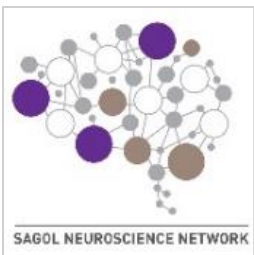


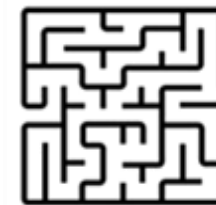
Ichilov Scientific Ecosystem





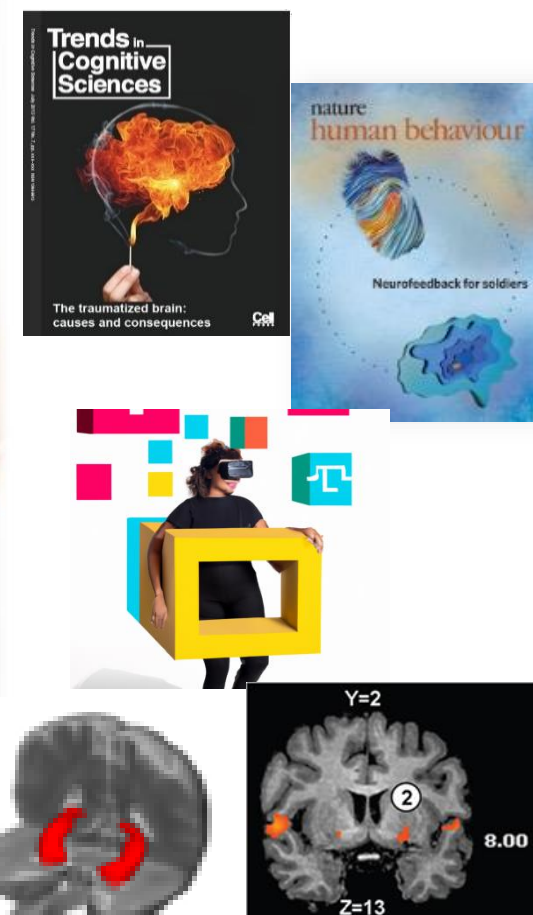
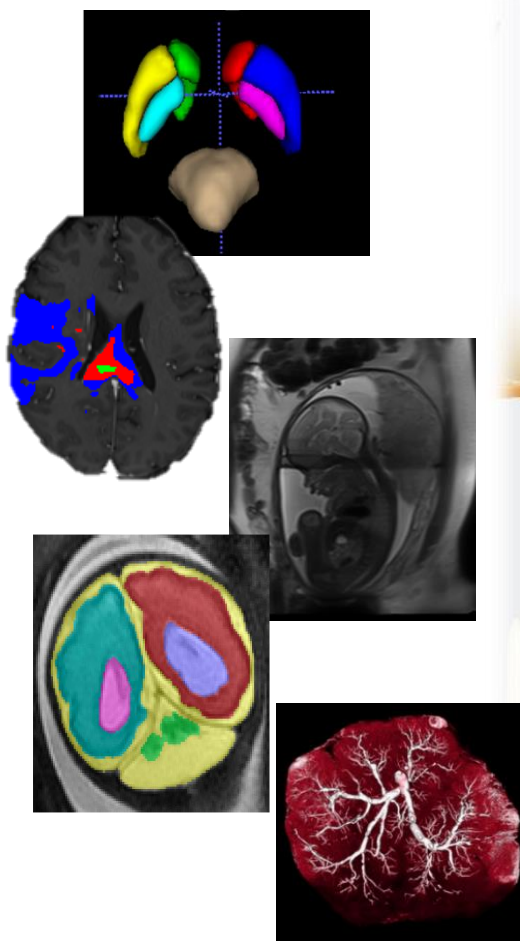
Sagol Brain Institute

מכון סגול לתפקודי המוח



Cluster 1: Advanced Medical Imaging –Prof Dafna Ben Bashat

Cluster 2: Cognitive-Affective Neuro-Informatics –Prof Talma Hendler



➤ Who we are and our area of interest

Name of lab/Location

Advanced Medical Imaging Cluster

Sagol Brain Institute
Agaf H, MRI, Floor 3

Lab Manager: Anna Levchakov
~14 students

PI/Manager

1. Prof. Dafna Ben Bashat (PhD)
2. Dr. Moran Artzi (PhD)
3. Guy Gurevitch
Presurgical clinical service

➤ Who we are and our area of interest

Main Subjects in the lab:

- ❑ **Brain tumors:** Diagnosis, classification, grading, therapy response assessment
Primary and brain metastasis
- ❑ **Neurological disorders:** Understanding mechanism and defining imaging biomarkers
PD, DLB, MS, AD
- ❑ **Brain development:** Characterizing normal development and developmental disorders
Children, preterm, autism
- ❑ **Fetal & Placenta:** Placental structure and function and it's effect on fetal brain
development and outcome

Brain Tumors: Translating research into clinical services

Differentiating between treatment related changes and recurrent tumors

Quantitative report

Custom MRI acquisition

20-Brain Tumors

```
AAHead_Scout_64ch-head-coil
AAHead_Scout_
t1_fl2d_sag
t1_mprage_tra_p2_iso
DCE_FA_20
DCE_FA_30
DCE_FA_15
DCE_FA_10
DCE_FA_5
DCE_FA_3
DCE_MAIN
tra_t2_tirm_dark-fluid
DCE_X_4_rep
tra_t2_tse
tra_t2_swi3d
DCE_X_4_rep
DTI_ep2d_diff_mddw_20_isov
ASL_3D_tra_iso
DCE_X_4_rep
ep2d_perfusion_inj Delay 15 sec
t1_mprage_tra_p2_iso
svs_se_30
svs_se_135
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fs



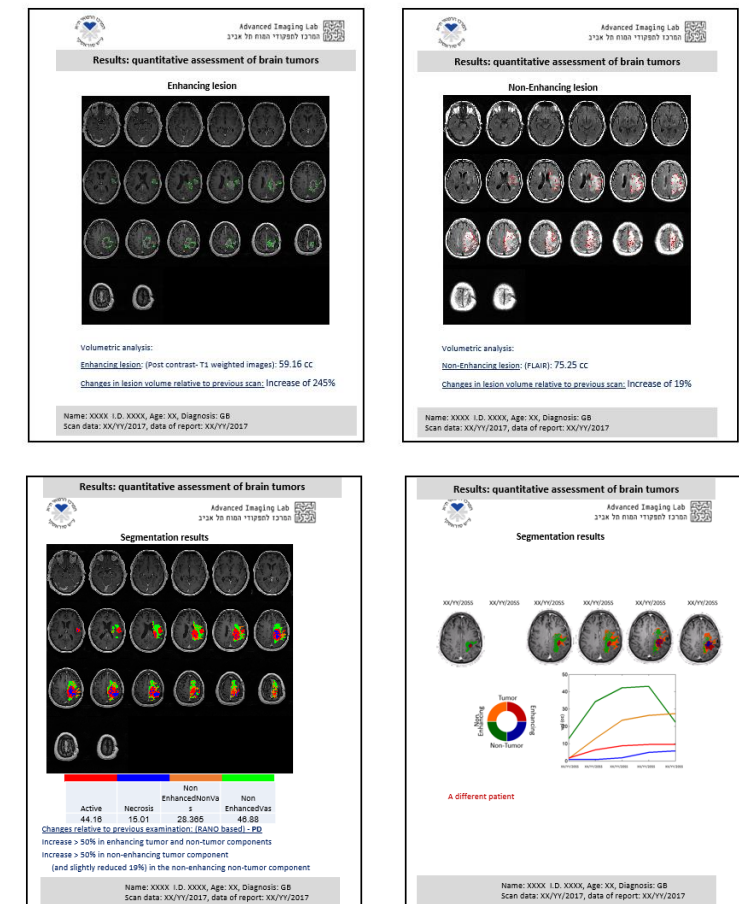
Providing a full report to:

Preprocessing - image analysis
Segmentation
Feature extraction
Classification



Recently, the Israeli Ministry of Health approved this scan to be included in the “Sal Habriut” (the Health Basket)

Radiologist
Neuro-oncologist
Radiation-oncologist



Neurological disorders

- **Identify imaging markers for early diagnosis**

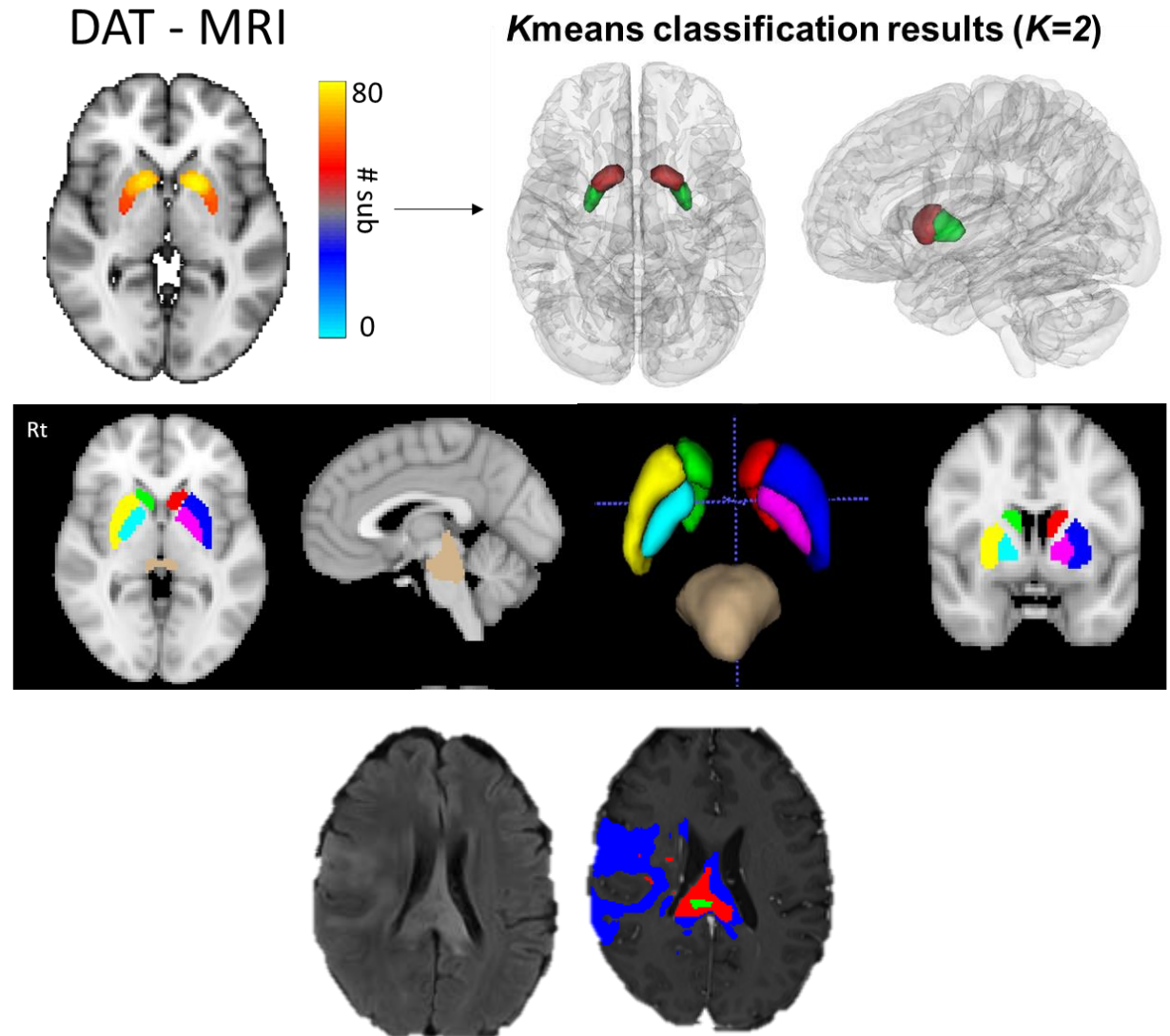
Neuromelanin, DAT
PD, DLB

- **Study mechanism**

Iron / neuromelanin
BBB disruption
PD, DLB, Lupus

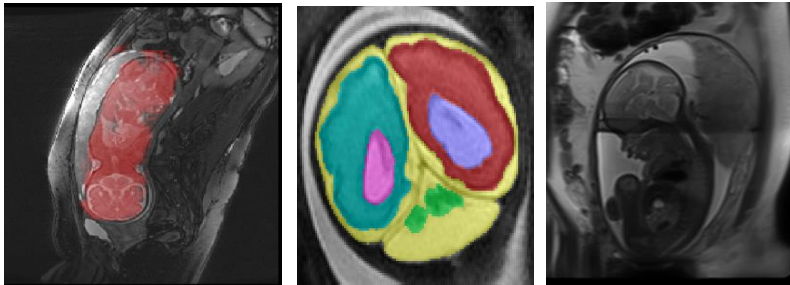
- **Develop automatic tools for quantitative assessment**

WM lesions
MS, PD, DLB



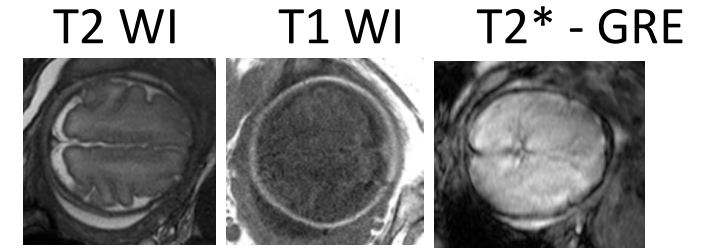
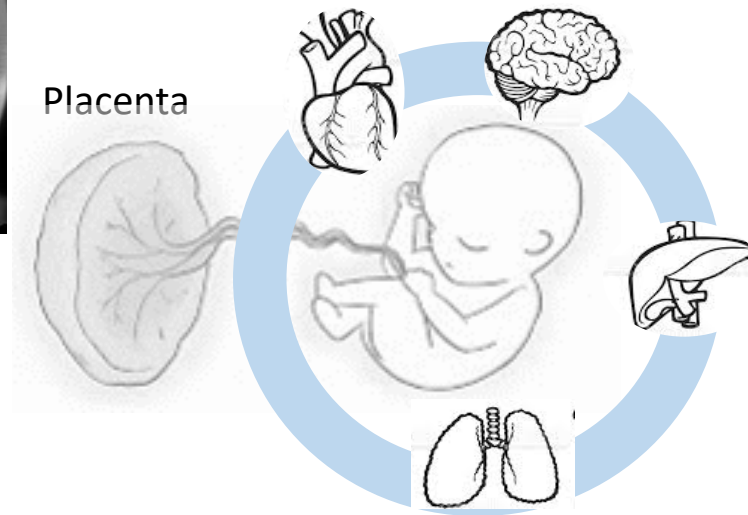
Fetal and placental development

3D – Volumetric analysis

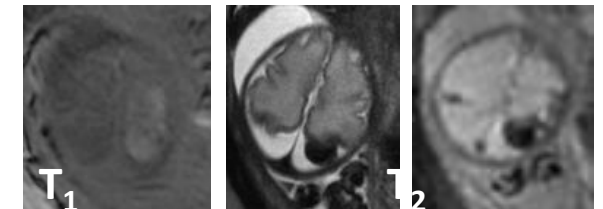


Neurodevelopmental and metabolic outcomes

- Fetuses with growth restriction
- Fetuses infected by CMV
- Fetuses with malformation of cortical development

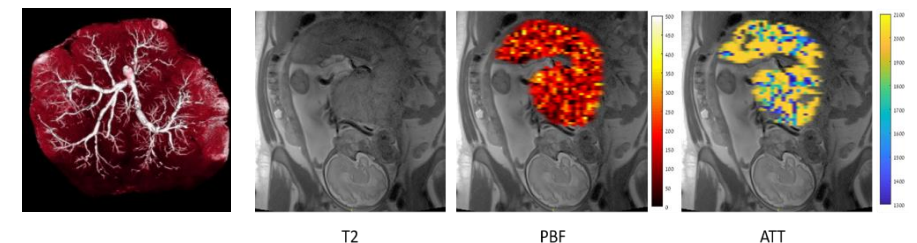


Extra axial hemorrhage



Fetal Brain

Placental structure & function



➤ Key Capabilities

What are we specialized in

- Acquisition:
 - Advanced MRI methods
- Image processing methods:
 - DL tools
 - Radiomics
 - AI

What specialized equipment we use to answer Q

- State of the art, research dedicated MRI system
- Software and strong computers for image processing

How can we aid other scientists to answer their Q

- Advice and guidelines to analyze their MRI/ imaging data
- Collaborate on various topics

What questions still needs to be answered, what is needed in order to answer them?

- Collect and organize a database of patients / fetuses at Ichilov
- Requirement for *a large storage and strong computational resources*
- Correlated imaging with *outcome*
- Correlated imaging with *genetic findings*
- Develop a multi-parametric AI algorithm for prediction

➤ Who we are and our area of interest

Name of lab cluster/Location

Cognitive-Affective Neuro-Informatics cluster (CANI)

Sagol Brain Institute

Agaf H, MRI, Floor 3 offices , Floor 2 labs

Engineer: Yael Hamrani

IT: Oren Levin

Regulation: Orly Elhadif

~25 students

PI/Manager

1. Prof. Talma Hendler (MD PhD)
[Neuropsychiatry & Neuromodulation Lab](#)

2. Dr. Gal Raz (PhD)
[Immersive Neuroscience Lab](#)

3. Dr Haggai Sharon (MD PhD)
& Dr Nimord Keynan (PhD)
[Consciousness & Psychedelic Lab](#)

4. Prof Yulia Lerner (PhD)
[NeuroCognitive Lab](#)

5. Dr Neomi Singer (PhD)
[Music 2 UR Brain Lab](#)

Who we are and our area of interest

Neuropsychiatry & Neuromodulation Lab



PI: Talma Hendler (MD, PhD)
Director of the IPR @ TAU

From EEG to fMRI

Patent

Epileptic BOLD mapping

Simultaneous fMRI/EEG

+

Algorithm

From fMRI to EEG

Electrical Finger Print

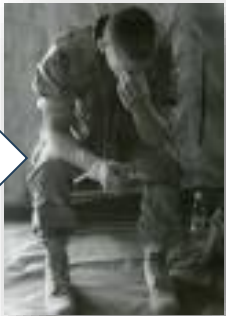
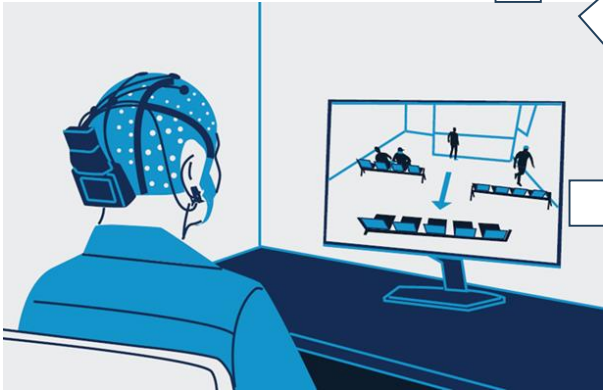
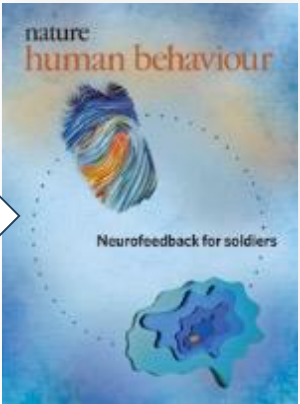
Patent

Self-Neuromodulation

Brain guided empowerment of immunity

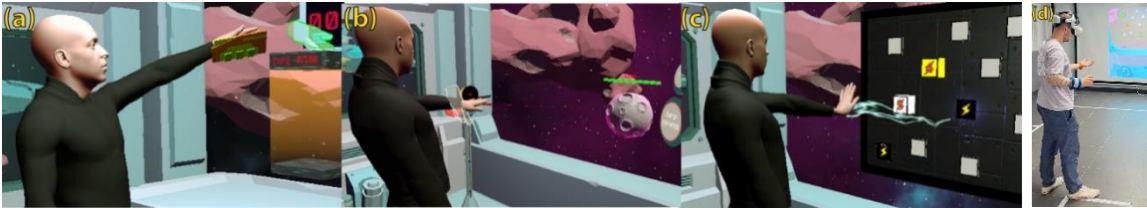
Brain guided stress resilience

Brain guided treatment for PTSD

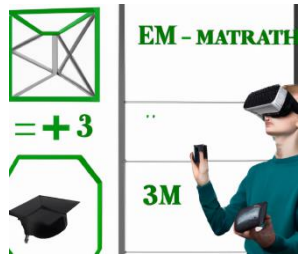


➤ Who we are and our area of interest

- XR for clinical and pedagogical applications for psychiatry and rehabilitation



Motor rehabilitation in children with Cerebral Palsy and war wounded



Bodily math intuitions in children with Cerebral palsy



Modulating body perception in body image disorders



Augmented Reality Storytelling in Parkinson's Disease Characterization

- Gamification of clinical interventions



A gamified closed-loop intervention for tic disorders

Immersive Neuroscience Lab



PI: Gal Raz (PhD)

➤ Who we are and our area of interest



Music to your brain Lab



PI: Neomi Singer (PhD)

Main subjects:

- Music is a powerful accessible neuro-stimulator and has positive impact on various domains cardinal for mental and physical health

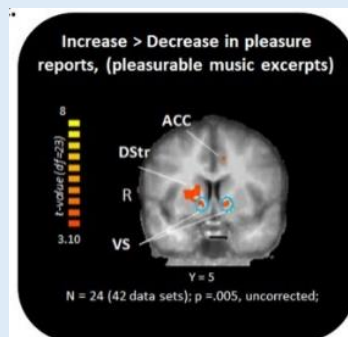
Reward and motivation **Stress and anxiety** **Pain** **Movement** **Language** ...

Understanding how music stimulates brain function in health and disorder

Translating this knowledge into **neuromusic tools** for treatment and prevention of mental and neurological suffering

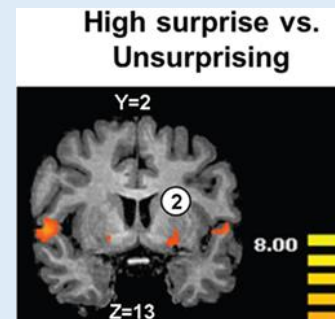
- Music induced pleasure and reward processing – from mechanism to translation

What brain regions are stimulated by music?



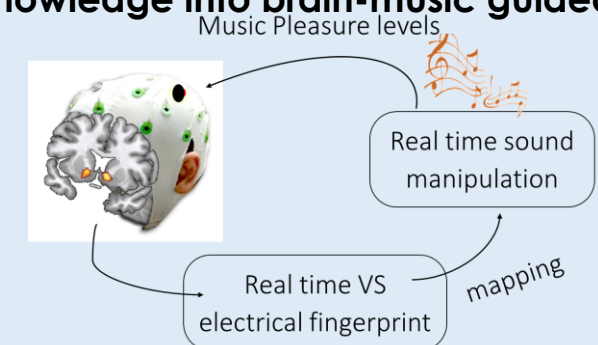
Music-induced pleasure engages reward system

What are the 'active ingredients' in music?



Musical "surprises" engage a hub in brains' reward system

Translation: harness the neuromusic knowledge into brain-music guided tools

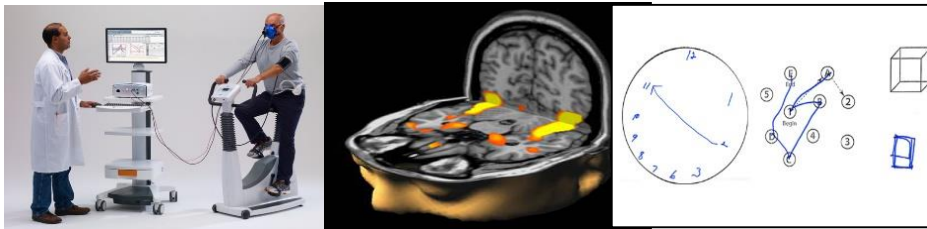


A Music-brain-computer-interface tool self modulating reward related activation

➤ Who we are and our area of interest

Main subjects:

- Neurocognitive plasticity in healthy aging and degenerative disorders



CPET

Neuroplasticity Following
Physical Exercise in Older Adults

Functional MRI

Neuropsychology

- Lifestyle medicine



Neurocognitive Lab



PI: Yulia Lerner (PhD)

episodic memory in older adults

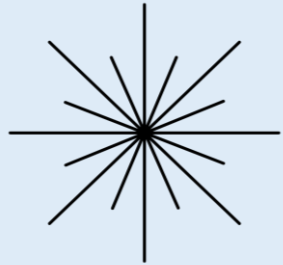


Physically active Lifestyle in MCI



Aerobic capacity and
cognitive reserve

➤ Who we are and our area of interest



Affiliated with the Institute for Psychedelic Research
(IPR-TLV)-Tel Aviv University

iprtlv@tauex.tau.ac.il

Consciousness &
Psychedelic Lab



PI: Haggai Sharon (MD PhD)

Informed Psychedelic Medicine

1. **Basic Science:** Unravel the mechanisms of action behind psychoactive substances.
2. **Clinical Research for Responsible Administration:** Advance safe and effective treatments, with an emphasis on stress-related disorders and chronic pain.
3. **Multi-Disciplinary:** Promote a critical perspective on psychedelic medicine through robust multi-disciplinary partnerships.



Nimrod Jakob Keynan (PhD)
Scientific Manager
of the IPR

➤ Key Capabilities

What are we specialized in

- Multi-modal imaging
- Behavioral Characterization
at multiple levels (psych, bio, physio)
- Pharmacological interventions
- Image and signal processing
- Statistical modeling
- AI (DL/LLM)

What specialized equipment we use to answer Q

- State of the art, research
dedicated MRI /EEG system
- State of the art VR/AR equipment
- State of the art Brain Computer
Interface systems
- Data science abilities in
Neurobehavioral information

How can we aid other scientists to answer their Q

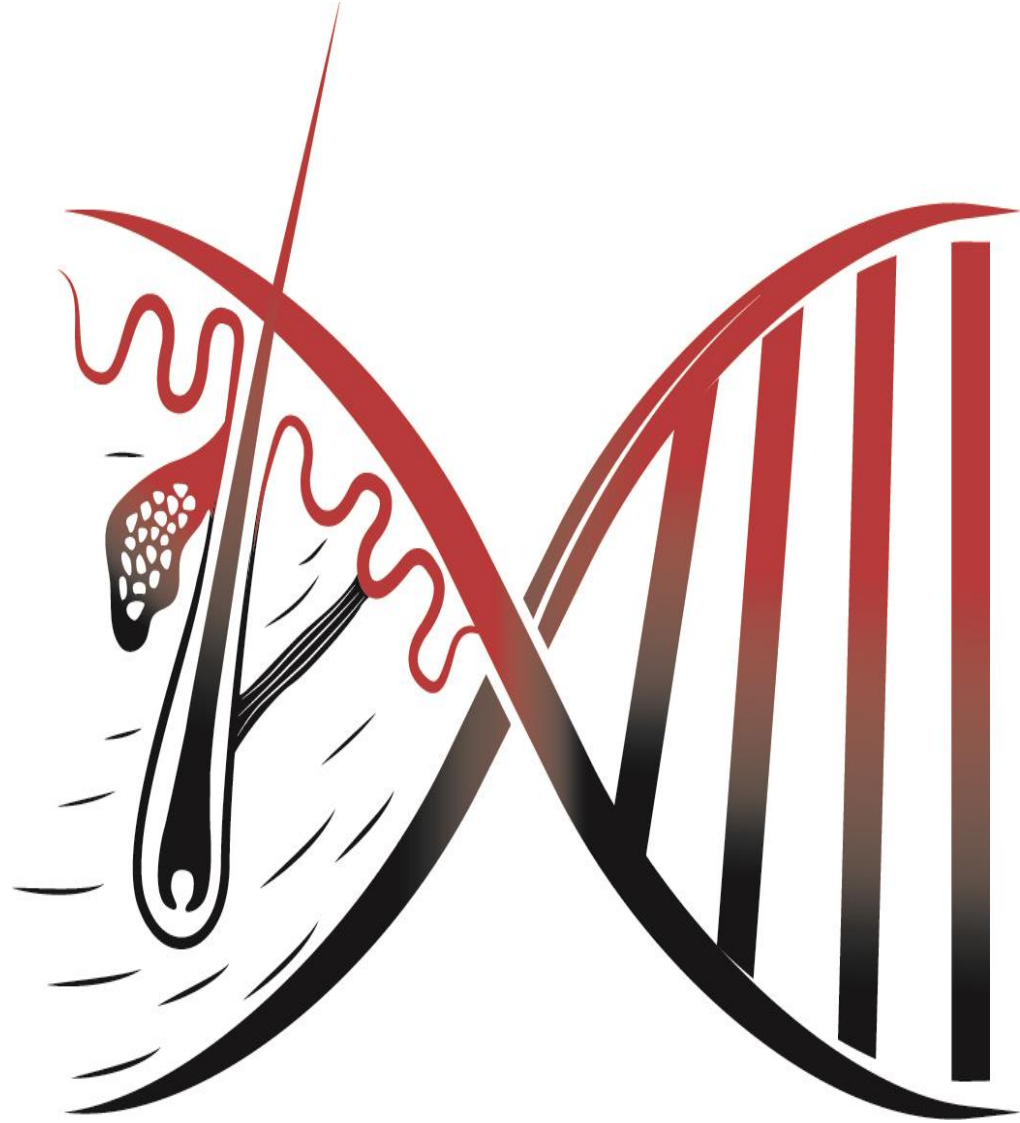
- Advice and guidelines to plan
system level studies
- Advise in data analysis
- Collaborate on various topics
connecting brain, mind and
body, with a translational
perspective



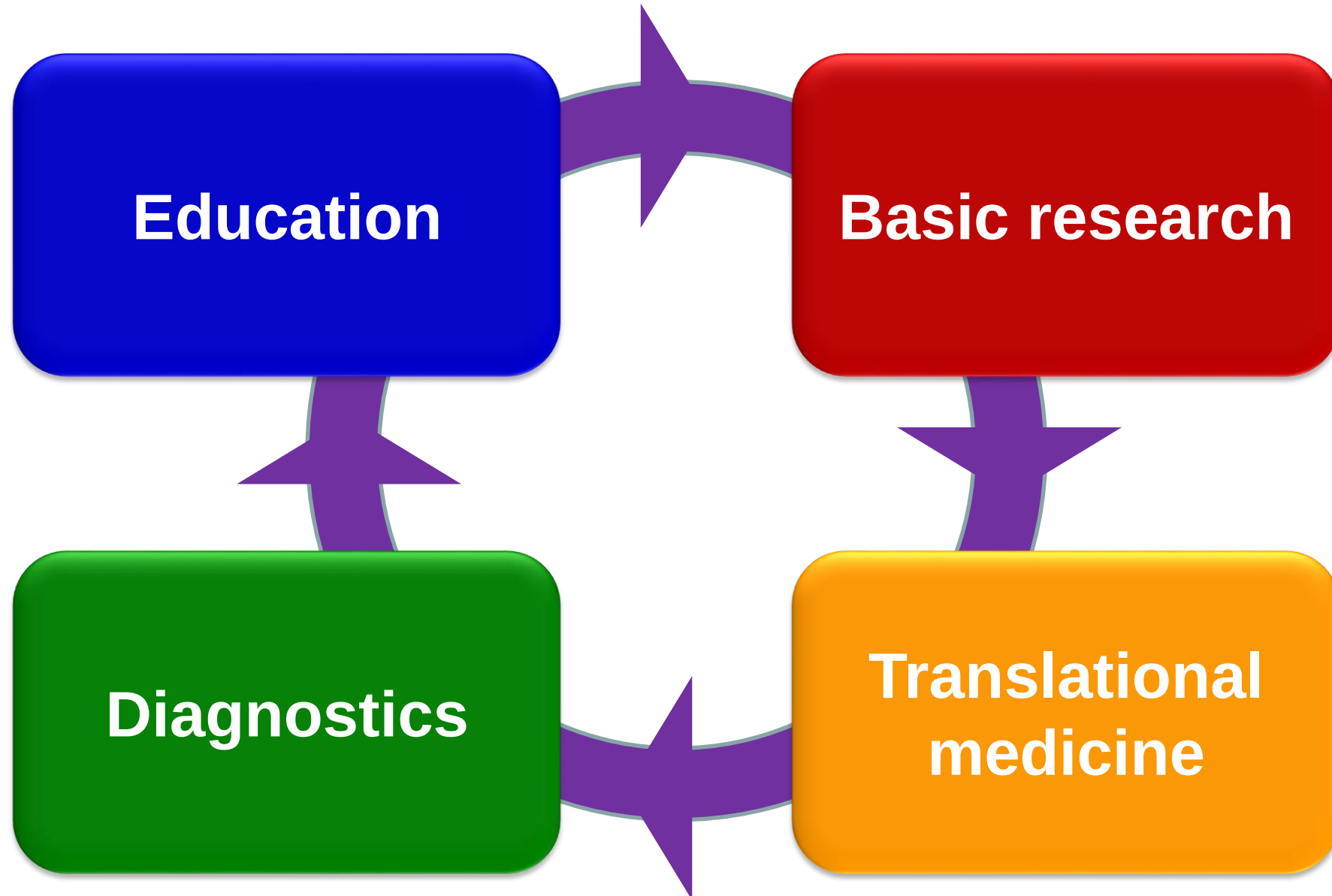
What questions still needs to be answered, what is needed in order to answer them?

- Connecting between levels of measurements (Psych, Physio and Bio)
- The role of the brain in general medicine (gastro, pain, rheumatology, dermatology, pediatrics and more...)
- Translation gaps –moving from lab to clinica

**Laboratory of
Molecular
Dermatology**
Division of Dermatology



Strategic aims



Molecular dermatology laboratory



**Genetic basis
of skin
diseases**

Rare monogenic disorders

Hypotrichosis



Ectodermal dysplasia



Keratoderma



SAM syndrome



Epidermolysis bullosa



Ichthyosis



Common multifactorial disorders

Pemphigus vulgaris



Vitiligo



Psoriasis



Atopic dermatitis



International recognition:
foreign referrals



Molecular dermatology laboratory



**Genetic basis
of skin
diseases**

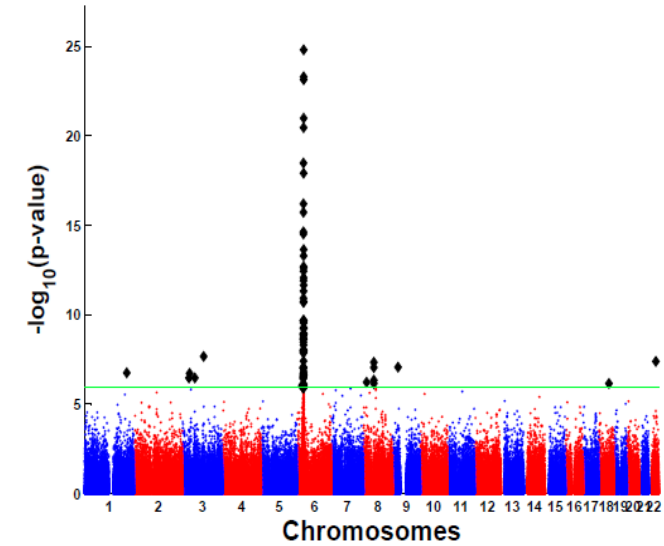
NGS

Analysis

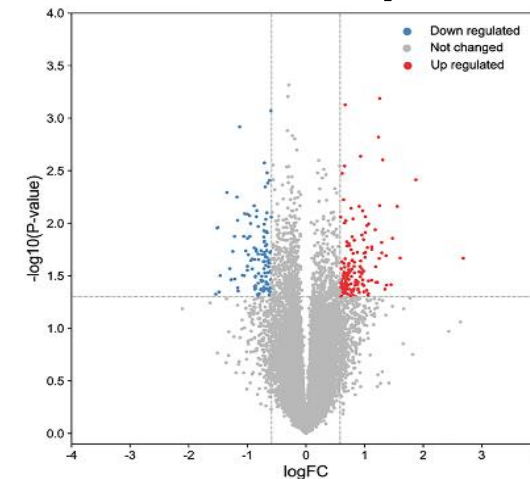
WES

WGS

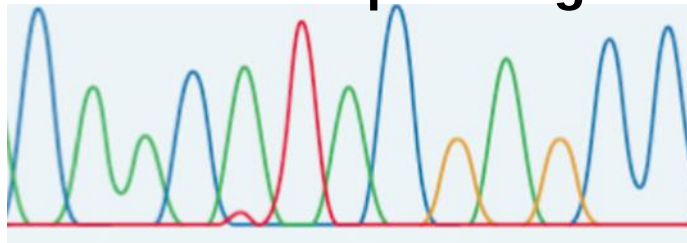
GWAS



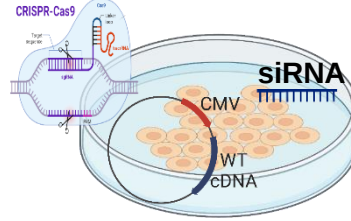
RNA seq



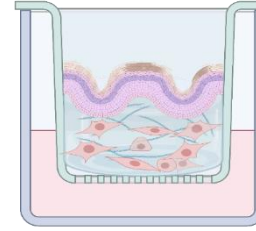
Direct sequencing



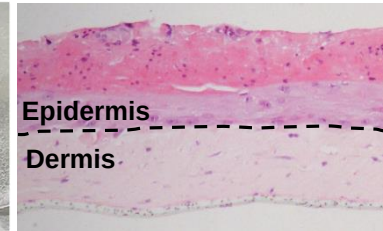
Molecular dermatology laboratory



2D cells culture

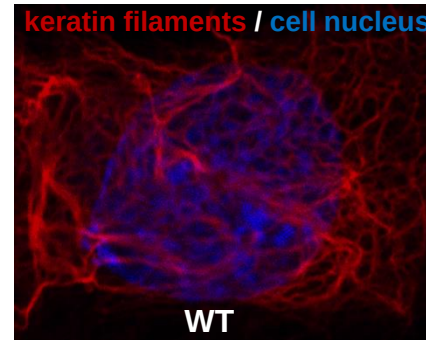


3D cells culture

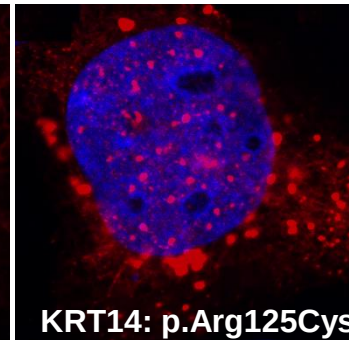


Genetic basis
of skin
diseases

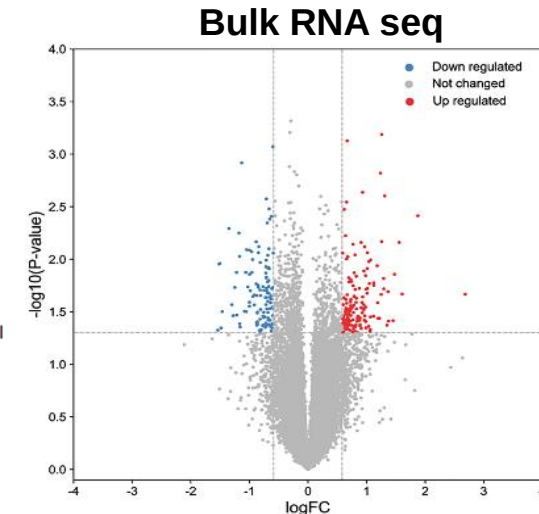
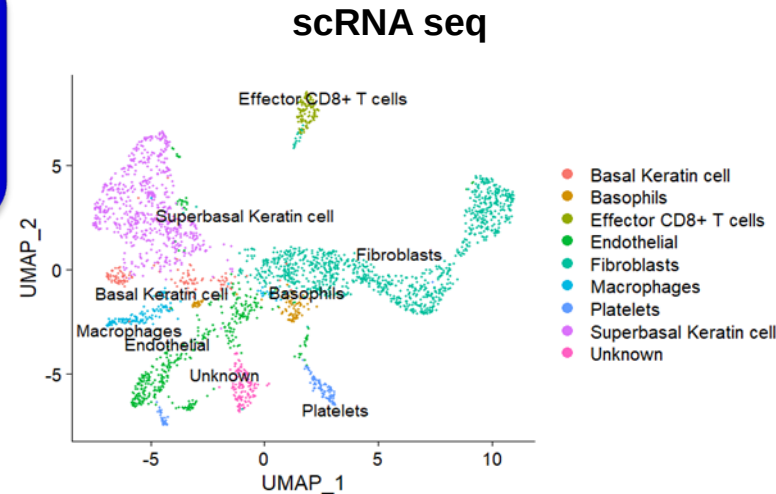
Functional
studies
(mechanism)



WT



KRT14: p.Arg125Cys



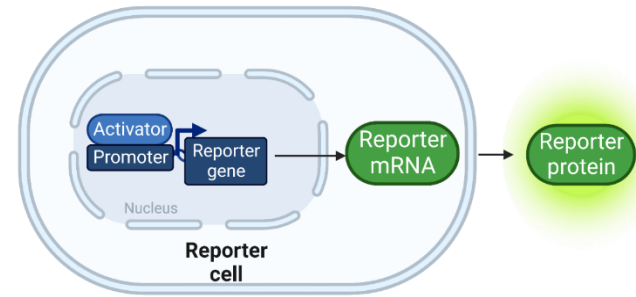
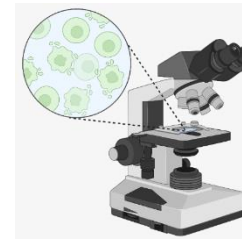
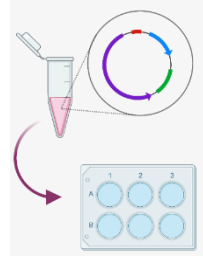
Molecular dermatology laboratory



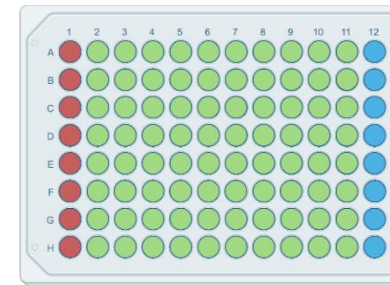
**Genetic basis
of skin
diseases**

**Functional
studies
(mechanism)**

**Translational
research**



**Small
molecules
libraries
screen**



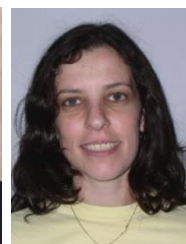
● Positive control
● Negative control
● Compound



המעבדה לדרמטולוגיה מולקולרית



אלכסנדר
אילדרדסטי



מור פבלובסקי



ליאת סמואלוב



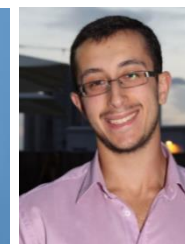
דני דניאלי



חזי אליהו



נוי קלר רוזנטל



קיריל מלוביצקי



ליאור לסמן



ירדן פלר



גנאן מוחמד



אלון פלד



אביטל בניאל



גל בראונשטיין



סרי עסאף



נביה אליאס



ראועה אשתי



לובנא קהיר

➤ Who we are and our area of interest

Name of lab/Location

- Laboratory of Biomarkers and Genomics of Neurodegeneration
- Sammi Ofer Building. 10TH Floor

PI/Manager

- PI: Prof. Roy Alcalay, MD, MS
- Lab manager: Mali Gana-Weisz, PhD

Main Subjects in the lab

- Establish a large biospecimen repository of people affected by neurological disorders [Parkinson's disease (PD), CJD, dementia with Lewy bodies and early onset dementia] and their relatives who are at-risk
- Explore the different types of immune cells in cerebrospinal fluids of people with and without Parkinson's and with and without *GBA1* mutations
- Discover genetic and epigenetic variants in PD that modify the age at onset, disease severity and rate of progression.
- In-depth genomics analysis and characterization of genes involved in the immune system, the nervous system, and inflammation in Parkinson's disease.

Keep it simple to people who are not in the field

- PD is a relatively common neurodegenerative disease. Up to 30% of Ashkenazi Jews with PD carry a mutation in either the *GBA1* or the *LRRK2* genes. Our lab studies these associations in multiple levels.
- We collect biospecimens: CSF, plasma, serum, DNA, RNA, PBMCs and urine from carriers and non-carriers with and without PD. We are a part of large international consortia for biomarker collection (PPMI, LCC)
- We conduct analyses to identify biomarkers and genetics risk factors and modifiers of PD risk.
- We genotype samples from a variety of neurodegenerative disorders (e.g., E200K in PRP)



➤ Key Capabilities

What are we specialized in

- Genomics
 - Whole genome sequencing (WGS) analyses of patient with neurodegenerative diseases and at-risk PD carriers
 - Neurochip analyses (e.g., NeuroBooster)
- Biorepository
 - MJFF-funded collection, extraction and storage of biosamples
 - Innovative electronic database of the lab sample
 - Develop novel sample collection (e.g., PBMCs; collection of different cell populations using FACS sorter)

What specialized equipment we use to answer Q

- QIACUBE – For RNA purification
- FACS sorter SH-800
- Agilent 2100
- Inverted Microscopy with Fluorescent filters
- STEPONE plus for SNPs and TaqMan assay.
- Nanodrop
- Qubit

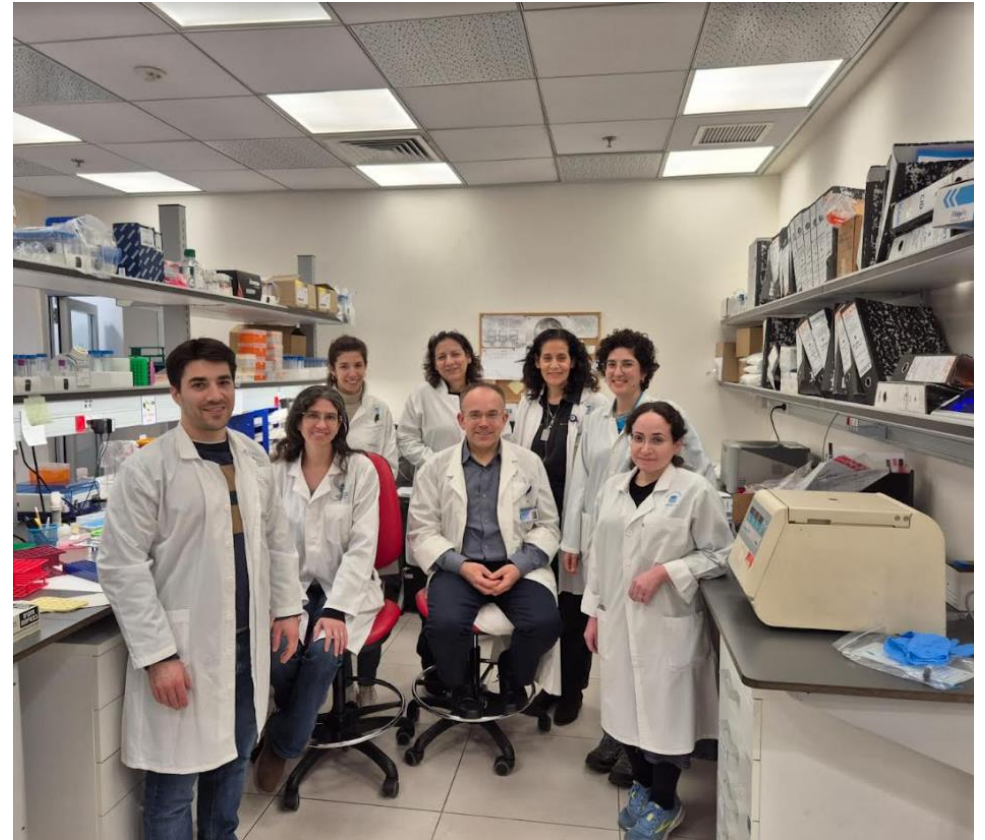
How can we aid other scientists to answer their Q

- We can support genomic analyses (knowledge and data)
- Specialized software supporting genetic analyses
- We have access to large international databases



Our team

- Prof Roy Alcalay, MD, MS, PI
- Mali Gana Weisz, PhD- lab manager, biorepository branch
- Orly Goldstein, PhD, genomics branch
- Tal Glinka, MSc, research assistant
- Liat Freidlin, BSC, research assistant
- Yael Shimshon, MSc, research assistant
- Nadav Elkoshi, MSc, Bio-informatician
- Shachar Shani, PhD student



Our collaborators and funders



THE MICHAEL J. FOX FOUNDATION
FOR PARKINSON'S RESEARCH

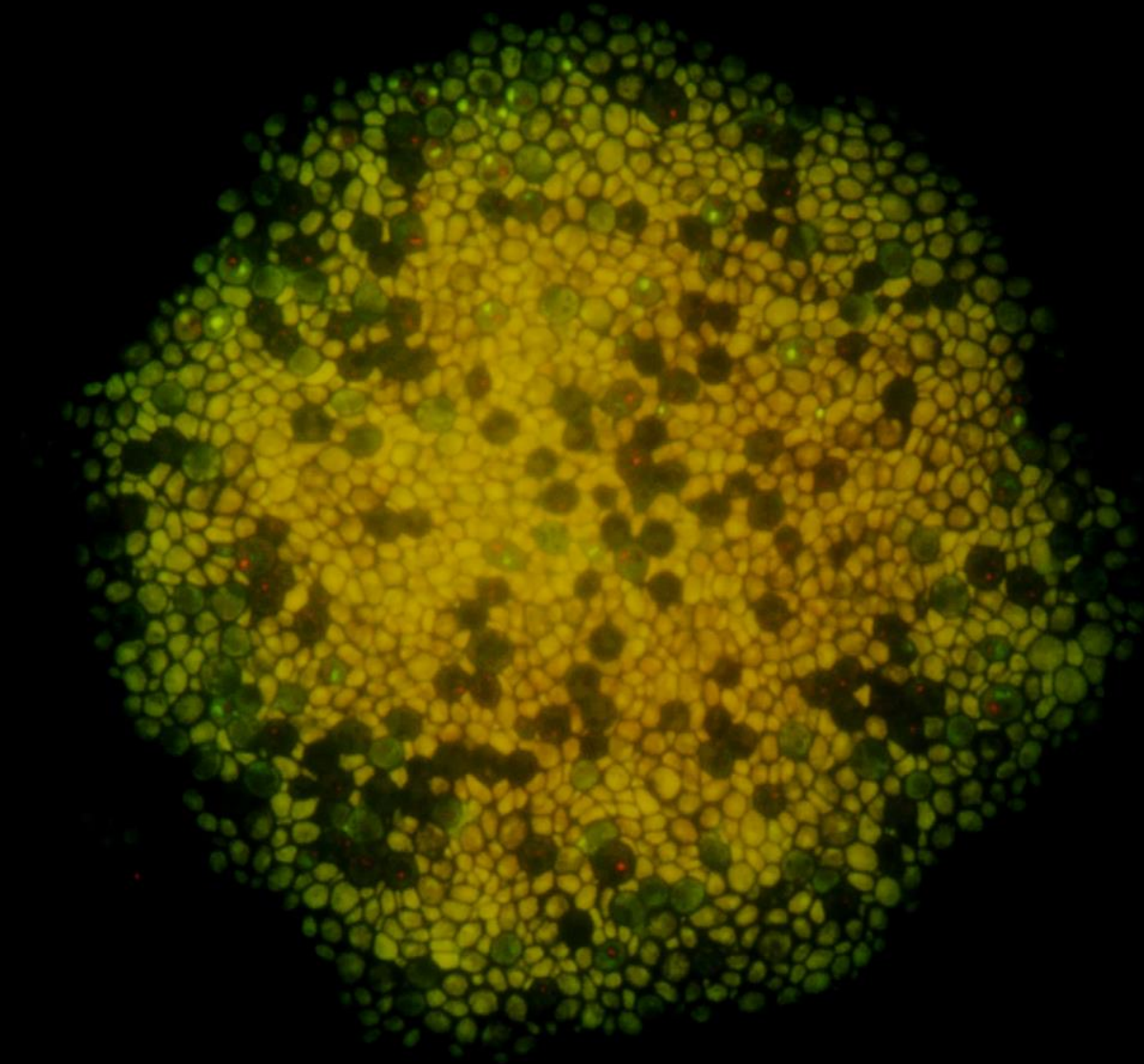


Collaborations within Ichilov

- LEMON: **Profs. Anat Mirelam and Avner Thaler**
- Division of Dementia: **Drs. Bregman, Omer and Shiner**
- Neuromuscular division: **Prof. Vivian Drory**
- The Genomic Research Laboratory for Lung Fibrosis. **Dr. Avraham (Rami) Unterman.**
- Laboratory of The Cancer Immunotherapy. **Dr. Ilan Volovitz**
- The Genetic Institute: **Dr. Anat Bar Shira**
- Grant submission: **Drs. Anat Aharon and Yifat Alcalay**



Molecular Mycology



Who we are and our area of interest

Name of lab/Location	PI/Manager	Main Subjects in the lab
• Molecular Mycology Lab • National Mycology Reference Laboratory • Rishonim building, 2nd floor	• Ronen Ben-Ami, M.D. • ronenba@tlvmc.gov.il • Tel. 052-7360190	• BAD FUNGI Why are they like that? • Virulence • Drug resistance • Tolerance • Immune interaction • Epidemiology

Key Capabilities

What are we specialized in

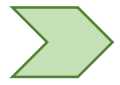
- In vitro susceptibility testing
- Animal models of infection and carriage
- High-volume genotyping (MLST, STR)
- Fungal / Mammalian cell interactions: macrophages, epithelial cells, endothelial cells

What specialized equipment we use to answer Q

- Pathogen-capable animal facility
- Broth microdilution susceptibility testing (CLSI)
- Live cell imaging
- Time kill assays

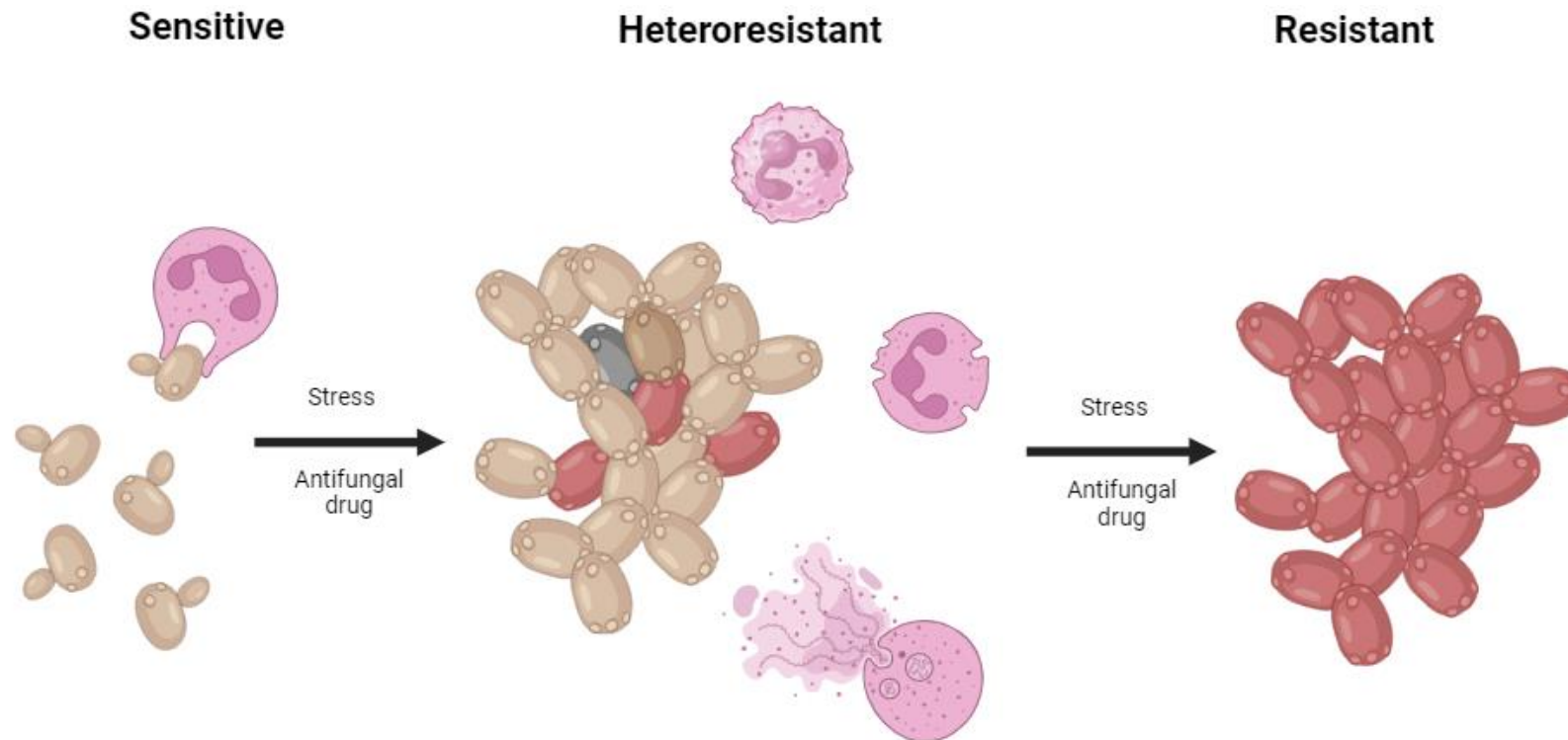
How can we aid other scientists to answer their Q

- Mine a large library of clinical fungal strains (>3000)
- Animal models involving fungi
- Perform susceptibility testing and population analysis



What questions still needs to be answered, what is needed in order to answer them?

- What is the itinerary leading to antifungal drug resistance?
- How does cell-to-cell variability in drug response (bet hedging) affect in vivo persistence?



- Identify the regulatory pathways governing tolerance
- Find specific inhibitors / potentiators of tolerance



TEL AVIV SOURASKY
MEDICAL CENTER
ICHILOV



Prof. Hagit Baris Feldman



The Genetics Institute



Research Laboratory

סמי עופר קומה 10

Lab manager - 1
Researchers - 2
PhD students - 2
MSc student - 1
BSc project - 1

The Genomics Center

סמי עופר קומה 10

Clinical Bioinformatics Unit

Clinical Laboratories

סוראסקי קומה 1 אגף ו

Cytogenetics

Molecular Genetics

Clinics

סוראסקי קומה 1 אגף ב

Pediatric and Adult Genetics

Prenatal Genetics

Oncogenetics

Medical geneticists (MDs)
Genetic counselors





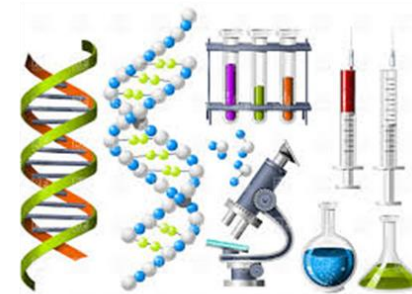
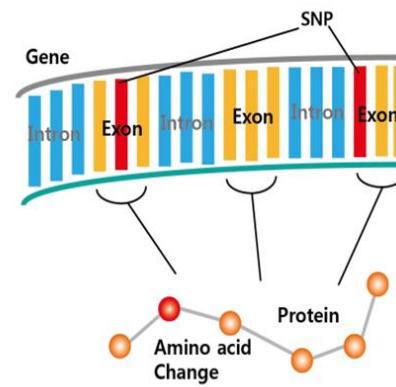
RARE DISEASE DAY

February 29th

Patient-centered approach



Back to the patient and family



Patient
with rare
phenotype

Next
generation
sequencing

Novel gene
discovery

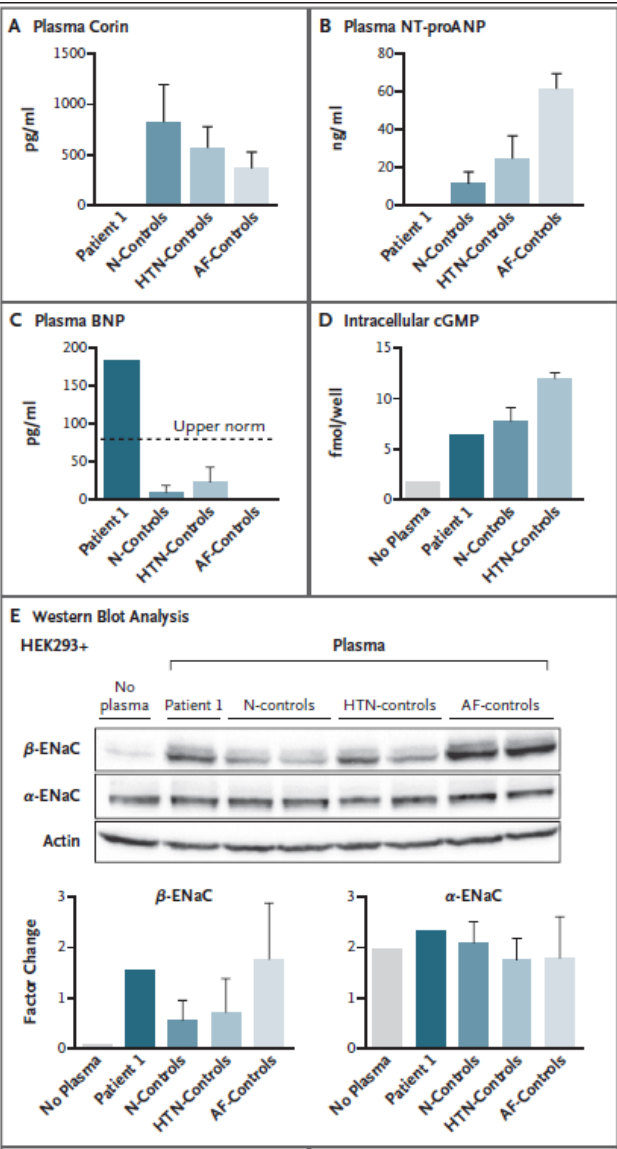
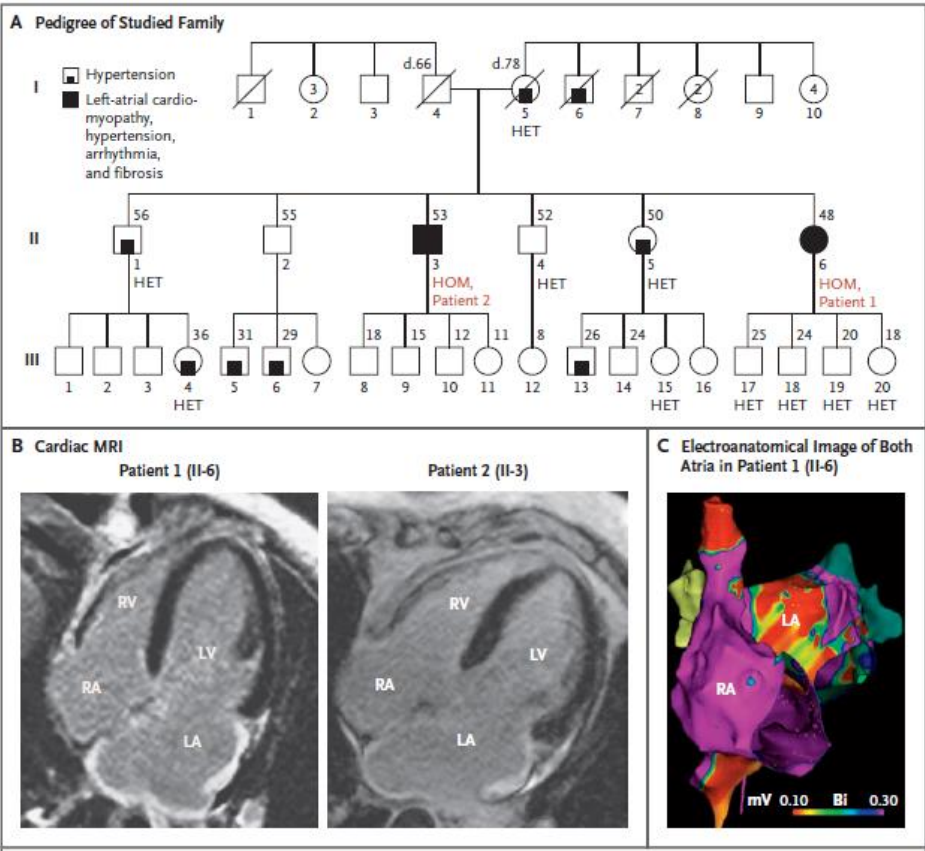
Tailored
functional
studies

BRIEF REPORT

Corin and Left Atrial Cardiomyopathy, Hypertension, Arrhythmia, and Fibrosis

Hagit Baris Feldman, M.D., Chofit Chai Gadot, Ph.D., David Zahler, M.D., Adi Mory, Ph.D., Galit Aviram, M.D., Emil Elhanan, M.D., Gabi Shefer, Ph.D., Ilana Goldiner, Ph.D., Yam Amir, M.Sc., Alina Kurolap, R.N., Ph.D., and Jacob N. Ablin, M.D.

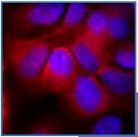
CORIN (NM_006587.4): c.684dupG; p.Met229Aspfs*16



Multidisciplinary work

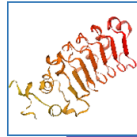
- Bioinformatics and computational analyses, basic science, in-depth clinical evaluation, personalized medicine
- Across all medical specialties

Gastroenterology & Immunology



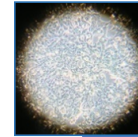
- Protein losing enteropathy
- Allergy susceptibility
- Candidiasis
- Recurrent fever
- COVID-19

Endocrinology



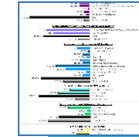
- Early onset obesity
- Premature ovarian insufficiency

Cardiovascular & lymphatics



- Hypertension
- Laterality disorder
- Yellow nail syndrome

Metabolics



- Propionic acidemia
- Gaucher disease

Who we are and our area of interest

Name of lab/Location	PI/Manager	Main Subjects in the lab	Keep it simple to people who are not in the field
• The Translational Genetics and Genomics Research Laboratory (TGGR Lab) • Location: Sammy Ofer, 10th floor	• PI: Prof. Hagit Baris Feldman, MD • Lab manager: Dr. Hofit Gadot, PhD	• Dedicated to decipher the role of genetic diseases in our patients • Study of novel disease-causing genes	• Our projects focus on the identification, characterization and functional analyses of novel human disease-causing genes in order to elucidate the disease pathophysiology and potentially provide targets for personalized medicine

➤ Key Capabilities

What are we specialized in

- Regulation of gene expression (DNA transfection, siRNA, stable cell lines, RT-qPCR)
- IHC/IF staining on FFPE or tissue culture
- WB
- Analysis of genetic variants on the RNA level (e.g. effect on splicing)

What specialized equipment we use to answer Q

- Illumina NGS sequencers:
 - NovaSeq 6000
 - NovaSeq X Plus
 - NextSeq 500
 - MiSeq
- Real time PCR 384-well plate
- ELISA with monochromator
- DNA gel & WB imager
- Confocal microscopy
- TEER
- UK biobank and Genomics England databases

How can we aid other scientists to answer their Q

- NGS and analysis services:
 - Exome & genome seq
 - RNA-seq – Soon!
- Analysis of intronic variants
- Anything GENETICS...
- **We LOVE collaborating with nice people 😊**



What questions still needs to be answered, what is needed in order to answer them?

- Computational capabilities to analyze large scale data (e.g. UK Biobank)
- Bioinformatician

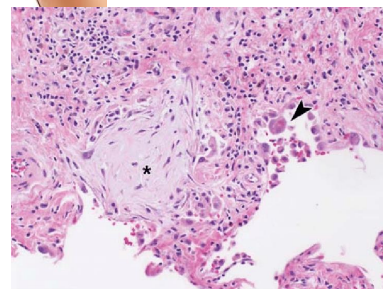
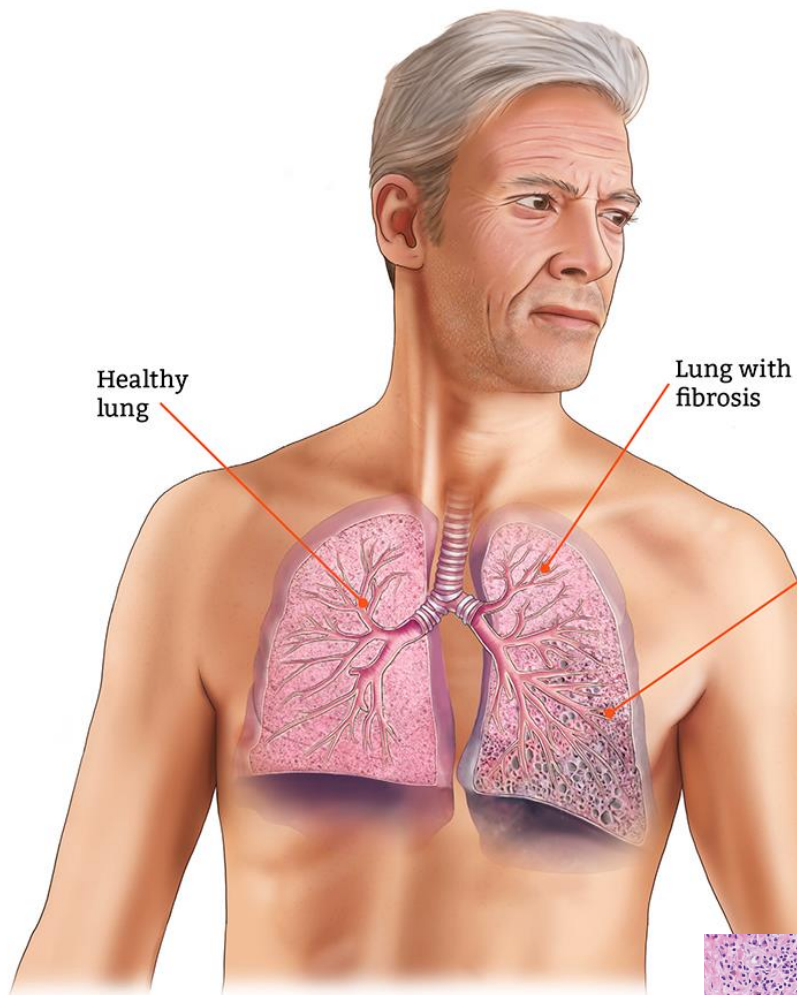
Come visit us!



Who we are and our area of interest

Name of lab/Location	PI/Manager	Main Subjects in the lab	Keep it simple to people who are not in the field
• Unterman lab • Heart building 10th floor	• PI: Dr. Avraham (Rami) Unterman, MD, MBA • Lab manager: Dr. Yan Stein, PhD	• Pulmonary Fibrosis • Pathogenesis • Novel biomarkers • Novel treatment targets • Fibrosis in other organs	• Applying advanced genomic technologies to better understand human diseases • Multiple collaborations across TSMC

פיברוזיס ריאתי Pulmonary Fibrosis



- תהליך הדרגתי שבו הריאות הולכות ומצטלקות
- כתוצאה מכך הריאות "מתקשות", קשה לנפחן
- יש הפרעה לפעילות התקינה של הריאות, עם ירידה ביכולת להכניס חמצן לגוף
- הסוג הכי מפורסם של פיברוזיס נקרא: פיברוזיס ריאתי אידיופאטי או IPF אך יש 200 סוגים נוספים
- מבחינה פתולוגית ב IPF יש מבנים מיקרוסקופיים בשם Fibroblastic foci שהם בחזית התקדמות הפיברוזיס

➤ Key Capabilities

What are we specialized in

- Single-cell RNA sequencing
- Spatial transcriptomics
- Computational genomic data analysis
- Molecular biology

What specialized equipment we use to answer Q

- 10x Genomics Chromium Controller (for scRNA-seq)



How can we aid other scientists to answer their Q

- We are happy to consult and collaborate on scRNA-seq projects (and spatial transcriptomics)



What questions still needs to be answered, what is needed in order to answer them?

- The role of fibroblastic foci in pulmonary fibrosis (PF) propagation and potential treatment targets
- What is the role of the immune system (and mainly Tregs) in IPF?
- Non-invasive (or minimally invasive) biomarkers to differentiate different types of PF and assess risk for progression

Who we are and our area of interest

Name of lab/Location	PI/Manager	Main Subjects in the lab	Keep it simple to people who are not in the field
The Microbiology Laboratory Sequencing Unit Sammy Ofer Heart Building, 10th floor	Prof. Amos Adler Dr. Katya Levytskyi	• Covid-19 Sequencing for the Ministry of Health • HIV drug resistance • Next-Generation Sequencing (NGS) from microorganisms • Metagenomics • Bioinformatics analysis	

Key Capabilities

What are we specialized in

- Identifying variants of COVID-19
- Identifying and analyzing genetic mutations associated with HIV drug resistance
- WGS of Microorganisms: Utilizing advanced sequencing techniques for studying microorganisms
- Metagenomics for the diagnosis of infectious disease-Validation
- Conducting bioinformatics analysis, including phylogenetic studies, resistance mechanism and virulence factors analysis

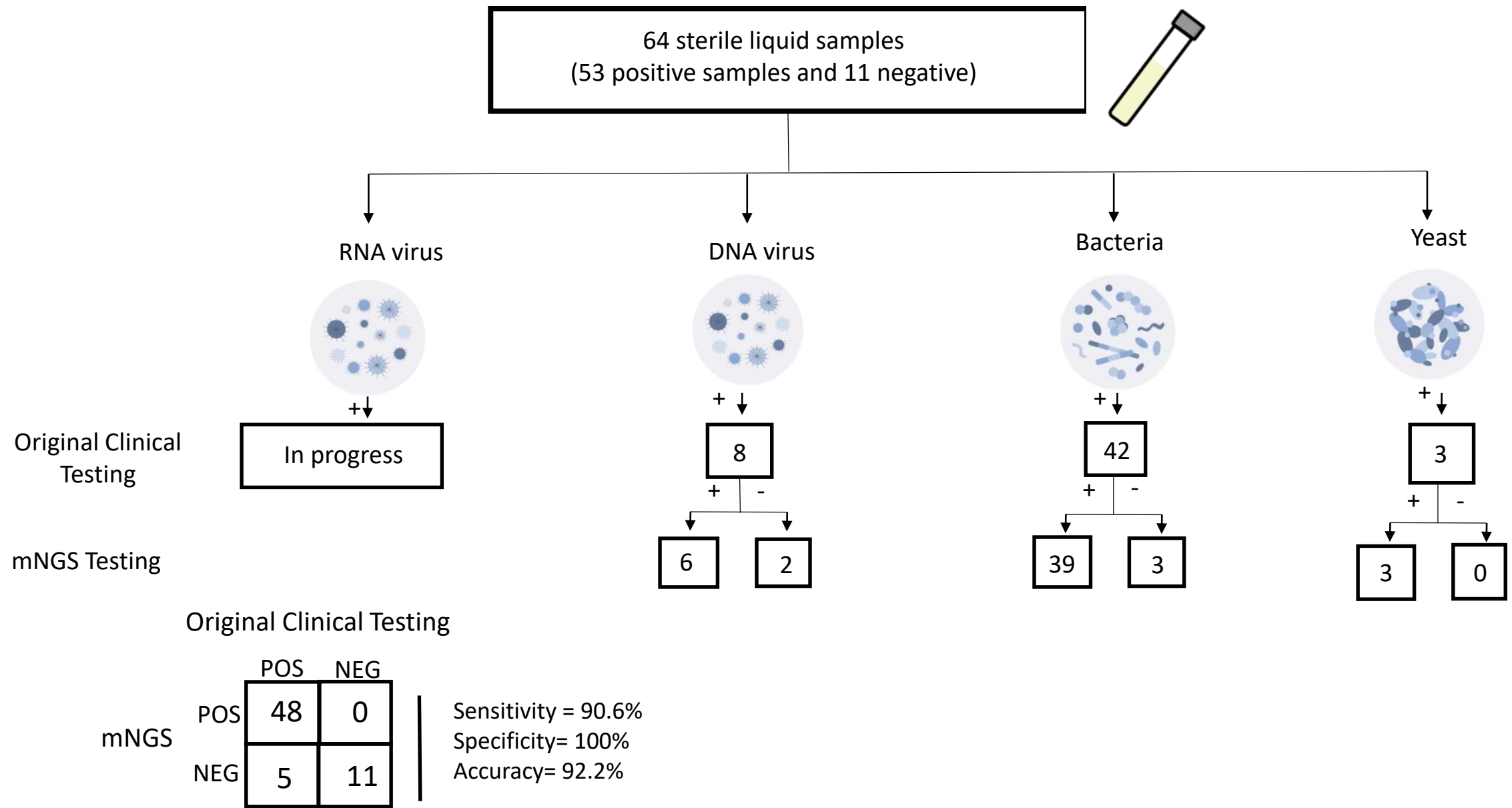
What specialized equipment we use to answer Q

- Next-Generation Sequencing Platforms: Illumina platforms (e.g., NovaSeq, NextSeq, MiSeq)
- PCR Machines
- Automated Handling Systems, such as the Hamilton robot
- Analysis Tools, such as MetaPhlAn, Kraken 2, CLC Genomics Workbench

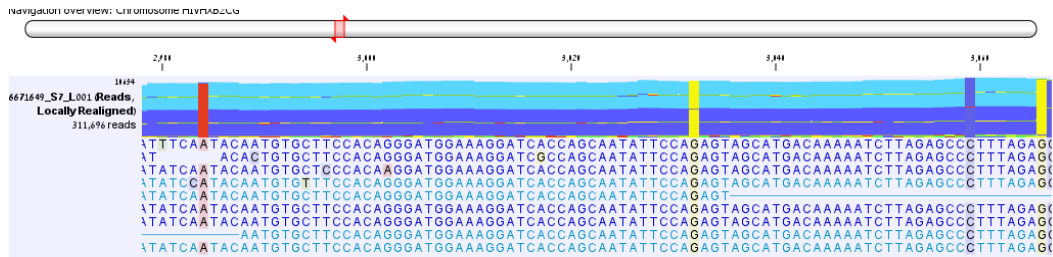
How can we aid other scientists to answer their Q

- WGS from microorganisms
- Metagenomics data and analysis from sterile body fluids and stool samples
- Bioinformatics analysis, including phylogenetics, resistance mechanism and virulence factors analysis.

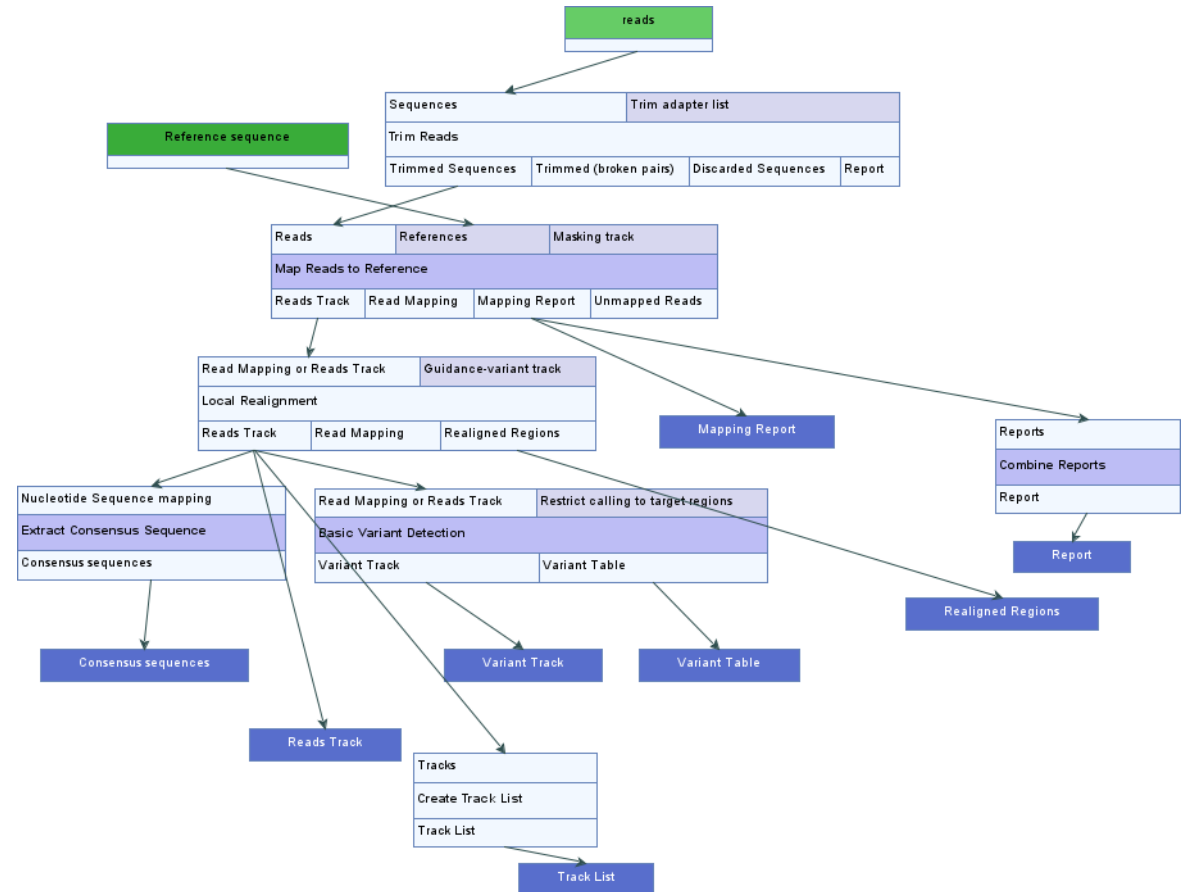
Assessing the Efficacy of Clinical Metagenomics Sequencing in Sterile Body Fluids: A Validation Study.



Analysis HIV drug resistance

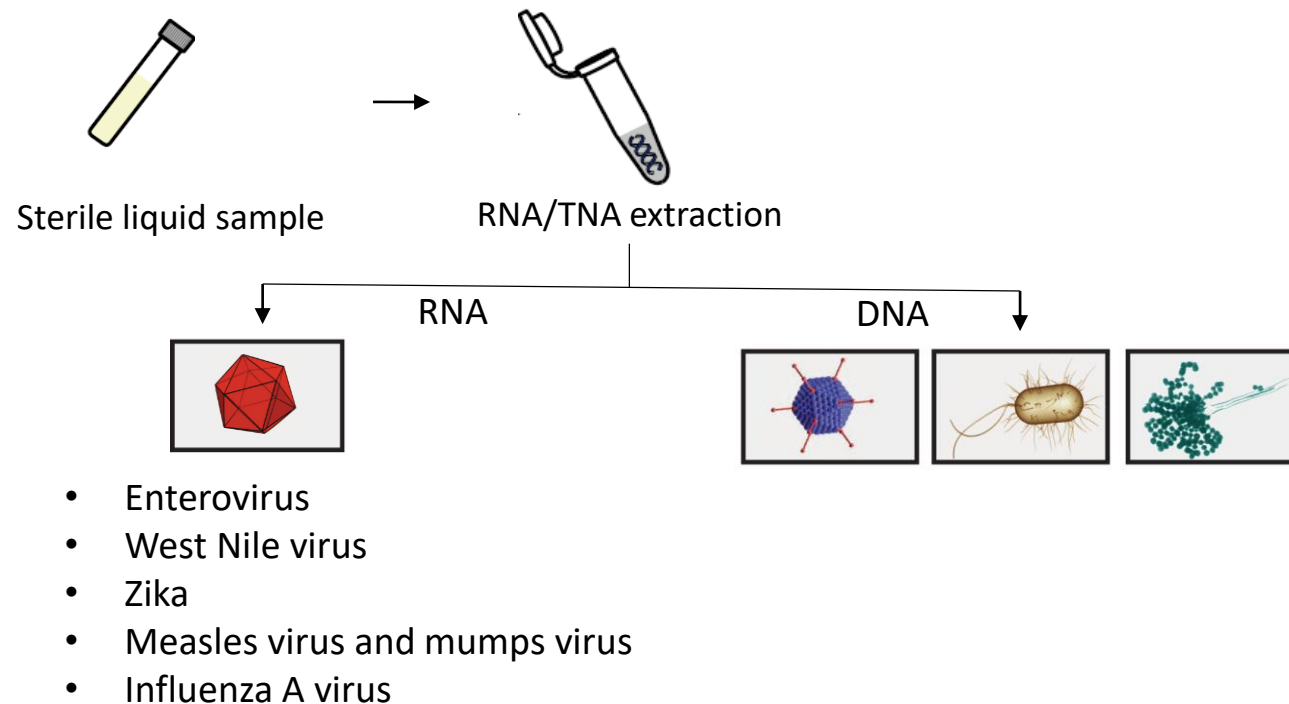


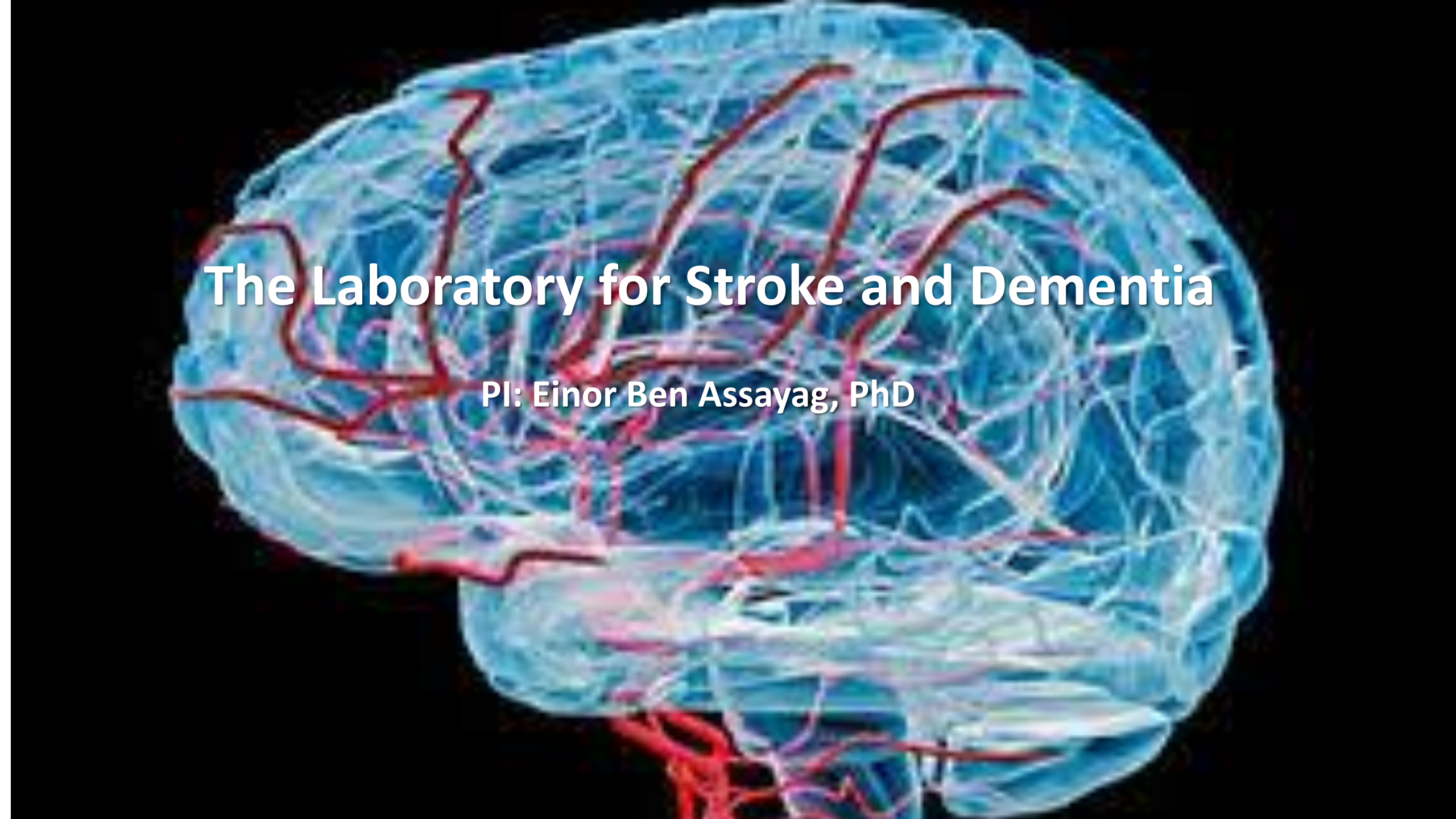
Name	Size	Start of sequence
HIVXB2CG (1809..3563) consensus	1749	GGCTACATTAGAAGAAATGATGACAGCATGCCAAGGAGTGGGAGGACCAA
HIVXB2CG (4013..5070) consensus	1058	TTCGGATTAGAAGTAAYATAGTAACAGACTCACAATATGCATTAGGAA



➤ What questions still needs to be answered, what is needed in order to answer them?

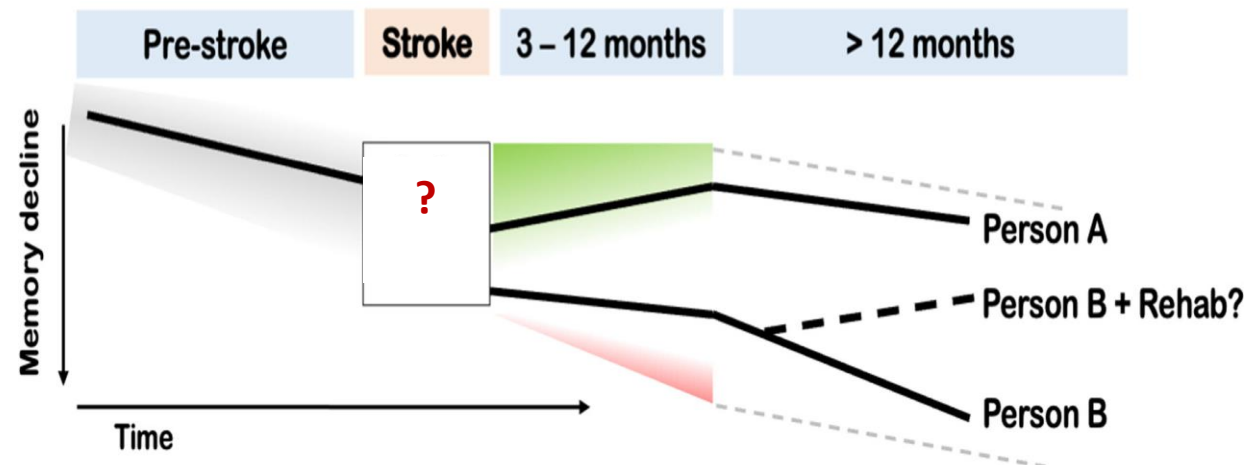
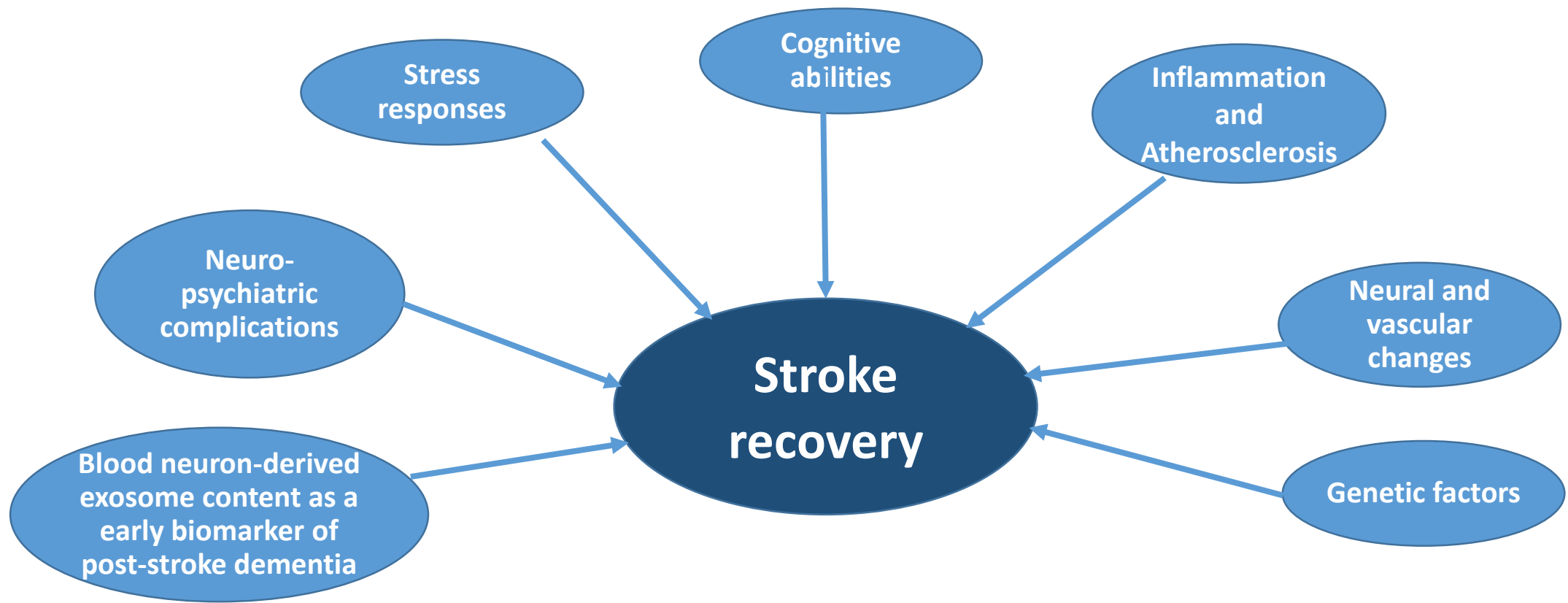
- RNAseq-RNA viruses





The Laboratory for Stroke and Dementia

PI: Einor Ben Assayag, PhD



Mission:

Promote Successful recovery after Stroke

**Vascular mechanisms
of neurodegeneration**

**Prodromal
biomarkers for the
development of
post-stroke
dementia**

**Interventional
study:
Maraviroc for
Post-stroke
cognitive
impairment**

**Novel Treatments
for Post Stroke
Neuropsychiatric
complications**



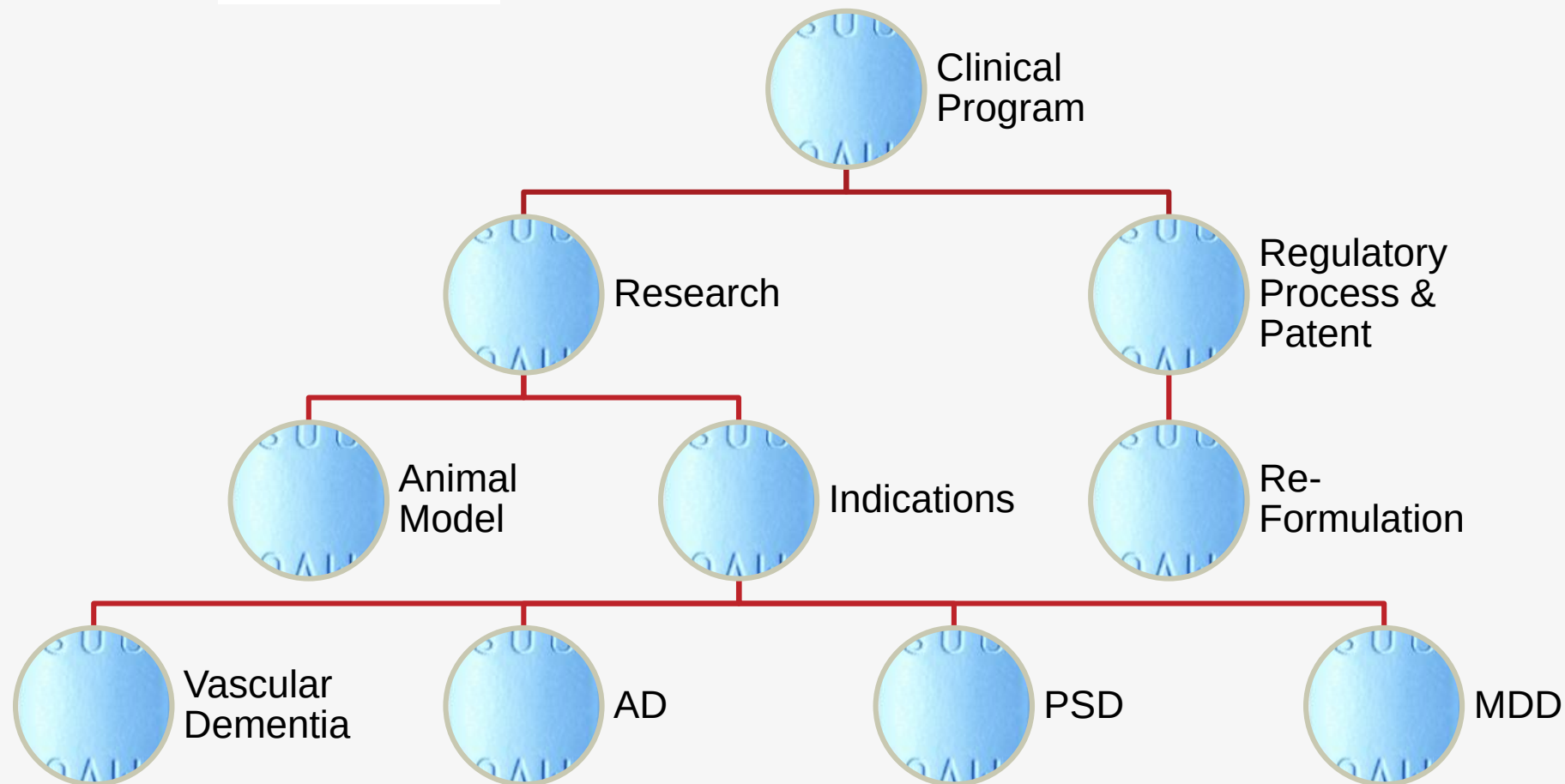
ICHILOV

TEL-AVIV SOURASKY
MEDICAL CENTER
MEDICAL EXCELLENCE AND
COMPASSIONATE CARE

The Story of CCR5-Δ32 & Maraviroc



Maraviroc - Next Steps



Key Capabilities

What are we specialized in

- Cognitive and behavioral assessments
- Inflammatory and Atherosclerosis measures
- **Large clinical trial set-up and conduct: regulatory approvals, contracts, manufacturing, randomization, EDC, patient recruitment and retention, monitoring, statistical analysis**
- Multivariate models for disease prediction and progression

What specialized equipment we use to answer Q

- Cognitive batteries
- Doppler lab
- Genetic lab

How can we aid other scientists to answer their Q

- We are experts in clinical trial set-up and conduct, in cognitive assessments and clinical phenotype.

 **What questions still needs to be answered,
what is needed in order to answer them?**

- **Develop an algorithm for vessel wall analysis in neuroimaging**
- **Immunohistochemistry of brain slices from the animal model**
- **Develop re-formulation of Maraviroc for improved BBB penetration**

תודה רבה!



Who we are and our area of interest

Name of lab/Location	PI/Manager	Main Subjects in the lab	Keep it simple to people who are not in the field
• Clinical Immunology, Sourasky 1 st floor (Z)	• Dr. Yifat Alcalay	• Autoimmune Disease (Immunology, Rheumatology, Hematology, Skin, Liver, Tissue, Gastric) • Autoimmune Neurology – collaboration with Dr. Avi Gadoth (Paraneoplastic syndrome, Autoimmune Encephalitis, MS, MOG...) • Primary Immunodeficiency Disorders, collaboration with Dr. David Hagin • Prion Disease - CJD • Alzheimer's Disease • Special Test Center (Mayo Clinic, Oxford)	• To provide the most expanded clinical Immunology laboratory services that exist today, while integrating research collaborations with researchers from the many relevant fields in our hospital

Key Capabilities

What are we specialized in

- Immunology methods: WB, Immunoblot, Immunofluorescence (IFA: ANA, CBA, Tissue)
- Protein aggregation assay
- Cell cultures
- Flow cytometry
- Functional assays, evaluation of immune response

What specialized equipment we use to answer Q

- CLARIOstar Plus (BMG): multi-mode plate reader.
RT-QuIC
- Simoa®: Single molecule Digital Elisa
- FACS

How can we aid other scientists to answer their Q

- We provide services based on outsourcing or research collaboration, using all the methods available in the laboratory



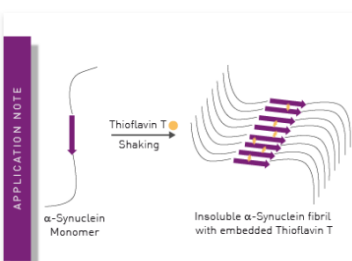
Reset

By Research Area

By Detection Mode

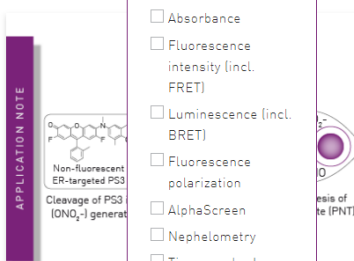
By Microplate Reader

- ☐ Absorbance
- ☐ Fluorescence intensity (incl. FRET)
- ☐ Luminescence (incl. BRET)
- ☐ Fluorescence polarization
- ☐ AlphaScreen
- ☐ Nephelometry
- ☐ Time-resolved fluorescence
- ☐ TR-FRET



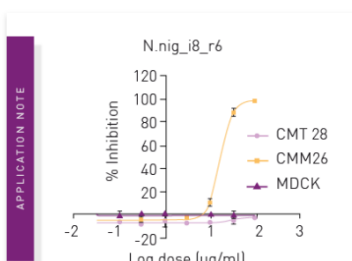
Peptidic inhibitors of α -Synuclein preventing Parkinson's disease-associated fibrilization and cytotoxicity

Read here how peptidic inhibitors of α -Synuclein nucleation and fibril elongation can be evaluated on microplate readers.



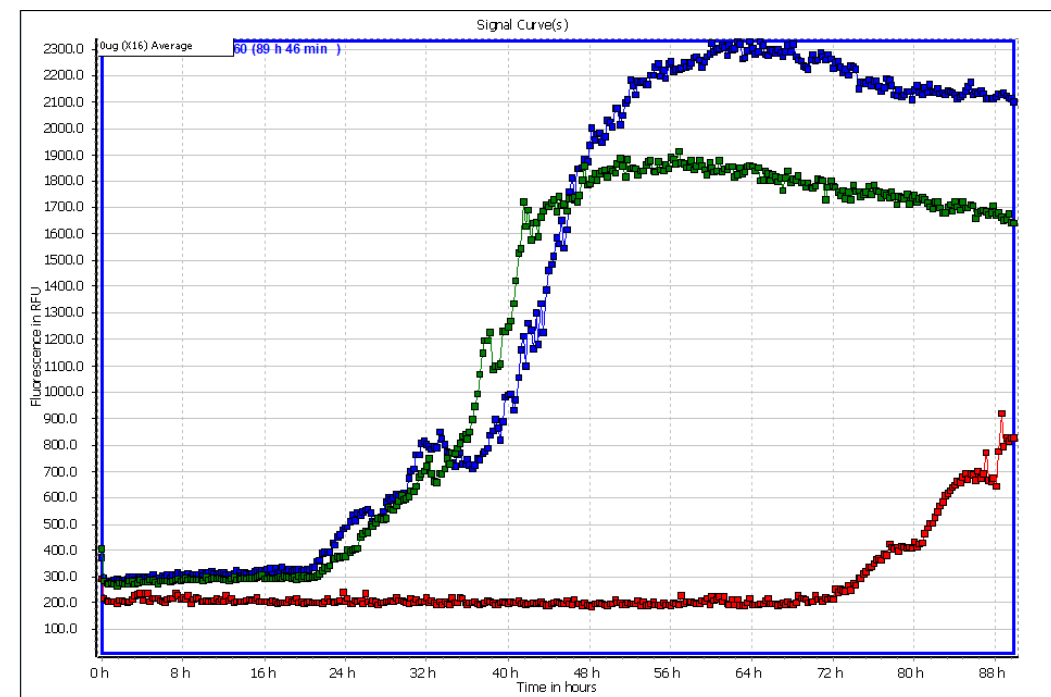
Production of cancer-associated immune cells can be detected with a fluorescence-based assay

The fluorescent sensor PS3 can be used to monitor immunosuppression in the tumor microenvironment by detecting peroxynitrite production. Find out more here.



Resazurin Cell Viability Assay for the Discovery of Selective Cytotoxic Compounds in Canine Mammary Cancer Research

Snake venom has a very bad image. But it's not all bad - If you would like to read about the useful functions of snake venoms as an anti-cancer treatment click here.



רק בבית החולים איכילוב: תרופה חדשה לאלצהיימר

מדובר בתרופה פורצת דרך, שניתנת בעירוי לאנשים עם אלצהיימר בשלבים המוקדמים של המחלה, ומטרתה לעכב את הפגיעה במוח והפגיעה התפקודית



מערכת תל אביב אונליין | 03.01.2022

לראשונה בישראל, ובפעם הראשונה בעולם מחוץ לארה"ב, ניתנה בבית החולים איכילוב בתל אביב תרופה חדשה לטיפול במחלת אלצהיימר. מדובר בתרופה פורצת דרך בשם Aducanumab אשר ניתנת בעירוי לאנשים שאובחנו עם מחלת אלצהיימר בשלבים המוקדמים של המחלה, ומטרתה לעכב את הפגיעה במוח והפגיעה התפקודית הנגרמת מהמחלה. התרופה אושרה לשימוש על ידי FDA לפני חודשים ספורים ומהווה תקווה חדשה לחולים במחלה חשוכת מרפא.

לדברי ד"ר נועה ברגמן, מנהלת השירות לנורולוגיה קוגניטיבית באיכילוב: "אני תקווה כי טיפול זה הנו תחילתו של עידן חדש שבו חולים עם מחלת אלצהיימר יוכלו לקבל טיפול שיעכב את ההתדרדרות הקוגניטיבית ויאפשר להם איכות חיים טובה יותר לאורך זמן".

Amyloid beta 42
Amyloid beta 40
Tau protein
Phosphorylated Tau181
NF-L (<u>Neurofilament light chain</u>)

Simoa® Bead Technology

Quanterix
Discovery Fueled by Ultra-Sensitivity



THE SR-X™ BIOMARKER DETECTION SYSTEM

Total Biomarker Assays

109

Oncology

26

Neurology

19

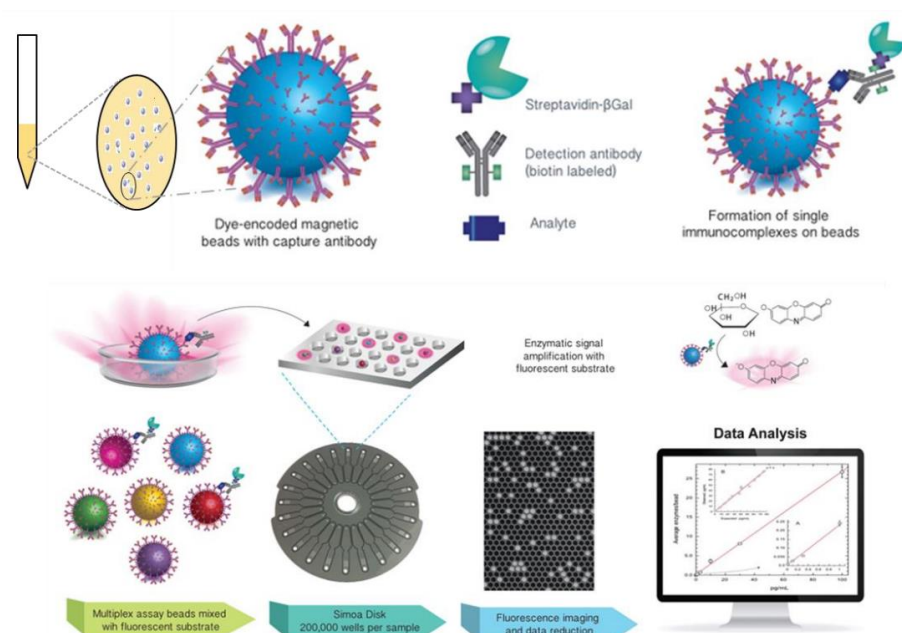
Immunology

13

Cardiology

45

Infectious Disease





What questions still needs to be answered, what is needed in order to answer them?

- Areas we plan to enter in the near future:
 - Big Data, AI
 - Single cell analysis (Isoplexis? RNAseq?)
 - Extra cellular vesicles
- We always welcome new collaboration! Please feel free to be in touch 
Yifatal@tlvmc.gov.il, 052-4262176

Center for the Study of Movement, Cognition, and Mobility:

Understanding, Assessing and Ameliorating Gait & Fall Risk in Older Adults and People with Neurological Disease

PI: Prof. Jeffrey M. Hausdorff; Associate Director: Prof. Anat Mirelman

Senior Research Engineer: Eran Gazit

Center for the Study of Movement, Cognition, and Mobility,
Neurological Institute, Tel Aviv Sourasky Medical Center

OVERALL RESEARCH OBJECTIVES

Physiology and
pathophysiology of
motor control, gait
balance, falls

- Improve understanding of gait, balance, motor control, and **neural control**
- Effects of aging and disease, in particular PD

Assessment

- Develop and validate new tools, eg, using wearables, to quantify daily living function

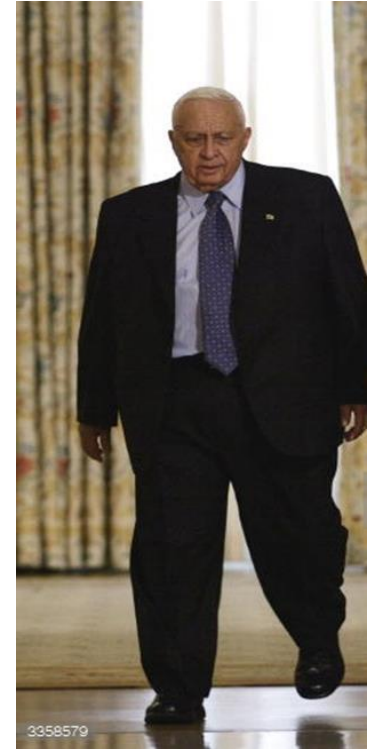
Therapy

- Develop and evaluate therapeutic interventions to improve function, especially gait stability and prevention of falls
- Augment motor & cognitive function

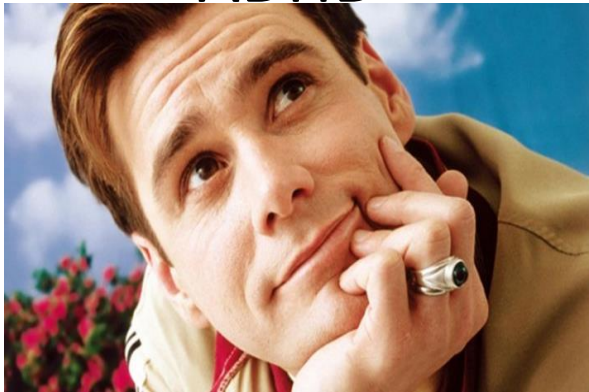
Aging



Post stroke



ADHD



Study Populations

MS



Alzheimer's



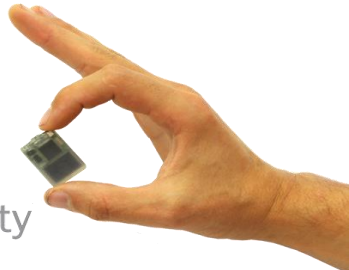
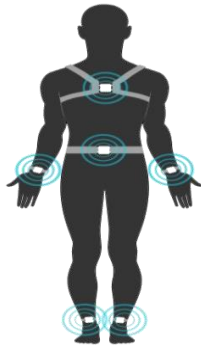
Parkinson's



Depression



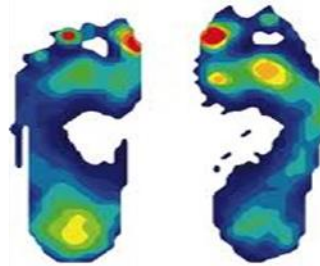
SOME OF OUR TOOLS



Axivity

IMUs

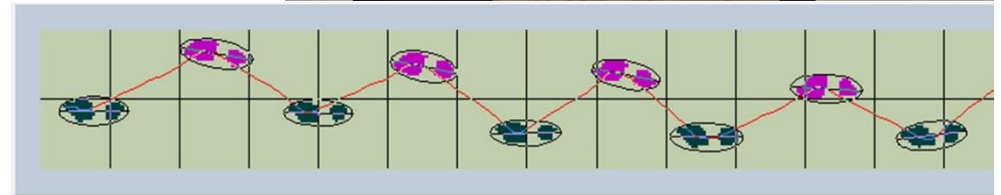
Smart insoles



TMS, tDCS, tACS



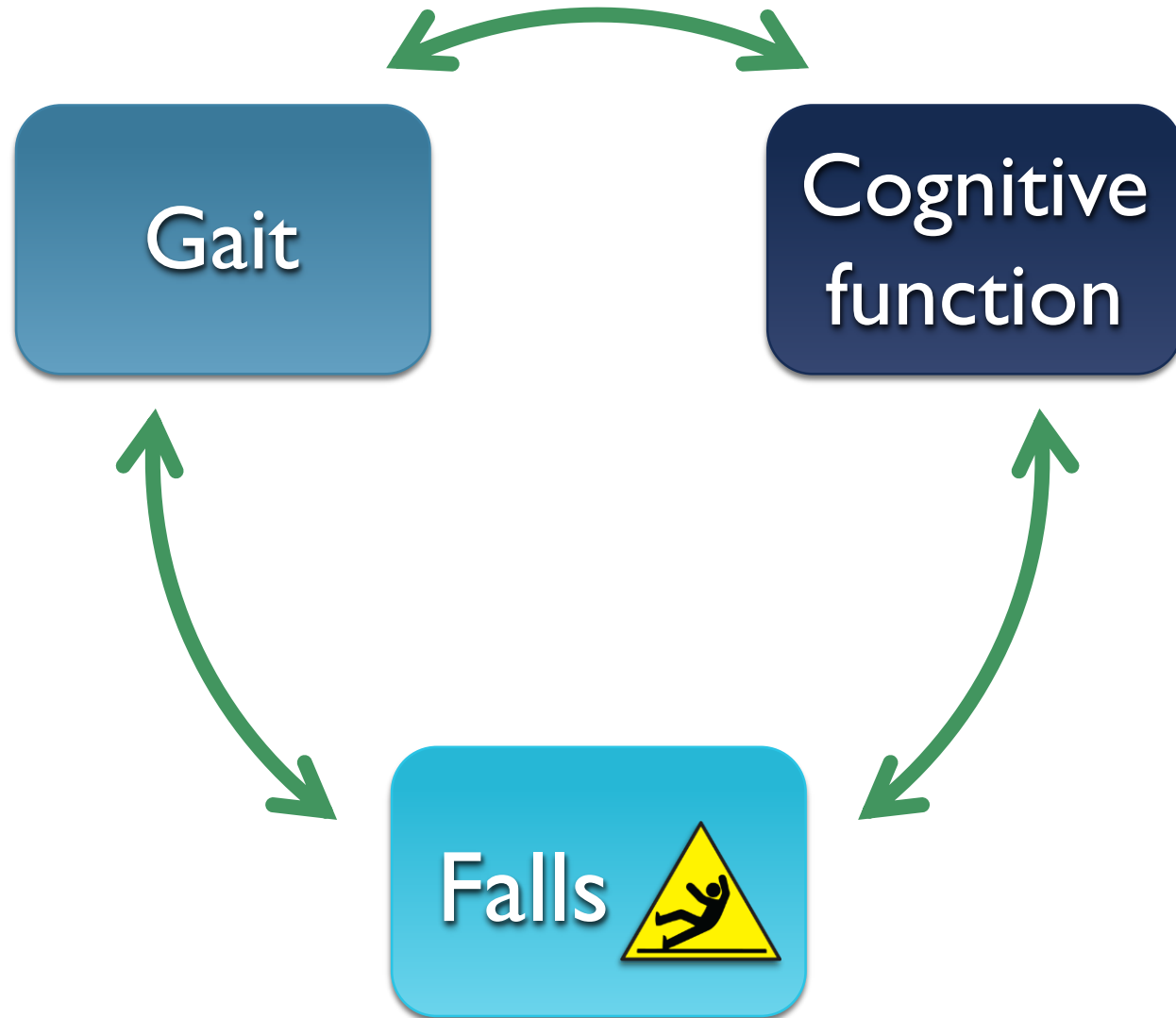
Pressure gait mat



Computerized obstacle course



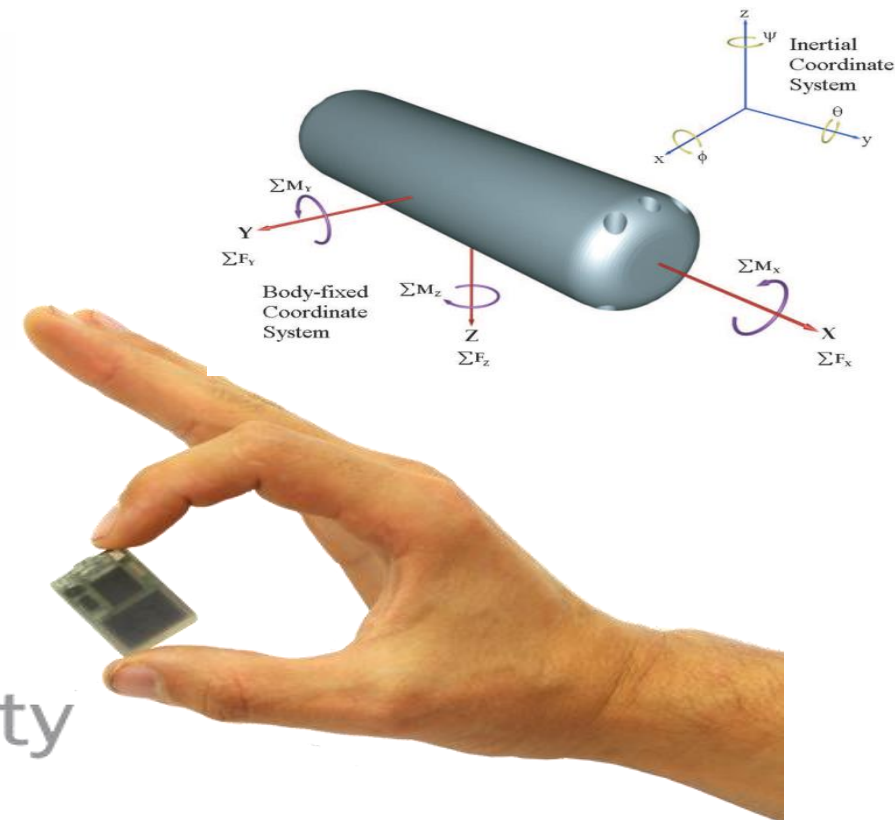
fNIRS



Multi-modal treatment approach: Targeting motor and cognitive function in a virtual reality game

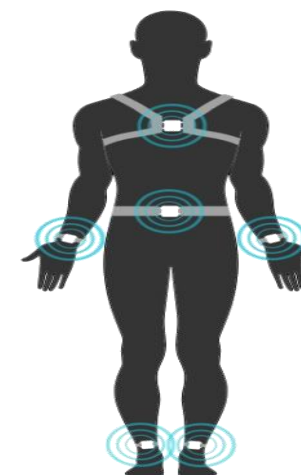
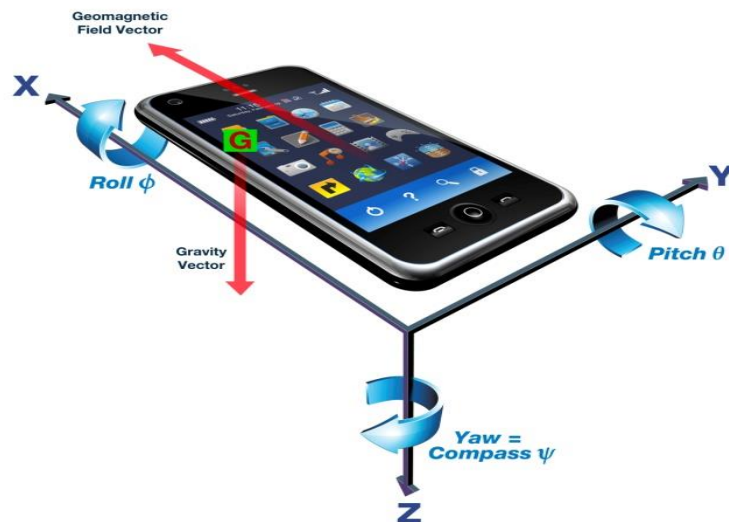


Gait training that promotes **motor learning**, while introducing graded **motor** and **cognitive** challenges **tailored** to the individual



Body Fixed Sensors

Axivity



Daily-living Continuous Assessment of Activity, Gait and Fall Risk

Nocturnal behavior:

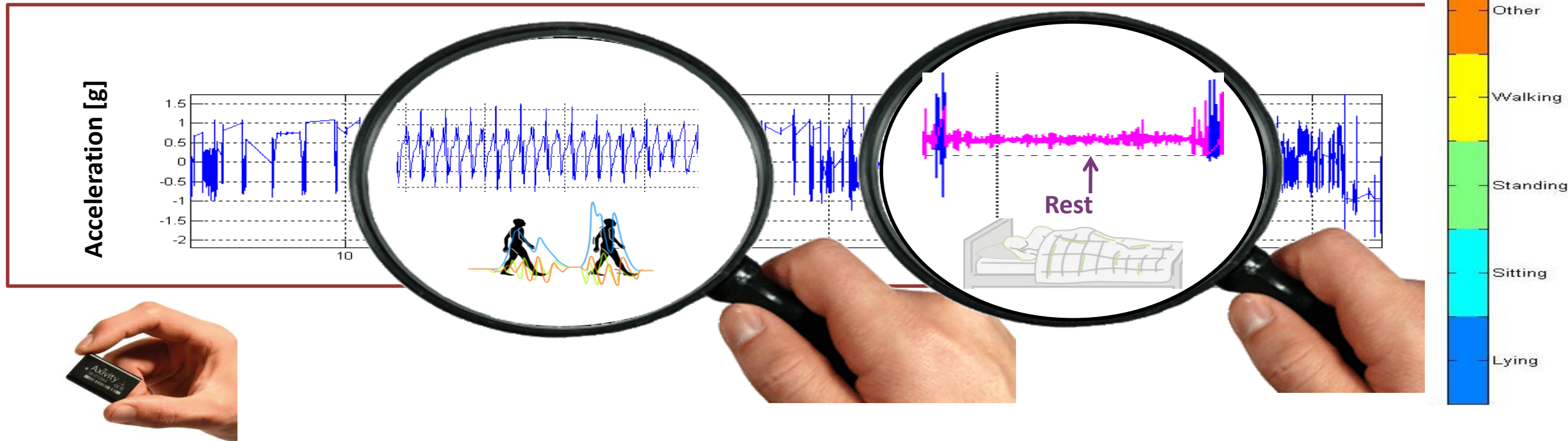
24 features

Physical Activity quantity and distribution patterns:

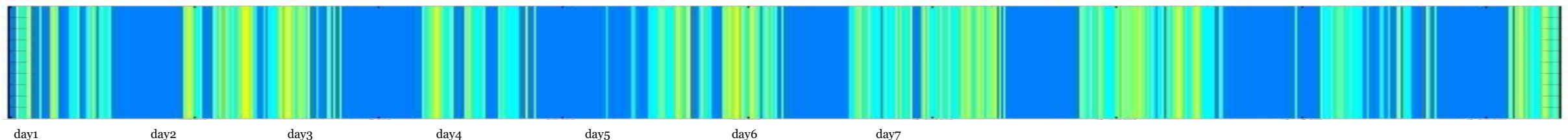
106 features

Gait quality:

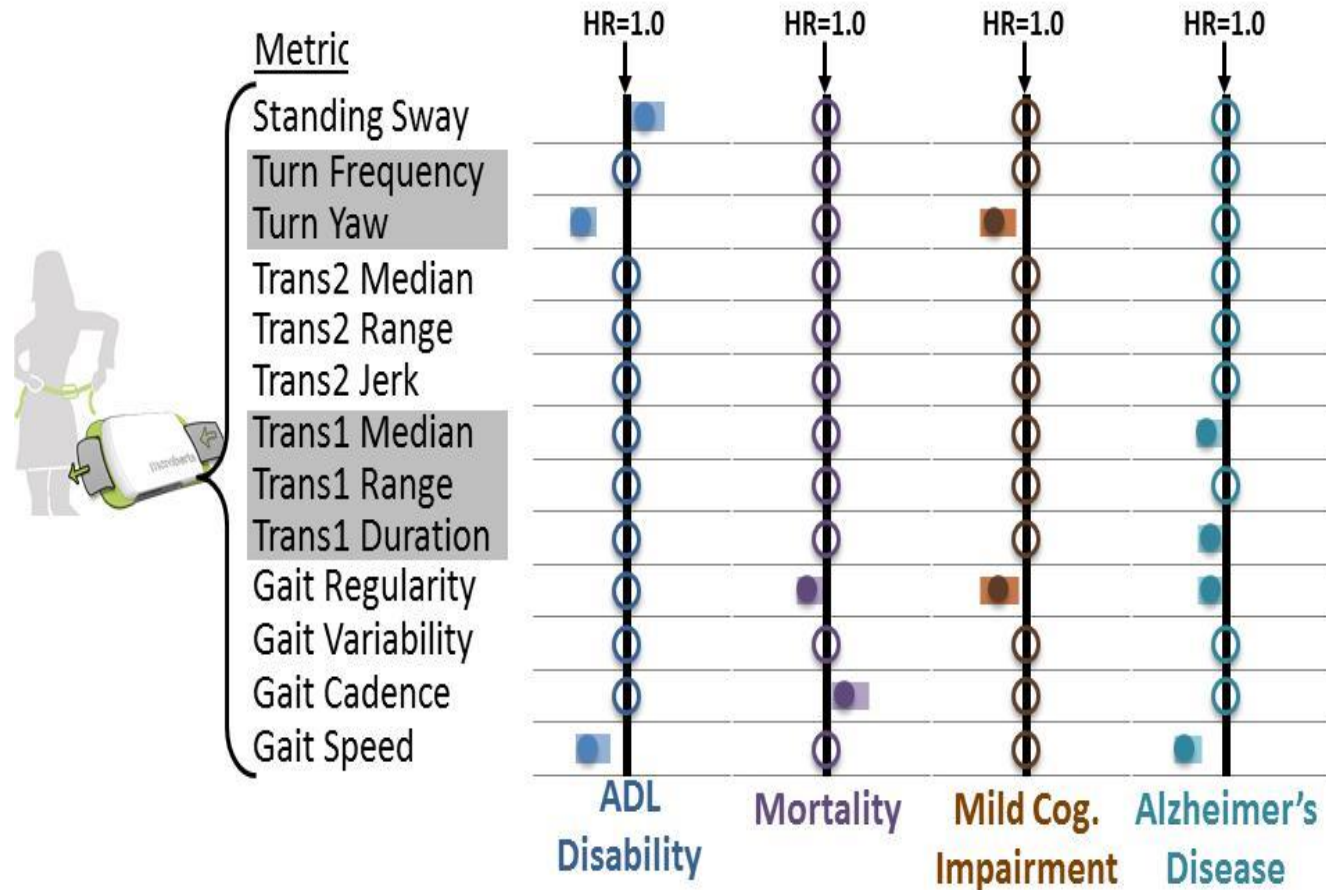
301 features



Automated activity classification (eg, lying, sit, stand, walk)



Distinct wearable-based measures predict different adverse health outcomes



Mean follow-up of 3.5 years, among 1,249 older adults (mean age 81, 78% female)



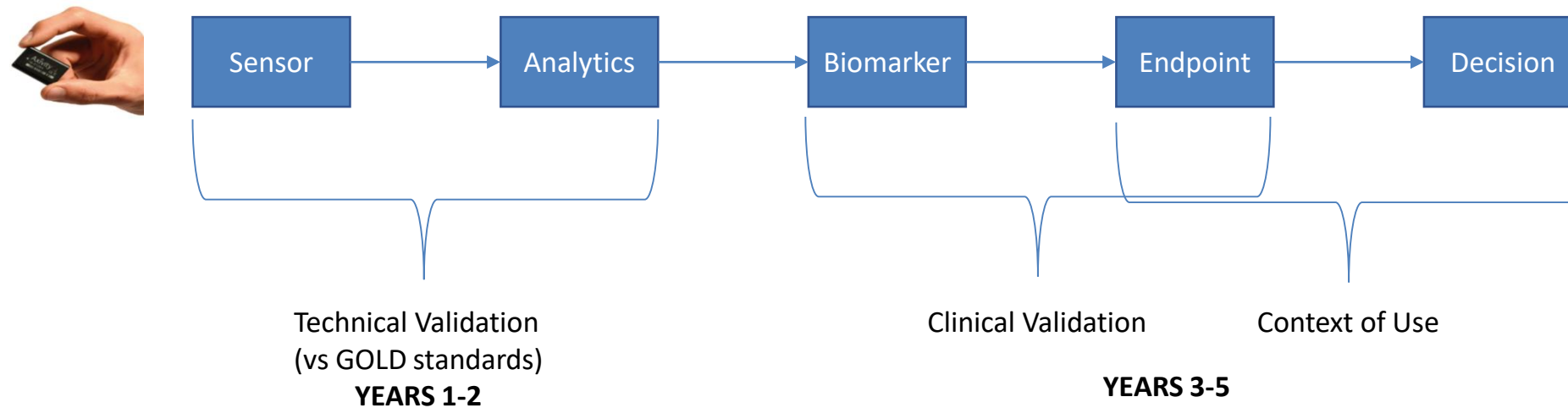
**Connecting digital mobility assessment to clinical outcomes
for regulatory and clinical endorsement**

34 partners from Europe and the USA

Primary outcome: real-world gait speed

Secondary outcomes: gait quality, activity...

Patient Cohorts: PD, MS, Hip fracture, COPD, Chronic heart failure



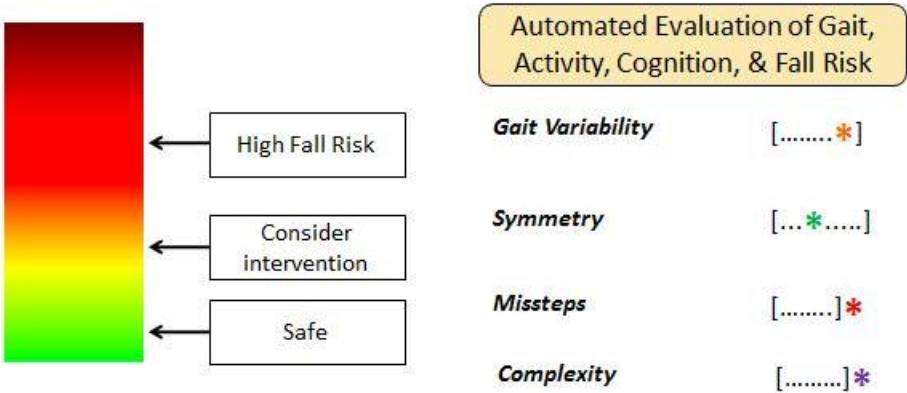
FDA and EMA-approved

<https://www.mobilise-d.eu/>

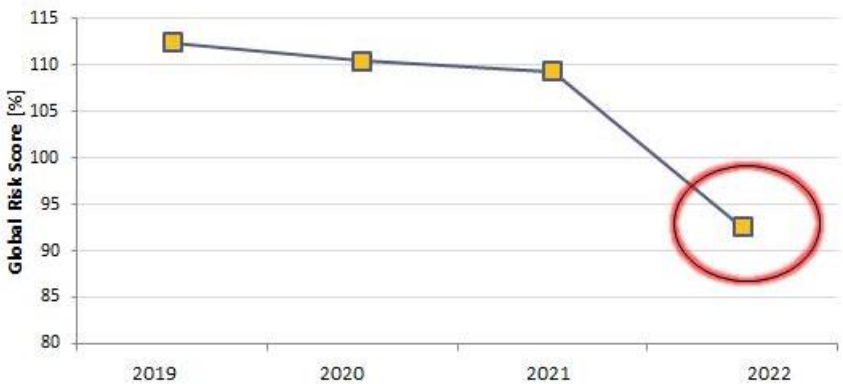
A look at the Future: wearable(s) by mail



Clinical Summary Report



Clinical Summary Report



THANK YOU FOR YOUR ATTENTION



National Institut
of Health



United States-Israel
Binational Science Foundation



National
Multiple Sclerosis
Society



THEME [HEALTH.2011.2.2.2-1]
[Investigator-driven clinical trials for
therapeutic interventions in elderly populations]

➤ Who we are and our area of interest

Name of lab/Location	PI/Manager	Main Subjects in the lab	Keep it simple to people who are not in the field
• Lab for molecular diagnostics of Myeloma • Hematology lab , 10th floor	• Prof. Yael Cohen • Dr. Limor Cohen	• Building a large clinical and molecular database MM patients • Identifying molecular patterns associated with treatment resistance, focusing on scRNAseq of tumor and microenvironment • Identifying mechanisms of resistance to therapy • Creating a decision support AI-based tool to enable optimized molecular based therapy selection	• Multiple Myeloma is basically incurable, but becoming a chronic disease with patients advancing from lines of treatment when resistance to treatment occurs. • There are many different treatment options and combinations, but no clear protocol for advanced patients. • Our research aims to create a tool for supporting the decisions of clinicians as to what therapy may work best for a specific patient.

Key Capabilities

What are we specialized in

- We are newly established, and aim to specialize in single cell analysis of patient samples
- We also aim to generate complementary testing of specific known resistance biomarkers/drivers using standard FACS, genomic mutations in CTC, and multiomics approaches

What specialized equipment we use to answer Q

- 10x genomics for single cell RNA seq
- Cell sorting
- Proteomics
- Bioinformatics
- AI based algorithms

How can we aid other scientists to answer their Q

- We are newly established
- Most of the research was based at the lab of Ido Amit from Weizman institute.



What questions still needs to be answered, what is needed in order to answer them?

- What are the pre-existing transcriptional signatures that contribute to therapy resistance, and which are acquired following treatment
- Patients undergoing autologous bone marrow transplantation- can we predict the ones that will not be successful?
- Can we find biomarkers for response to BCMA- CART ?
- Can we establish an algorithm to predict a patient- outcome at a decision point?
- Can we identify early-stage patients more susceptible to develop multiple myeloma?
 - Can we understand the pre-existing oncogenic drivers and delay or prevent onset?
- **We aim to expand our patient cohort to be able to establish a reliable predictive AI based tool to advance our understanding of this heterogeneous disease and direct our research efforts.**

➤ Who we are and our area of interest

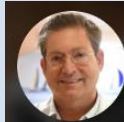
Name of lab/Location

**Center for interdisciplinary
innovation in bone healthcare**

Sami Ofer Building, 10th
floor, rooms 70-72



PI/Manager



Prof. Amal Khoury ,Lab PI
Email: amalkh@tlvmc.gov.il



Dr. Amir Sternheim,Lab PI
Email: amirst@tlvmc.gov.il

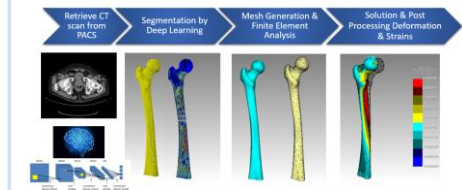


Prof. Zohar Yosibash , Lab PI
Head of Center for Interdisciplinary Innovation
in Bone Healthcare;School of Mechanical
Engineering;Vice Dean of Research of the
Faculty of Engineering
Phone: +972-52-8795751
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Main Subjects in the lab

- CT-based patient-specific prediction of humeral fracture risk due to metastases or osteoporosis
- Efficacy of bone treatment
- Optimization of fixation procedures

Keep it simple to people who are not in the field



Virtual models of patient's bones are constructed based on CT-scans to determine their response by computer simulations.

➤ Key Capabilities

What are we specialized in

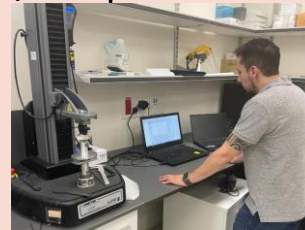
Biomechanical experiments of bone/soft tissues

Digital health and AI applied to human bone treatment

Analysis of CT-scans and finite element models

What specialized equipment we use to answer Q

Tensile/compression machines



Software for FEA & AI

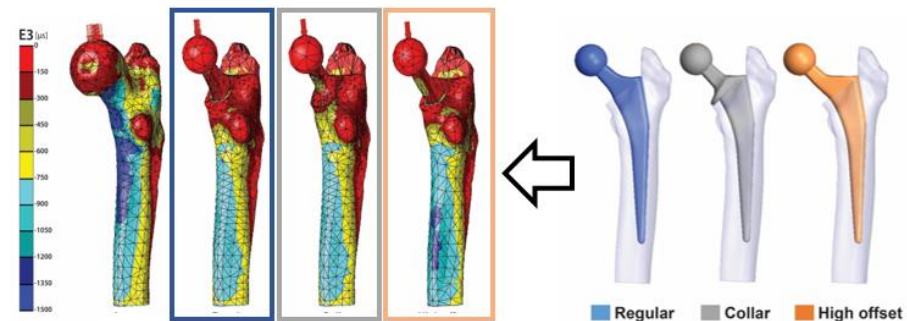
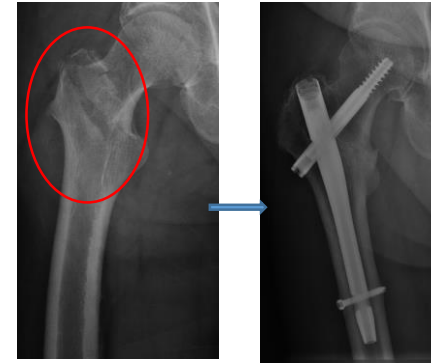
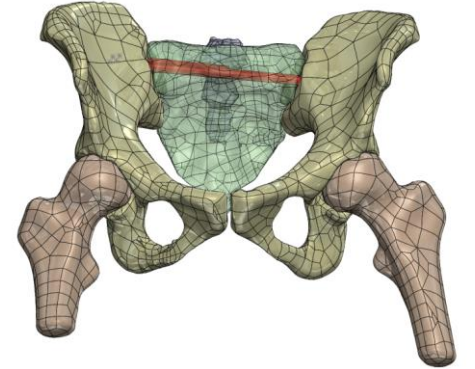


How can we aid other scientists to answer their Q

- Endocrinology – who are at risk of osteoporotic fractures
- Hematology – decision support for SMM to AMM
- Oncology – efficacy of medication and influence on bone health
- Of course Orthopedics – Optimize implants, prophylactic surgery
- Radiology – CT analysis

➤ What questions still needs to be answered, what is needed in order to answer them?

- Pre-operative personalized optimal fixation of insufficiency fractures of the sacrum by simulation and AI. CT-based finite element (FE) simulations combined with Deep-Learning (DL) algorithms.
- Opportunistic analysis of CT-scans for the identification of patients at risk of hip fractures FE+DL.
- Optimizing patient-specific implant design and fracture fixation.



The Sieratzki-Sagol Institute for Sleep Medicine

Revital-Shani Hershkovich, PhD

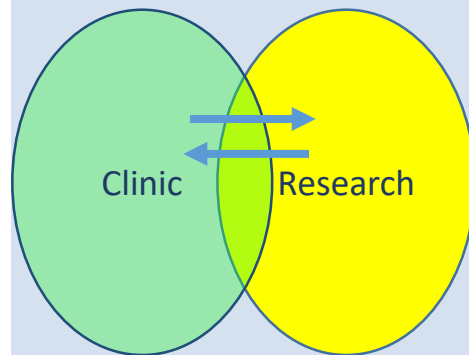
Ichilov Scientific Ecosystem

Feb 2024

➤ Who we are and our area of interest

The Lab

- Sieratzki-Sagol Institute for Sleep Medicine
- 2.5 years
- Sourasky build.
- The largest sleep center in Israel (8 rooms) all ages 0-120



Founders and Scientists

- Prof Riva Tauman
- Prof. Nir Giladi
- Prof. Yuval Nir
- Prof. Anat Mirelman
- Revital Shani-HersHKovich (PhD)
- Dr. Jenny Zitser

Main Subjects in the lab

- **Neurodegeneration**
- **Sleep disorders**
 - Parkinson
 - PTSD
 - Homeostasis
 - Epilepsy
 - Sleep and biological systems:
 - Metabolism, Endocrine, Menopause, Nutrition, Mood, Pregnancy
- R&D of medical devices
- Pharma

In simple words...



• Clinic

All sleep tests available in sleep medicine



• Science

Quantitative evaluation of physiological signals before-, during- and after- sleep in various health conditions



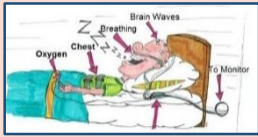
• Technology

A mandatory station in the development of innovative tools and solutions in sleep medicine

➤ Key Capabilities

What are we specialized in

- Gold Standard & High Density video polysomnography (in-lab sleep tests)



- Sleep disorders (neurological and respiratory)
- Obtaining clinical & research sleep parameters
- Advanced EEG analysis

What specialized equipment & resources we have to answer Q

- 8 rooms
- Dedicated research staff
- vPSG:
 - EEG, EMG, EOG, ECG, respiratory, video
- vPSG with High-density EEG (256 electrodes)
- Home devices
- Eye-tracker
- Psychophysics
- Large database of 12+ years of clinical sleep studies
- Certified and Experienced Team:
 - sleep doctors, sleep technicians, study coordinators

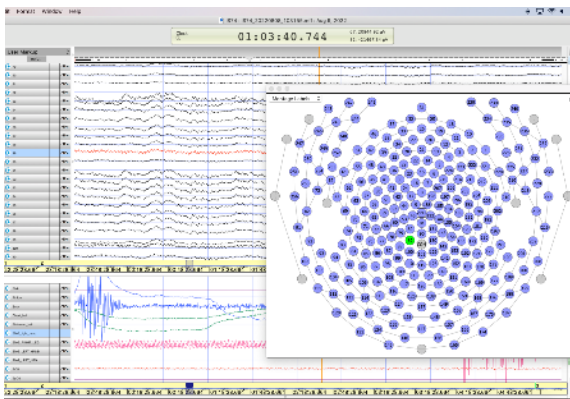
How can we aid other scientists to answer their Q

- Facility
- HR
- Knowledge
- We welcome research collaborations!

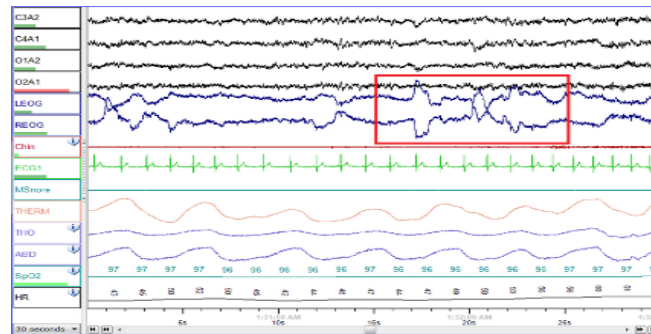


Take a Tour

High-Density EEG System
- Research only -



Gold Standard PSG System
- Clinical and Research -
7 Rooms



Team



THANK YOU!

Revital @ sleep center

050-5250590

revitalshe@tlvmc.gov.il