Prusiner-Abramsky Research Awards

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

Previous Winners 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

Previous Winners 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

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

Previous Winners 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

Previous Winners 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

Previous Winners 2012

DR. RONIT SHARON
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School

PROF. RONEN LECKER
Department of Neurology
Hebrew University-Hadassah Medical School

DR. ALEXANDER M. BINSHTOK
Institute for Medical Research Israel-Canada
Hebrew University-Hadassah Medical School

PROF. HAIM OVADIA
Department of Neurology
Hebrew University-Hadassah Medical School

The Hebrew University of Jerusalem
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June 2018

The Authority for Research and Development
The Hebrew University of Jerusalem

Project coordinator: Ayelet Sagiv
Project text editor: Channa Coggan
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THE PRUSINER-ABRAMSKY RESEARCH AWARDS IN CLINICAL & BASIC NEUROSCIENCE

AT THE HEBREW UNIVERSITY OF JERUSALEM
BY THE ORION FOUNDATION

THE HEBREW UNIVERSITY OF JERUSALEM

IN THE CENTRAL LABORATORY AT THE HEBREW UNIVERSITY FACULTY OF MEDICINE

Location: Temporary Premises- The Russian Compound

Aug 1, 1949

Photo by: Larsen

100 Years of KNOWLEDGE
The Hebrew University of Jerusalem

Board of Governors 2018

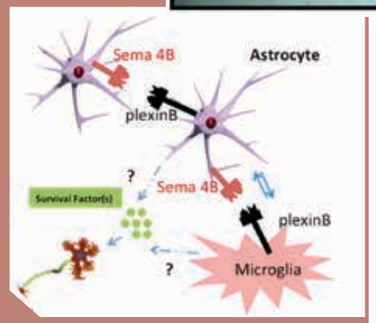
תשע"ח 2018

Research Awards - 2018

Prof. Stanley B. Prusiner, M.D.

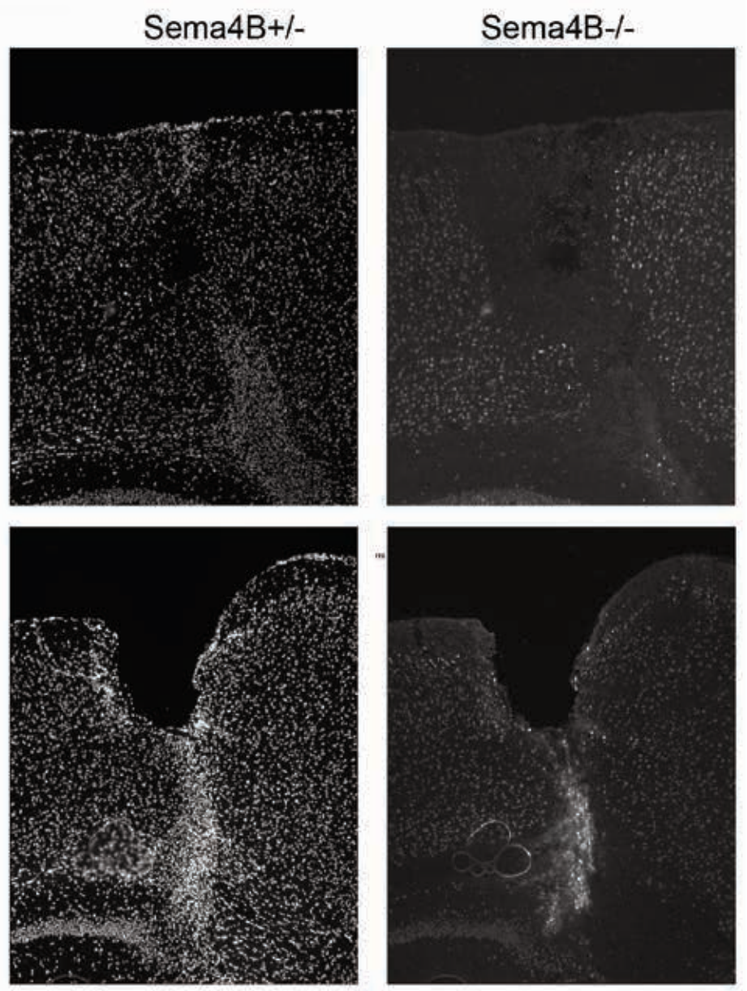
Stanley B. Prusiner, M.D., is Director of the Institute for Neurodegenerative Diseases and Professor of Neurology at the University of California, San Francisco (UCSF), where he has worked since 1972. Born in Des Moines, Iowa, in 1942, he spent his childhood there and in Cincinnati, Ohio. He received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

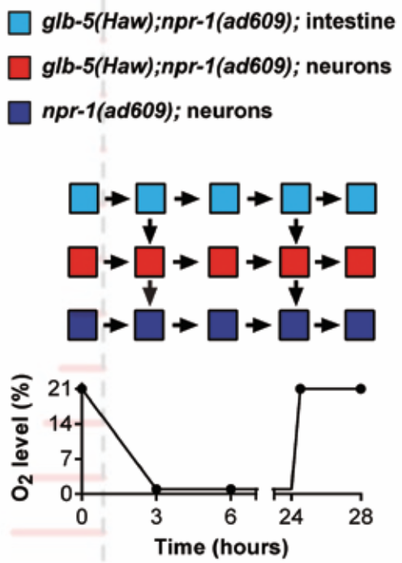
Prof. Prusiner is a member of the U.S. National Academy of Sciences, the Institute of Medicine, the American Academy of Arts and Sciences, the American Philosophical Society, and a foreign member of the Royal Society of London. He is the recipient of numerous prizes, including the Potamkin Prize for 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).

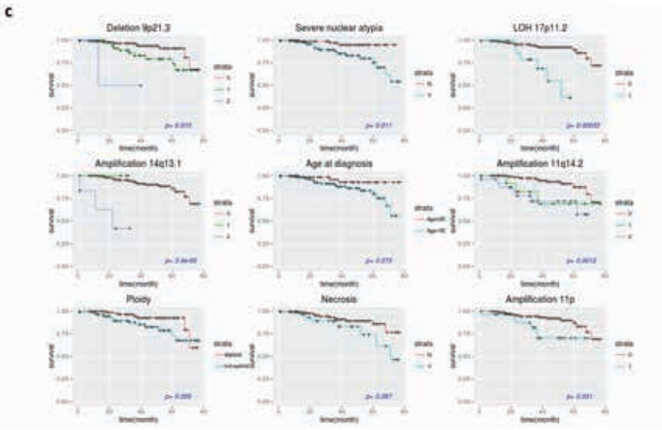


Prof. Prusiner's groundbreaking research on prion diseases, beginning in the late 1970s, led him to propose an explanation for the cause of bovine spongiform encephalopathy ("mad cow" disease) and its human equivalent, Creutzfeldt-Jakob disease, for which he was awarded the Nobel Prize. In this work, 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.

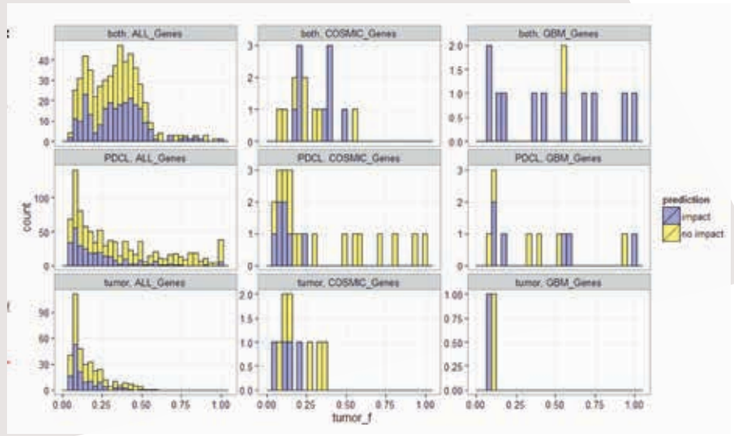
His research has elucidated a fundamental understanding of the proteins underlying such illnesses as Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis (ALS) and PrP prion diseases. These advances in understanding the molecular, genetic and cellular basis of neurodegenerative diseases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

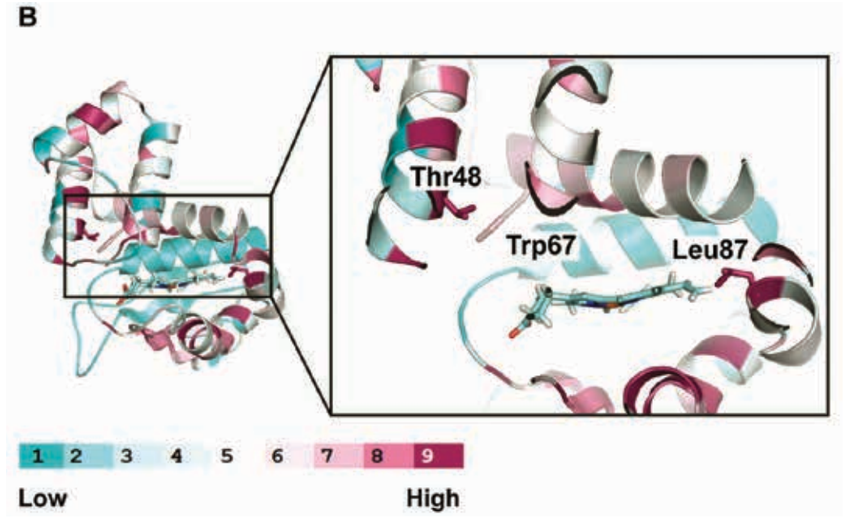




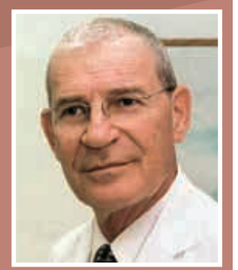


PRUSINER-ABRAMSKY





Research Awards - 2018

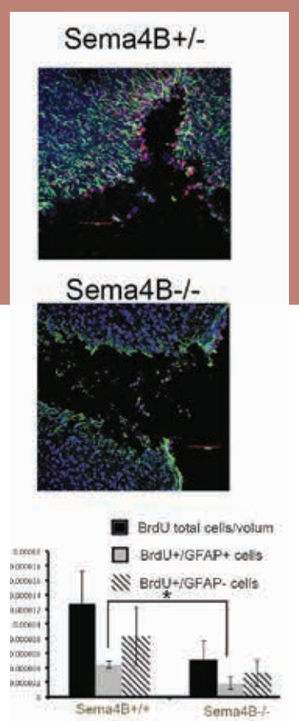


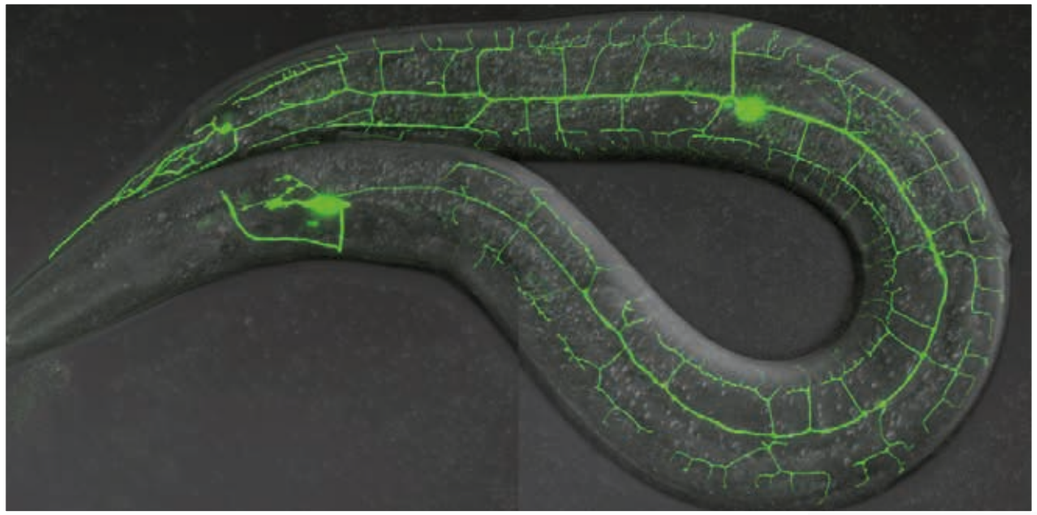
Prof. Oded Abramsky, M.D., Ph.D.

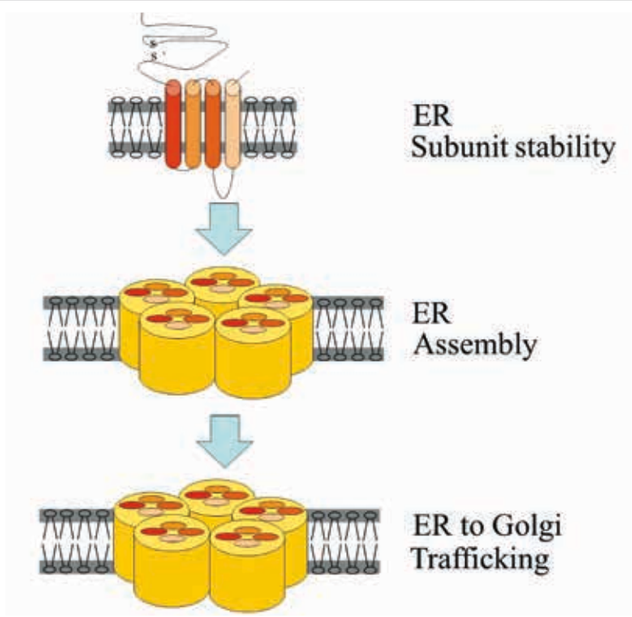
Oded Abramsky was born in Jerusalem and received his M.D. and Ph.D. degrees from The Hebrew University of Jerusalem. He completed his residency in neurology at Hadassah University Hospital, where he was later appointed Head of the Neuroimmunology Unit (1982) and Chairman of the Neurology Department (1988-2005). 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.

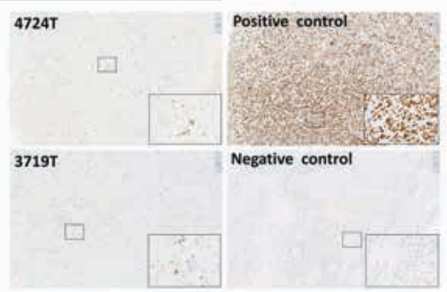
Prof. Abramsky has been actively involved in many aspects of medical research and holds prominent positions in numerous professional organizations concerned with both clinical practice and medical research. He was Chief Scientist of the Israel Ministry of Health (1987-1992), Chairman of the National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









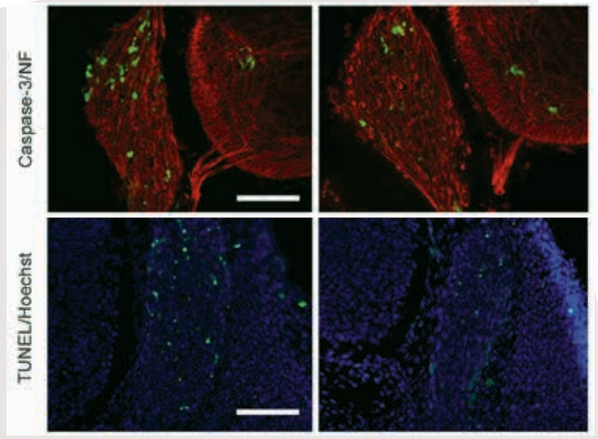
PRUSINER-ABRAMSKY

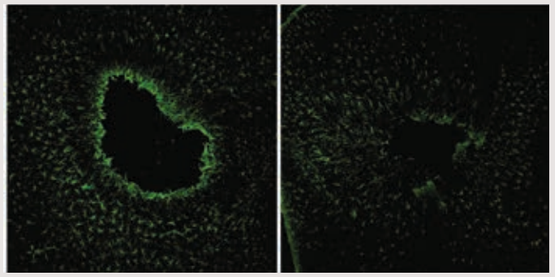
Research Awards - 2018

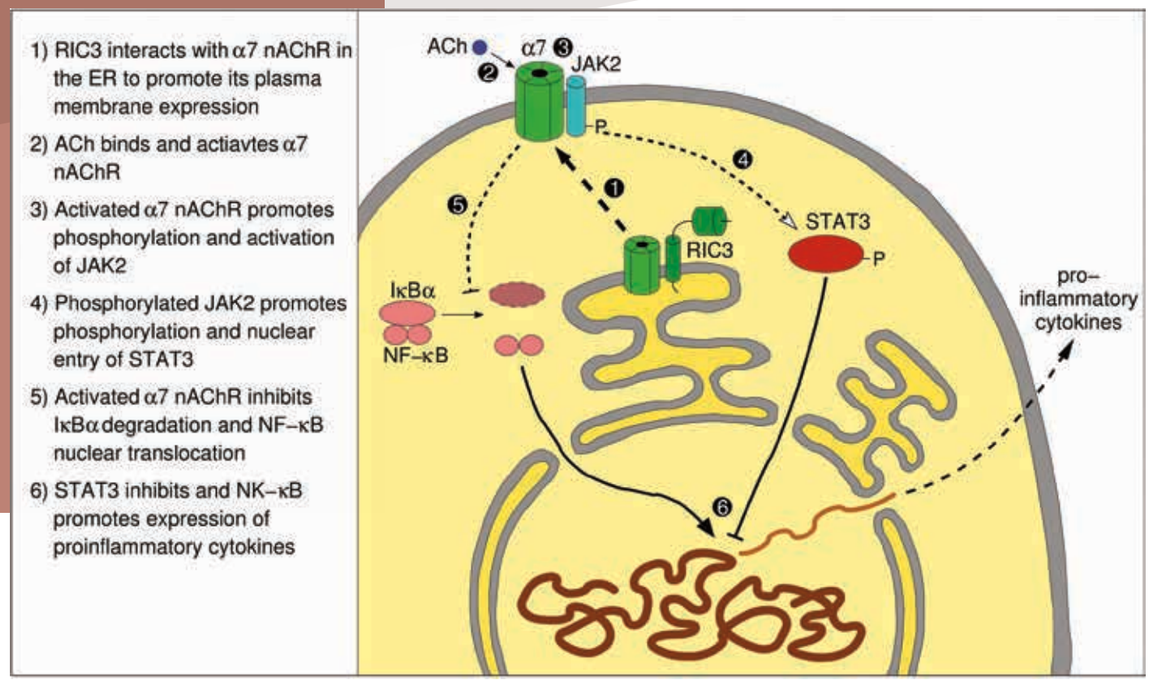
The prestigious **Prusiner-Abramsky Research Awards in Clinical and Basic Neuroscience by The Orion Foundation** honor Professors Stanley Prusiner and Oded Abramsky. Prof. Prusiner of the University of California at San Francisco is a Nobel Prize Laureate in Medicine (1997) and an Honorary Doctor of The Hebrew University of Jerusalem.

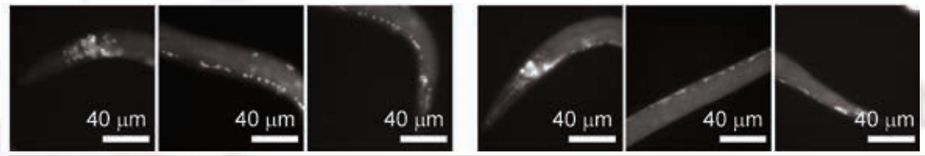
Prof. Abramsky is the former Chairman of the Neurology Department and a former Dean of the Faculty of Medicine at The Hebrew University.

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. 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

PROF. MILLET TREININ

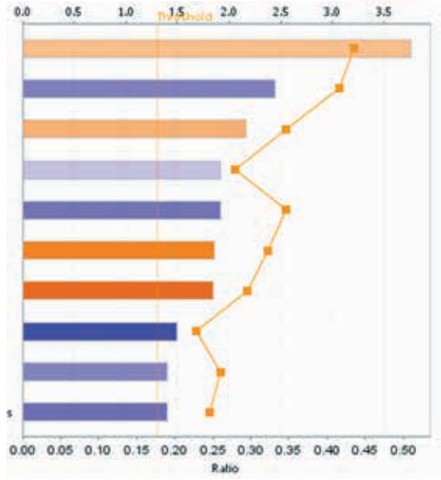
Department of Medical Neurobiology
Hebrew University-Hadassah Medical School

Understanding the Role of RIC-3, a Chaperone of Nicotinic Acetylcholine Receptors, in Multiple Sclerosis (MS)

DR. SHAI ROSENBERG

Center for Neuro-Oncology
Hebrew University-Hadassah Medical School

Brain Tumor Genomics and Personalized Medicine

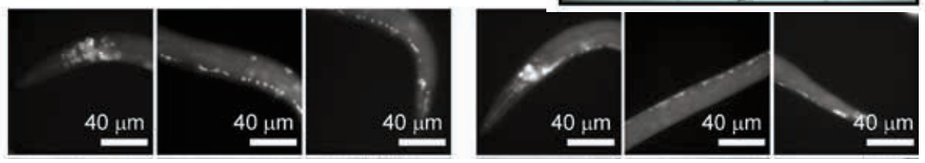


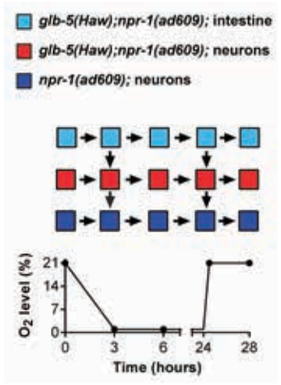
DR. EINAV GROSS

Department of Biochemistry and Molecular Biology
Faculty of Medicine

Dr. Gross carried out his Ph.D. studies at the Weizmann Institute. Following postdoctoral research at the MRC-LMB in Cambridge, England, he joined The Hebrew University's Faculty of Medicine in 2011 as a senior lecturer. Together with his team, he has explored the way neurons recover from hypoxia/reoxygenation stress using the nematode C. elegans as a model system. Dr. Gross expects that his team's findings will be relevant to the understanding of the process of neuronal recovery from oxidative stress in mammals and so lead to the development of better therapies against disease such as traumatic brain injury and stroke.

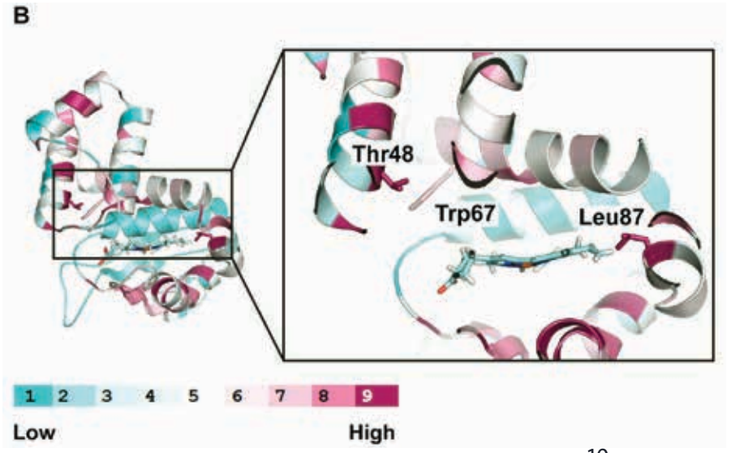
Mechanisms of Recovery from Hypoxia/Reoxygenation Stress in the Nematode *Caenorhabditis Elegans*





H/R stress plays a major role in the pathophysiology of several neuronal conditions including traumatic brain injury (TBI) and stroke. These brain injuries compromise millions of human lives worldwide and impose a significant economic burden on society. Thus, understanding the underlying damage mechanisms, which are activated upon exposure to H/R stress, is critical for the development of future interventions that could save lives. To explore this, Dr. Gross and his research team have used the genetically tractable model organism Caenorhabditis elegans (C. elegans).

A key discovery that they made is that the neuroglobin GLB-5 accelerates the recovery of worms from H/R stress. Moreover, using genetics, they show that GLB-5 mediates its activity by controlling the function of an oxygen (O2) sensor complex composed of soluble guanylate cyclases, namely GCY-35 and GCY-36. Soluble guanylate cyclases (sGCs) are gas-binding proteins that control diverse and important physiological processes such as platelet aggregation, vasodilation, and synaptic plasticity. The Gross laboratory identified conserved structural motifs in the regulatory gas-binding domain of GCY-35 and GCY-36, which are important for the interaction with GLB-5. Intriguingly, these motifs are conserved from human to bacteria and may play an important role in regulating the activities of both nitric oxide and O2 sensors. The journal of Neuroscience published results of these studies that provide the basis for future studies to determine the mechanism by which GLB-5 regulates the function of the GCY-35/GCY-36 O2-sensing complex. Since many biological mechanisms are evolutionarily conserved between mammals and C. elegans, we expect that our findings will be relevant to understanding the process of neuronal recovery from H/R stress in mammalian model systems and so lead to the development of better therapies for H/R stress-related diseases such as TBI and stroke.

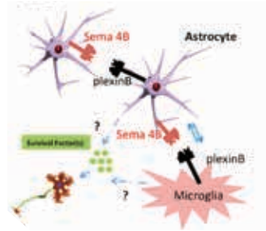


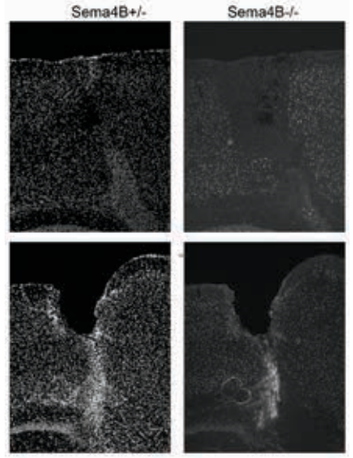
DR. ODED BEHAR

Department of Developmental Biology and Cancer Research
Institute The Institute for Medical Research Israel-Canada
Faculty of Medicine

Dr. Behar received his B.Sc. in biology, and MsC and Ph.D. in neuroscience from The Hebrew University of Jerusalem. He did his post-doctoral training in developmental neurobiology at the Harvard Medical School. After his post-doctoral training, he spent a few more years as an instructor and later as assistant professor at Harvard University before joining the Faculty of Medicine, The Hebrew University, in 2001. The titles of two of his latest published works are "ALS related human cortical and motor neurons survival is differentially affected by Sema3A" and "Astrogliosis induced by brain injury is regulated by Sema4B phosphorylation".

Neuronal Cell Death in Health and Diseases





Neurons are the key component in brain function. Dysfunction and death of patients in all neurodegenerative diseases, brain injuries and stroke are all primarily the result of neuronal cell death. Thus, a major challenge in the field of neuroscience is to decipher the underlying factors that influence the loss of neurons under these very different conditions. In contrast to the adult nervous system, during development, neuronal cell death is an intrinsic part of normal development in which about 50% of neurons are neutrally lost. Over the years, Dr. Behar's team has studied the mechanisms involved in neuronal cell death, both under normal conditions during development and during adult life under pathological conditions. Although neurons are critical components of brain functions, it is increasingly clear that glial cells play critical roles in health and diseases. In recent years, his team extended their scope of research by looking into the contribution of glial cells to brain pathology. His laboratory's significant contributions include:

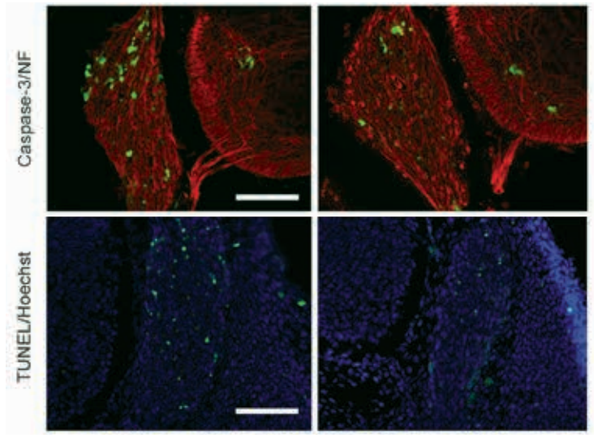
1) Neuronal cell death during development was long thought to be the result of a competition over a limited amount of survival factors. Dr. Behar showed, however, that cell death is not merely just the result of a limited neurotrophic supply, but rather a balance between pro-death and pro-survival signaling. His team also demonstrated that some of these pro-death signaling also serve in parallel as a repellent signal for the growing axons, assisting in guiding them toward their targets.

2) Furthermore, he showed that the mechanism of interaction between pro-death and pro-survival is in part based on direct interactions between the different receptors for these survival and death signals.

3) Dr. Behar's team demonstrated a linkage between axonal guidance during development and neuronal cell death as a mechanism to eliminate abnormal and misguided neurons.

4) His lab showed that death signaling used normally during development may also be upregulated. ALS might contribute to this pathogeny.

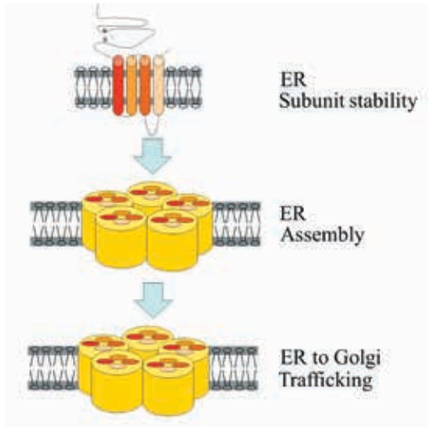
5) Dr. Behar uncovered a molecule expressed by astrocytes that influences their activation following brain injury. His team further showed that this modification of astrocytes activity results in improved survival of neurons as a result of injury.

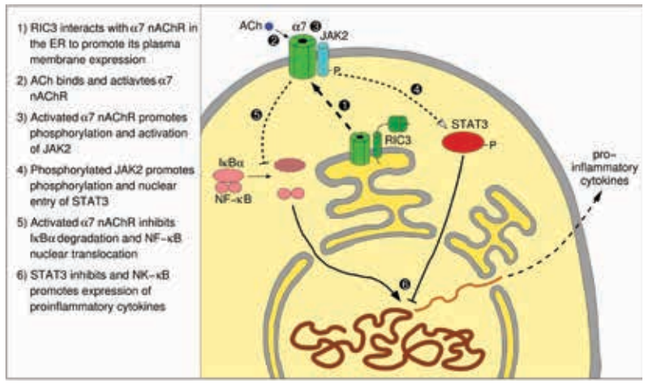


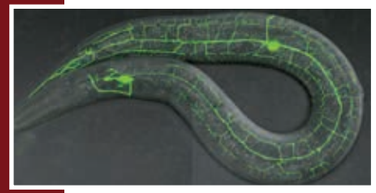
PROF. MILLET TREININ

Department of Medical Neurobiology
Hebrew University-Hadassah Medical School

Prof. Millet Treinin joined The Hebrew University – Haddassah Medical School in 1995. She received her Ph.D. in genetics from The Hebrew University in 1991, and then spent three years as a post-doctorate at Columbia University. Her lab was the first to clone ric-3, which is now the focus of research in many labs around the world. (See The C. elegans ric-3 gene is required for maturation of nicotinic acetylcholine receptors, *EMBO J., 2002). Her current research is on ric-3 and nicotinic receptors, and their relevance to neuroinflammatory and neurodegenerative diseases.*

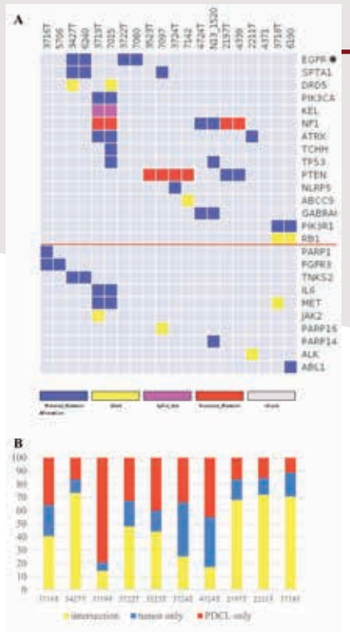






Understanding the Role of RIC-3, a Chaperone of Nicotinic Acetylcholine Receptors, in Multiple Sclerosis (MS)

Understanding the role of RIC-3, a chaperone of nicotinic acetylcholine receptors, in Multiple Sclerosis is crucial. Multiple Sclerosis (MS) is an autoimmune disease in which encephalitogenic T-cells enter the central nervous system and initiate a cascade of inflammatory events leading to demyelination and axonal damage. Genome-wide association studies implicated the RIC-3 protein in MS. The Treinin lab first cloned the ric-3 gene in the nematode C. elegans and demonstrated its function as a chaperone of nicotinic acetylcholine receptors (nAChRs). Her team later demonstrated conservation of RIC-3 sequence and function between nematodes and humans. While RIC-3 was shown to affect maturation of multiple human nAChRs, using heterologous expression systems, its roles in human health and disease – and in particular in MS – are still unknown. Work by others implicated nAChRs in regulating inflammatory processes, including in MS, as part of the cholinergic anti-inflammatory pathway. The Treinin lab, in collaboration with Prof. Talma Brenner and Prof. Adi Vaknin-Dembinsky from the Department of Neurology in Hadassah Hospital, will now examine the hypothesis that disease-associated variants in the ric-3 gene affect MS and neuro-inflammation via the cholinergic anti-inflammatory pathway. Support for this hypothesis comes from results showing that RIC-3 is required for the cholinergic anti-inflammatory pathway and that its expression is regulated by pro-inflammatory signals. Treinin's team will now examine responsiveness of the cholinergic anti-inflammatory pathway in relation to expression and regulation of ric-3 in immune cells from MS patients and healthy donors. Results of this analysis will be correlated with the ric-3 genotype of patients. Association between ric-3 variants and altered responsiveness of the cholinergic anti-inflammatory pathway, and/or altered expression or regulation of ric-3, will support our hypothesis that RIC-3, via its role in the cholinergic anti-inflammatory pathway, contributes to MS progression and to neuro-inflammation in general.



DR. SHAI ROSENBERG

Center for Neuro-Oncology
Hebrew University-Hadassah Medical School

Dr. Shai Rosenberg studied medicine in the Technion Excellence Program and earned his Ph.D. in statistical genetics. He specialized in clinical neurology in Hadassah Hospital. Dr. Rosenberg is deeply interested in cancer genomics and in the application of his knowledge in computational biology to research in the field of brain tumor genomics. Therefore, he specialized in neuro-oncology. Dr. Rosenberg recently completed post-doctoral fellowship in the Laboratory for Experimental Neuro-Oncology, Salpetriere Hospital, Paris. Since his return to Hadassah Hospital Dr. Rosenberg combines taking care of brain tumor patients, establishing the laboratory for cancer computational biology, and conducting research in this field.

Brain Tumor Genomics and Personalized Medicine

Brain tumors are caused by a sequence of genomic changes. Each patient's tumor has a unique genomic profile. Recent advances in genomic technologies coupled with the development of many novel gene-targeting drugs hold promise for a personalized medicinal approach for brain tumors. This approach has already led to several revolutionary achievements in the treatment of melanoma and lung cancer. However, the majority of brain tumor patients do not benefit from this approach and remain without a cure. Dr. Rosenberg's research uses advanced computational biology and machine learning methods to enhance the clinical application and efficacy of personalized medicine for brain tumors.

Glioblastoma is the most deadly and prevalent primary brain tumor. In collaboration with the GlioTeX group in the Salpetriere Hospital in Paris, Dr. Rosenberg created a Glioblastoma patient derived cell lines (PDCL) library. Their goal was to create a large set of diverse tumor models to enable testing of novel gene-targeting drugs in the relevant genomic context. The parental tumors and the PDCL were analyzed for several genomic levels (DNA and RNA). Dr. Rosenberg confirmed that the PDCL recapitulate most of the genomic changes of the parental tumors and highlighted several important differences. Dr. Rosenberg's team now uses this library and computational tools to examine resistance mechanisms to a gene-targeting treatment by analyzing the genomic dynamics after administration of the drug. In addition, they plan to extend its use to Glioblastoma organoids.

Oligodendroglioma is a relatively favorable brain tumor. However, it has a very heterogeneous clinical behavior and generally cannot be cured. It is thus important to (i) identify biomarkers predicting earlier disease progression and (ii) identify genes that can be targeted by drugs for personalized medicine. Dr. Rosenberg used the French cohort for grade III oligodendroglioma (POLA). The patients underwent thorough clinical follow-up and their tumors were analyzed for genomic Copy Number Variation (CNV). He identified recurrent areas of CNV and then used machine learning to create a multivariable survival model. Dr. Rosenberg showed that using a combination of clinical and genomic information gave better survival prediction. He identified the most important CNV areas that were associated with survival and/or contained drug targetable genes.