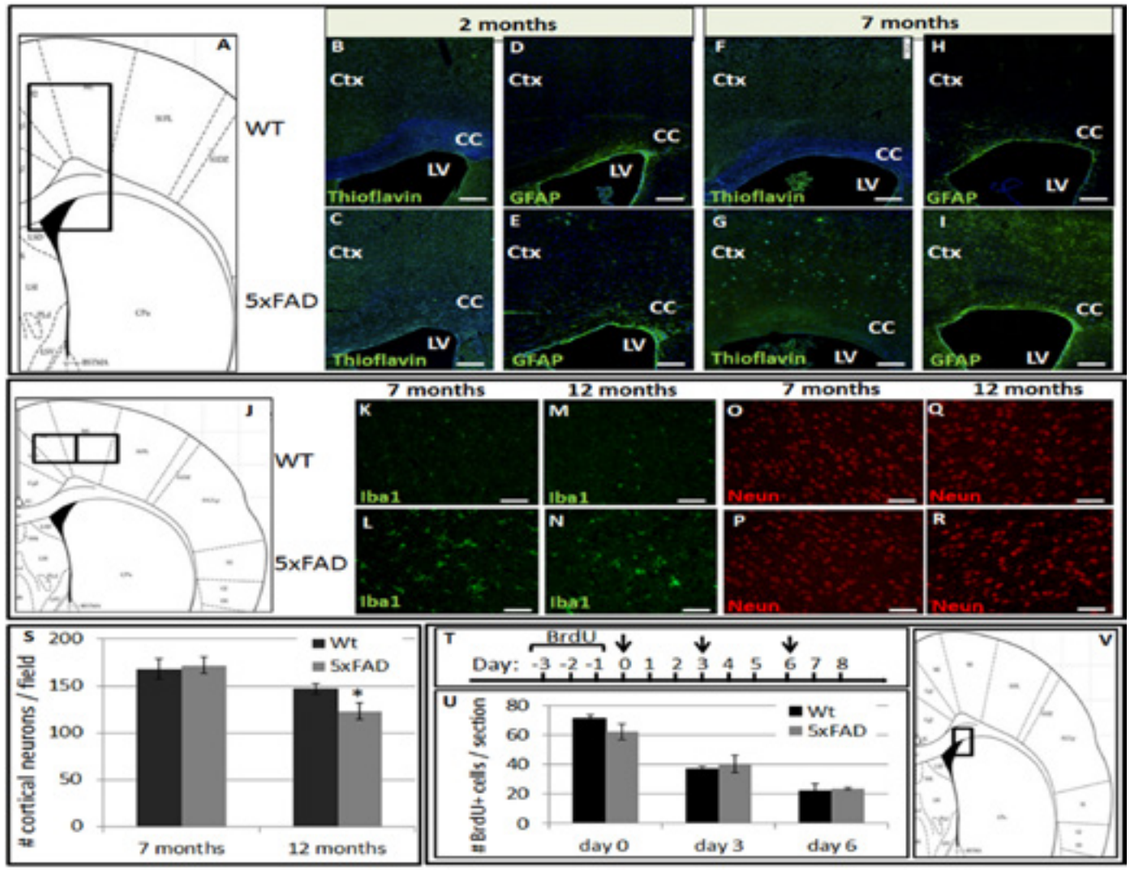
A comprehensive analysis of these novel neuroradiological biomarkers is an important step towards offering personalized medicine for stroke patients.

The annotated arrow points on an active atherosclerotic plaque along the A1 segment of the right Anterior Cerebral Artery

1St Prize Researcher

NINA FAINSTEIN

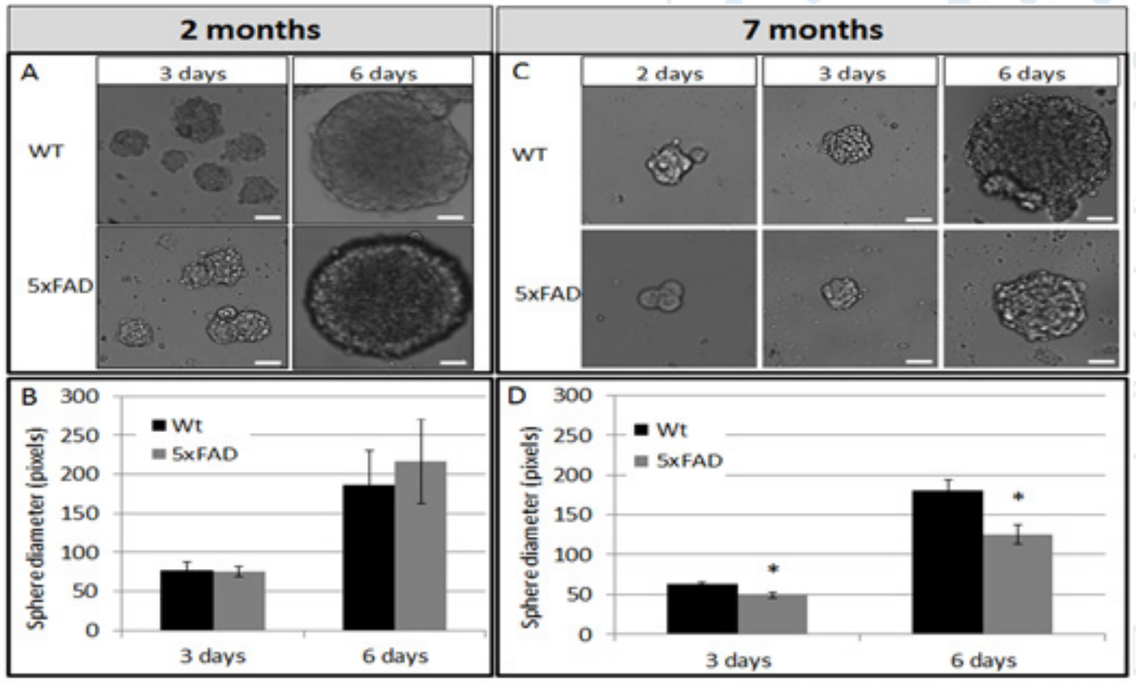
Dr. Nina Fainstein is in the Department of Neurology at the Hadassah Medical Center. After graduating in Medicine, she began her research in the field of neural precursor cells (NPCs). She and her lab team showed the powerful, time-limited, immunomodulatory and neurotrophic effect of NPCs and their therapeutic potential upon transplantation. Her work focuses on understanding the functionality of resident brain NPC in neurodegenerative diseases and studying alternations in those functions following the development of brain pathology. In addition to clinical research, she has been active in outreach activities such as introducing science to youth. She guided gifted high-school students in their biology thesis and coordinated a program to facilitate students in Israel's periphery to do so as well.



RESEARCH DESCRIPTION

Alzheimer's disease is widely studied, but the knowledge regarding brain processes affecting the disease timeline is very limited. The variety and the time gap between the accumulation of amyloid plaques in the brain and the presentation of cognitive decline is clinically unexplained. A major candidate in providing neuroprotection is the resident brain neural stem/precursor cell (NPC) pool. Transplanted NPCs possess powerful immune-modulatory and trophic properties, which raises the question whether resident brain NPCs have any role in controlling disease pathology and whether NPCs failure enables neurodegeneration. Her lab characterized the pathological properties of 5xFAD transgenic mouse models of Alzheimer's disease at different ages and found that at the mouse age of seven months, although there is a heavy amyloid deposition and gliosis, no neurodegeneration occurs and a normal rate of neurogenesis is preserved in the subventricular zone (SVZ) as compared to wild type mice. However, freshly isolated NPCs from seven months old 5xFAD mice exhibited a reduced expansion rate and diminished immune-modulatory and trophic properties. Moreover, there was slower recovery of SVZ NPCs after various toxic and inflammatory insults and reduced expression of key genes involved in NPC proliferative and migratory response. Notably, these functions were fully preserved in two-months old 5xFAD mice, a time-point prior to Alzheimer's-specific pathological changes. The dysfunctional properties were reproduced in wild type NPC by the addition of an amyloid beta peptide. Interestingly the age-dependent acquired NPC dysfunction was completely reversible, suggesting that the failure of resident NPC to provide tissue support was induced by the pathological Alzheimer's brain environment.

She is now focusing on studying the interactions between resident NPCs and glial cells. Based on what is known so far, she believes that the ability to manipulate and restore resident brain NPCs' functionality will become a powerful therapeutic tool in protecting the brain and postponing neurodegenerative diseases.



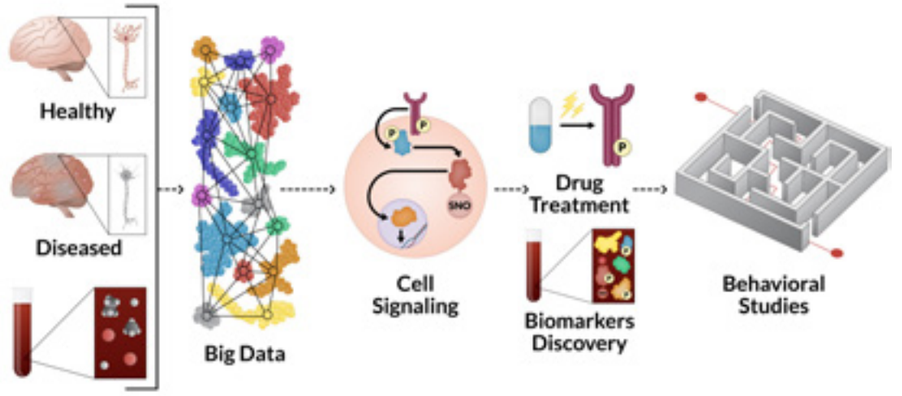
1 St Prize Researcher

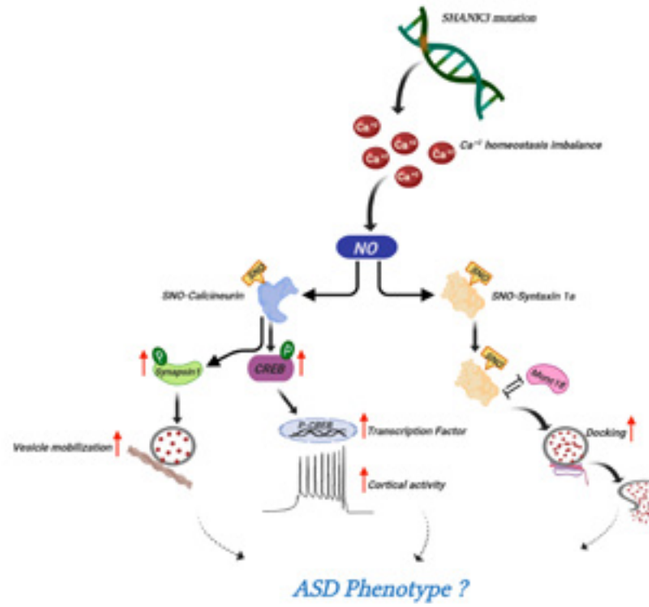
HAITHAM AMAL

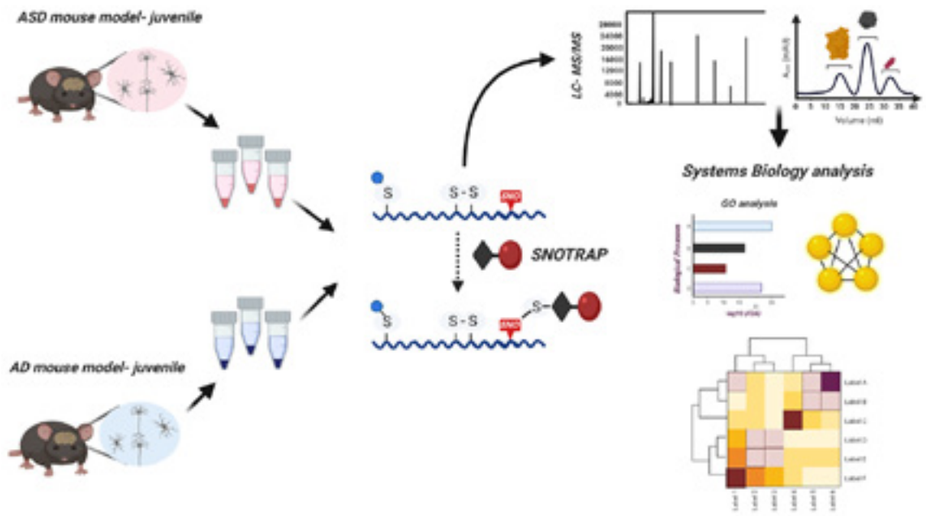
Dr. Haitham Amal has conducted his Postdoctoral studies at the Biological Engineering department at MIT. He is also an affiliate at the Stanley Center for Psychiatric Research at the Broad Institute of MIT and Harvard. Dr. Amal finished his B.Sc.Pharm degree at the School of Pharmacy - Faculty of Medicine at the Hebrew University. He conducted his Masters' studies in neuropharmacology (summa cum laude) in Tel-Aviv University and his PhD in the Faculty of Chemical Engineering at the Technion. Currently, he is an Assistant Professor at the Institute for Drug Research at the Faculty of Medicine in the Hebrew University. Dr. Amal published more than 23 papers and was the first to discover the groundbreaking finding that nitric oxide plays a major role in autism. He received many awards: the MIT-Technion Postdoc Fellowship, the Maof Research Grant, the Golda Meir Lectureship Award, the Brettle Center for Research Award, the HUJI-UK Spine seed fund, the VATAT Fellowship for both outstanding PhD and postdoc reseachers, and more.

RESEARCH DESCRIPTION

The Amal lab combines advanced omics technologies with computational biology, biochemical, pharmacological and behavioral methods with the ultimate goal to identify novel biomarkers and drug targets for autism spectrum disorder, Alzheimer's disease and other neuropathologies. The Laboratory of Neuromics, Cell Signaling, and Translational Medicine uses both clinical samples and transgenic mouse models to achieve these ultimate goals. Combining proteomics, Systems Biology, molecular and behavioral neuroscience studies, Dr. Amal was the first to show the involvement of the neurotransmitter nitric oxide (NO), in the pathogenesis of autism. Recently, the Amal lab has driven studies on mice, which revealed significant sex differences in the brain functions and aging-related reprogramming of the trafficking map. Dr. Amal also discovered changes in the brain that are an overt demonstration of the disease in mouse models of Alzheimer's disease (AD). He further showed that phospho-signaling in mice treated with cannabinoids leads to behavioral deficits. Finally, the Amal has built a novel multi-omics platform that will greatly .assist in discovering biomarkers and drug targets for autism spectrum disorder.



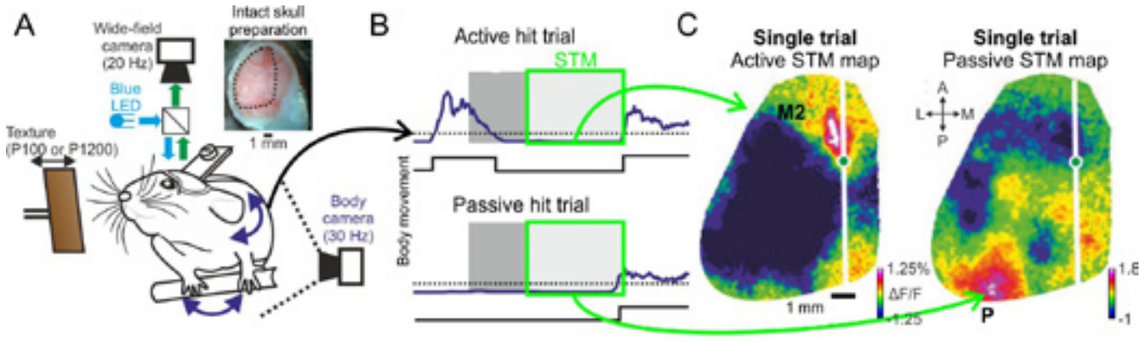


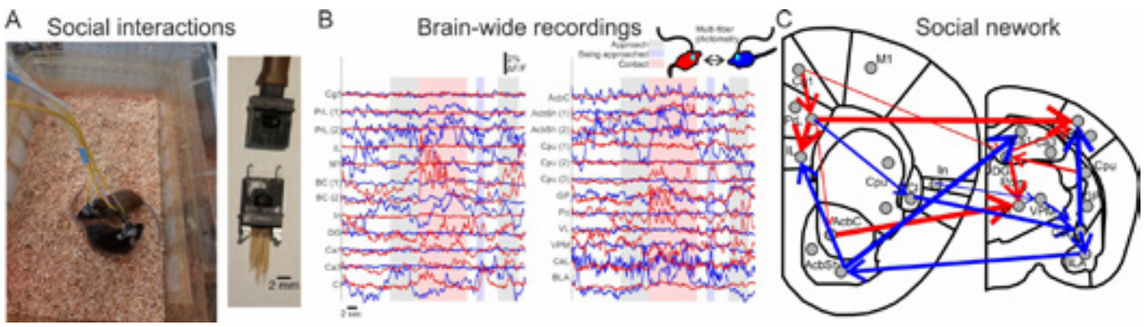


1St Prize Researcher

ARIEL GILAD

Dr. Ariel Gilad is a faculty member in the Department of Medical Neurobiology, Faculty of Medicine, Hebrew University of Jerusalem. His interest in how the whole brain encodes cognitive processes led him to acquire a PhD in Neuroscience with Professor Hamutal Slovin, using wide-field voltage imaging of primary visual cortex in behaving monkeys. As a Post-doctoral Fellow, he continued to study cognitive processing across the whole mouse cortex with Prof. Fritjof Helmchen at the University of Zurich, Switzerland. He returned to Israel as a Marie-Curie Fellow to study learning-related dynamics in the auditory thalamus with Professor Adi Mizrahi. Dr. Gilad uses state-of-the-art techniques and novel approaches to understand cognitive brain-wide dynamics at the individual level in both healthy and disordered brains.

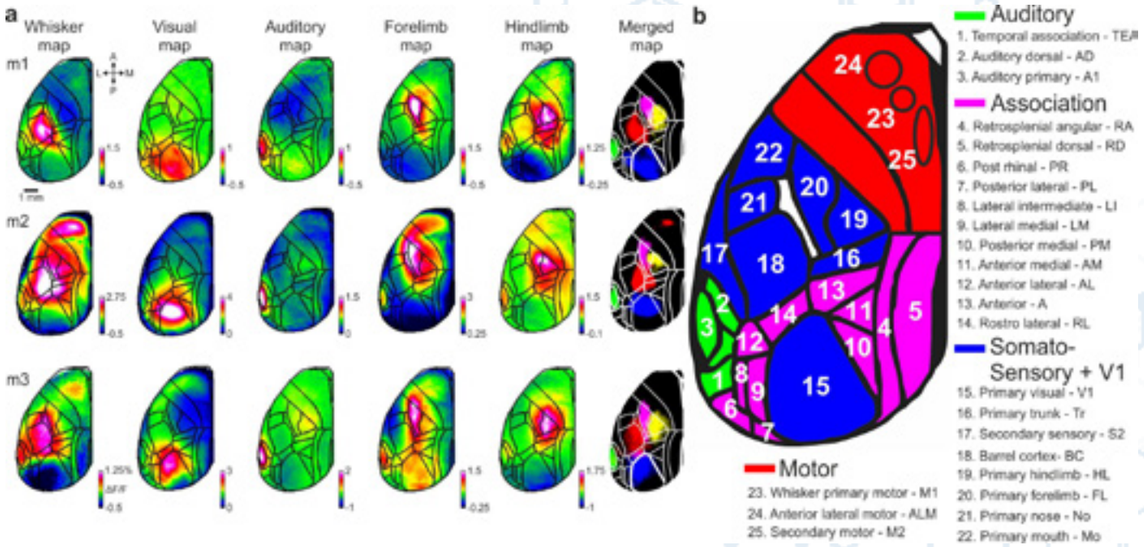




RESEARCH DESCRIPTION

The brain is responsible for thinking, combining mental processes such as sensory integration, perception and working memory, grouped together under one broad definition: cognition. The holy grail of neuroscience is to understand how the brain encodes cognition, unifying many specific processes into a coherent intellect. The biggest obstacle in achieving this challenge is the complex nature of the brain, an extremely complicated organ containing billions of neurons entangled together forming a dynamic, ever-changing network. Even more overwhelming is the plastic and dynamic nature of the brain, constantly changing and forming new synapses, knowledge and experience. There are no two similar brains on earth, and even the same brain can give different outcomes to seemingly identical incoming stimuli. Neuronal populations are multidimensional, merged in an eternal, ever-changing loop between the external and internal worlds.

His lab investigates how the brain encodes cognition at the brain-wide level. He has adopted a mesoscale approach in which he aims to simultaneously image as many brain areas as possible of mice performing complex behavioral tasks involving different cognitive functions. In particular, he focuses on studying sensory integration, perception, working memory and social interactions. Complementing the mesoscale approach, he applies multi-area two-photon microscopy, optogenetics and labeling techniques to dissect the relevant neuronal sub-populations responsible for different cognitive functions. The goal is to obtain a cognitive brain-wide map that will aid in understanding cognition as a whole in both the healthy and diseased brain.



Previous **Winners**

2020

DR. MORDECHAI MEDVEDOVSKY
Department of Neurology,
Hebrew University-Hadassah Medical School
Automatic algorithm for ictal behavior analysis in video-EEG

PROF. GADI GOLEMAN
MRI/MRS lab of the Human Biology Research Center
Hebrew University-Hadassah Medical School
Subject-specific diagnostic method based on functional connectivity fMRI

DR. DAN ROKNI
Medical Neurobiology Department
Hebrew University-Hadassah Medical School
Circuits and mechanisms underlying sensory processing in complex enviroments.

DR. AMI CITRI
The Edmond and Lily Safra Center for Brain Sciences
Experience-Dependent Plasticity in the Mammalian Brain: attention, reward and the development of habits, compulsions and addiction.

2019

DR. OR KAKHLON
Dept. of Neurology
Hadassah-Hebrew University Medical Center
Metabolic analysis as a tool for neurological drug development

DR. CHEN MAKRANZ
Gaffin center for Neuro-oncology
Sharet Institute for Oncology
Hadassah University Medical Center
Brain-derived circulating DNA as a biomarker for Radiotherapy-induced Brain Damage

DR. YONATAN KUPCHIK
The Department of Medical Neurobiology,
Institute of Medical Research Israel – Canada,
The Faculty of Medicine
Synaptic pathology in the reward system in drug addiction and obesity

DR. AYAL BEN-ZVI
The Department of Developmental Biology and Cancer Research
Institute of Medical Research Israel – Canada,
The Faculty of Medicine
Molecular and cellular aberrations of the Blood Brain Barrier (BBB) in central nervous system (CNS) pathologies

2018

DR. EINAV GROSS
Department of Biochemistry and Molecular Biology
Faculty of Medicine
Mechanisms of Recovery from Hypoxia/Reoxygenation Stress in the Nematode Caenorhabditis Elegans

DR. ODED BEHAR
Department of Developmental Biology and Cancer Research Institute
The Institute for Medical Research Israel-Canada
Faculty of Medicine
Neuronal Cell Death in Health and Diseases

DR. SHAI ROSENBERG
Center for Neuro-Oncology
Hebrew University-Hadassah Medical School
Brain Tumor Genomics and Personalized Medicine

PROF. MILLET TREININ
Department of Medical Neurobiology
Hebrew University-Hadassah Medical School
Understanding the Role of RIC-3, a Chaperone of Nicotinic
Acetylcholine Receptors, in Multiple Sclerosis (MS)

Previous **Winners**

2017

PROF. CHAYA KALCHEIM
Department of Medical Neurobiology
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Embryonic Development of the Nervous System: The Transition between Peripheral and Central Branches

DR. JOSHUA GOLDBERG
Department of Medical Neurobiology
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Physiological Underpinnings of Neurodegeneration and Neuronal Adaptations in Movement Disorders

DR. PANAYIOTA PETROU
Department of Neurology
Hebrew University-Hadassah Medical School
Testing the Effect of Pomegranate Seed Oil (Grana Gard) on the Clinical
Symptoms and the Quality of Life in Patients with Multiple Sclerosis and Alzheimer's Disease

DR. IRIS LAVON BEN MOSHE
Department of Neurology
Hebrew University-Hadassah Medical School
Clarifying Molecular Mechanisms that Could Aid in the Development of New Treatment and Diagnostic Strategies in Brain Tumors and Neurodegenerative Diseases

2016

DR. AVI PRIEL
Institute for Drug Research, School of Pharmacy
Faculty of Medicine
Inflammatory Pain: Elucidating the Cellular and Molecular Basis

DR. YUVAL TABACH
Department of Developmental Biology and Cancer Research
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Combined Computational and Experimental Methods Suggest a Unified Theory to Explain 40 Neurodegenerative Disorders

DR. SHAHAR ARZY
Department of Neurology
Hebrew University-Hadassah Medical School
The Human Self in Space, Time, and Person: Physiology and Pathology

DR. NETTA LEVIN
Department of Neurology
Hebrew University-Hadassah Medical School
Cortical and White Matter Mapping in Understanding Visual System Pathologies

2015

DR. EHUD COHEN
Department of Biochemistry and Molecular Biology
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Dissecting the Mechanistic Roles of Aging in the Emergence of Neurodegenerative Disorders

DR. YORAM BEN -SHAUL
Department of Medical Neurobiology
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Neuronal Circuits Underlying Social Behavior

DR. DAVID ARKADIR
Department of Neurology
Hebrew University-Hadassah Medical School
DYT1 Dystonia Links Corticostriatal Synaptic Plasticity and Learning Behavior in Humans

Previous **Winners**

DR. MARC GOTKINE
Department of Neurology
Hebrew University-Hadassah Medical School
Identification of Serological, Cytological and Genetic Factors
Associated with the Development and Progression of ALS in Israel

2014

PROF. ALBERT TARABOULOS
Department of Microbiology and Molecular Genetics
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Prion Neurotoxicity: From Protein Misfolding to Lipid Disease

PROF. HAGAI BERGMAN
Department of Medical Neurobiology
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Computational Physiology and Pathophysiology of the Basal Ganglia and their Disorder – From Understanding to Closed Loop Deep Brain Stimulation Treatments

DR. DANA EKSTEIN
Department of Neurology
Hebrew University-Hadassah Medical School
Development of Tools for Patient-Specific Individualized Diagnosis and Treatment of Epilepsy

DR. ADI VAKNIN-DEMBINSK
Department of Neurology
Hebrew University-Hadassah Medical School
Personalized Medicine in Multiple Sclerosis and Neuromyelitis Optica: Predicting Disease Outcome and Treatment Responsiveness

2013

PROF. ALEXANDER LOSSOS
Department of Neurology
Hebrew University-Hadassah Medical School
Diagnosis and Treatment of Adult Polyglucosan Body Disease

DR. HANNA ROSENMANN
Department of Neurology
Hebrew University-Hadassah Medical School
Alzheimer's Disease and Tauopathies - Improved Animal Models, Pathogenesis, and Therapeutic Approaches

DR. SARA EYAL
Institute for Drug Research
School of Pharmacy
Imaging CNS Function in Health and Disease

DR. ADI INBAL
Department of Medical Neurobiology
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School
Molecular Mechanisms of Forebrain and Eye Development

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