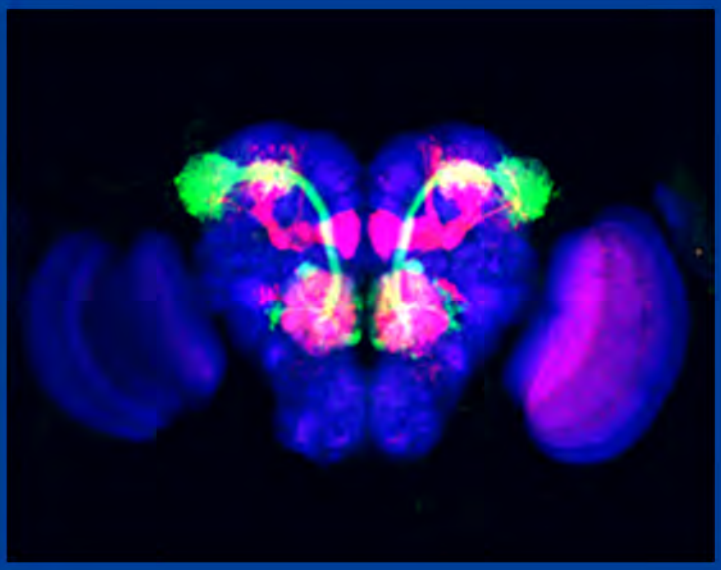
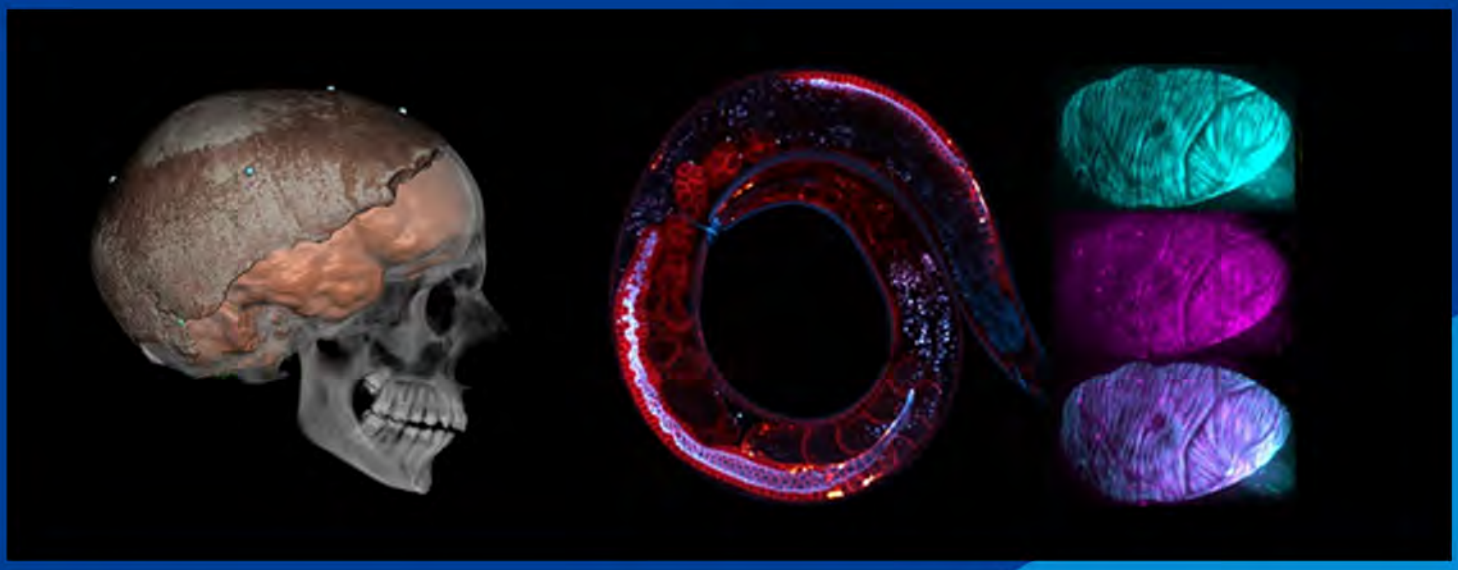
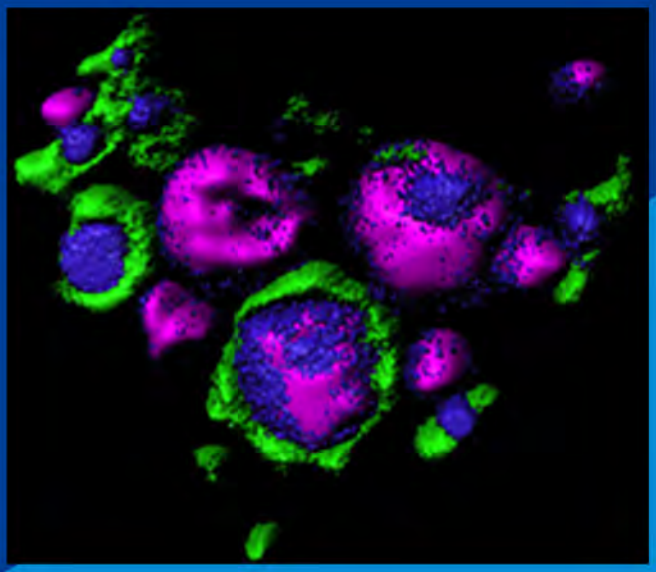
Tel Aviv University

Sackler Faculty of Medicine







Health and Medical Sciences at Tel Aviv University

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Cover credits
Top: Second and third order olfactory neurons in the *Drosophila* brain. Hadas Lerner Nussbaum, Moshe Parnas.
Middle left: Manot 1 skull, 55,000 years ago, the mother of modern populations. Israel Hershkovitz.
Middle right: Genetic engineering and fluorescence microscopy in the transparent nematode *C. elegans* allows observation of cytoskeletal protein localization and dynamics in adult physiology and embryonic development. Priti Agarwal, Kriti Sethi, Ronen Zaidel-Bar.
Bottom left: Rab5-stimulated fusion that mast cell secretory granules undergo during their biogenesis. Ronit Sagi-Eisenberg.
Bottom right: Recording electrical brain activity during overnight sleep with a high-density (256-channel) EEG system. Yuval Nir.

Our Faculty

Basic and translational research

As the largest health and medical sciences faculty in Israel, our **research and teaching** cover the full spectrum of cutting-edge health and biomedical sciences.

Our **diverse educational and training programs** are delivered by academic staff who are experts in their fields, offering PhD, MSc, MD, DMD, and MPH degrees in medical sciences, clinical medicine, dental medicine, communication disorders, nursing, occupational therapy, physical therapy and public health.

Our broad **areas of research** encompass cancer and molecular therapies, cardiovascular research and diseases, dental health and medicine, diabetes, metabolic and endocrine diseases, genomics, artificial intelligence and precision medicine, hearing, language and speech sciences and disorders, infectious disease, inflammatory and autoimmune diseases, medical education and ethics, nervous system and brain disorders, nursing, occupational and physical therapy, public health, reproduction, development and evolution, stem cells, regenerative medicine and aging.

For more information, please visit https://en-med.tau.ac.il/

Vision

We believe that bringing together the best and brightest minds – faculty, research associates, post-doctoral fellows and graduate students at the Sackler Faculty of Medicine - will expedite medical breakthroughs.

Our combined Preclinical Faculty members performing research on the Tel Aviv University campus, along with our Clinical Faculty at the affiliated hospitals in the greater Tel Aviv area, are the key to our success to translate our research into effective cures and treatments.

The Faculty by numbers

- 130 Preclinical Faculty members, with labs on the Tel Aviv University Ramat Aviv campus, and 10 with labs at the affiliated hospitals
- 1000 Clinical Faculty members, with labs at the 17 affiliated hospitals in the greater Tel Aviv area
- 1,050 Graduate students performing research on campus and hospitals
- 1250 Medical, 360 Dental, 1660 Health Profession and 600 Public Health students

Prof. Ehud Grossman, MD, Dean

Prof. Karen B. Avraham, PhD, Vice Dean for Preclinical Affairs

Our areas of study

Understanding and conquering human disease remains one of the most important missions of humanity. Despite centuries of continuous progress, we still lack some basic knowledge about the human body in health and disease. From genetics and biochemistry to epidemiology and public health, from virology to immunology, and from diabetes to cancer -- at the Sackler Faculty of Medicine we apply our basic curiosity of the **secrets of life** to **questions** that actually matter. We strive to improve **patient care** by bettering our **understanding of human disease**. Join us in this important and fascinating journey.

Anthropology and Ancient DNA

Cancer and Molecular Therapies

Cardiovascular Research and Diseases

COVID-19 Pandemic

Development, Aging, and Regenerative Medicine

Diabetes, Metabolic and Endocrine Diseases

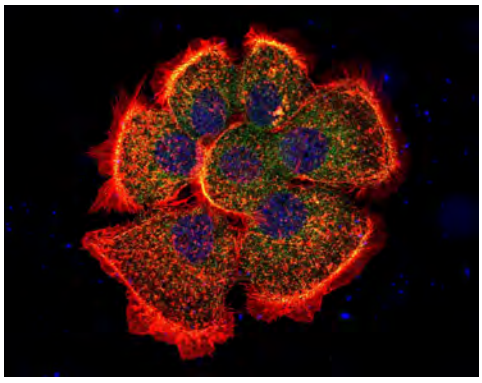
Genomics and Precision Medicine

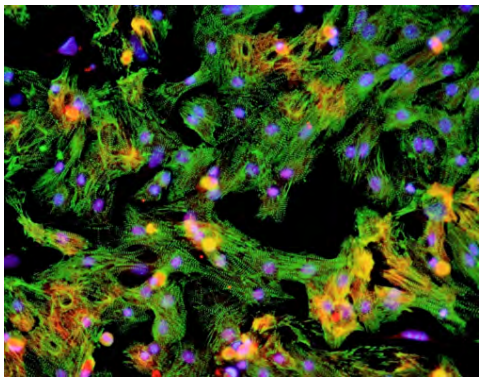
Infectious and Inflammatory Diseases

Nervous System and Brain Disorders

Public Health

Rehabilitation





Credits:

Left – Primary mouse keratinocyte stained with phalloidin (red), striatin (green), and Dapi (blue). Yarden Shor, Michal Caspi, Rina Rosin-Arbesfeld.
Middle - Induction of heart cell growth. OPN activates signals (yellow) that enter the heart cell (green) nuclei (blue). Itai Rotem, Jonathan Leor.
Right - *C. elegans* germline expressing a membrane marker. Yusuke Hara, Ronen Zaidel-Bar.

Centers, Institutes and Hubs

Dr. Yftach Gepner at the Sylvan Adams Sports Institute

Biomed@TAU Research Hubs

https://en-biomed.tau.ac.il/

Felsenstein Medical Research Center

http://felsenstein-center.com/doc/about-fmrc

Sylvan Adams Sports Institute

https://adams-sports.tau.ac.il/

Blavatnik Center for Drug Discovery

https://bcdd.tau.ac.il/

Center for Nanoscience and Nanotechnology

https://nano.tau.ac.il/

Safra Center for Bioinformatics

https://safrabio.cs.tau.ac.il/

A view from our students

Fatima Amer-Sarsour

PhD student,
Dr. Avraham Ashkenazi laboratory

"I joined the Ashkenazi lab in Sackler Faculty of Medicine in February 2019. My PhD project focuses on the investigation of protein degradation pathways in disease models of congenital central hypoventilation syndrome. The Faculty of Medicine exposes me to a variety of opportunities in different fields. Beyond different methods and collaborations, the human capital here is special and diverse. I gained a lot from it by developing valuable research skills and tools I will use in the future."

"Our Faculty of Medicine at Tel Aviv University, with its affiliated hospitals, is a leading center of research into the genetics, diagnosis and treatment of human diseases. It provides a unique interface between basic and clinical science that underpins its high-level objective of understanding the biology of disease. Therefore, this is an ideal place for me to develop my scientific career towards independence. My lab is like one big family, where we are all very much involved and united. We initiate meetings to celebrate personal events and celebrate the holidays of all lab members as we come from different nationalities. One of the most memorable experiences for me is that my supervisor, Dr. Avi Ashkenazi, sent me to a conference in Portugal. This was my first experience at an international conference abroad."

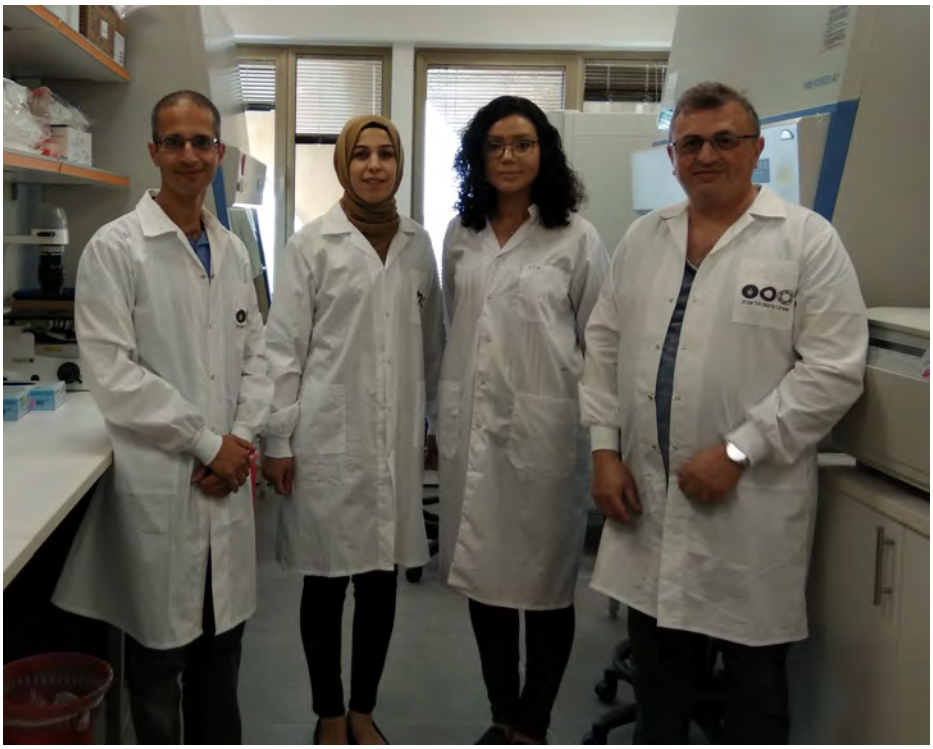


Photo: Members of the Ashkenazi lab – from left, Prof. Avraham Ashkenazi, Fatima Amer-Sarsour, Margarita Galves, Dr. Yevgeny Berdichevsky.

A view from our students

Gideon Karmon

MD-PhD student, Prof. Illana Gozes laboratory

"My research focuses on autism spectrum disorder. Specifically, on a rare monogenic cause of ASD caused by a mutation in the ADNP gene. Although rare, researching a monogenic cause for ASD may help elucidate key in disease features in ASD which may help alleviate the burden of this debilitating disease. I am also focus on testing a potential drug candidate on a novel mutant mouse model, making my research highly translational."

"The faculty has a very diverse milieu of researchers from all fields, making collaboration easy and accessible. Many of them are highly translational, which is important to me as an MD-PhD student. The high translational potential of most of the research conducted at the Faculty of Medicine was extremely important to me as an MD PhD student. My PhD studies will help me become a better physician, taking tools and understanding from the laboratory bench to the patient setting. The tools I acquired during my PhD will assist me in becoming a better physician researcher, with the ultimate goal of taking bedside problems and applying them to further research toward novel diagnostics and therapeutics. The Sackler School of Medicine is (in my opinion) the best medical school in Israel, and I joined one of the best laboratories in the school for my PhD studies, this was and still is an excellent experience."

Photo: Members of the Gozes lab – from left, front: Gal Hacohen-Kleiman, Dr. Eli Giladi, Prof. Illana Gozes, Dr. Adva Hadar, Dr. Yanina Ivashko-Pachima, Oxana Kapitansky, Yael Toren; left, back: Shlomo Sragovich, Gidon Karmon.

Anthropology and Ancient DNA

Affiliations

Dan David Center for Human Evolution and Biohistory Research
https://en-med.tau.ac.il/dan_david_center

Shmunis Family Anthropology Institute (SFAI)
https://sfai.tau.ac.il/

The Institute is dedicated to investigating the thousands of fossil specimens that comprise the Sackler Biological Anthropology Collection, one of the world's largest, employing state-of-the-art technologies. The Skeletal Imaging Laboratory, the heart of the institute, is enabling scholars to extract hidden information from fossils on the multitude aspects of past human behavior, nutrition and health. Images are stored in a database, forming the Shmunis Digital Library, a web-based resource made available for scholars around the world.

The Institute is managed by Prof. Israel Hershkovitz, Dr. Hila May, Dr. Rachel Sarig, and Dr. Viviane Slon.

Neanderthal skull from Amud cave 50,000 years ago.

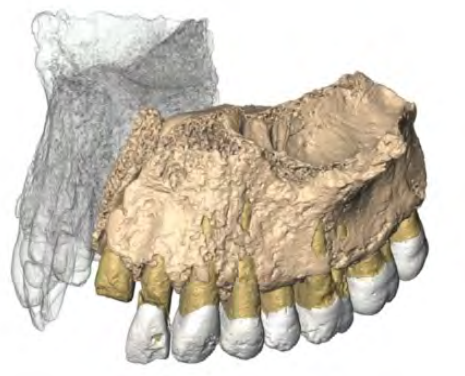
Young anthropologist in action: Emma Blatt excavating at Manot Cave (photo with permission).

Prof. Israel Hershkovitz

Prof. Hershkovitz is an emeritus Professor in the Department of Anatomy and Anthropology, where he is head of the Dan David Laboratory for the Search and Study of Modern Humans. He is also Head of the Tassia and Dr. Joseph Meychan Chair for the History and Philosophy of Medicine, Head of the Dan David Center for Human Evolution and Biohistory Research, and Head of the Shmunis Family Anthropology Institute. During his career he has been engaged in numerous excavations in Israel, responsible for some of the major fossils found in the country, and was a key person in establishing and organizing the fossil collection at the Sackler Faculty of Medicine.

Paleopathology in medicine

Prof. Hershkovitz' varied research touches many aspects of past population life. By providing detailed descriptions of bone modifications for many diseases, he made paleopathology an evidence-based medical discipline. His studies showed how evolution affect current people health (demonstrating that many spinal diseases are "trade off" for bipedalism), and how important diseases were in shaping past population physique (being the right hand of natural selection). He introduced the time dimension into medical thinking and showed how human behavior and climate affect population health in past times. He further showed that the turning point in human population health was at the advent of agriculture, some 10,000 years ago. He documented the first modern humans migrating out of Africa (Misliya cave fossils 200,000 years ago), and retrieved the mother population of all present people outside Africa (Manot cave fossils 55,000 years ago).



Anthropology and Ancient DNA

Dr. Hila May

Biohistory and evolutionary medicine

What make people vulnerable to diseases? Most present-day health hazards, such as obesity, cancer, sclerosis, and arthritis, have their roots thousands or even millions of years ago, when humans began to acquire their current anatomical shape. Dr. May studies recent and past human populations to achieve new insights on long lasting biological and social phenomena. This type of research allows a comprehensive understanding of human behavior, biology and illness. The research is based on a multidisciplinary approach for the study of humankind and combines both genetic and morphological data. The morphological research is carried out using advanced imaging techniques, as well as traditional anthropological methods. The genetic study uses cutting-edge techniques of DNA that is extracted from ancient bones.

Dr. May is head of the Biohistory and Evolutionary Medicine Laboratory at the Department of Anatomy and Anthropology. She is affiliated to the Dan David Center for Human Evolution and Biohistory Research. Dr. May graduated from Tel Aviv University in Life Sciences and Sociology and Anthropology, obtained an MSc in Evolutionary Medicine, and a PhD in Physical Anthropology at Tel Aviv University. For her postdoctoral research, she joined the Institute for Evolutionary Medicine at Zurich University, where she specialized in methods of virtual anthropology. The research in her laboratory is multidisciplinary and involves novel methodologies for the study of past populations and revealing the evolutionary causes of modern-day diseases. Dr. May won the Memorial Award from the BSF for young scientists.
https://hilamaylab.wixsite.com/bem-lab

CT reconstruction of 2,000 year old mummy of an Egyptian priest

Anthropology and Ancient DNA

Dr. Rachel Sarig

Dr. Rachel Sarig is at the Goldschleger School of Dental Medicine, where she is a principal investigator and the head of the Dental Anthropology Laboratory. Dr. Sarig is a graduate of Tel Aviv University, having completed her D.M.D. and her Ph.D. in anatomy and anthropology, and her post-graduate studies in orthodontics (*summa cum laude*), all at the Sackler Faculty of Medicine. Sarig is a curator and researcher at the Dan David Center for Human Evolution and Bio-history Research and the Shmunis Family Anthropology Institute.

Dental anthropology

Understanding who we are and where we come from can shed a light on our future. Many of the current oral diseases and malformations have their roots in our evolutionary history. Knowing the evolutionary processes that led to the current shape and size of our skull and mandible may greatly bear on our understanding of phenomena such as malocclusions, dental malformations and oral diseases. Sarig's main interest is in studying the evolutionary and environmental effects on oral health in prehistoric populations and their implications on modern societies. The study of the masticatory apparatus is conducted both on prehistoric and modern samples using laboratory models, micro-CT scans and clinical studies.

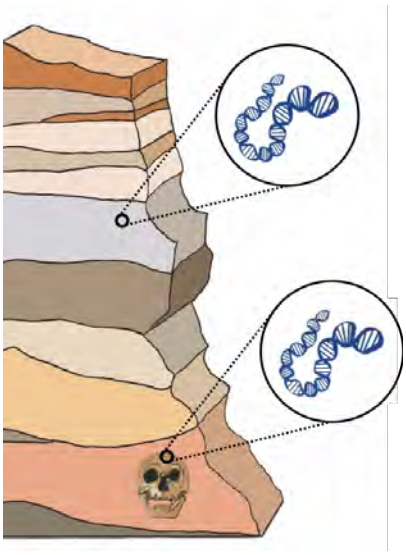
Anthropology and Ancient DNA

Dr. Viviane Slon

Dr. Slon is at the Departments of Anatomy and Anthropology and Human Molecular Genetics and Biochemistry and affiliated with the Dan David Center for Human Evolution and Biohistory Research. Her PhD and post-doctoral research on ancient hominin DNA were conducted in the Department of Evolutionary Genetics of the Max Planck Institute for Evolutionary Anthropology (Leipzig, Germany). She has an MSc in Medical Sciences and a BSc in Medical and Life Sciences, both from Tel Aviv University. Dr. Slon is the recipient of the Dan David Prize Scholarship for Young Researchers, the Otto Hahn Medal, the Otto Hahn Award, and the Alon Fellowship.

Ancient DNA

Who were the people living in our region in prehistoric times? Were they related to other populations living elsewhere in the world at the same time? Did they migrate or otherwise interact with populations living in neighboring regions? How were their societies organized? To answer such questions, we analyze DNA from ancient individuals, which we recover both from skeletal remains and from sediments deposited at archaeological sites. We do so by implementing and pursuing the development of state-of-the-art methodology suited to face the challenges of DNA preservation over time in warm climates. Our newly-established laboratory, which includes a clean room facility dedicated to the generation of ancient DNA data, is the first of its kind in Israel. The study of ancient genomes allows to elucidate not only who were the people living in the past, but also how past events affect on our own genomes today.

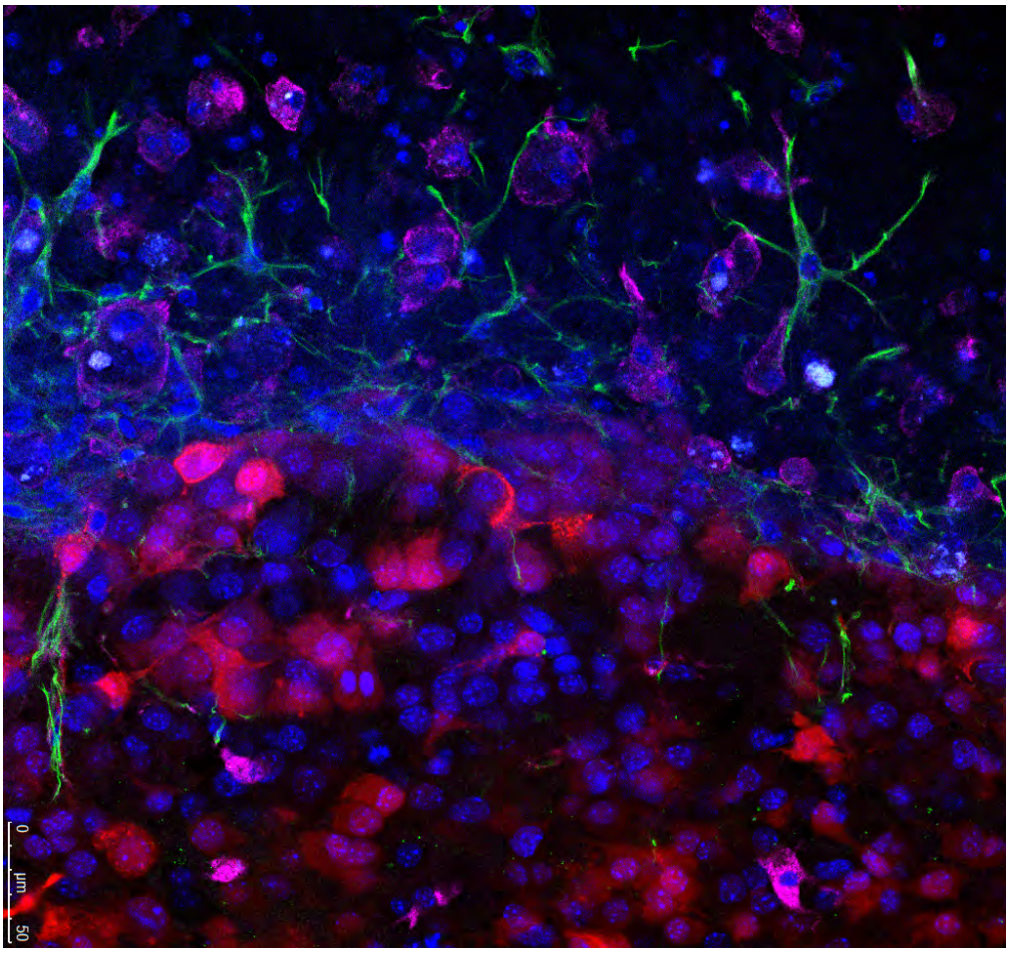


S. Peyrégne

Affilations

Cancer Biology Research Center

https://cbrc.tau.ac.il/



Melanoma brain metastases. Tumor cells, red; astrocytes, green; microglia, violet. Neta Erez.

Prof. Sivia Barnoy

Nursing genetics and information technology

Patients do not always share hereditary cancer information with their at-risk relatives. Prof. Barnoy is engaged in studies that deal with testing and disclosure of cancer genetic information to blood relatives. She examines factors such as stigma and health beliefs that might influence the decision to be tested and share test results with relatives.

Prof. Barnoy, Department of Nursing, School of Health Professions, completed her nursing degree at the Hebrew University with distinction. She then obtained an M.Sc. (graduated with distinction) and Ph.D. at the Department of Human Genetics of the School of Medicine at Tel Aviv University. Barnoy served as the department chair between 2010-2014. She has co-authored over 65 papers. She is active internationally in genetic nursing in the International Society for Nurses in Genetics, who in 2018 granted her the Founder Award for Excellence in Research. She was nominated as the Israeli delegate in the Global Genomic Nursing Alliance Initiative.

Her approach is unique as she studies this question from both the patients, the counselees, and counselors' point of view. The Israeli law states that genetic information belongs to the counselees; however, her current results call for a re-discussion about the privacy of genetic information.

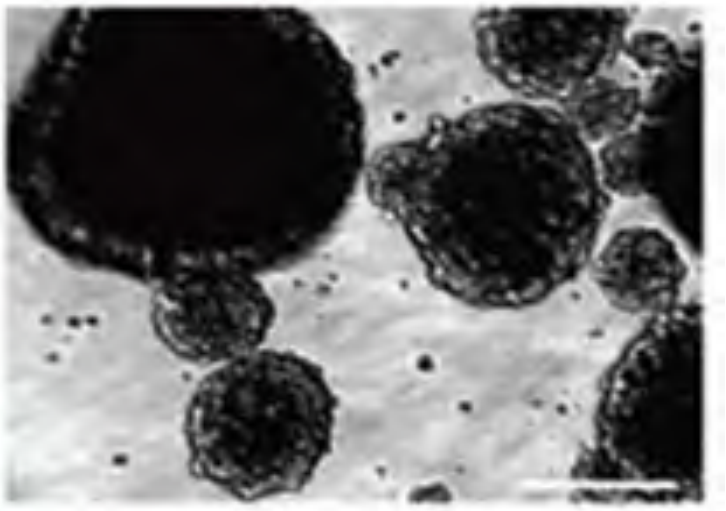
Dr. Uri Ben-David

Dr. Ben-David, Department of Human Molecular Genetics and Biochemistry at the School of Medicine, completed his PhD at the Hebrew University and his postdoctoral training at the Broad Institute of Harvard and MIT. He was recently selected as a "Next Generation Star" of the American Association for Cancer Research (AACR). He has earned several prestigious prizes for early-career scientists, including the Dan David Scholar Award, the Kaluza Award, and the Kaye Innovation Awards.

https://www.bendavidlab.com/

Cancer aneuploidy

Healthy human cells have 23 pairs of chromosomes. Any deviation from this number – known as aneuploidy – has very severe consequences. For example, an extra copy of chromosome 21 results in Down syndrome. However, cancer cells are highly aneuploid, and aneuploidy is even required for tumor progression. Dr. Ben-David studies this "aneuploidy paradox" using state-of-the-art genomic and functional approaches. The work in the lab aims to uncover the basic biology underlying this hallmark of cancer, and to exploit it to target cancer cells and eliminate tumors.



Dr. Yaron Carmi

Cancer immunotherapy

Our body's immune system knows how to attack and kill cancer cells – so why isn't this happening in each case? How do we unblock this natural lethal response? Dr. Carmi is taking a fresh approach to the problem using advanced microscopy and genetic engineering to monitor, in real time, how our immune cells communicate with each other. He will use the new understanding to develop better, safer therapies that kick in the natural anti-cancer immune response.

Dr. Carmi, Department of Pathology, Sackler Faculty of Medicine, completed his PhD studies *summa cum laude* at Ben-Gurion University of the Negev and won the *Pratt* award for excellence PhD students. He completed his postdoctoral training at the Department of Immunology at Stanford University, where he earned the *Young Investigator Award*. His work on dendritic cell vaccination was published in *Nature* and *Cell* and he has co-authored over 30 manuscripts in peer-reviewed journals, including *Science* and *Immunity,* and written four patents. Based on his findings, he co-founded two companies, Bolt Therapeutics and more recently, Gilboa Therapeutics, and he serves as a consultant in Velocity Pharmaceutical Development venture capital, and as a board member at the Israel Society for Gene and Cell Therapy. Carmi was awarded the Alon Fellowship for outstanding young Israeli scientists.

https://www.carmilab.org/

Dr. Merav Cohen

Immunotherapy targets using single-cell analysis

Tissue development, homeostasis and pathologies are highly regulated processes orchestrated by intercellular crosstalk between immune cell niche and tissue resident cells, not necessarily from the immune lineage. Dr. Cohen incorporates state of the art single cell RNA-sequencing technologies, murine models, clinical approaches and advanced computational methods in order to reveal the molecular signature of interacting cells that drives exclusive cell function. The lab aims to assess similarities and discrepancies in interactome molecular signature between tissue development process and cancerous conditions in order to identify novel immunotherapy targets, directed against intercellular crosstalk.

Dr. Cohen, Department of Clinical Microbiology and Immunology, received her MSc in the field of Cancer Immunology from the Faculty of Engineering Sciences, Department of Biotechnology Engineering, Ben-Gurion University of the Negev, in a direct MSc track for excellent students, and graduated *summa cum laude*. She received her PhD in the field of 'Neuro-Immunology' from the Department of Neurobiology, the Weizmann Institute of Science. Dr. Cohen performed her postdoctoral training in the field of 'Immuno-Genomics', at the Department of Immunology at the Weizmann Institute of Science, and at the Department of Oncological Sciences, Icahn School of Medicine at Mount Sinai, New York, in the field of 'Cancer Immunology'. She won the Feinberg Graduate School Prize for Outstanding Achievements in Postdoctoral Research, and the Ministry of Science and Technology Scholarship for Postdoctoral Fellows in Applied and Engineering Science.

https://www.mcohenlab.com/

Prof. Neta Erez

Prof. Erez, Department of Pathology, began her academic career at the Faculty of Agriculture, Hebrew University where she received her B.Sc. She then proceeded to complete her M.Sc. and Ph.D. at the Weizmann Institute of Science in the field of tumor immunology. Supported by a fellowship from the Cancer Research Institute (CRI), Dr. Erez performed her postdoctoral research at the University of California, San Francisco, working in the field of tumor biology.

https://netaerez.tau.ac.il/

Tumor microenvironment in metastasis

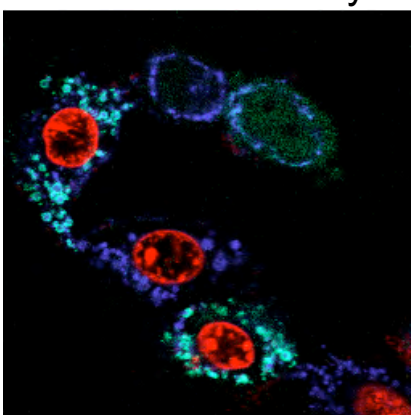
The research of Prof. Erez is focused on tumor biology, tumor microenvironment, cancer-related inflammation and the role of stromal cells in facilitating tumor progression and metastasis. Her main focus is in understanding the early stages of metastatic relapse, and the role of the metastatic microenvironment. Prof. Erez studies these crucial aspects of cancer using genetically engineered models of breast cancer and of melanoma. The main goal of the studies is to identify key molecular pathways in the communication between tumor cells and their microenvironment that can be targeted by novel therapeutics, to prevent tumor metastasis.

Prof. Zvi Fishelson

Prof. Fishelson is a member of the Department of Cell and Developmental Biology and an Incumbent of The Roberts-Guthman Chair in Immunopharmacology. He served as President of both the International Complement Society and European Complement Network (ECN) and was awarded an ECN Gold Medal. He is treasurer of the Israeli Society for Cancer Research, Board Member of the Israel Immunological Society and member of the Henry Kunkel Society. He is an editorial board member of *Molecular Immunology* and associate editor of *Frontiers in Immunology*.

Cancer cells resisting immunity

Several therapeutic approaches try to enlist the patient's immune system for killing of his/her cancer. All these approaches face a major obstacle: cancer cells are resistant to any type of damage inflicted by the armory of our immune system. Prof. Fishelson has uncovered several defense strategies employed by cancer cells to resist immune attack. His team is currently investigating the molecules that protect the cancer cells and their mode of action, and seek potential intervention points through which this protection could be annulled. They develop reagents that block resistance of cancer cells, sensitize them to available immunotherapies and enable the patient's immune system to destroy its cancer.



Dr. Maayan Gal

Dr. Gal is a faculty member in the Department of Oral Biology at the School of Dental Medicine. He completed his PhD studies at the Department of Chemical Physics at the Weizmann Institute of Science and was an HFSP postdoctoral fellow at the Harvard Medical School. He ran an independent lab at Miguel in northern Israel,. Gal co-founded a biotech company dealing with Ag.Chem protein modulators.

https://maayaangaal.wixsite.com/galma

Protein modulators for therapy

Dr. Gal focuses on the discovery and development of novel protein modulators as the basis for new therapeutics. Of main interest are the challenging targets belonging to the biological space of protein-protein interactions (PPIs). For this purpose, we are integrating cutting-edge computational, biophysical and cellular biology tools. We are focused on the interaction of calcineurin-NFAT proteins, known as the T-cell activation switch, as the basis for developing new immunosuppressant and on immune checkpoint receptors function. The T-cell inhibition switch is the basis for developing new therapeutics for inflammation and cancer.

Dr. Assaf Madi

Dr. Madi, head of the Systems Immunology Lab, completed his Ph.D. studies at Tel Aviv University in computational immunology. Dr. Madi then continued to do a postdoctoral fellowship at Harvard Medical School, Brigham and Women Hospital, Broad Institute of Harvard and MIT, Boston, USA where he mainly focused on the study of T-cell differentiation and cancer immunology.

www.asafmadilab.com

Systems immunology for cancer

Can we activate our immune system to fight cancer? What immune cells are important and what prevents them from exercising their anti-tumor functions? Can we trigger these specific immune cells to destroy cancer cells and at the same time provide an immunological memory to prevent recurrence of the disease? The main interest of the lab is studying gene circuits of immune cells involving differentiation, activation and regulation. We focus on exploring these cells and circuits mainly in the context of the tumor pathology following stimulation, immunotherapies or cell-cell interactions. We apply cutting-edge technologies including 3D bioprinting of tumors, single cell RNA-seq and spatial transcriptomics, mouse tumor models, molecular biology, and other high-throughput genetic and genomic methods combined with advanced computational approaches to identify and functionally characterize genes that play an important role in immune cell circuits and their effect on tumor growth. This approach, will enable in-depth studies of immune-cell signaling in the context of the tumor microenvironment.

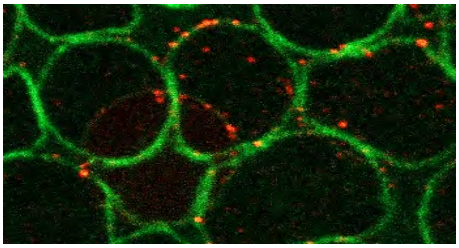
Prof. Rina Rosin-Arbesfeld

Prof. Rosin-Arbesfeld received her PhD in Biochemistry and Microbiology from TAU and trained as a post-doctoral fellow at the MRC-LMB in Cambridge, UK. Rosin-Arbesfeld serves as Chair of the Search Committee of the Faculty of Medicine. Rosin-Arbesfeld has competitive grant funding from the US-Israel Binational Science Foundation, the Jerome Lejeune Foundation, and the German-Israeli Foundation for Scientific Research and Development.

http://www3.tau.ac.il/rosin-arbesfeld/

Molecular changes in cancer

Wnt signaling is one of the most fundamental signaling cascades involved in both development and homeostasis. Aberrant activation of the Wnt pathway is associated with numerous diseases, most notably in the development of colorectal cancer (CRC). The Rosin-Arbesfeld lab focuses on different aspects of Wnt signaling in both sickness and health. The team conducts comprehensive genetic and biochemical screens to isolate novel regulators of the Wnt pathway in order to identify new targets for therapeutic purposes. Currently, the team is involved in pre-clinical, as well as clinical trials, aimed at restoring the normal expression of tumor suppressors, known to inhibit the Wnt pathway in patients suffering from hereditary CRC. The team is looking into the relationships between Wnt signaling and the microbiome and have identified bacteria that are involved in CRC development.



Wnts associate with the erythrocyte membrane

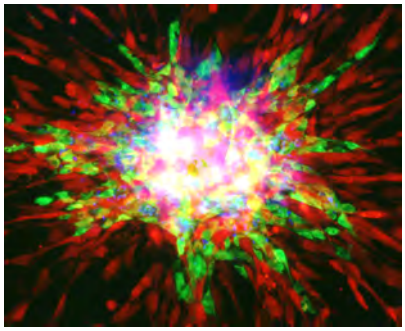
Prof. Ronit Satchi-Fainaro

Nanomedicine

Major efforts invested into the development of new drugs often fail to be translated into meaningful clinical benefit for cancer patients. Developing effective novel therapeutics for cancer while accurately predicting their clinical success in certain cancer types remains an urgent unmet medical need. Prof. Satchi-Fainaro incorporates cutting edge multidisciplinary basic, translational and clinical approaches to explore this scientific "blind spot". To this end, Satchi-Fainaro develops clinically relevant 3D cancer models that better capture the clinical characteristics and drug responsiveness of human cancer. These models are being exploited for the development of efficacious clinically-translatable therapies for various cancer types. Her vision is that this multidisciplinary approach will revolutionize our perception of tumor progression and consequently the way we diagnose and treat cancer.

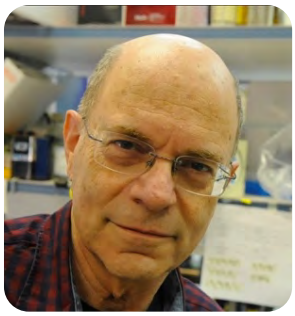
Prof. Satchi-Fainaro is at Department of Physiology and Pharmacology, where she is head of the Cancer Research & Nanomedicine Laboratory, Head of the TAU Kahn 3D BioPrinting Initiative and holds the Kurt and Herman Lion Chair in Nanosciences and Nanotechnologies. She completed her PhD in Polymer Chemistry and Cancer Nanomedicine at the University of London and her postdoctoral training at Harvard University and Children's Hospital Boston working on Vascular and Cancer Biology. She was awarded the Fulbright, Rothschild, and JULUDAN Prizes, Teva Pharmaceutical Industries Founders Award, the 2019 Youdim Family Prize for Excellence in Cancer Research, 2020 Kadar Family Award for Outstanding Research, the 2020 Humboldt Foundation Bessel Research Prize, and "Woman of the Year" by Globes magazine. She serves on the Board of Directors of Teva Pharmaceutical Industries Ltd.

https://satchifainarolab.com/



3D glioblastoma. Cancer cells in red, endothelial cells in green, nanomedicine in blue

Prof. Yossi Shiloh

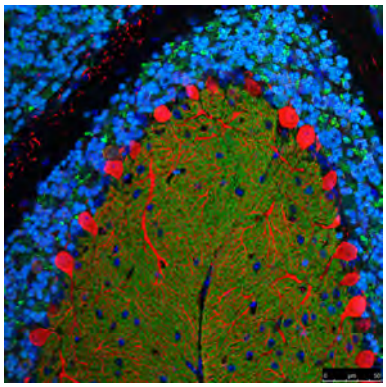


Genome instability in disease

The Shiloh lab studies the implications of genome instability on our health. Our DNA is constantly damaged by internal and external DNA damaging agents. In response to this ongoing threat to the genome, the DNA damage response (DDR) – a broad signaling network is activated. The Shiloh lab discovered a key player in this system – the protein kinase, ATM. This discovery was a result of a long quest to identify the gene responsible for a human genome instability syndrome called ataxia-telangiectasia (A-T). A-T involves cerebellar degeneration and cancer stability and continues to decipher the physiological basis of the many symptoms of A-T, particularly the cerebellar attrition. Recently, the lab initiated an investigation of the role of genome instability in aging and cellular senescence.

Prof. Shiloh heads the Myers Laboratory for Cancer Genetics at the Department of Human Molecular Genetics and Biochemistry. He obtained his Ph.D. in Human Genetics at The Hebrew University of Jerusalem and trained at the Harvard Medical School, University of Michigan, New York University Cancer Center, Memorial Sloan Kettering Cancer Center and Rockefeller University, and was a Fogarty Fellow at the U.S. National Institutes of Health. He is a member of The Israel National Academy of Sciences and Humanities and won the 2005 EMET Prize in Life Sciences, the American Association of Cancer Research G.H.A. Clowes Memorial Award for Outstanding Accomplishments in Cancer Research, the Israel Prize in Life Sciences and the Olav Thon Prize in Natural Sciences and Medicine (Oslo, Norway). He has dedicated most of his scientific career to understanding A-T. He gives popular scientific lectures to the general public on the medical, social and ethical implications of the genome revolution.

https://www.tau.ac.il/~yossih/



Mouse cerebellum. Purkinje cells, which gradually disappear in A-T patients, highlighted in red.

Affiliations

Neufeld Cardiac Research Institute at the Sheba Medical Center,
Affiliated with the Sackler Faculty of Medicine

https://eng.sheba.co.il/The_Neufeld_Cardiac_Research_Institute

Artist Statement

The bravery of compassion, to love and the commonality of our experiences as human beings are key themes in my artwork. This heart series are my translations of our heroic journey. I use color, pattern, texture, and symbols to depict our universal human experiences such as birth, evolution, revelation, temporality, beauty, the sacredness of life, and experiences of suffering and joy. The image of the heart resonates for me as a symbol of these journeys. .

Credit: Leslie Synder Portney

Prof. Silvia Koton

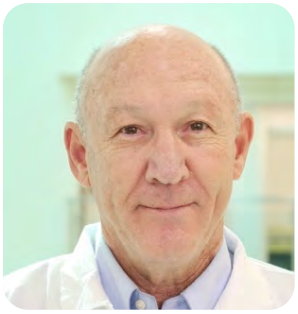
Stroke epidemiology, aging and cognitive function

Prof. Koton, Department of Nursing, is a Registered Nurse and holds a Master's Degree in Occupational and Environmental Health and a PhD in Epidemiology and Preventive Medicine from TAU. She was Chair of the Department of Nursing and holds adjunct associate professor appointments at John Hopkins University, Department of Epidemiology, Bloomberg School of Public Health, and School of Nursing. Prof. Koton was nominated International Fellow of the American Heart Association (FAHA), and selected as a Paul Dudley White International Scholar. She is head of the Herczeg Institute on Aging at Tel Aviv University.

Stroke is a major cause of long-term disability and a strong predictor of dementia and cognitive decline in adult and elderly populations. The incidence of stroke has declined in the last decades in various countries, however, this decline is not consistent across population-groups. Prof. Koton's varied research includes studies on epidemiology of stroke and other cardiovascular diseases; age and aging; dementia, changes in physical and cognitive functioning after stroke, and health of primary caregivers of the elderly.

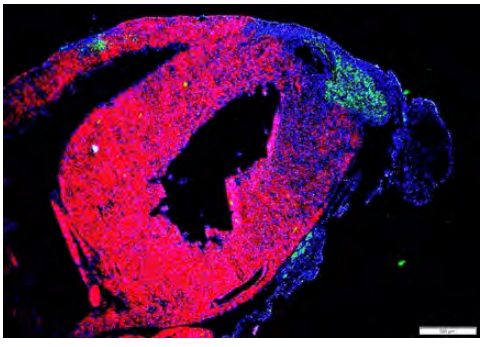
Prof. Silvia Koton studies the factors associated with changes in stroke epidemiology and cardiovascular risk factors in Israel and in the US. Her research provides important information on possible reasons for these changes; how the incidence of stroke may be affected by the increasing rates of obesity, diabetes and other cardiovascular risk factors, and how the changing trends in stroke may influence rates of physical and cognitive function in old persons.

Prof. Jonathan Leor



Cardiovascular regeneration

Leor's research includes the study of the heart's lack of reparative ability. His research group approached the challenge from a different angle by studying the role of extracellular matrix and immune cells in heart repair. Leor pioneered the use of scaffolds and injectable biomaterials to treat heart diseases. His lab was the first to target macrophages to improve infarct healing.



Prof. Jonathan (Yoni) Leor is a Professor of Cardiology at TAU and and the Director of the Neufeld and Tamman Cardiovascular Research Institutes at TAU and the Sheba Medical Center. He is a cardiologist, physician-scientist. He obtained his MD degree from Tel-Aviv University. He completed his medicine residency and cardiology training at the Sheba Medical Center, Israel. Leor performed a post-doctorate fellowship in cardiovascular regenerative medicine at the University of Southern California. He served as the director of the Intensive Cardiac Care Unit at Soroka Medical Center and head of the Experimental Cardiology Lab at Ben-Gurion University. He is currently the director of the Neufeld and Tamman Cardiovascular Research Institutes at Tel Aviv University and Sheba Medical Center, and the director of the Medical Scientist Training Program (MSTP or MD/Ph.D. program).

His work has led to establishing a novel line of research dedicated to understanding how the immune system and extracellular matrix affect heart repair. He was the first in Israel to develop novel cardiovascular regenerative therapies, such as cardiac stem cell therapy, tissue engineering, and gene therapy. Leor is a co-inventor of breakthrough injectable biomaterial to treat heart attacks and heart failure.

Myocardial regeneration. Macrophages (green cells) infiltrate the injured heart (red) of neonatal mouse and promote heart repair. Tal Konfino & Leor.

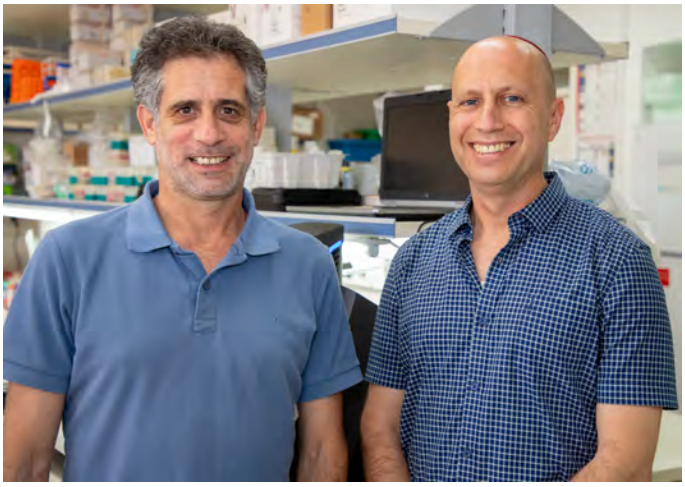
COVID-19 Pandemic

The COVID-19 pandemic has changed our lives as we know it. Our scientists at the Sackler Faculty of Medicine mobilized within days to:

- Build a “Corona Lab”, to conduct thousands of tests per day
- Develop the serological tests used by the IDF
- Lead the effort in public health policy and messaging
- Isolate neutralizing antibodies against SARS Co-V-2
- And develop a nanovaccine

Affiliations

The Center for Combating Pandemics



Left: Prof. Motti Gerlic & Prof. Ariel Munitz.
Right: Ziv Ehrlich at the Corona Lab

Dr. Bruria Adini

Dr. Adini, head of the Department of Emergency Management and Disaster Medicine in the School of Public Health, is an expert in both field and academic activities in disaster management. She has authored over 50 papers. Adini serves as a board member of Local Authorities Confronting Disasters and Emergencies (LACDE) and the Israeli National Council for Trauma and Emergency Medicine and served two terms as a board member of the World Association of Emergency & Disaster Medicine (WADEM).

Resilience in a pandemic

A vital component of an effective management of any pandemic is the resilience of the population and the responders. What factors encourage or impede on the compliance to behavioral directives? How do varied aspects of resilience impact on our well-being and capacity to adapt to adversities? Dr. Adini implements an eclectic approach to monitor continuously the individual, community, national and organizational levels of resilience. The evolving findings facilitate policy-makers' ability to sustain or modify measures to improve management of the pandemic.

Dr. Ilana Dubovi

Dr. Dubovi is at the Department of Nursing, Stanley Steyer School of Health Professions at the Faculty of Medicine. She completed her PhD in Education at the Department of Learning, Instruction and Teacher Education, University of Haifa. She completed two postdoctoral positions, at the Department of Instructional Technology and Learning Sciences at Utah State University, and at the Faculty of Education at Ben-Gurion University of the Negev, Israel.

Educational technology

Building upon a growing evidence that patient education plays a pivotal role in patient disease self-management and health outcomes, Dr. Dubovi's research seeks to leverage the efficacy of educational programs by integrating digital educational technology. With this goal in mind, she develops and evaluates various cutting-edge technologies, such as virtual reality simulations, online games, computer-based models, interactive visualizations and more. Using intelligent multi-modal biosensors, her team was the first in the world to looking into personalized adaptive technology to make patient education process more fine-tuned to patient's needs and literacy levels. Educational technology for patients is a very timely approach, even more so in times of COVID-19 pandemic era, to support distant patient-clinician encounters as telemedicine aids.

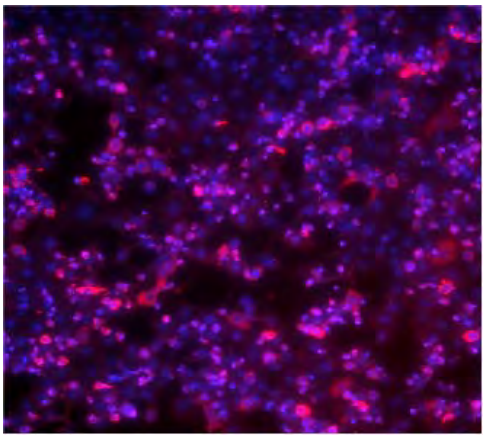
Dr. Natalia Freund

Dr. Freund is at the Department of Clinical Microbiology and Immunology. Her research focuses on human adaptive immune response towards diseases, such as HIV-1, Tuberculosis, SARS-CoV-2 and cancer. Before coming to Tel Aviv University, she completed her postdoctoral training at the Rockefeller University in New York City, where she led groundbreaking research on anti-HIV-1 neutralizing antibodies and proved their efficacy as novel HIV immunotherapeutics.

http://www3.tau.ac.il/nfreund/

Neutralizing antibodies

Neutralizing antibodies are a key component of adaptive immunity against many viruses and can be elicited by natural infection or vaccination. Recent studies showed that neutralizing antibodies are elicited after SARS Coronavirus 2 (SARS-CoV-2) infection and are directed against the receptor binding domain (RBD) of the SARS-CoV-2 Spike protein. Dr. Freund's goal is to characterize the neutralizing antibody responses against SARS-CoV-2 by isolating neutralizing antibodies from infected donors and determining the mechanistic basis for their action. Additionally, she is interested in how these antibodies correlate with COVID-19 clinical manifestations and disease severity. Recently, her team has isolated 22 monoclonal antibodies from COVID-19 donors, some of which were found neutralizing against the live SARS-CoV-2.



Vero E6 cells infected with SARS Coronavirus-2. Freund & Ben Croker, UC San Diego.

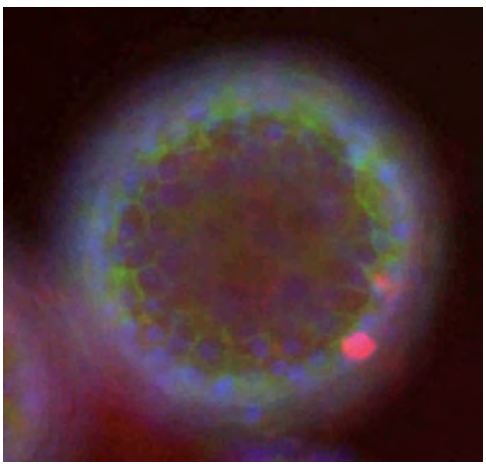
Dr. Oren Kobiler

Dr. Kobiler is at the Department of Clinical Microbiology and Immunology. Kobiler obtained his BSc from the Hebrew University in Medical Sciences. He received, in parallel, his MD and PhD from the Hebrew University. As a postdoctoral fellow at the Department of Molecular Biology at Princeton University, he received a Human Frontier Science Program (HFSP) Long Term Fellowship and the ISF Bikura Postdoctoral Award. He frequently appears on the news to share a scientist's perspective on the COVID-19 pandemic.

https://www.tau.ac.il/~okobiler/Home.html

Organoid models

SARS-CoV-2 is a new emerging coronavirus that cause the COVID-19 global pandemic. The clinical manifestations among SARS-CoV-2 infected individuals vary from asymptomatic infection to acute respiratory failure and death. While SARS-CoV-2 share many features of the other human coronaviruses, it has become a major threat on global human health. By comparing basic infection processes of the seasonal coronaviruses to the SARS-CoV-2, Kobiler anticipates to identify the unique features of this virus. His team is establishing a model system for coronavirus infection of patient-derived airway organoids. The reproducibility of the model system will allow the team to test and identify the role of specific parameters of the SARS-CoV-2 infection, and to test possible drugs.



Dr. Khitam Muhsen

Dr. Muhsen is at the Department of Epidemiology and Preventive Medicine, School of Public Health. Trained as a nurse, she then obtained her PhD in epidemiology at Tel Aviv University, and a post-doctoral fellowship at the Center for Vaccine Development, University of Maryland School of Medicine, US. Dr. Muhsen's main research interest is in the epidemiology of infectious diseases, enteric diseases and vaccines. Her research has been supported by competitive awards and grants such as the Israel Science Foundation, Israel-US Binational Science Foundation, Ministry of Health, Israel National Institute for Health Policy and Health Services Research, and Bill and Melinda Gates Foundation.

Sero-epidemiological studies on coronavirus

Dr. Muhsen initiated sero-epidemiological studies to assess the acquisition and transmission of the new coronavirus in the population, and the development and persistence of the humoral immune response to SARS-Cov-2 in COVID-19 patients and their households contacts and medical personnel. These questions are being addressed in longitudinal studies, with measurement of serum IgG antibodies against coronavirus that develop in patients and in asymptomatic persons. This includes studies in households of COVID-19 patients and a multicenter study among medical personnel. The novel aspects of these studies include the longitudinal design, the inclusion of various populations and ethnic groups and capturing the first and second waves of COVID-19 epidemic in Israel. The expected results will assist in shaping preventive measures, and the assessment of their effectiveness.

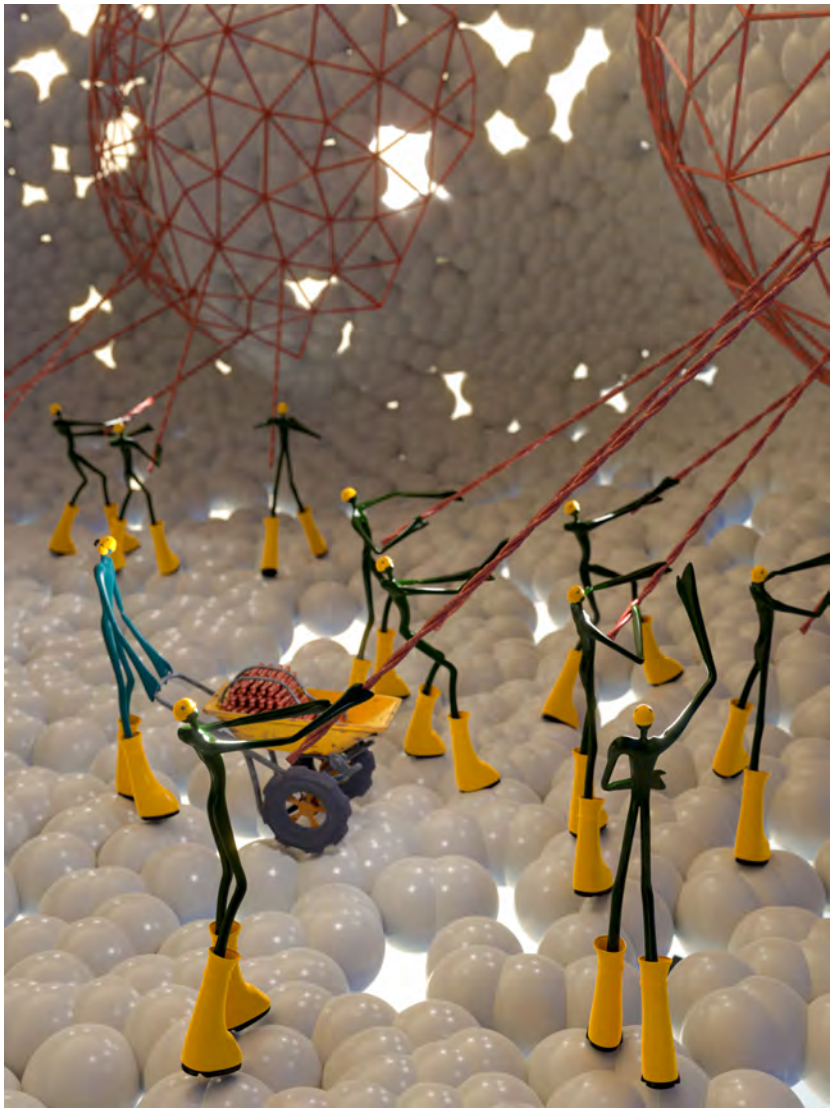
Understanding the natural immunity to SARS-Cov-2 is important for vaccine development.

Development, Aging and Regeneration

Affiliations

Switzerland Institute of Developmental Biology
https://www.swissinstitutedb.com/

Herczeg Intitute on Aging
https://herczeg.tau.ac.il/index.php/en/



Contractile activity of actomyosin A: a miniature world (cell) where toy-like workers (formins: cyan and myosin: green) are reshaping the surface of their world (cell membrane: white) by pulling metal meshes (actin filaments). Diego Pitta de Araujo.

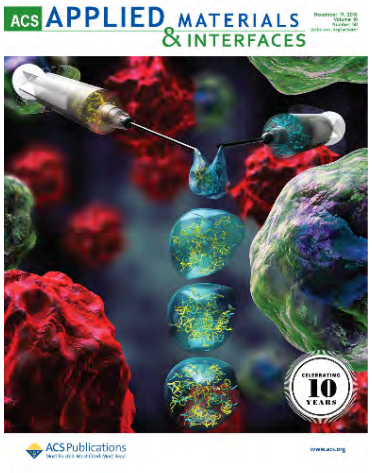
Dr. Lihi Adler-Abramovich

Dr. Adler-Abramovich is at the School of Dental Medicine, where she is a principal investigator and the head of the Laboratory of Bioinspired Materials and Nanotechnology. Dr. Adler-Abramovich studied biology at Tel Aviv University where she received both her M.Sc. (*summa cum laude*) and her Ph.D. She has been awarded numerous prestigious grants and prizes, including the ERC Starting Grant, ISF-Center for Excellence Grant and the Colton Foundation Scholarship. She has published in *Nature Nanotechnology*, *Nature Chemical Biology*, *Nature Communications*, *Nano Letters*, *ACS Nano* and is the inventor of more than 10 patents.

https://lihi13.wixsite.com/lihi

Bone regenerative medicine

Bone regeneration is a critical challenge in the treatment of fractures, bone loss due to tumor resection, and alveolar bone deficiencies. Approximately 2.2 million bone graft procedures are performed annually worldwide. Despite significant progress in bone tissue engineering, there is an unmet need for patient-specific long-lasting bone restoration. Dr. Adler-Abramovich's research in the Laboratory of Bioinspired Materials is focused on mimicking self-assembly processes that occur in nature, including biomineralization and the organization of short peptides and amino acids into ordered nanostructures. We are a materials science laboratory with emphasize on organic chemistry and medical-biological applications. The group aims to develop customized supramolecular scaffolds that will promote personalized therapy for bone regenerative medicine, thus significantly advancing the fields of tissue engineering and materials science while offering a novel solution to a major healthcare issue.



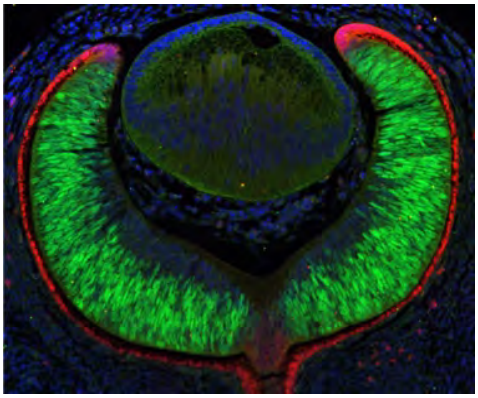
Prof. Ruth Ashery-Padan

Prof. Ashery-Padan is at the Department of Human Molecular Genetics and Biochemistry, a member of the Sagol School of Neuroscience and holds the Zucker–Sussman Chair for Glaucoma Research. Ashery-Padan completed her MSc and PhD at the Hebrew University of Jerusalem and her postdoctoral training at the Max Planck Institute for Biophysical Chemistry in Göttingen, Germany. She is the recipient of the Alon Fellowship (VATAT), the Dan David Prize for Young Investigators, Teva Prize, and the E. Matilda Ziegler Foundation for the Blind Award. Prof. Ashery-Padan heads the Yoran Institute for Human Genome Research.

https://asherypadanlab.com/

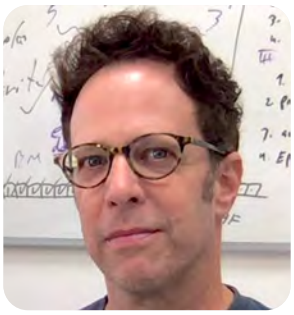
Development of visual system in mammals

Prof. Ashery-Padan's research group focuses on understanding the molecular mechanisms that control the development of the visual system in mammals. The group established and employs transgenic mouse lines for state-of-the-art functional studies of genes in vivo. This is combined with gene-expression profiles using laser capture and single-cell sequencing, transcription factor activity on target genes, and chromatin structure during development. Her group studies ocular cell types generated from human stem cells to uncover the molecular mechanisms underlying the differentiation of human lineages, and to model human diseases. The work is contributing to understanding the etiology of monogenic and complex retinal diseases, toward a better prediction of individuals' susceptibility and the design of stem cell-based models and future therapies for blinding diseases.



Cytoarchitecture of the mature mouse retina - subset of retinal cell types are identified by immunostaining. Shaul Raviv, Ashery-Padan.

Dr. Chen Luxenburg

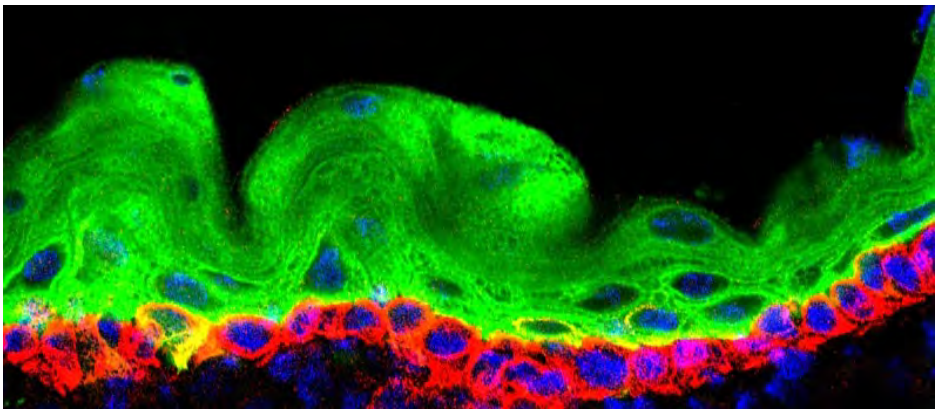


Dr. Luxenburg completed his Ph.D. studies in Molecular and Structural Cell Biology at the Weizmann Institute of Science. For his post-doctoral training, he trained at the laboratory of Prof. Elaine Fuchs at the Rockefeller University in New York. Dr. Luxenburg is the recipient of a number of research grants and awards, including the ISF, I-CoRE, BSF, ICRF, and the Teve founders prize. Dr. Luxenburg serves on the scientific board of the Israeli Society of Developmental Biology, Switzerland Institute of Developmental Biology, and the Biomed@TAU Developmental Research Hub. He is also the academic coordinator of the International Graduate program.

https://www.luxenburglab.com/

Cytoskeletal regulation of epidermal stem cells

One of the significant challenges in biomedical research is to understand how stem cells give rise to functional tissue during development, maintain it throughout life, and regenerate it upon wounding. The Luxenburg lab studies how cytoskeleton-derived signals regulate stem cells function. We use the skin epidermis as our primary model system, and studies in the lab provide insight into both skin development and common skin diseases such as cancer and psoriasis.



Dr. Miriam Theilla

Dr. Miriam Theilla, Department of Nursing, School of Health Professions, is a registered nurse and holds a master's degree in critical care nursing and a Ph.D. in clinical nutrition from the Faculty of Agriculture, Food and Environment of the Hebrew University. She is a member of forums on nursing and clinical nutrition. Dr. Theilla is in charge of the clinical nutrition clinic at the Rabin Medical Center.

Nutritional care for patients

Malnutrition is common among hospitalized patients. Dr. Theilla's research focuses on the assessment and nutritional care of hospitalized and critically ill patients. She aims to demonstrate the importance of the nursing staff's involvement in the nutritional treatment of patients, while highlighting the identification and prevention of malnutrition in the hospital and in the community. Dr. Theilla developed a self-assessment tool completed by the patient that detects patients who are at nutritional risk. In addition, she examines optimal nutritional care and resting energy expenditure (REE), as well as the ideal protein intake for critically ill patients and the effect of fish oil-enriched nutritional support on the healing of pressure ulcers and the function of the respiratory and immune system. The subject of nutrition has a physical, emotional, and social impact on people. As part of Dr. Theilla's work at the clinical nutrition clinic, she also investigates the emotional and social effects of parenteral nutrition among type III intestinal failure patients.

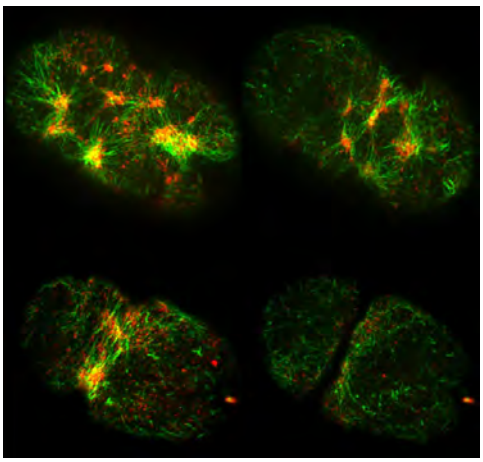
Prof. Ronen Zaidel-Bar

Prof. Zaidel-Bar, Department of Cell and Developmental Biology at the School of Medicine, completed his Ph.D. in Molecular Cell Biology at the Weizmann Institute and post-doctoral training at the University of Wisconsin - Madison. He started his independent group at the Mechanobiology Institute, National University of Singapore, where he was awarded the National Research Foundation Fellowship, and seven years later he joined Tel Aviv University. Zaidel-Bar is a world leader in the field of cell and tissue mechanobiology.

https://www.zaidelbarlab.com/

Cytoskeletal regulation

A developing embryo taking shape, a heart pumping blood, and a wound closing itself all rely on mechanical forces to accomplish their important tasks. A special cellular machinery, the cell's skeleton, is responsible for generating these forces, but how this machinery is assembled at the right time and place in our bodies remains poorly understood. Prof. Zaidel Bar's group is using cutting edge genetics and live-imaging microscopy in human and nematode models to gain a "front row seat" view of what the cytoskeleton is doing inside an animal. A better understanding of cytoskeleton regulation is important to prevent birth defects and to treat numerous diseases, such as asthma, hypertension, and cancer metastasis.



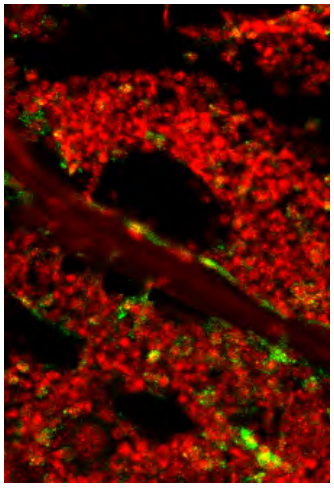
Actin (green) and myosin (red) in the cortex of a *C. elegans* 1-cell embryo form a contractile belt that drives the first cell division. Wei-Yung Ding, Zaidel-Bar.

Prof. Drorit Neumann

Prof. Neumann, Department of Cell and Developmental Biology, completed her PhD at the Weizmann Institute and was trained as a postdoctoral fellow with Prof. Lodish at MIT. She set up and coordinated the EpoCan FP7 Consortium, which assessed the long-term risks of Epo and investigated better Epoetin-driven treatment modalities. She currently serves as head of the Dr. Miriam and Sheldon G. Adelson Graduate School at the Sackler Faculty of Medicine and holds the Lily and Avraham Gildor Chair for the Investigation of Growth Factors.
https://droritneumannlab.com/

Osteoporosis

Anemia is a serious global health concern estimated to affect a third of the world's population. The introduction of erythropoietin (Epo) into clinical practice has revolutionized the treatment of this condition, although there is the risk of inadvertent effects that may be hazardous. Prof. Neumann has demonstrated that Epo is associated with a dual action of bone loss and immunomodulatory effects. Osteoporosis is the most common bone disease, affecting nearly half the population over the age of 50. Neumann's team studies Epo in mouse models and patients, in collaboration with bone experts and clinicians. Epo is a new player in osteoimmunology, and will link the effects of the hormone to a wide range of outcomes on bone and immune cells, and suggest methods to realize the therapeutic potential of Epo, maintaining immune competence as well as the erythroid stimulating-effect while attenuating the risk for bone loss.



Deshet-Unger et al. *Theranostics* 2020

Prof. Shimon Efrat

Prof. Efrat chairs the Department of Human Molecular Genetics and Biochemistry at the School of Medicine and is the Nancy Gluck Regan Chair in Juvenile Diabetes. He received his Ph.D. at the Hebrew University, followed by postdoctoral training at Cold Spring Harbor Laboratory. He then joined the faculty of Albert Einstein College of Medicine for a decade, where he is still a Visiting Professor, before moving to Tel Aviv University. He has seven patents, co-founded a company, and served on the scientific advisory boards of several companies.

Diabetes

Diabetes, resulting from loss or failure of insulin-producing pancreatic beta cells, afflicts about 400 million people. The optimal treatment, transplantation of functional cells, is severely limited by shortage of human organ donors. Prof. Efrat aims at developing an abundant source of human insulin-producing cells for beta-cell replacement therapy, by reprogramming human donor beta cells into pluripotent stem cells, which can be massively expanded in tissue culture, followed by differentiation.

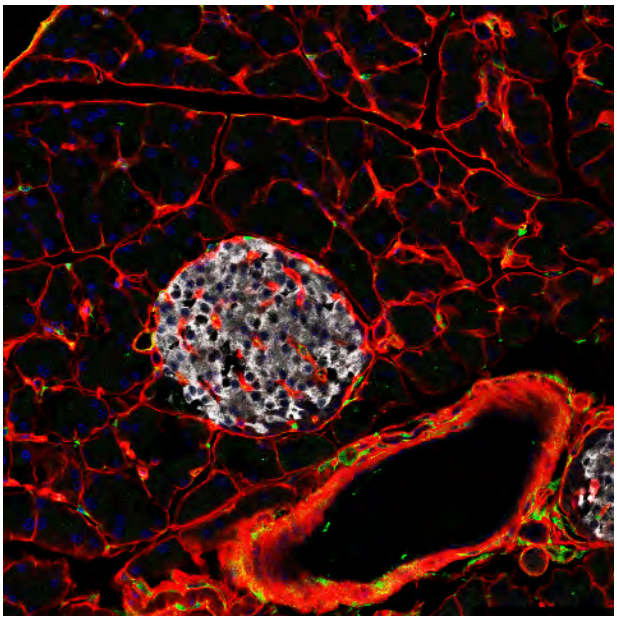
Dr. Limor Landsman

Pancreatic microenvironment

Diabetes is now reaching epidemic proportions, yet our incomplete understanding of its etiology hinders the quest for a cure. Dr. Landsman studies how proper pancreatic insulin production is maintained in health, and why it is lost in diabetes. To this end, she and her team research the crosstalk between insulin-producing cells and their surroundings, focusing on how this communication is affected by the various diabetes risk factors. Their primary goal is to decipher the underlying causes of diabetes, to facilitate a personalized approach for a cure.

Dr. Landsman is head of the Pancreas Biology Lab at Tel Aviv University. She graduated from the Hebrew University of Jerusalem with honors and obtained an M.Sc. and Ph.D. degrees in Molecular Genetics and Immunology from the Weizmann Institute of Science. For her postdoctoral studies, she joined the laboratory of Prof. Matthias Hebrok at UCSF, an expert on pancreas physiology and pathophysiology. She has obtained prestigious research grants and awards, including the European Union ERC and FET programs, the Israel Science Foundation, and the German-Israeli Foundation. She serves on the scientific board of the Switzerland Institute of Developmental Biology, the D-Cure Foundation, and the Israeli Islet Researchers Forum.

https://www.landsman-lab.com/



Pancreas: white are insulin-producing cells; green and red cells marks the vasculature.

Genomics and Precision Medicine

Affiliations

Safra Center for Bioinformatics
https://safrabio.cs.tau.ac.il/

Single Cell Genomics Core
https://en-med.tau.ac.il/single-cell-genomics-core

TAU-SCGC

Yoran Institute
http://yoran.tau.ac.il/

Noam Shomron

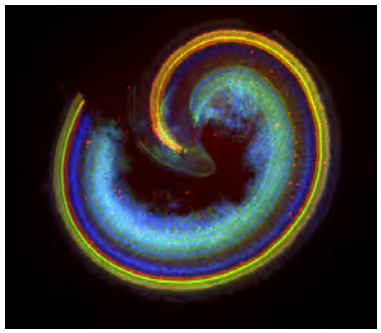
Prof. Karen B. Avraham

Genetics and epigenetics for human disease

Hearing loss is a leading cause of disability worldwide, with an estimated 466 million people suffering from this debilitating loss. Prof. Avraham's goal is to determine the genetic basis of hearing loss and use genome editing to create models to study the mechanisms of auditory function. Gene therapy is being conducted on these models for human hearing loss. Regulatory mechanisms are being discovered at the level of non-coding RNA and methylation. The team's work has demonstrated that genomic sequencing using high-throughput technologies is effective for genetic diagnoses in a diverse population, providing a guideline for precision medicine for hearing loss in Israel. *GRIN2D* mutations are associated with epileptic encephalopathy. Avraham and her team study the mechanism of this NMDA receptor and develop mouse models, towards drug therapy.

Prof. Avraham is Vice Dean at the Faculty of Medicine at Tel Aviv University and holds the Drs. Sarah and Felix Dumont Chair for Research of Hearing Disorders. She is a member of the Department of Human Molecular Genetics and Biochemistry, the Sagol School of Neuroscience and the Safra Center for Bioinformatics. Avraham was awarded the Sir Bernard Katz Prize, the Bruno Memorial Prize, the TEVA Prize for Groundbreaking Research in Rare Diseases, and the Teva Founders Prize on Breakthroughs. She is co-director of the Aufzien Family Center for the Prevention and Treatment of Parkinson's Disease and the Taube-Koret Global Collaboration in Neurodegenerative Diseases. Prof. Avraham founded and co-directs the Biomed@TAU Research Hubs, the MSc program in Medical Sciences with a specialty in Genetic Counseling.

https://www.kbalab.com/



Organ of Corti immunolabelled hair cells. Shahar Taiber.

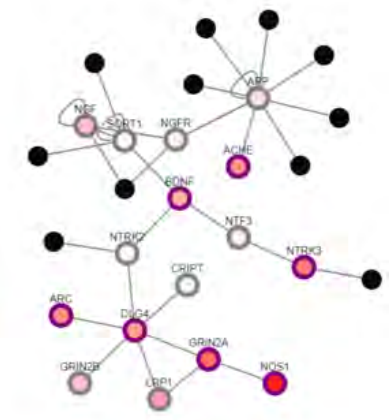
Dr. Ran Elkon

Dr. Elkon, Department of Human Genetics and Biochemistry at the School of Medicine, has his training in Physics and Bioinformatics. He is a member of the Safra Center for Bioinformatics. He completed his Ph.D. at TAU and his postdoctoral research at the Netherlands Cancer Institute.

http://www.elkonlab.tau.ac.il/

Computational tools for prevention of disease

Our genomes are 99.9% identical. The 0.1% variation determines not only the uniqueness of each one of us, but also our predisposition to common diseases such as cancer, heart diseases, diabetes, schizophrenia, and Alzheimer's Disease. Understanding how genetic variants affect the risk for developing these diseases is a major challenge of current human genetic research, and Dr. Elkon's lab develops and applies novel computational tools to decipher such links. Gaining better understanding of genetic risk factors to common diseases will allow the identification of individuals who are at high risk before the onset of the disease and subject them to preventive regimens.



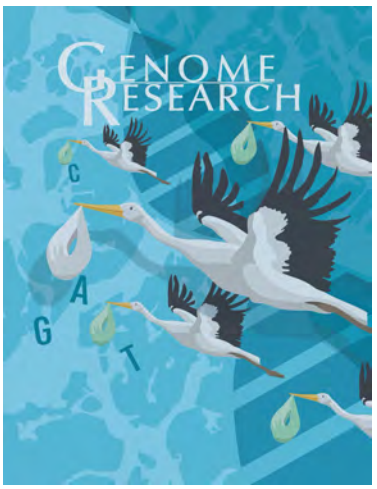
Prof. Noam Shomron

Prof. Shomron heads the Functional Genomic Team at the Faculty of Medicine, after training at MIT. He leads a multidisciplinary team of scientists that develops computational methods for parsing big-data in the bio-medical field using Artificial Intelligence. Shomron is Editor of the 'Deep Sequencing Data Analysis' book; Director of 'Rare-Genomics' Israel (NPO); Academic Director of 'ScienceAbroad' (NPO); and, Co-founder and Chief Scientific Officer (CSO) of Variantyx, which provides clinical interpretation of whole genome sequences.

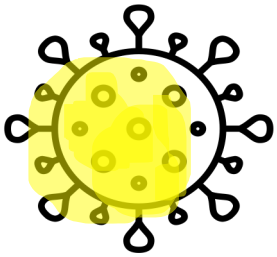
http://www.tau.ac.il/~nshomron

Genomics and human diseases

Our body is built from billions of cells. How each cell and organ interpret DNA is still a great puzzle. Understanding the molecular interactions within our cells, in health and disease, would greatly improve our ability to diagnose and treat complex human diseases, such as cancer and neurological disorders. Prof. Shomron and his team scan thousands of genes in order to pinpoint the ones that play a major role in tumor development and metastasis. His team has shown that by injecting nanoparticles with small molecules into the tumor the spread within the body is halted. In another study, using a simple blood test combined with artificial intelligence, the team has shown that circulating DNA and RNA molecules in the blood can indicate early development of neurological diseases, their stage, and the spectrum of the disease. This information could be used to devise a novel therapeutic approach.

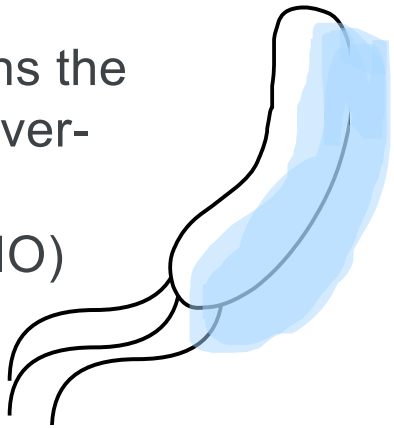


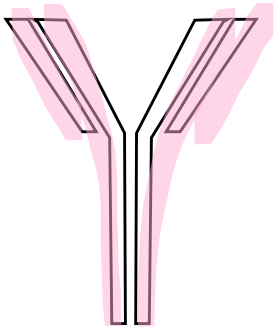
Infectious and Inflammatory Diseases



Infectious diseases are among the top 5 global causes of death (WHO)

Antimicrobial resistance (AMR) threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria, parasites, viruses and fungi (WHO)





Chronic inflammatory diseases — including stroke, heart disorders, cancer, and diabetes — are the most significant cause of death worldwide (WHO)

Prof. Fuad A. Iraqi

Prof. Iraqi, at the Department of Clinical Microbiology and Immunology, completed his PhD at the Hebrew University in Jerusalem and three postdoctoral positions at University of Toronto, University of Michigan and the International Livestock Research Institute (ILRI).

Genetic basis of host response to diseases

People response differently to infection (viral, bacterial, fungal and parasite) and chronic diseases (obesity, diabetes, cancer, heart diseases). Based on our and others studies, this variation in response are controlled by the individual (host) genetic structure. Prof. Iraqi has studied, mapped and identified the host genetic components that control and define the individual response to variety of infectious and chronic diseases, including bacterial, fungal, viral, parasite, obesity, type 2 diabetes, periodontitis, lung cancer, and intestinal cancer. Currently, he also focuses on studying the host genes that control the variation in response to COVID-19.

Prof. Udi Qimron

Prof. Qimron is Chair of the Department of Clinical Microbiology and Immunology. He has authored over 50 scientific articles, some in prestigious journals such as *Nature*, *Science*, and *Cell*. He won the prestigious ERC grant twice. He is also the CTO of a company established based on his inventions, Trobix-Bio.

https://flaxadam.wixsite.com/qimronlab

CRISPR-Cas for bacterial resistance

Bacterial resistance to antibiotics is among the top three major health threats according to the World Health Organization. Rather than producing more antibiotics, which may worsen the problem, we have taken a unique approach, in which we reverse bacterial resistance to antibiotics. Our approach uses the genetic engineering tool, CRISPR-Cas, to eliminate resistance genes from bacteria, and at the same time to enable growth of antibiotic-sensitive bacteria.

Dr. Dor Salomon

Dr. Salomon is at the Department of Clinical Microbiology and Immunology. He completed his PhD (Dean's direct track) at Tel Aviv University, followed by a Postdoctoral fellowship at the University of Texas Southwestern Medical Center. Dr. Salomon was awarded the NIH Pathway to Independence Award (K99/R00) and was also awarded the Alon Fellowship for young investigators and the prestigious European Research Council (ERC) starting grant. During the period of COVID-19 quarantine, he organized a virtual international conference with over 400 participants, named T6SympoZOOM.

https://www.dorsalomonlab.com/

Antibacterial treatment

The World Health Organization predicts that by 2050, multidrug-resistant pathogens will become the leading cause of death worldwide. To prevent this catastrophe, the development of novel antibacterial treatments is necessary. Dr. Salomon is employing multi-disciplinary approaches to study mechanisms and toxins that are used by bacteria to neutralize their bacterial competitors. By adapting and custom-engineering these natural antibacterial mechanisms, Dr. Salomon is developing next-generation antibacterial treatments and prophylactics.

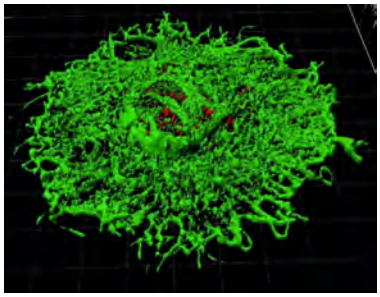
Prof. Ronit Sagi-Eisenberg

Dr. Sagi-Eisenberg is Head of the Department of Cell and Developmental Biology. She completed her PhD at Tel Aviv University and trained at the Weizmann Institute of Science and at the National Institutes of Health in the US.

https://rselab.wixsite.com/mysite

Allergic diseases

Allergic diseases have reached epidemic proportions affecting more than 30% of the world population. Yet, allergy treatment is still by largely symptomatic, the reason being the multiple and diverse stimuli that trigger mast cells, the central players in allergic diseases, and the wide spectrum of inflammatory mediators that are released by triggered mast cells. The latter might cause allergic symptoms when mast cells are triggered by an allergen, but might also cause neurogenic or chronic inflammation, when mast cells are activated by neurotransmitters or neighbouring cells, as is the case of neurodegenerative diseases, autoimmune diseases and cancer. Therefore, the best treatment for mast cell dependent disorders would be blocking mediator release from triggered mast cells. To this goal, the Sagi-Eisenberg lab combines functional genomics analyses with high resolution microscopy to delineate the secretory response and identify the protein networks that control this process. Central proteins are marked as targets for the development of novel therapeutic means aimed at targeting the pathological activity of mast cells during disease.



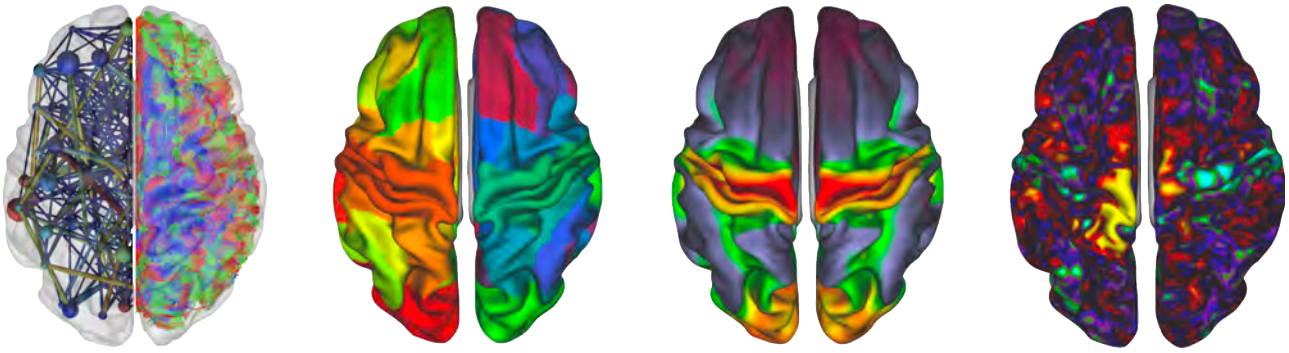
Nervous System and Brain Disorders

Affiliations

Sagol School of Neuroscience
https://www.sagol.tau.ac.il/en/

Aufzien Family Center for the Prevention and Treatment of Parkinson's Disease
https://en-med.tau.ac.il/Aufzien_Center_TAU

Goldschleger Eye Research Institute
https://en-med.tau.ac.il/eye_institute



From left to right: Structural brain connectivity, extracted from diffusion MRI scans; Parcellation of the human cortex, based on functional connectivity; Myelin map (calculated from T1w/T2w MRI scans); Brain activation map extracted from functional MRI, while moving the right foot. Ido Tavor.

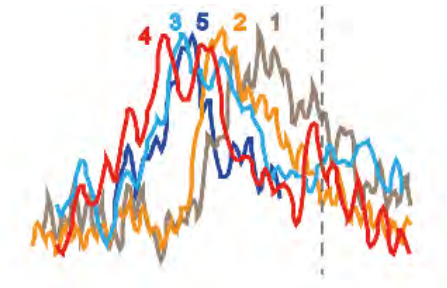
Prof. Bernard Attali

Prof. Attali, in the Department of Physiology and Pharmacology, was educated in France, and received a B.Sc/M.Sc. in Chemistry and Pharm.D. from Paul Sabatier University (Toulouse). He obtained his Ph.D. in Neurobiology from the Weizmann Institute of Science and performed his post-doctoral training at the National Centre for Scientific Research (CNRS) in France.

https://attalilab.com/

Channels in disease

Prof. Attali focuses on potassium channels since they play crucial roles in many cellular functions such as shaping cardiac and neuronal action potentials, tuning neuronal firing patterns, synaptic integration or modulating neurotransmitter release. Using the powerful combination of molecular biology, biophysics, biochemistry and electrophysiology, his team's research aims at elucidating the structural, biophysical and physiological attributes of potassium channels in human brain and heart. His laboratory is a worldwide leader in studying Kv7 potassium channels, whose mutations lead to major neurological and cardiovascular disorders such as epilepsy, myokymia, atrial or ventricular fibrillation. Notably, he showed that SK4 Ca^{2+}-activated K^+ channels are involved in the cardiac pacemaker activity and represent new targets for cardiac arrhythmias.



Dr. Avraham Ashkenazi

Dr. Ashkenazi, from the Department of Cell and Developmental Biology at the School of Medicine, completed his PhD at the Weizmann Institute of Science and his postdoctoral training at Cambridge University. He was awarded the Young Investigator Award by the European Biochemical Society and the Azrieli Fellowship for excellent new faculty in Israel. He is part of the Taube-Koret Global Collaboration in Neurodegenerative Diseases.

https://www.ashkenazilab.com/

Autophagy in Huntington and Parkinson's disease

Dr. Ashkenazi's long-term scientific goal is to identify mechanisms that contribute to neuronal survival. To achieve this goal, his laboratory combines stem cell technology, primary neurons, animal models, and biochemical and cellular approaches. Dr. Ashkenazi's pioneering work on autophagy (self-eating) revealed how this cell survival pathway breaks down protein clumps (aggregates), and reduces toxicity in models of triplet repeat expansion diseases, such as Huntington's and Parkinson's disease. He was the first to describe a biological function of triplet repeats encoding polyglutamine stretches in regulating autophagy in health and in Huntington's disease. Dr. Ashkenazi's research opens several new venues of understanding protein degradation pathways and the biology of neurodegenerative diseases. Moreover, his research has the potential to reveal new druggable targets that can be utilized to control a range of neurological disorders caused by aggregate-prone proteins.

Dr. Tami Bar-Shalita

Dr. Bar-Shalita, Department of Occupational Therapy at the School of Health Professions, completed her PhD at the Hebrew University of Jerusalem and her postdoctoral training at the University of Southern California. She is actively translating the knowledge evolved in her lab to the clinical field.

Sensory modulation dysfunction

We all share the same physical environments, yet for some of us these severely attenuate our efficient function and well-being. This condition is termed sensory modulation dysfunction (SMD), characterizing about 10% of the general population. Dr. Bar-Shalita is the first to apply a unique approach by the coupling of sensory and pain domains using neurophysiology and psychophysical methods. Through this approach, Dr. Bar-Shalita found that SMD is linked to disorders such as substance use disorder and chronic pain, which further served developing novel mechanism-based therapeutic modalities, currently under testing.

Prof. Orit Bart

Dr. Bart is a faculty member at the Department of Occupational Therapy in the School of Health Professions. She holds a Ph.D. in health professions and performed her post-doctoral training at Haifa University. She is Chair of the Department of Occupational Therapy. Bart is a member of the International Advisory Council for Children with Developmental Coordination Disorder (DCD) and of the Israeli Association of Occupational Therapy and the American Occupational Therapy Association.

Autism spectrum disorder

Children with autism experience stress in diverse life situations. The most common stress-provoking situations are engagement in social interaction and exposure to tactile stimuli. Dr. Bart aims to assess brain engagement during different play settings (solitary play vs. dyadic play) and during exposure to different tactile stimuli (direct – physiology vs. indirect -cognitive) in children with Autism. This is step towards better understanding of the physiological and cognitive-emotional mechanism underlying atypical sensory responsiveness and social interaction. To overcome the challenge of assessing young children with Autism Dr. Bart used an electro-physiological marker for sustained attention, the Brain engagement index, of which is an easy-to-use, reliable, and valid tool.

Prof. Hagit Eldar-Finkelman

GSK-3 and neurodegeneration

The research in Prof. Eldar-Finkelman's laboratory is focused on the development of new innovative therapeutics addressing unmet needs in the neurodegenerative disorders arena. A particular interest is given to the protein kinase, glycogen synthase kinase-3 (GSK-3), as a prominent drug target for treating neurodegeneration. They combine expertise in chemistry, biology, and computational modeling to design drugs with unique inhibition modality. The team's goal is to ultimately produce beneficial therapeutics for clinical practice.

Prof. Eldar-Finkelman obtained her BSc in Chemistry from the Hebrew University of Jerusalem, and her MSc in Physical Chemistry and PhD in Life Sciences at the Weizmann Institute. Her postdoctoral work was conducted with the Nobel Prize Laureate Edwin G. Krebs at the University of Washington in Seattle. She then became an Assistant Professor at the Harvard Medical School in the Division of Women's Health and then joined TAU. Eldar-Finkelman was a visiting scientist at MBL Woods Hole, Cape Code; EMBL-EBI Hinxton, UK; Perelman School of Medicine, University of Pennsylvania, Philadelphia; and at Rockefeller University, NYC. Her academic activity includes, representing the university in the Inter-University Forum for Medical Sciences, in the National Council for Experiments in Animals Subjects, and in the State Control Committee in the Knesset, Chair of the Faculty committee for PhD studies and of the University Committee for Animal Care and Ethics. She is part of the Taube-Koret Global Collaboration in Neurodegenerative Diseases.

https://heflab.com/

Prof. Illana Gozes

Therapeutics for autism and beyond

Prof. Gozes discovered and studies Activity-dependent neuroprotective protein (ADNP), recognized as a leading gene accounting for 0.17% of autism spectrum disorder (ASD) cases globally. The Gozes laboratory focuses on genome editing, to test and develop therapeutics such as the ADNP enhancing fragment NAP (CP201) and pipeline products, for effects on autism and other ASD-related predicaments. Prof. Gozes further discovered convergence among autism, schizophrenia, stress-related ailments and Alzheimer's disease with ADNP playing a role in all of these diseases. As such, the Gozes laboratory strives to pave the way to novel diagnostics and treatments toward healthy development, maturation and aging of the brain.

Prof. Gozes (Emerita) is Head of the Dr. Diana and Zelman Elton (Elbaum) Laboratory for Molecular Neuroendocrinology, and at the Department of Human Molecular Genetics and Biochemistry, Sackler Faculty of Medicine, the Adams Super Center for Brain Studies and Sagol School of Neuroscience. She is Chief Scientific Officer at Coronis Neurosciences,with her BSc, from Tel Aviv University, Direct PhD, from Weizmann Institute of Science, Israel, postdoc at MIT and Salk Institute, and was a Senior Scientist/Associate Professor at the Weizmann Institute and Fogarty-Scholar-in-Residence at the NIH, USA. Prof. Gozes has won many awards of excellence, including Tel Aviv University's Vice President Award, Olson Prize, Julodan Prize, Teva Prize, Neufeld Award, Hanse-Wissenschaftskolleg (HWK) Fellowship, Humboldt Award, the Landau Prize for Life Achievements and the RARE Champion of Hope Award. She currently serves as Secretary of the European Society for Neurochemistry, is a member of the Israeli Ministry of Education, Council of Higher Education and is the Editor-in-Chief of the *Journal of Molecular Neuroscience*.

https://www.adnpkids.com/illana-gozes.html

Dr. Yoni Haitin

Dr. Haitin completed his Ph.D. studies at Tel Aviv University and his postdoctoral training at the University of Washington, where he was awarded the Human Frontier Organization Long Term Postdoctoral Fellowship. Haitin has established a structural-physiology research program at the Department of Physiology and Pharmacology at the School of Medicine. Dr. Haitin serves as the secretary of the Israeli Society for Physiology and Pharmacology and is on the editorial board of *PLoS One*. He heads the Joint Undergraduate Program with the Faculty of Life Sciences.

https://haitinlab.com/

Ion channels in disease

Proteins are molecular machines essential for all cellular activities. When they malfunction due to genetic mutations or environmental effects, they also underlie and facilitate many human diseases. As the roles of these crucial cellular building blocks are tightly related to their atomic structures, deciphering disease-related mechanisms requires scrutinizing proteins' utmost fundamental molecular properties. Dr. Haitin focuses on studying ion channels and prenyltransferases, two types of radically different enzyme families. By utilizing cutting-edge biochemical and biophysical approaches, they delineate the structural mechanisms underlying functional regulation of these key protein families. Moreover, given the emerging pivotal roles these proteins play in numerous diseases, they use high-throughput screens to identify novel modulators, which may prove beneficial for future development of targeted therapeutic strategies.

Prof. Yael Henkin

Auditory neuroscience and hearing rehabilitation

What are the neurophysiological underpinnings of auditory processing in the normal and impaired auditory system? how are they affected by increasing age, monaural vs. binaural listening, and by rehabilitation with cochlear implants and hearing aids? Prof. Henkin utilizes a complementary auditory neuroscience approach in search of neurophysiological biomarkers and behavioral indices of auditory processing in normal hearing listeners, hearing-impaired listeners with bilateral/unilateral hearing loss habilitated by cochlear implants and hearing aids, and in children with autism, selective mutism, and auditory processing disorders (APD). Her clinical experience in audiology and hearing rehabilitation have set the ground for clinical research aimed at transforming research findings into diagnostic and rehabilitative approaches.

Prof. Henkin, from the Department of Communication Disorders at the School of Health Professions, completed her PhD and post-doctoral studies at TAU and at the University of Michigan, respectively, focusing on auditory processing in cochlear implant recipients, using auditory cortical neurophysiology. Prof. Henkin is Head of the Hearing, Speech, and Language Center and Communication Disorders Services, and co-director of the cochlear implant program at the Sheba Medical Center. She manages a diverse spectrum of diagnostic and therapeutic activities in the field of communication disorders including audiology, hearing rehabilitation, speech, language, communication disabilities, and swallowing disorders. She was awarded the DFG German-Israeli grant in collaboration with scientists from the University of Hannover. Prof. Henkin consults the Israeli Ministry of Health on various topics in the fields of communication disorders and hearing healthcare.

Dr. Michal Itzhaki

Dr. Itzhaki, Department of Nursing, School of Health Professions, serves as the Chair of the Department. She is the first registered nurse in Israel to have completed a direct PhD track, which she obtained at the Department of Nursing Department at Tel Aviv University. She completed her post-doctoral training at the Department of Sociology & Anthropology at Bar-Ilan University. She collaborates with nursing theorists in academic institutions worldwide exploring caring in multicultural societies.

Emotion management

Feeling rules are unwritten social rules that dictate the strength of emotions appropriate for different situations. In case of incompatibility between experienced and socially expected emotions, emotional management is required to overcome the dissonance. Dr. Itzhaki explores the feelings experienced by healthcare workers and patients and their coping strategies with differences between expected versus experienced emotions in life-threatening situations (emergency and disaster) and in complex care situations. Investigation of the emotion management experienced by nurses includes attention to caring and emotional resilience. Her research forms the basis for developing intervention programs aimed at efficient emotional labor, which includes raising the caregiver/patient's sense of resilience and emotional support. She uses a mixed methods design that combines qualitative and quantitative methods.

Prof. Liat Kishon-Rabin

Speech processing and brain plasticity in cochlear implant users

Prof. Kishon-Rabin investigates the effect of sensory, cognitive and linguistics processes that are involved in speech perception in optimal and degraded listening conditions in normal and pathological hearing. The different factors that influence performance assist in understanding the wide variability in performance of implanted cochlear implant users, as well as in developing habilitation protocols that are tailored to the hearing-impaired individual. Prof. Kishon-Rabin was one of the first to study functional hearing in infants with cochlear implants, for which she received worldwide recognition. She investigates the influence of auditory stimulation and experience dependent factors that drive cortical development in infants using video analysis and brain-imaging techniques. Her team are pioneers in implicit learning processes via auditory modality using fNIRS measurements, for the first time for cochlear implants in Israel.

Prof. Kishon-Rabin is at the Department of Communication Disorders, School of Health Professions and is the Dean of Innovation in Teaching & Learning at Tel Aviv University. She completed her PhD in psychoacoustics from the Speech & Hearing Sciences Department at the Graduate Center, City University of New York. She was the first Israeli to be awarded with the Graham Fraser Memorial Lecture by the British Cochlear Implant Group. She is an associate editor for the *International Journal of Audiology*. She is vice president of the European Federations of Auditory Societies (EFAS) and will serve as president from 2021-2023. In continuation to her research, which supports intervention during the early years of the developing brain, Prof. Kishon-Rabin initiated a series of social startups in infant day-cares and pre-school bringing evidence-based practice of language acquisition programs to practitioners, caretakers and parents either directly or via novel on-line programs.

Prof. Tova Most

Prof. Most is at the Department of Communication Disorders, Steyer School of Health Professions, Faculty of Medicine and the Department of Counselling and Special Education, Jaime and Joan Constantiner School of Education. Prof. Most research focuses on the rehabilitation and education of deaf and hard of hearing individuals. Her research work has been published in leading international scientific journals including 95 research manuscripts, 15 book chapters and a book in the area of education and rehabilitation of deaf and hard of hearing children and adults.

Rehabilitation and education of hard of hearing and deaf individuals

Prof. Most' research activities focus on the effect of hearing loss and the use of various sensory aids (hearing aids, cochlear implants) on the perception and production of spoken language. The research relates to individuals from in a wide range of ages and various degrees of hearing loss from unilateral and mild hearing loss to profound deafness. Prof. Most also studies the ramifications of a hearing and communication deficiency on the individual's academic, social and emotional functioning. She examines their functioning in the various life environments of education, family, community and occupation, focusing on the individuals with hearing loss as well as their parents, friends, teachers and employers. She provides a holistic approach and broad in-depth understanding of the ramifications of the hearing loss on the individual's functioning.

Prof. Yuval Nir

Prof. Nir, Department of Physiology and Pharmacology, completed his PhD at the Weizmann Institute of Science and his postdoctoral training at center for sleep and consciousness, University of Wisconsin-Madison. He has won several awards including the Adelis Neuroscience Prize.

https://yuvalnirlab.com/

Sleep

Sleep is a universal behavior that is present across the animal kingdom. We spend a third of our lives sleeping, but still don't fully understand what it is for. Prof. Nir is studying the relation between sleep and cognition using a unique combination of animal and human research: what it is about sleep that keeps us 'disconnected' from the external environment? How does sleep promote learning and memory? Can we harness sleep to improve neuropsychiatric diagnosis and counteract neurodegeneration?

Prof. Eran Perlson

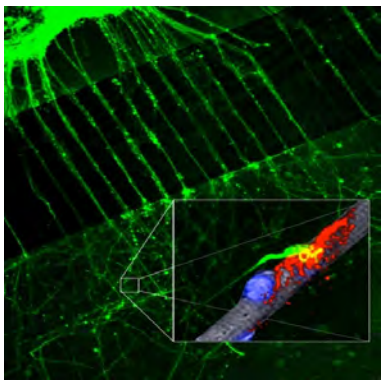
Prof. Perlson, at the Department of Physiology and Pharmacology, is a leader in the research of nerve degeneration and regeneration. He completed a Ph.D. at the Weizmann Institute of Science in molecular and cellular neurobiology. As a Postdoctoral Research Fellow at University of Pennsylvania Medical School, he focused on understanding the mechanisms underlying axon degeneration in ALS. His scientific work has earned him a large number of distinguished grants, awards and honors, and he is the author of numerous publications in high profile journals and invited speaker to leading international meetings.

http://www3.tau.ac.il/medicine/perlson/

Amyotrophic lateral sclerosis

Amyotrophic lateral sclerosis (ALS) is a lethal adult-onset motor neuron disease, pathologically characterized by neuronal death and degeneration. No effective treatment exists for ALS. Prof. Perlson is taking a fresh approach to this challenge using advanced microscopy, genetic engineering and a novel NMJ-on-a-Chip platform that mimics the human motor unit. This novel platform was developed first in the world by Prof. Perlson's team, and enables growth of patients' neurons and muscle on a silicon chip.

This unique platform opens new possibilities for experimental analyses of neuron degeneration and regeneration process, and provides a tool for personalized medicine. The team's main goal is to elucidate the critical events leading to neuron damage that can be targeted and prevented. By preventing nerve degeneration and activating its regeneration, they will be able to find effective treatment to neurodegenerative disease such as ALS or spinal cord injuries.



Dr. Sigal Portnoy

Dr. Portnoy is at the Department of Occupational Therapy at the School of Health Professions. Dr. Portnoy received her B.Sc. in Electronic Engineering at Tel Aviv University and her M.Sc. and Ph.D. in Biomedical Engineering at the Musculoskeletal Biomechanics Laboratory at Tel Aviv University. She was the scientific director of the Gait and Motion Laboratory at the Hadassah Medical Center in Jerusalem.

https://www.tau.ac.il/~portnoys/

Technology for rehabilitation

The promise of new and exciting technologies to enhance the world of motor and cognitive rehabilitation, relies on its integration in the clinics. One of the main goals of Dr. Portnoy is to create and distribute accessible and innovative tools that will promote the use of technologies in rehabilitation. Among the developed tools are a software that evaluates cognitive function, validated, published and to date, downloaded by more than 250 users worldwide, and a software that automatically fits the dimensions of virtual model of orthoses for 3D printing, according to simple limb measurements performed by the clinician.

Dr. Angela Ruban

Spinal cord injury

Spinal cord injury causes permanent changes in strength, sensation and motor functions. Hope of recuperation is slim to none. Primary mechanical damage to spinal cord tissue kills a certain number of neuronal cells. But there's a secondary damage due to the release of excess glutamate, which is responsible for an additional functional disability. Our main idea is to reduce the secondary damage as soon as possible — to block the body's reaction to the spinal cord trauma. Our new study finds the intravenous injection of a potent enzyme, just hours after the accident, has the potential to diminish a cascade of pathological events responsible for neuronal death, such as inflammation and scarring. It will be the first emergency treatment for neurotrauma in the world. We suggest administering the injection by paramedics even in cases of uncertain diagnosis. There's no side effect, but it might just mitigate secondary damage and dramatically improve the quality of a person's life.

Dr. Ruban, at the Department of Nursing in the School of Health Professions, received a PhD in Clinical Pharmacology from the Ben Gurion University. She was a postdoctoral scholar at the Department of Neurobiology at Weizmann Institute of Science. During this period, she and Prof. Teichberg developed a novel Blood Glutamate Scavenging (BGS) technology for the treatment of malignant and neurodegenerative disorders. Dr. Ruban A. is a faculty member at the Health Profession School, Faculty of Medicine, Tel Aviv University. Her lab research has focused on evaluating the therapeutic potential of the treatment in the neurotrauma, neurodegenerative and malignant diseases.

https://www.angelarubanlab.com/

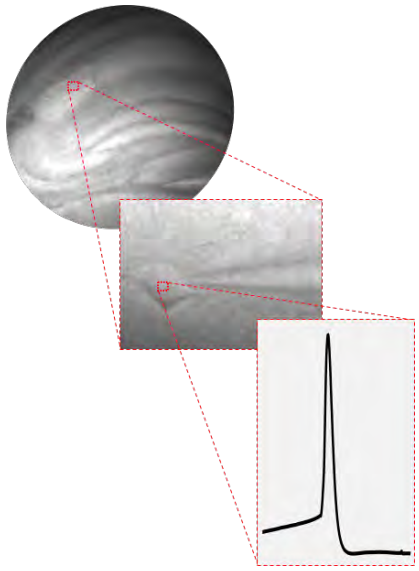
Dr. Moran Rubinstein

Dr. Rubinstein, head of the Goldschleger Eye Research Institute and member of the Department of Human Molecular Genetics and Biochemistry at the Sackler Faculty of Medicine of Tel Aviv University, completed her Ph.D. studies at Tel Aviv University and her postdoctoral training at the University of Washington. She serves on the scientific committee of the Israeli Society for Physiology and Pharmacology, the editorial board of the *Journal of Molecular Neuroscience* and as guest editor for *Frontiers in Pharmacology*.

https://moranrub.wixsite.com/rubinsteinlab

Neurodevelopmental disorders

Neurodevelopmental disorders, which include cognitive impairment, severe epilepsy and autistic features, are the leading cause of morbidity in children. While recent genetic studies, exposing involvement of specific genes in the etiology of these disorders, have contributed to the tremendous advancement in the studies of these disorders, our understanding of the pathophysiological pathways leading from a genetic mutation to abnormal brain function is limited. In order to bridge this gap, the lab of Dr. Rubinstein uses unique mouse models, which are a precise mimic of the human disorder. By combining genetic, electrophysiological and behavioral approaches, her goal is to elucidate the neurobiological basis of these disorders and unveil novel diagnostic and therapeutic approaches.



Prof. Inna Slutsky

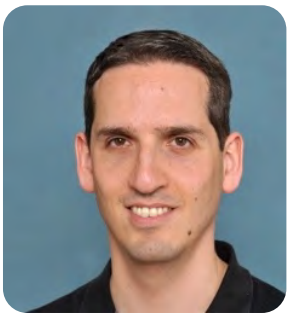
Prof. Slutsky is at the Department of Physiology and Pharmacology and the Sagol School of Neuroscience at Tel Aviv University. Dr. Slutsky completed her PhD at the Hebrew University of Jerusalem and post-doctoratal studies at MIT. She is a member of the American Federation for Aging Research (AFAR) National Scientific Advisory Council, editorial member of *eLife* and *Scientific Reports* journals, and scientific committee member of the Israel Society of Neuroscience. Dr. Slutsky is a recipient of the MetLife Foundation Prize in Alzheimer's research, Bernard Katz Prize in Neuroscience, the New Investigator Award in Alzheimer's Disease from American Federation for Ageing Research, the Sieratzki Prize and the ERC Starting and Consolidator Awards.

https://www.slutskylab.com/

Plasticity and memory in Alzheimer's disease

Prof. Slutsky's research is focused on understanding the basic mechanisms that maintain synaptic plasticity and memory function and initiate memory dysfunction in Alzheimer's disease (AD). Using high-resolution optical imaging, electrophysiology and molecular biology, Slutsky's team focuses on identifying the mechanisms that initiate synaptic and cognitive impairments in common, late-onset AD. Dr. Slutsky and her team discovered how neuronal activity and sensory experience regulate molecular composition of amyloid-beta, the physiological role of amyloid-beta, the role of magnesium ion in cognitive enhancement and the molecular mechanism triggering synaptic hyperactivity at the earliest AD stages.

Dr. Ido Tavor

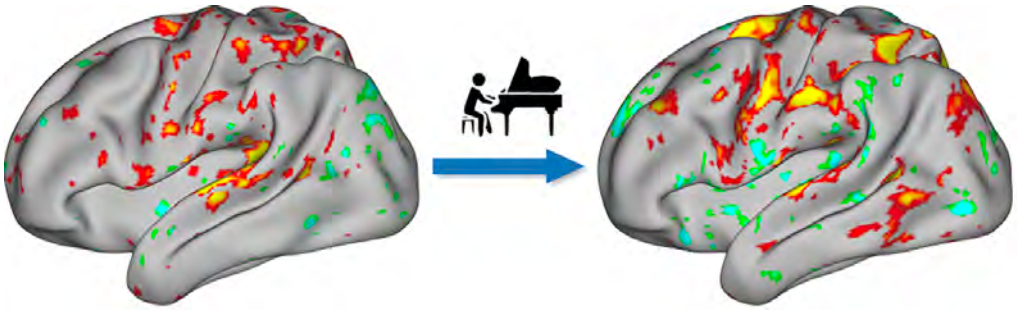


Brain structure, function and human behavior

Dr. Tavor, from the Department of Anatomy and Anthropology at the School of Medicine and the Sagol School of Neuroscience, completed his PhD at Tel Aviv University. He then proceeded to a postdoctoral training at the University of Oxford where he specialized on advanced imaging techniques. He holds an inter-disciplinary lab, combining computational, statistical and cognitive neuroscience methods to study the human brain and behavior.

https://www.tau.ac.il/~idotavor/

What makes us different? While doing the exact same thing, different individuals present different patterns of brain activity. Dr. Tavor studies what underlies behavioral and functional differences between individuals using Magnetic Resonance Imaging (MRI). Specifically, he uses advanced imaging techniques to examine how modifications in brain connectivity and microstructure affects brain function and human behavior, both in healthy and clinical populations. By better understanding the relations between brain function and structure, new insights on human behavior may be gained.



Public Health

Public health laboratories at the Sackler Faculty of Medicine are responsible for providing timely and reliable results, primarily for the purpose of disease control and prevention, as well as improving quality of life across range of population.

Our public health researchers conduct interdisciplinary studies, incorporating behavioral health, mental health, health education, occupational safety, disability, gender issues in health, reproductive epidemiology, and disease prevention.

Programs

Summer Institute of Advanced Epidemiology and Preventive Medicine, in collaboration with Johns Hopkins University Bloomberg School of Public Health
https://en-med.tau.ac.il/School-of-Public-Health/Summer-Institute

Emergency & Disaster Management Program
https://emergexint.tau.ac.il/

The School of Public Health has been at the forefront of efforts to benefit the health of populations worldwide, including the current COVID-19 pandemic.

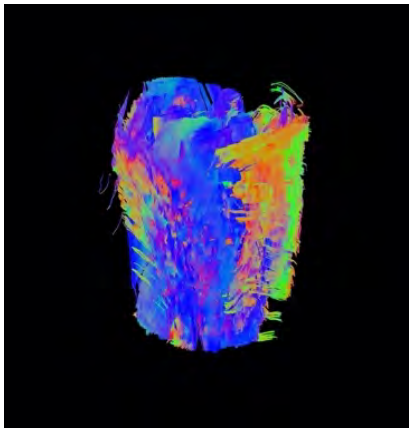
Dr. Yftach Gepner

Dr. Gepner, School of Public Health, Sackler Faculty of Medicine, completed his Ph.D. (2016) at Ben-Gurion University on the role of lifestyle intervention on various body fat depots. He then continued his training in the Department of Sport and Exercise at University of Central Florida, to better understand the field of exercise physiology in both applied and basic in nature. Gepner has been awarded the 2020 Neufeld Memorial Research Grant, which will run concurrently with his BSF and other grants.

https://www.gepnerlab.com/

Impact of exercise training

Regular physical activity is one of the most important things you can do for your health, and has long been touted as a strategy for weight loss. However, only 20% meeting the physical activity guidelines and over 90% of the people who lose weight will gain it all back. Dr Yftach Gepner research focuses on understanding the impact of exercise training, combined with dietary strategies, on muscle damage and mass, metabolism and performance across a range of populations. Dr. Gepner are using cutting-edge technologies, including magnetic resonance imaging (MRI) for assessing muscle damage and adipose tissue distribution, doubly labeled water to assess energy expenditure and labeled amino acid to determine protein synthesis by muscle biopsy. By combining applied and mechanistic metabolism and physiology adaptation studies, his goal is to elucidate the unique beneficial effect from physical activity.



Prof. Liat Lerner-Geva

Prof. Lerner is at the School of Public Health, Sackler Faculty of Medicine, and Chair of the Department of Epidemiology and Preventive Medicine. She is a board-certified physician in Epidemiology and Public Health with special emphasis on reproductive epidemiology. She is the director of the Women and Children's Health Research Unit at the Gertner Institute for Epidemiology and Health Policy Research (Ltd) and the founder and director of the National Registry for in vitro fertilization treatment cycles in Israel.

Reproduction and infertility

Israel has a world-wide unique epidemiology and public health policy regarding reproduction in general and infertility treatments in particular. Prof. Lerner-Geva are taking a scientific, evidence based approach to evaluate these topics, including investigation of factors that predicts successful reproduction and having healthy babies. She is carefully assessing on a national basis the short and long-term adverse outcomes of infertility treatments. These insights will lead to the development of safer and better procedures that are of great interest in the national, as well as the international arena.

Dr. Yael Lahav

Dr. Lahav is a new faculty member in the Department of Occupational Therapy at the Sackler Faculty of Medicine. Dr. Lahav is a licensed clinical psychologist. She completed her PhD studies at Tel Aviv University, where she studied the longitudinal associations between attachment and perceived health among former-prisoners-of-war of the 1973 Yom Kippur War. She was a post-doctoral fellow at the University of Southern Denmark, where she studied the link between attachment and dissociation during treatment among childhood sexual abuse survivors and at Stanford University, as a Fulbright grantee, where she studied posttraumatic growth, as well as the phenomenon of identification with the aggressor among childhood sexual abuse survivors.

https://www.tau.ac.il/~yaellah1/

Trauma and abuse

Dr. Lahav investigates the implications of psychological trauma, and focuses on uncovering the mechanisms underlying post-traumatic distress following interpersonal and ongoing traumatic events, such as was captivity, domestic violence, as well as sexual, physical, and emotional abuse during childhood. Her interests revolve primarily, around the unique associations between the psychological, interpersonal, somatic, physiological, and functional facets of psychological trauma; as well as the interpersonal processes involved in the victim-perpetrator dynamics, known as identification with the aggressor.

Rehabilitation

The Stanley Steyer School of Health Professions

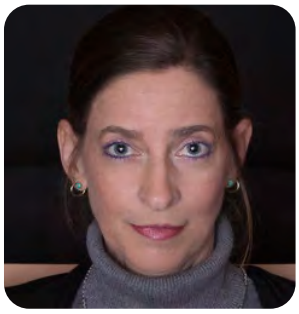
Four clinical fields of study and research

- Communication Disorders
- Nursing
- Occupational Therapy
- Physical Therapy

Our major goal: to improve the health and wellbeing of our population.

https://en-med.tau.ac.il/Steyer-School-Main

Dr. Michal Avrech Bar



Dr. Avrech Bar is at the Department of Occupational Therapy at the School of Health Professions. She received her PhD from Tel Aviv University, followed by a postdoctoral fellowship at the University of British Columbia, Vancouver, Canada. She joined the Occupational Science Europe (OSE) - Research Committee as Israel's representative. The committee is responsible for developing the research agenda for Occupational Science Europe.

Occupational science

Dr. Avrech Bar's primary area of research is occupational science, a scientific discipline that is defined as the systematic study of the human as an occupational being. It is the basic science that supports the practice of occupational therapy. As an occupational scientist she studies the relationship between engagement in occupations, health, and wellbeing. The goal of her research is to clarify the nature of these relationships and to provide empirical evidence to support them, especially among women in relation to their role as mothers. In her research she employs advanced qualitative and quantitative methods with healthy women, women in their role as caregivers to their children or spouse and women diagnosed with illness or having a disability.

Dr. Debbie Rand

Dr. Rand is at the Department of Occupational Therapy at the School of Health Professions, and affiliated with the Sagol School of Neuroscience. She completed her PhD at Haifa University and her postdoctoral training at the University of British Columbia, Canada. She presented her research at international conferences in the field of rehabilitation, gerontology and advanced technologies.

https://www.tau.ac.il/~drand/

Gaming for rehabilitation

Dr. Rand's research aims to achieve a better understanding of the factors hindering and facilitating the recovery of individuals post stroke and specifically the use of their affected upper extremity.

Her studies are clinical aiming to research the factors related to the limited recovery of the affected upper extremity. She has developed interventions (utilizing gaming technologies) aimed to improve the affected upper extremity as well as assessment and treatment of the cognitive deficits of these individuals.

Recently, she has expanded her research to the growing population of (healthy) older adults. She investigates physical and social frailty as well as cognitive decline, aiming to determine ways to promote successful aging.

Prof. Navah Ratzon

Prof. Ratzon is at the Department of Occupational Therapy, and is Head of the School of Health Professions. Among her other achievements, Ratzon chaired the Council for the Advancement of Women in Science and Technology at the Ministry of Science and Technology from 2016-2020. She is a member of the Advisory Council to the Minister of Health on the subject of rehabilitation and of the Advisory Committee to the Minister of Health and the Minister of Labor and Welfare on the subject of employee health. Prof. Ratzon is a social activist, engaged in developing community intervention programs and research among communities in need, such as children of immigrants from Ethiopia, children of foreign workers, and students with disabilities.

Occupational rehabilitation

Ratzon's research areas focus on ergonomics, vocational rehabilitation, and driving rehabilitation. Her research in the field of ergonomics focuses on workers at risk of developing skeletal muscle problems. Her studies highlight multiple populations, such as professional musicians, people who work long hours on the computer, and "blue-collar" workers. In her research on occupational rehabilitation, Ratzon focuses on raising awareness of professional risks and treatments among those recovering from cancer, people after hand injuries, and more. As a researcher in the field of driving rehabilitation, Ratzon examines ways to assess driving ability and interventions to reduce the driving risks in professional drivers, adolescents with ADHD, people with schizophrenia, and people after a stroke.

Training opportunities

The School of Graduate Studies at the Sackler Faculty of Medicine **strives for excellence** in research and serves as a training platform for Master's programs – M.Sc., M.P.H., M.Occ.H., M.A. - and Doctor of Philosophy - Ph.D. - in diverse biomedical fields. The school is the largest graduate school at Tel Aviv University, with 1050 students, including 430 Ph.D. students, and 580 Masters' students.

The Faculty of Medicine's M.Sc. and Ph.D. thesis projects offers financial support to undertake research in our laboratories. **Tuition and stipend scholarships** are available to qualified students, providing a tuition-free degree and living stipend.

We welcome **students from abroad**, with opportunities for courses in English. While our official spoken language is Hebrew, all laboratory members speak English, providing an international environment.

Prof. Drorit Neumann, Head of the Graduate School

Dr. Chen Luxenburg, Academic Coordinator, International Graduate Program

Life in Tel Aviv

The city of Tel Aviv-Jaffa is a bustling, energetic and dynamic one, with opportunities for sun, exercise, food and socializing like no other place.




Source: Unsplash

For more information, please visit https://en-med.tau.ac.il/

Karen Avraham, Oct 27, 2020