RESEARCH ON TAP

The Biology of Aging

Wednesday, March 26 | 4-6 pm

bu.edu/research/events

Boston University Office of Research

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Agenda

Opening Remarks	Ana Fiszbein Brianne Connizzo Thomas Perls
Presentations	Tom Perls Stacy Andersen George Murphy Stefano Monti Brianne Connizzo Samuel Beck LaDora V. Thompson Ana Fiszbein Jeroen Eyckmans Daniel Dempsey Slava Labunskyy Vladimir Botchkarev Hadi T. Nia Tristan Barako
Funding Opportunities & Closing Remarks	**Foundation Relations** Tristan Barako Katharine Canfield

A Natural Model of Exceptional Health Span and Longevity

Thomas Perls MD, MPH

Professor

Department of Medicine, Chobanian and Avedisian and School of Medicine

The New England Centenarian Study

Our NIH-NIA Funded Projects

Longevity Consortium's

Centenarian Project

LONG LIFE FAMILY STUDY

Integrative Longevity Omics

Resilience/Resistance against Alzheimer's Disease in Centenarians & Offspring

Rhoda Au (CAM)

Stefano Monti (CAM)

Daniel Segrè (CRC)

George Murphy (CREM)

Key Underlying Premise

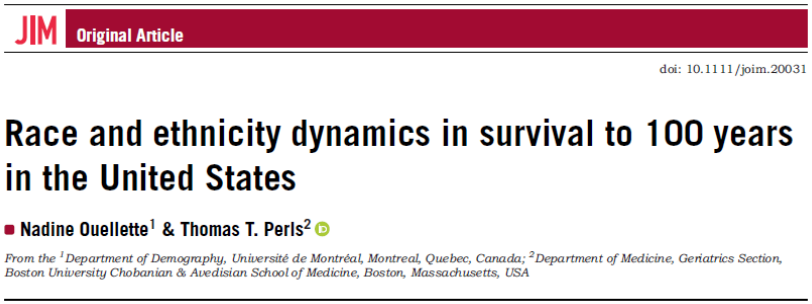
- People age differently from one another but at ages beyond 100, at older and older ages, they are more and more alike.
- About 90% of centenarians are disability-free up through their early nineties. “the older you get, the healthier you’ve been”!
- 15% are “Escapers”. At age100, escaped aging-related diseases
- Supercentenarians: 70% “escapers” at 100 and live independently until 106 years old!

Nature v. Nurture?

- To live to age 90, 75% of how we age is due to our health behaviors. To live to age 106+ years, 75% due to about 200 protective genes
- They are so alike, so need sample size of 500-1000
- They have protective genes. They don’t lack disease genes

Data and Biological Samples We Collect

- Data
  - Careful and detailed cognitive function
  - 1 week's worth of physical and sleep function data
  - Family pedigree data
  - Medical and dental history
  - Dietary habits and intake
  - Brain MRIs
- Biological samples
  - Blood
  - Fecal samples
  - Blood for creating induced pluripotent stem cells (iPSCs)
  - Brain donation



A longevity-specific bank of induced pluripotent stem cells from centenarians and their offspring

Todd W. Dowrey, Smuel F. Cranston, Nicholas Skvir, Yvonne Lok, Brian Gould, Bradley Petrowitz, Daniel Villar, Jidong Shan, Marianne James, Mark Dodge, Anna C. Belkina, Richard M. Giadone, Sofiya Milman, Paola Sebastiani, Thomas T. Perls, Stacy L. Andersen, George J. Murphy

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Current Directions

- Enhance diversity (different paths to 100+ years)
- Generate longitudinal omics (e.g. genetics, metabolites, microbiome, proteomics etc) data from our centenarian and offspring participants
- Enroll and study cognitive superagers (people with the cognitive function norms of people 30 years younger)
- Dr. Andersen:
  - Preclinical markers of cognitive decline v. resilience
  - Markers of rate of cognitive aging
- Dr. Murphy
  - iPSCs, differentiated lines and functional studies
  - Clocks
- Dr. Monti
  - Network Models, Pathways, Candidate Interventions

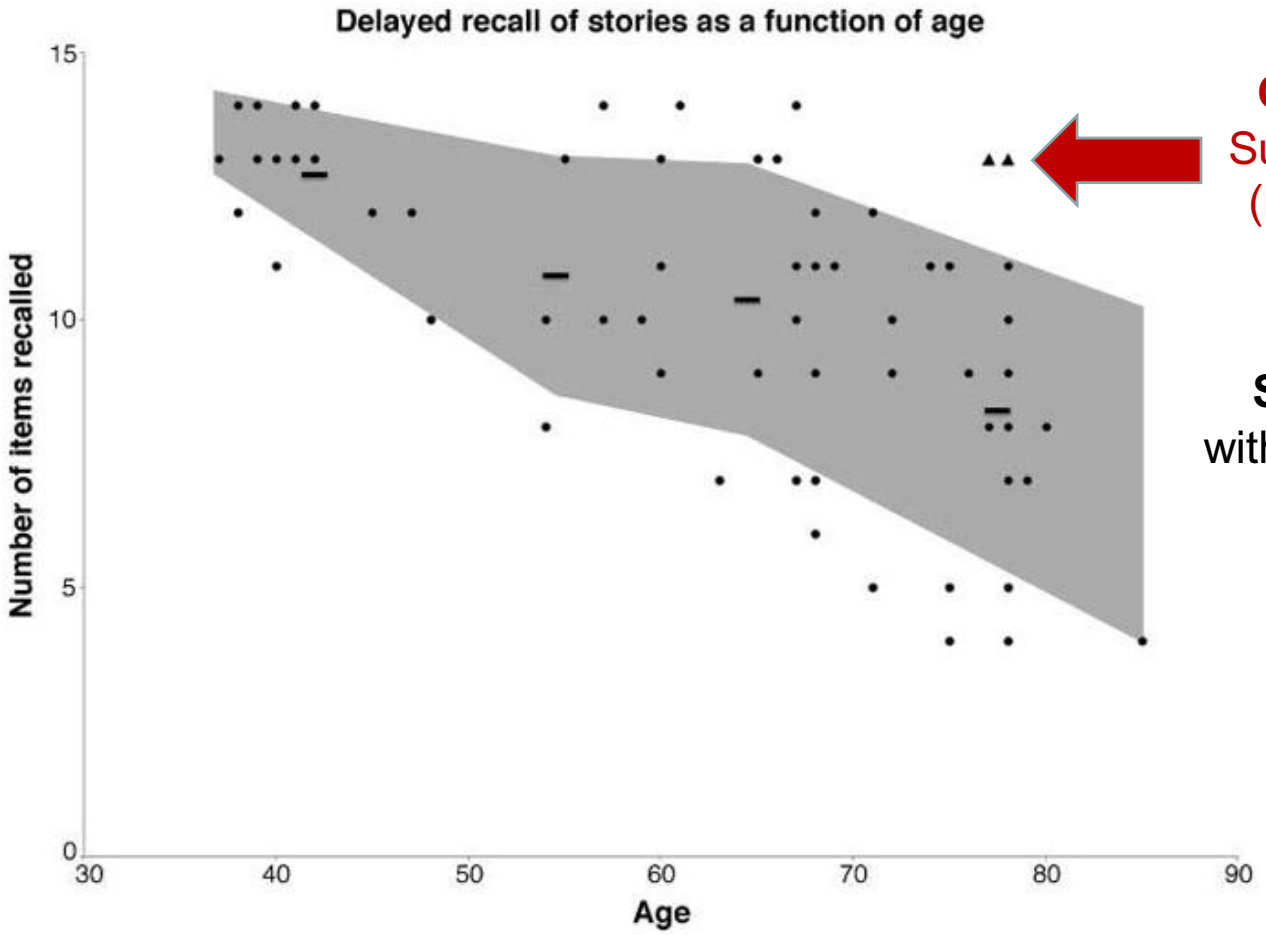
Insights into Alzheimer's Disease from Longevity Studies

Stacy Andersen, PhD

Assistant Professor

Dept of Medicine, Chobanian & Avedisian School of Medicine

Cognitive Superagers
Youthful episodic memory function



Cognitive Superagers
Superior episodic memory
(level 30 years younger)

Successful agers
within the normal range

Rogalski et al. *J Cogn Neurosci*, 2013; 25(1):29-36.

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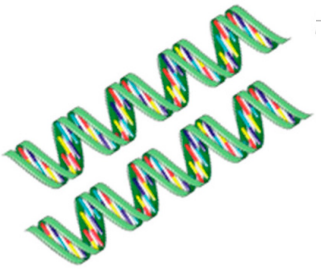
Neuroimaging

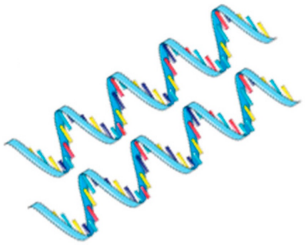
Neuropathology

Blood Biomarkers

Resilience/Resistance against
Alzheimer's
Disease in
Centenarians &
Offspring

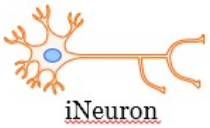


GENOMICS (DNA)



TRANSCRIPTOMICS (RNA)

iPSCs

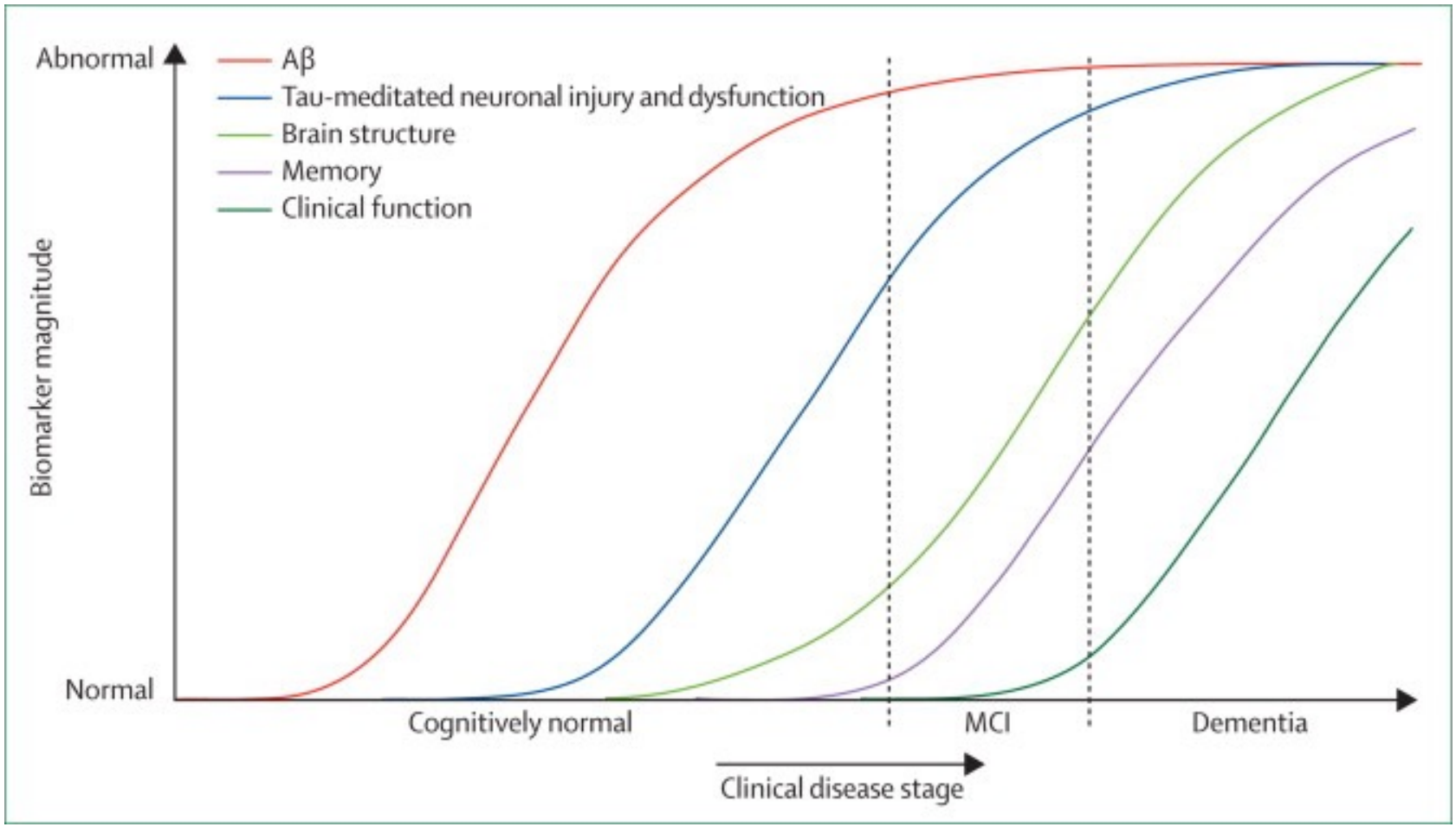


iNeuron

iAstrocyte

iMGL

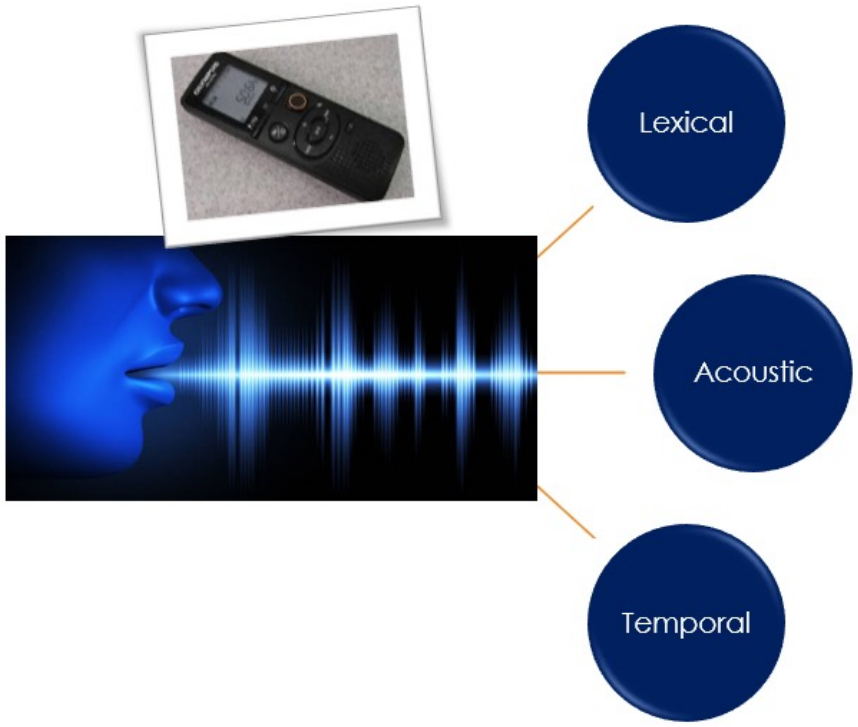
Early detection of Alzheimer's Disease

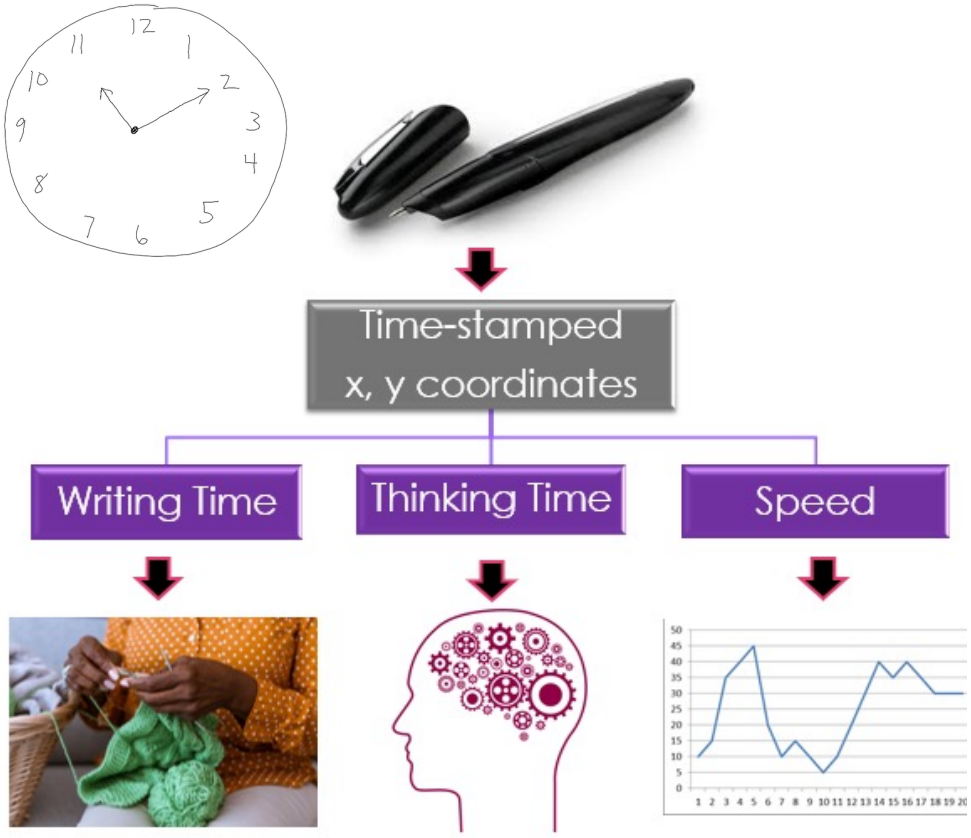


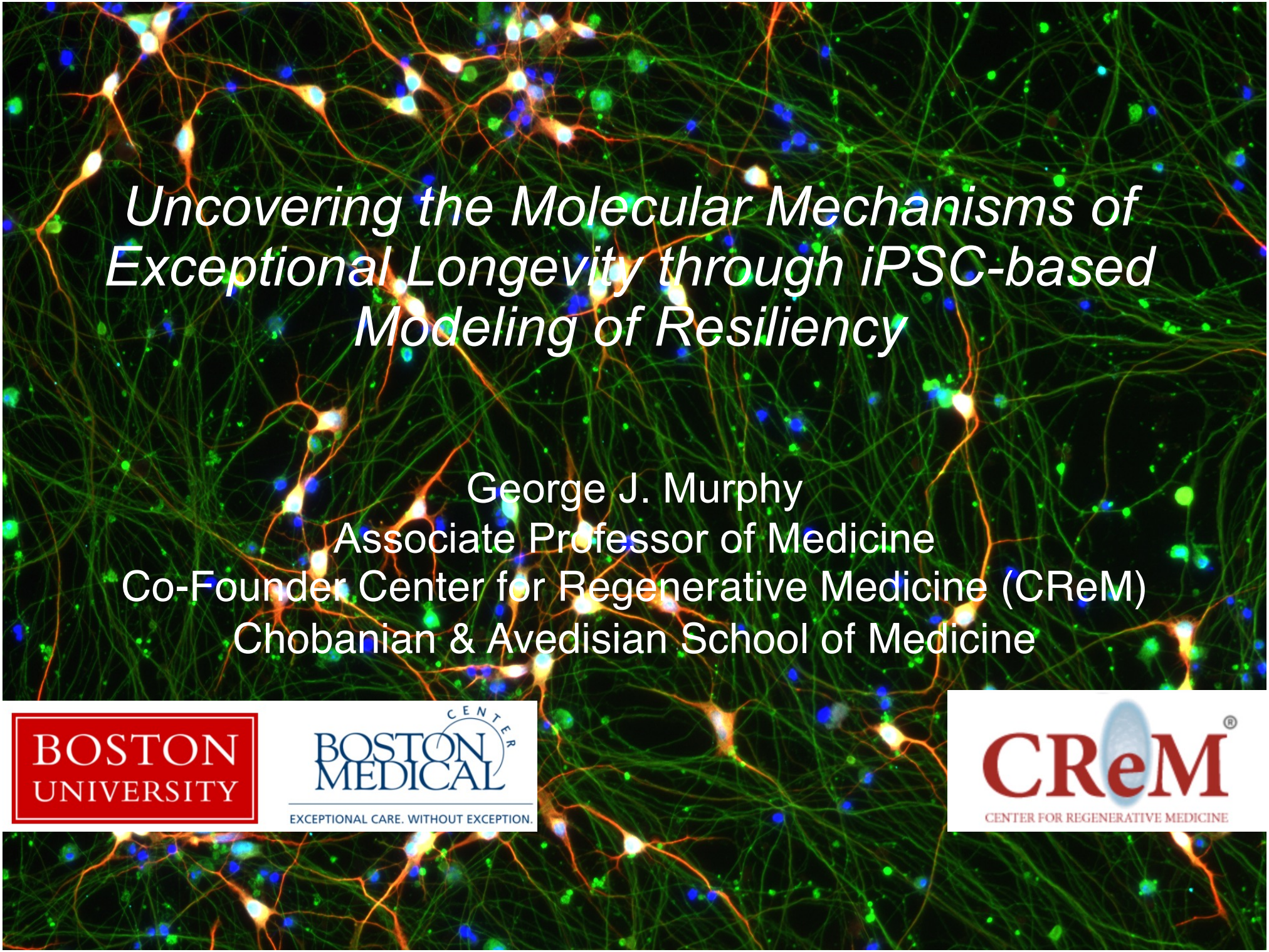
Jack et al., 2010. *Lancet Neurology*

Preclinical detection of cognitive impairment

The power of digital technologies







Uncovering the Molecular Mechanisms of Exceptional Longevity through iPSC-based Modeling of Resiliency

George J. Murphy
Associate Professor of Medicine
Co-Founder Center for Regenerative Medicine (CReM)
Chobanian & Avedisian School of Medicine

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CReM®
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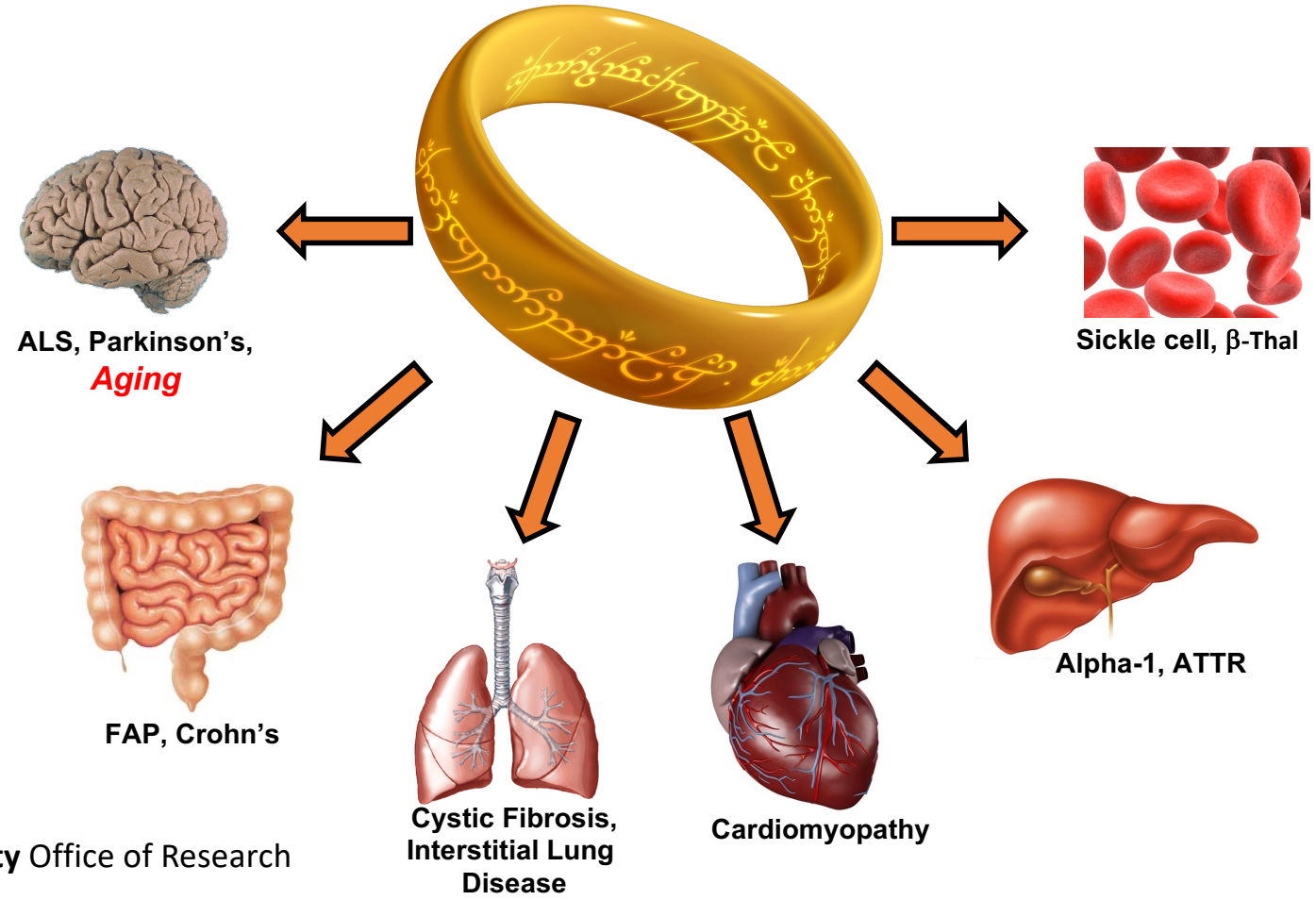
Pluripotent Stem Cells: *One Cell to Rule Them All*



A longevity-specific bank of induced pluripotent stem cells from centenarians and their offspring

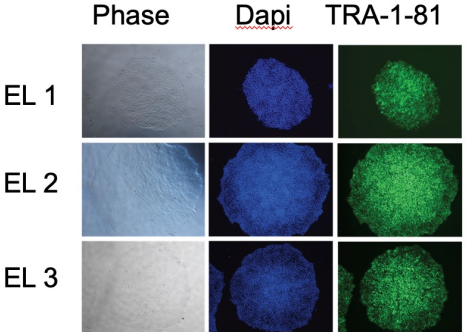
Exceptional Longevity (EL) Bank

Age	Sex	PBMC Collected	iPSC Generated
100-104	Male	13	1
	Female	18	2
105-109	Male	7	6
	Female	8	5
110+	Male	0	0
	Female	2	2
EL Offspring	Male	18	1
	Female	31	3
Non-EL controls	Male	5	0
	Female	2	0
Total		**104**	**20**

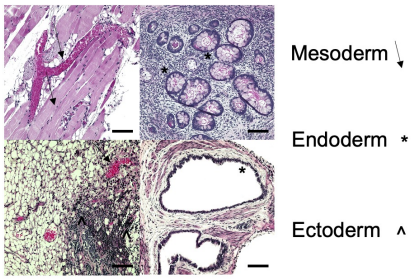
Clinical history of EL subjects

- Cognitive status (superager, normal, impaired)
- Disease, hospitalization
- Medications
- Quality of life (independence, fitness)
- Frailty index

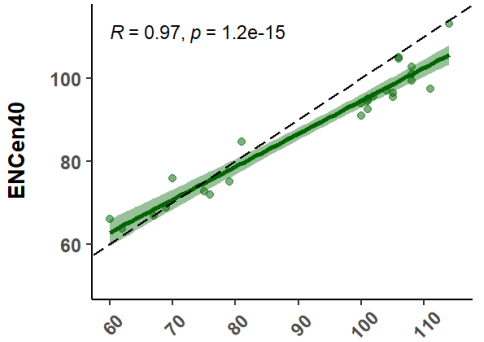
Characterized EL iPSC lines



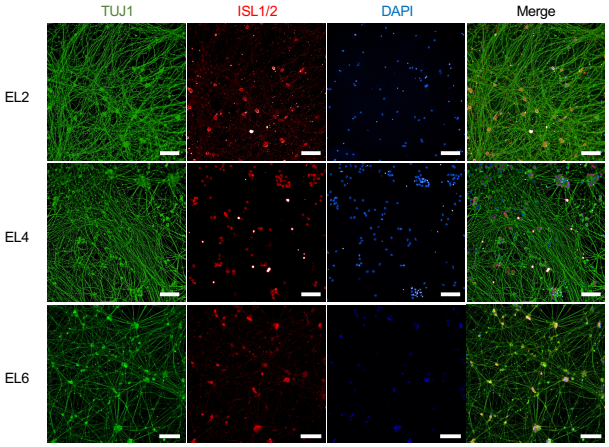
Teratoma assay



Application of biological age clocks

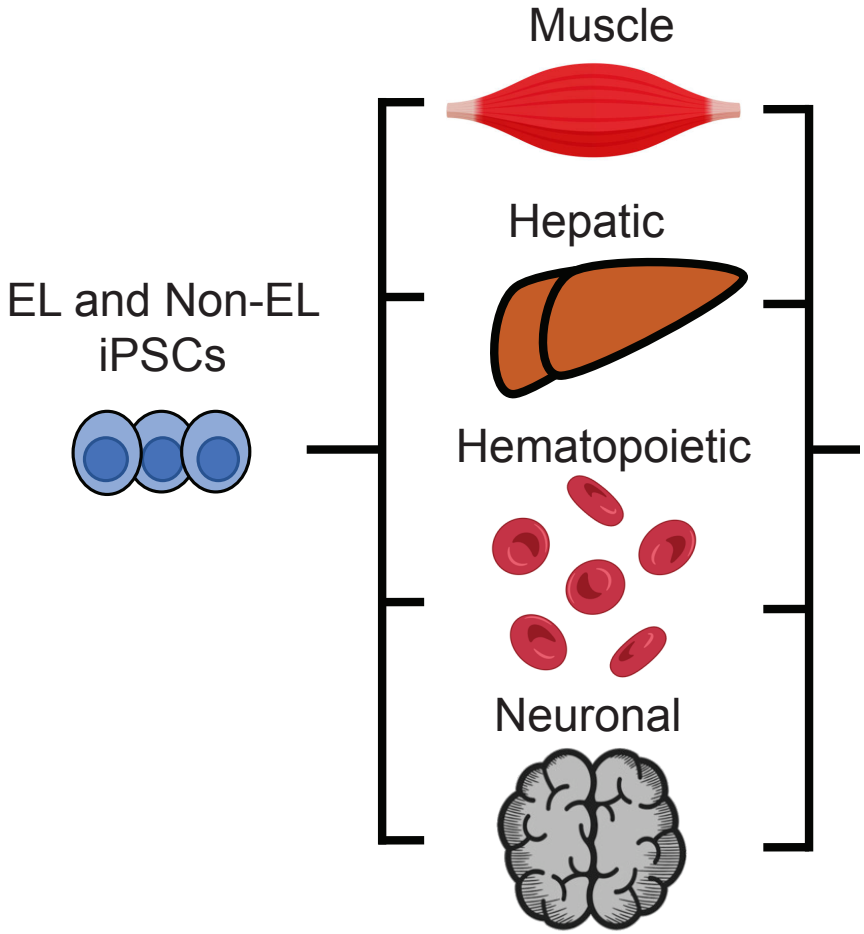


Efficient neuronal patterning

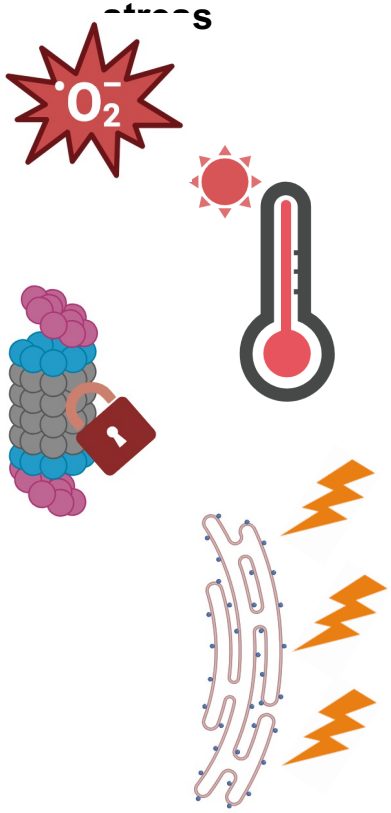


Dowrey et al., *Aging Cell* 2024

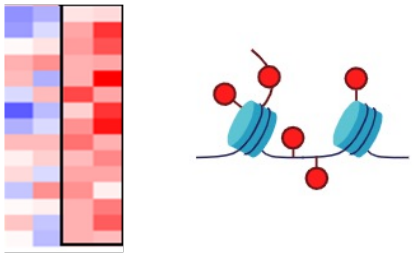
Establishing stress signatures in EL iPSC-derived cells



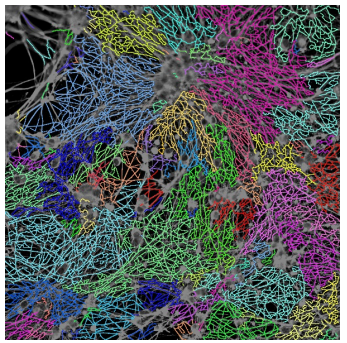
Application of cellular stress



Transcriptional and epigenetic profiling



Functional readouts



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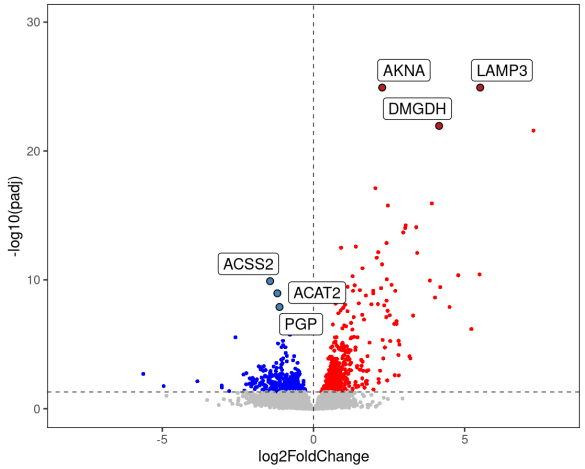
Application of resiliency signatures in discovery and validation

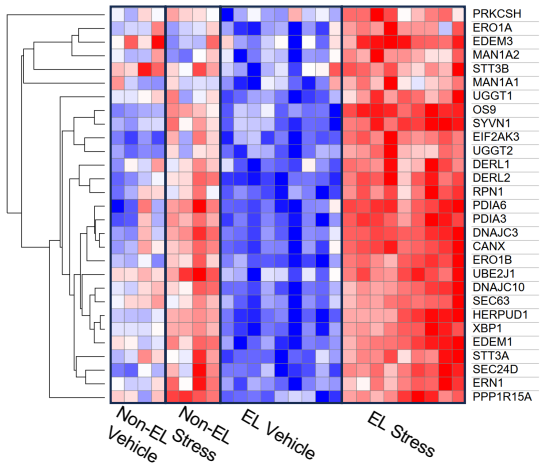
Generate molecular signatures of resiliency

Control vs EL (+Stress)



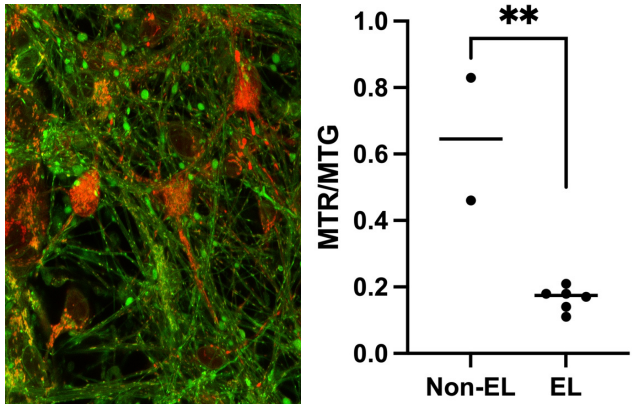
Curate context-specific pathways of interest

Protein processing in the ER



Assess functional capacity in longevity-specific cells

Mitochondrial activity



EL subjects maintain a molecularly and functionally "quieter" landscape while maintaining the ability to productively and robustly respond to stress

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Chobanian & Avedisian School of Medicine
Department of Medicine

Multi-Omics Modeling to Study
Healthy Aging and Exceptional Longevity (EL)

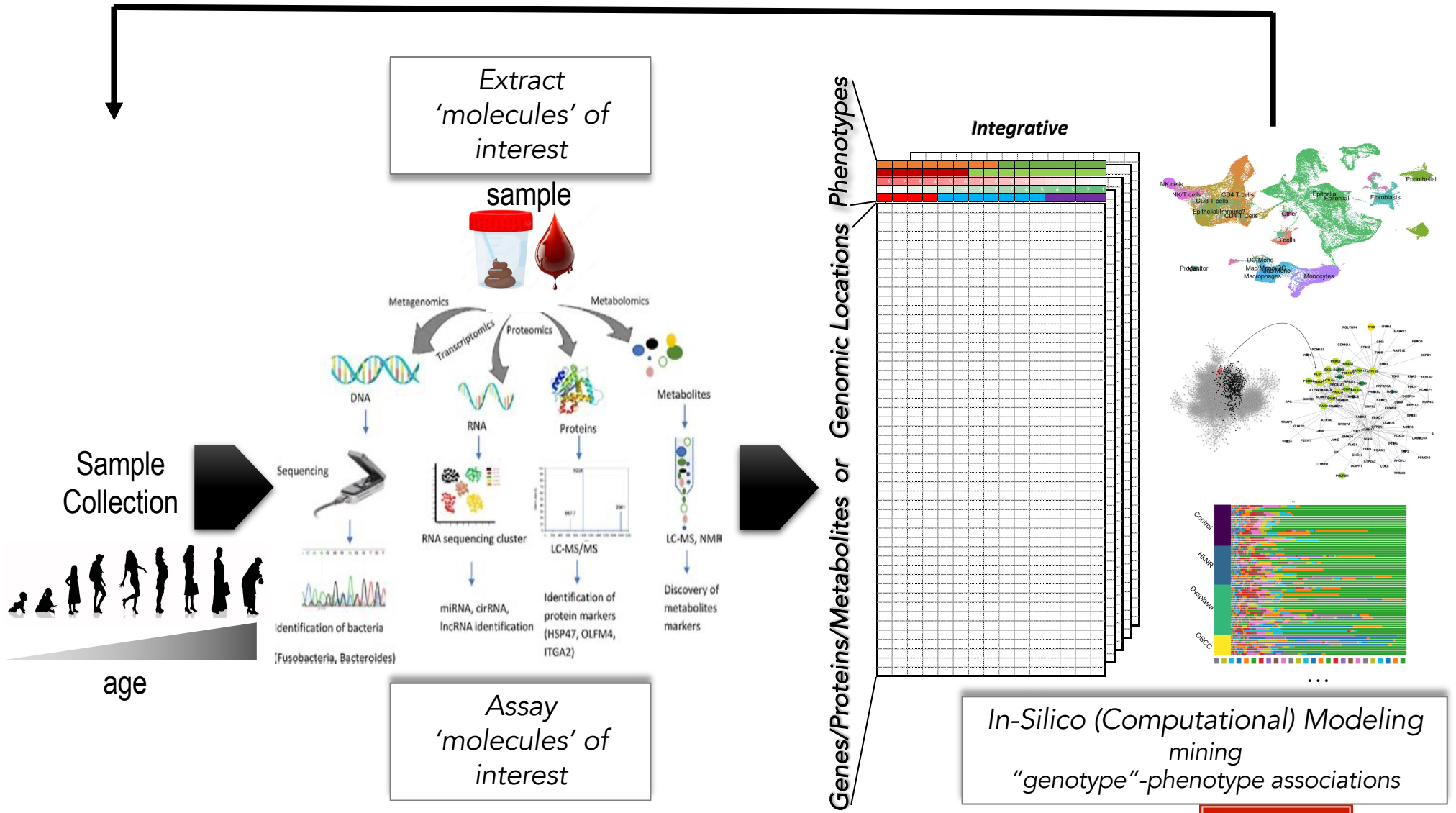
Stefano Monti
Section of Computational Biomedicine @ BUSM
Department of Biostatistics @ BSPH
Bioinformatics Program @ CDS
smonti@bu.edu
https://www.bumc.bu.edu/compbiomed/labs/monti/

Boston University Office of Research

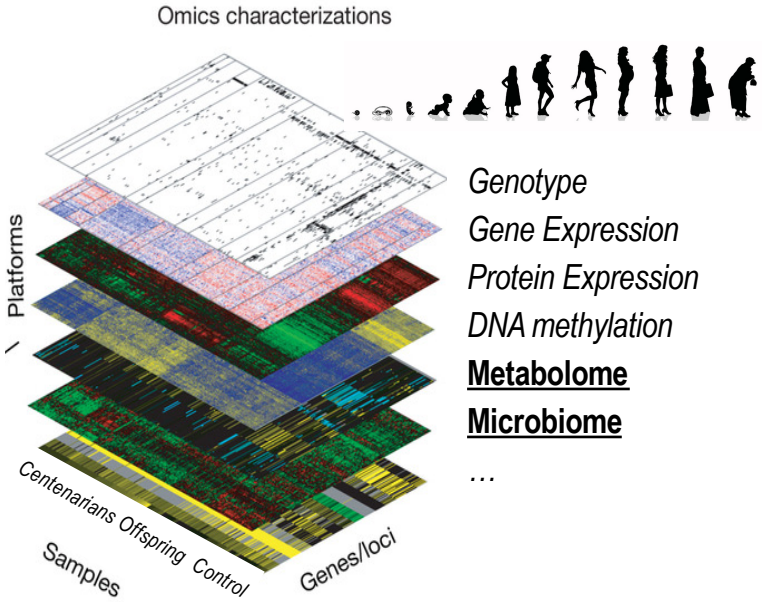
Boston University Interdisciplinary Programs
Bioinformatics

From Experiments to (Multi-Omics) Data

molecular epidemiology of age



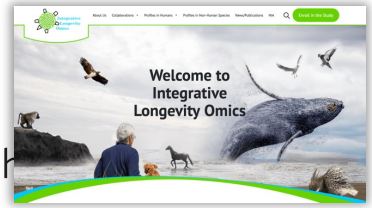
Integrative Multi-Omics
The Study of Healthy Aging & Longevity



Collaboration with
- Tom Perls, Paola Sebastiani, Stacy Andersen-Toomey
- New England Centenarian Study (NECS)
- George Murphy, et al.

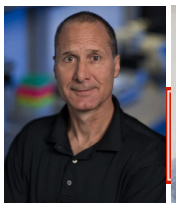
Several Consortia
- Longevity Consortium (Schork et al.)
- Long Life Family Study (LLFS) (Province et al.)
- Integrative Longevity Omics (ILO) (Perls et al.)

Exciting Challenges
- Analysis of "new" omics layers (Metabolomics, Metagenomics, …)
- Integrative Analysis of Multi-Omics




Perls

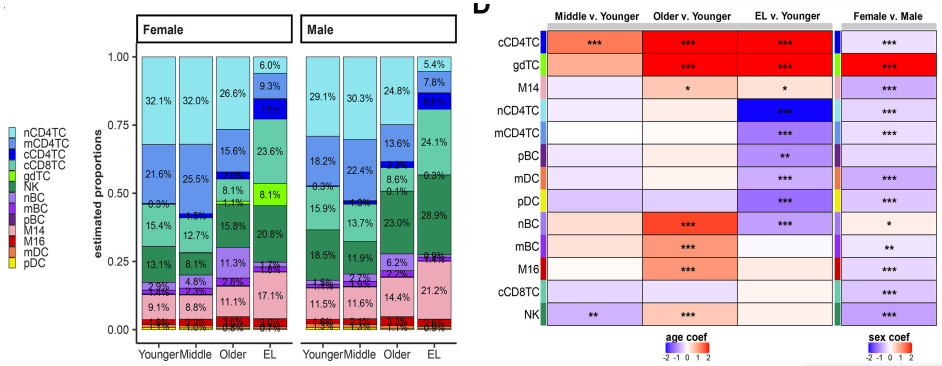

Sebastiani


Schork


Province


et al.

Single Cell Transcriptomics

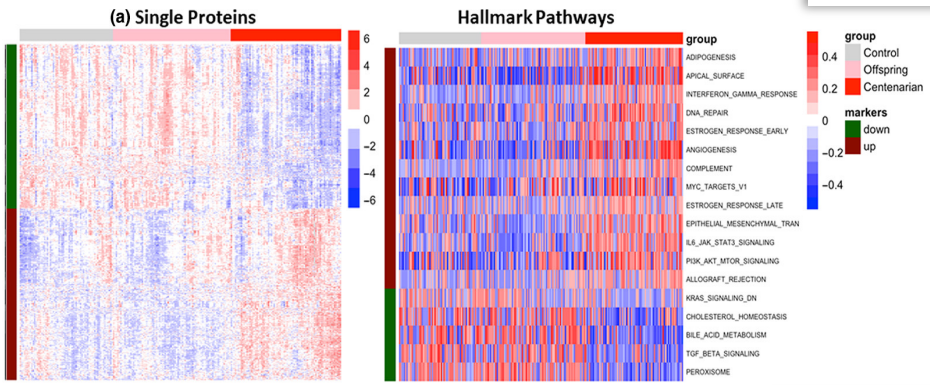


www.thelancet.com Vol 90 April, 2023

Multi-modal profiling of peripheral blood cells across the human lifespan reveals distinct immune cell signatures of aging and longevity

Tanya T. Karagiannis,[a,n,*] Todd W. Dowrey,[b,n] Carlos Villacorta-Martin,[b] Monty Montano,[c,d] Eric Reed,[e] Anna C. Belkina,[f,g] Stacy L. Andersen,[h] Thomas T. Perls,[h] Stefano Monti,[i,j,k,n] George J. Murphy,[b,l,n] and Paola Sebastiani[a,m,n]

Bulk Proteomics

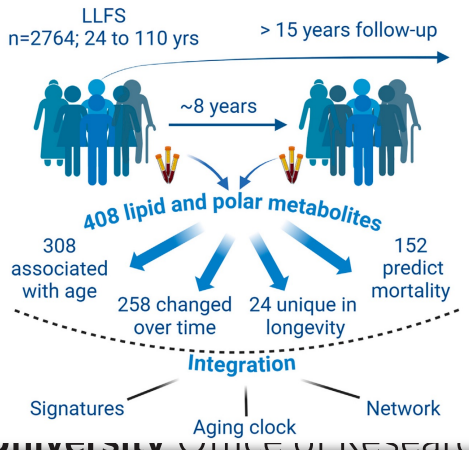


Aging Cell
WILEY
ORIGINAL ARTICLE

Protein signatures of centenarians and their offspring suggest centenarians age slower than other humans

Paola Sebastiani[1] | Anthony Federico[2,3] | Melody Morris[4] | Anastasia Gurinovich[2] | Toshiko Tanaka[5] | Kevin B. Chandler[6] | Stacy L. Andersen[7] | Gerald Denis[8] | Catherine E. Costello[9] | Luigi Ferrucci[5] | Lori Jennings[4] | David J. Glass[4,10] | Stefano Monti[2,3] | Thomas T. Perls[7]

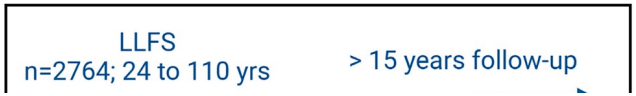
Bulk Metabolomics



Article
Cell Reports

Metabolite signatures of chronological age, aging, survival, and longevity

Graphical abstract



Authors

Paola Sebastiani, Stefano Monti, Michael S. Lustgarten, ..., Noa Rappaport, Thomas T. Perls, Gary J. Patti

Boston University

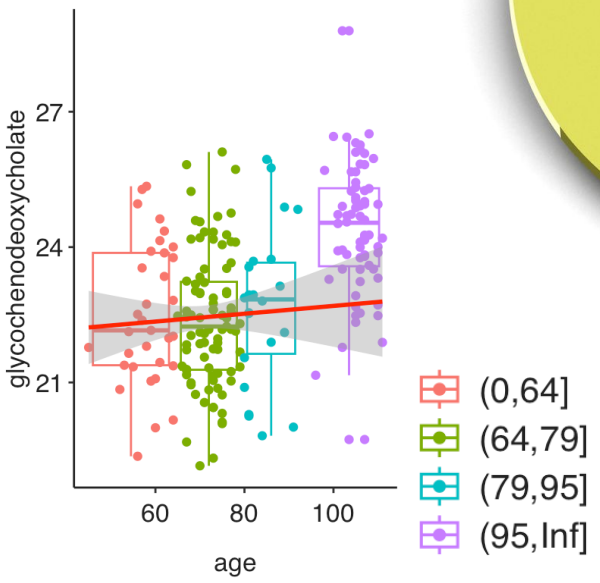
many (multi-)omics studies in the pipeline (transcriptomics, metabolomics, metagenomics) …

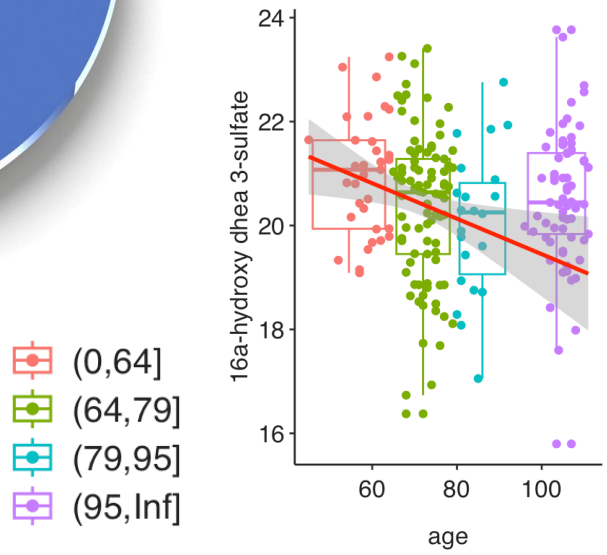
Looking for what is unique about EL subjects

"EL-only" *vs.* "Age-only" molecular features

EL studies
age-associations in populations enriched for EL subjects

Age Studies
age-associations in "standard" populations





Major Challenge

distinguishing End of Life (EoL) markers from Exceptional Longevity (EL) markers

Improving musculoskeletal health to extend healthspan

Brianne Connizzo

Assistant Professor

Biomedical Engineering

MOBILITY IS CRITICAL TO HEALTHY AGING

↓ **Blood Pressure**
Disease Risk
Stress & Anxiety

↑ **Strength**
Community
Independence

HEALTH TUESDAY, JAN. 11, 2011 ••• THE NEWS JOURNAL D3

Gait speed linked to longevity

In a study, older people who walked faster lived longer

By JANICE LLOYD
USA Today

Want to know how long you or your aging parents will live? One simple indi-

talization.

"My hope is that we begin to think about ways to reflect the health and function of older people that goes beyond diseases."

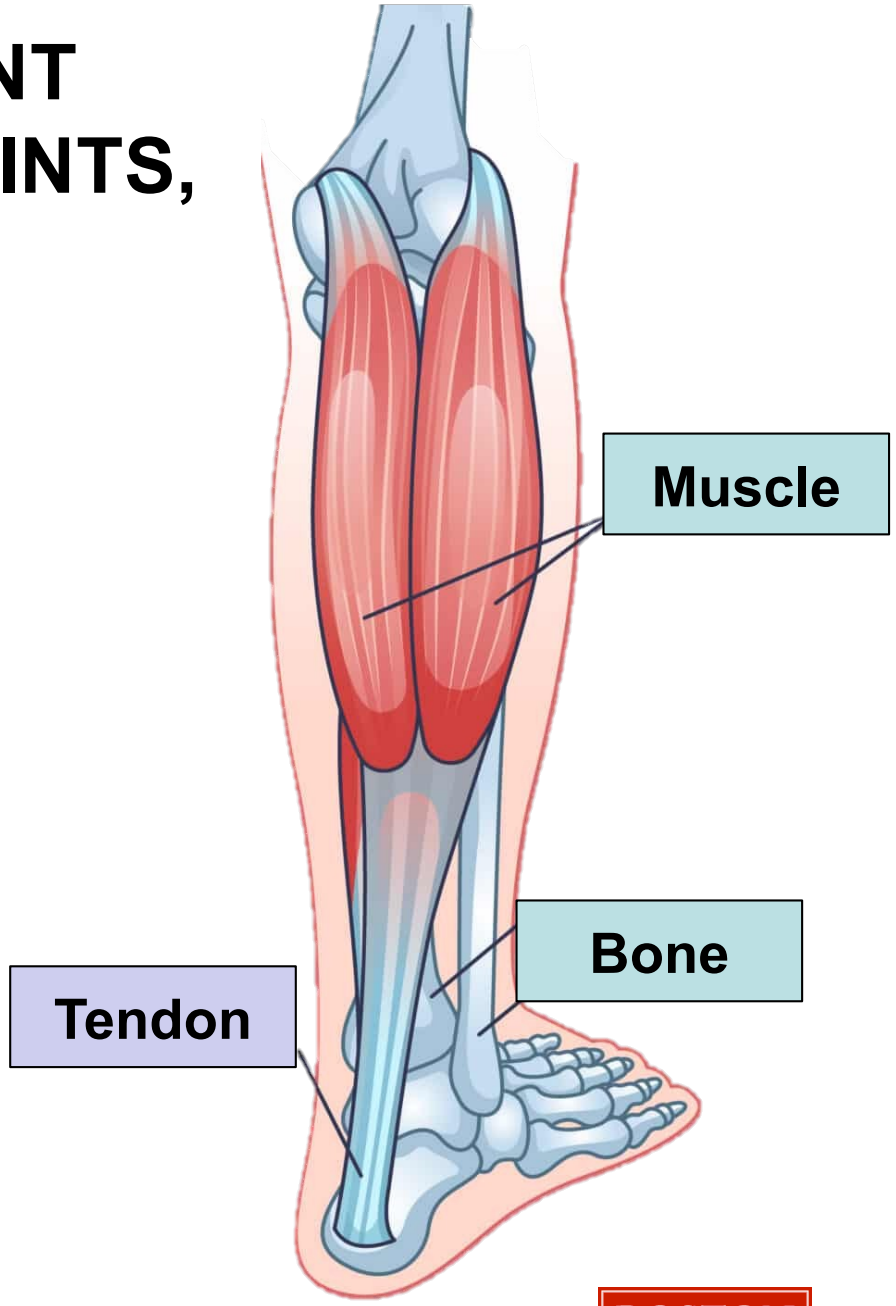
vide doctors with an inexpensive, safe and simple way of measuring performance that can help identify health problems, she said, and in many cases the re-

EFFICIENT MOVEMENT REQUIRES HEALTHY JOINTS, AND TENDONS!

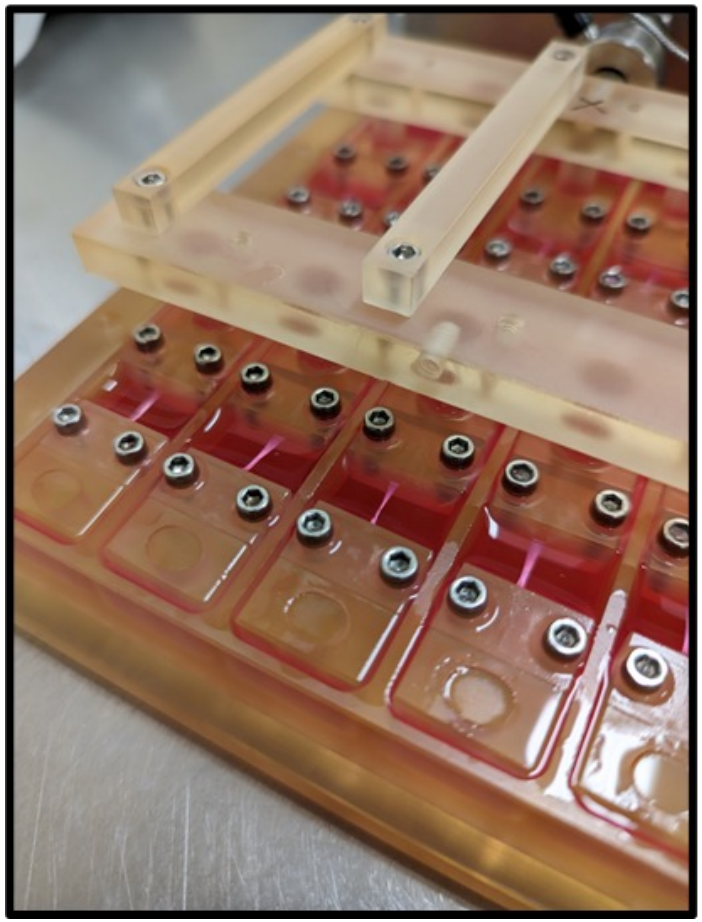
Required for Joint Stability and Efficient Movement

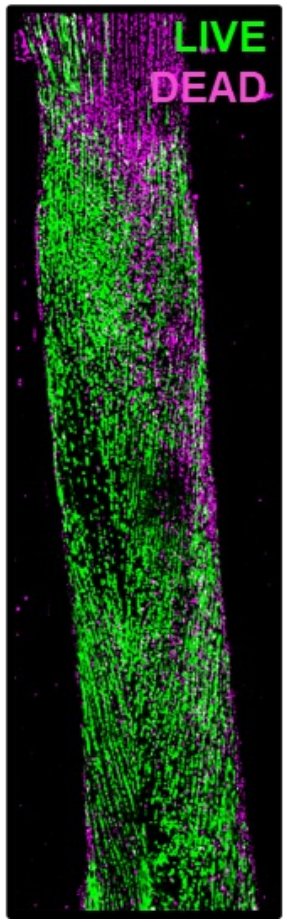
ECM-Rich Tissue with Few Cells

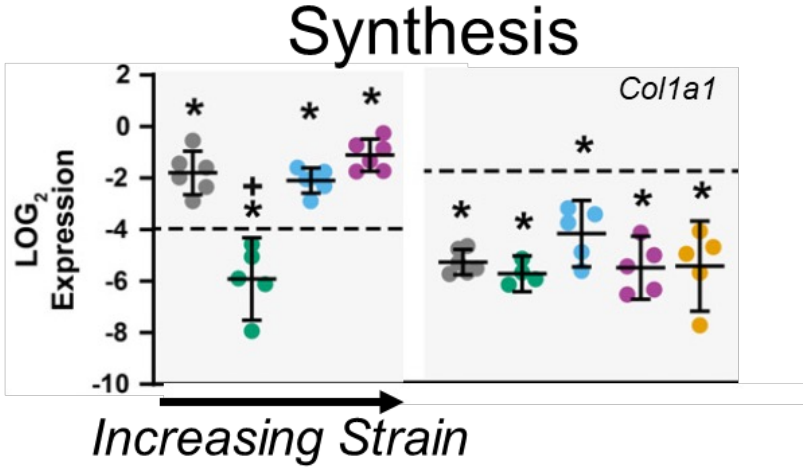
Relatively Quiescent But High Capacity for Adaptation

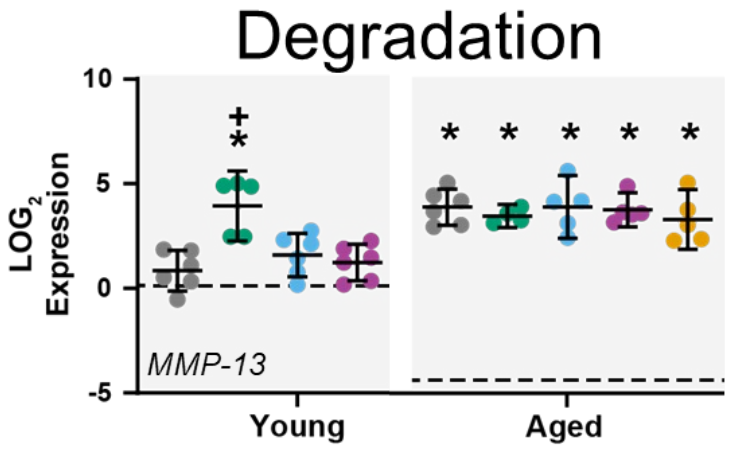


ADAPTATION TO CHANGING FUNCTION IS LOST WITH AGING



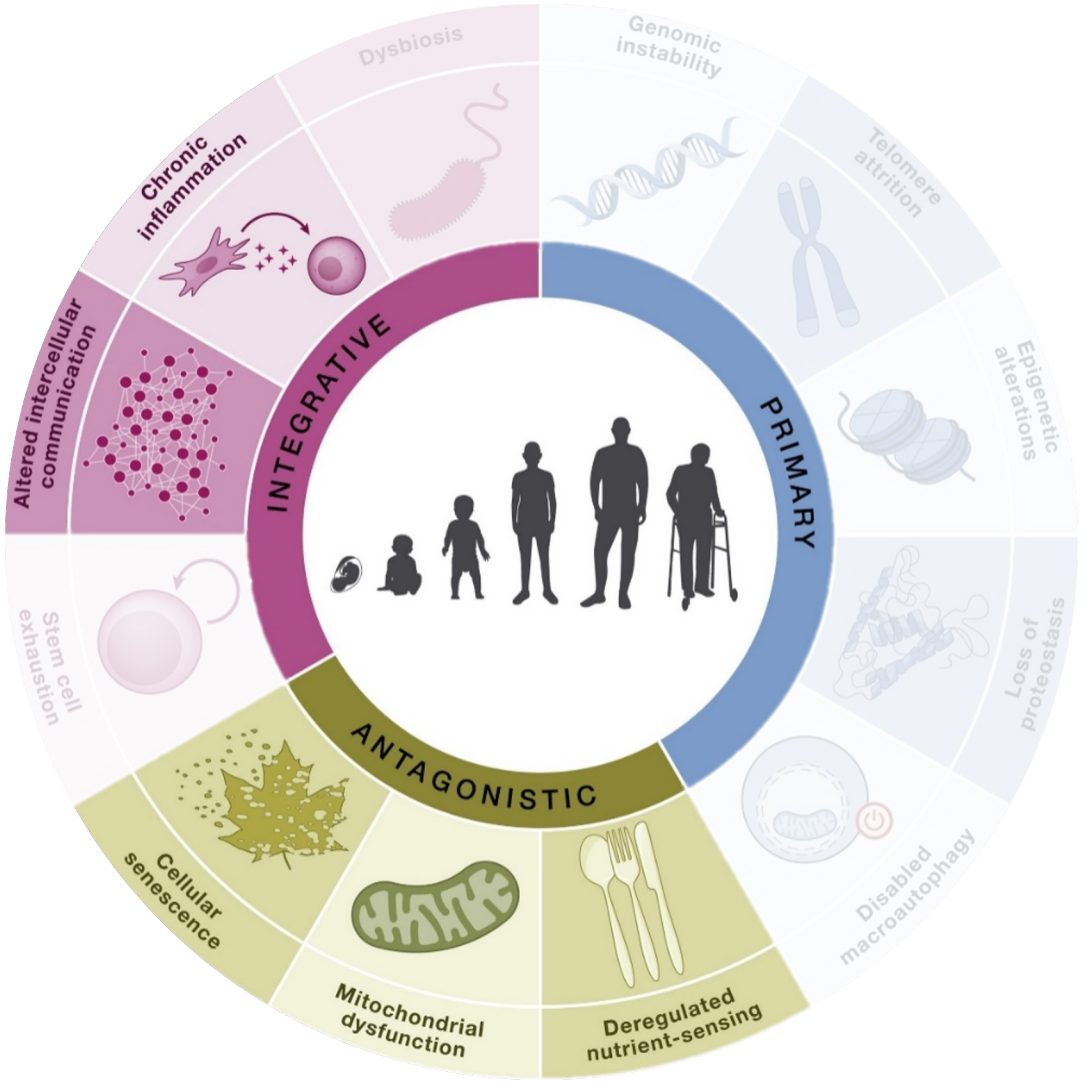






Aggouras, Stowe et al. JBME (2024)

WHAT CAUSES DYSFUNCTIONAL ADAPTATION? HOW CAN WE PREVENT OR REVERSE IT?



Adaptive remodeling is lost in aging

Aggouras, Stowe et al. JBME (2024)
Mlawer et al. (In Prep)
Stowe et al. (In Prep)

Senescence disrupts ECM remodeling

Stowe et al. Aging Cell (2024)

Intertissue signaling is disrupted

Kalĉo et al. (In Prep)

Nutrient sensing + processing is altered

Mlawer et al. BioRxiv (2025)

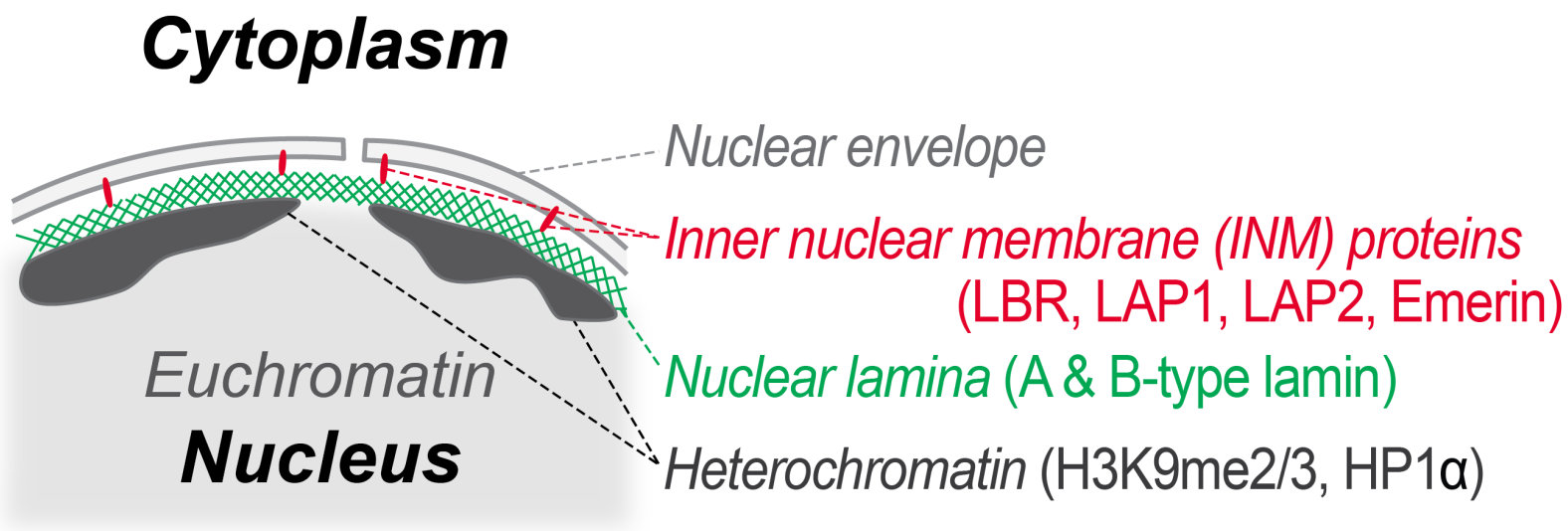
Beyond Epigenetics: Leveraging Big Data for Breakthrough Anti-Aging Therapies

Samuel Beck, PhD

Assistant Professor

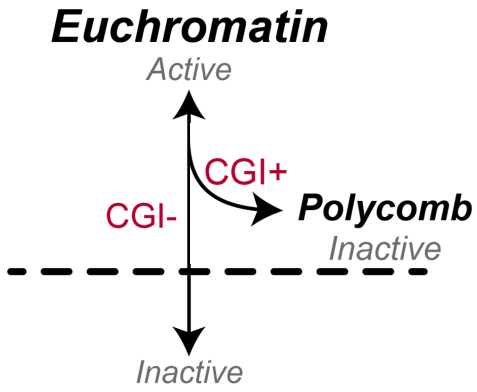
Department of Dermatology, Chobanian & Avedisian School of Medicine

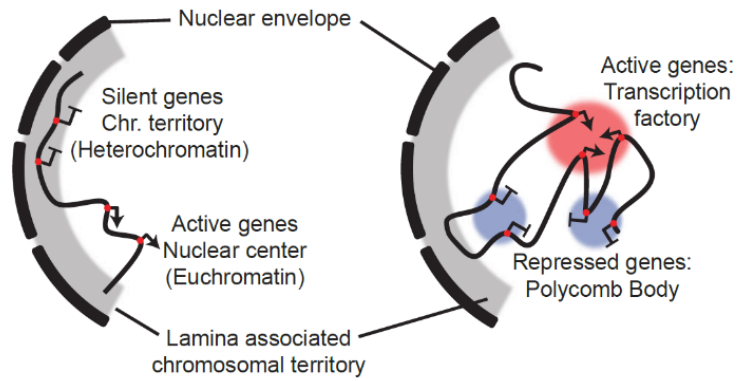
Question: Changes in chromatin architecture during aging



	Normative aging		Premature aging	
	Aged cells	Senescence	Progeria	Werner syndrome
Cause	Normative aging	Telomere shortening, oncogene induction	*LMNA* mutation	*WRN* mutation
INM protein	Loss of LAP2β / LBR	Loss of LBR	Loss of LAP2α	Loss of LAP2β / LBR
Nuclear lamina	Loss of Lamin A, Progerin accumulation	Degradation of Lamin B1	Progerin accumulation	Lamin B1 mislocalization
Heterochromatin	Global decondensation of heterochromatin, Degradation of HP1α			

Hypothesis: Does aging cause uncontrolled expression of CGI- genes?



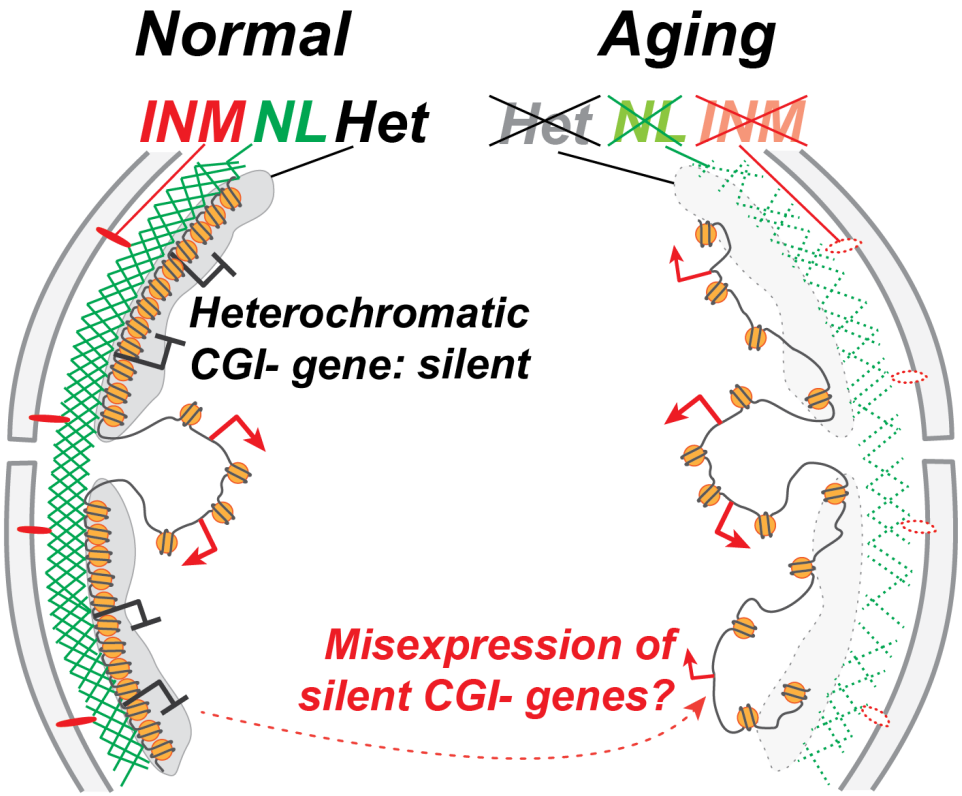


CT-extrusion model ***(CGI- genes)***

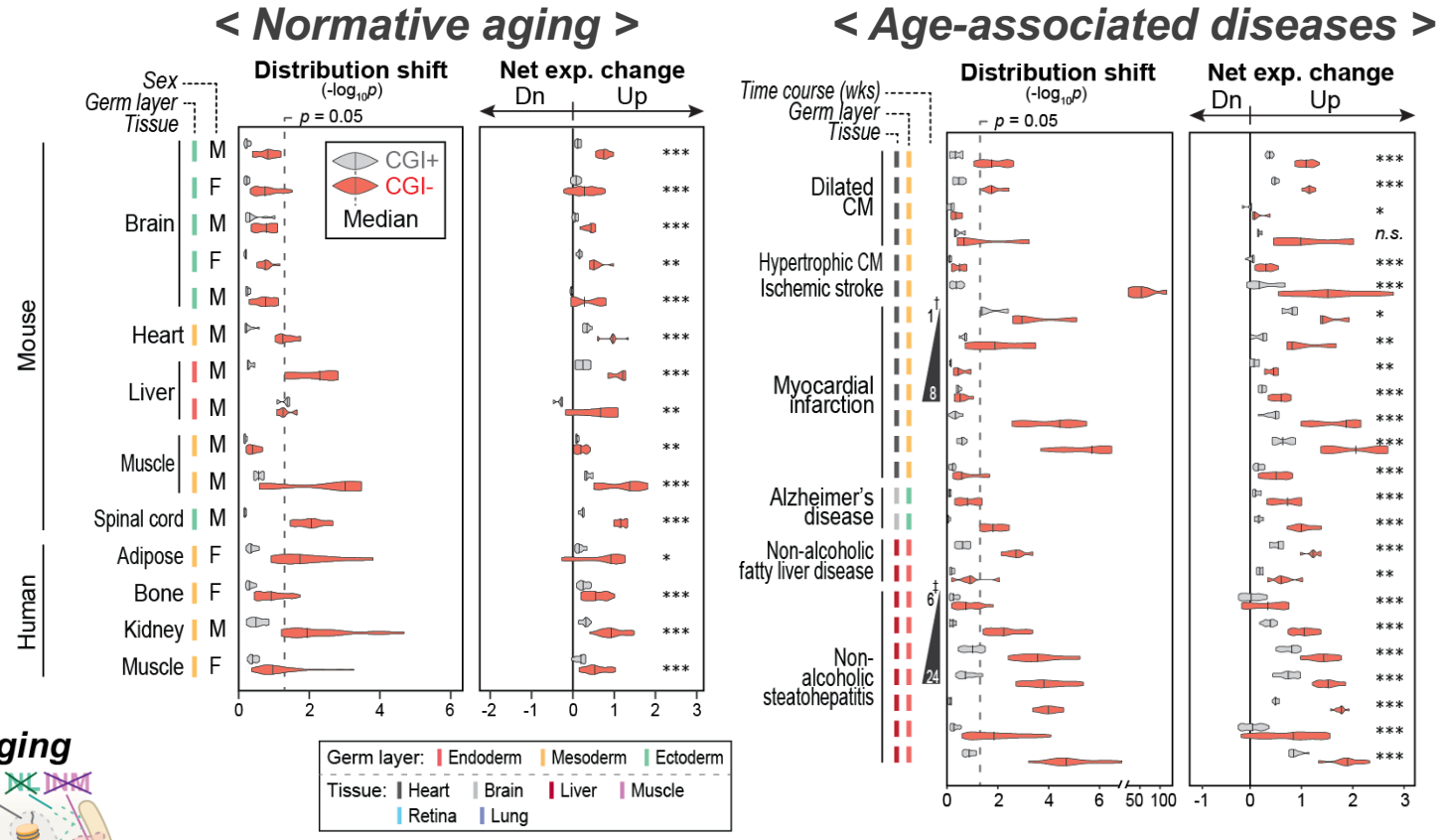
Nuclear subcompartment model ***(CGI+ genes)***

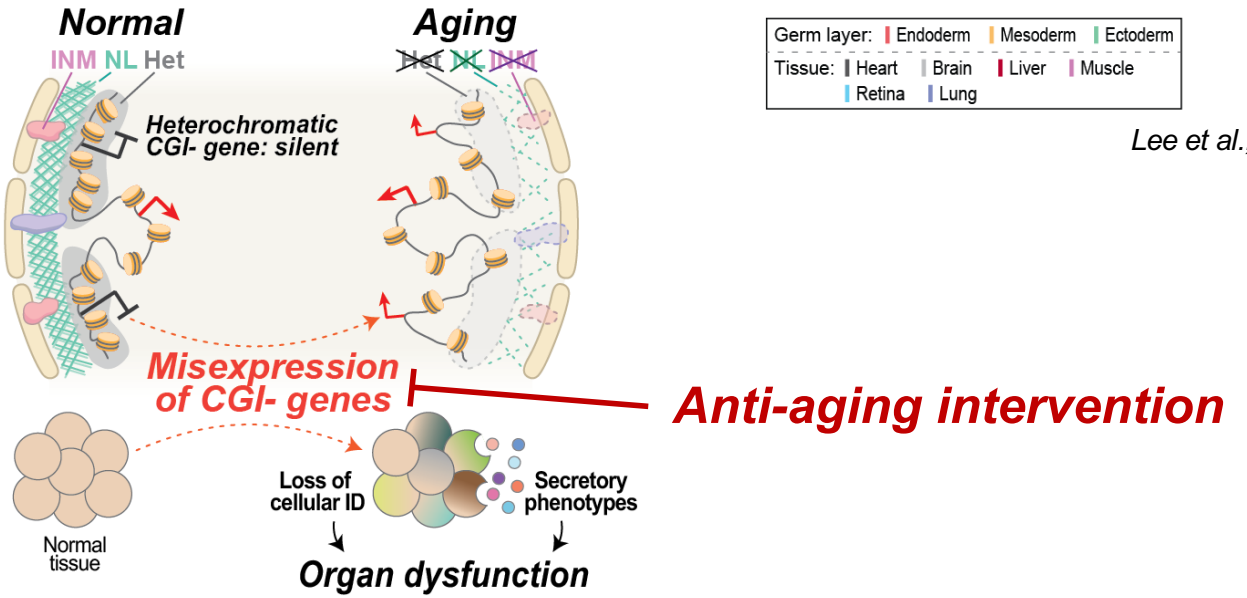
< CGI-mediated dual-mode gene regulation >

Nat Commun. 2014; Nucleic Acids Res. 2018, 2021



Global misexpression of CGI- genes in aging and diseases





Lee et al., Sci Adv 2021; OAJ Gerontol & Geriatric Med 2022

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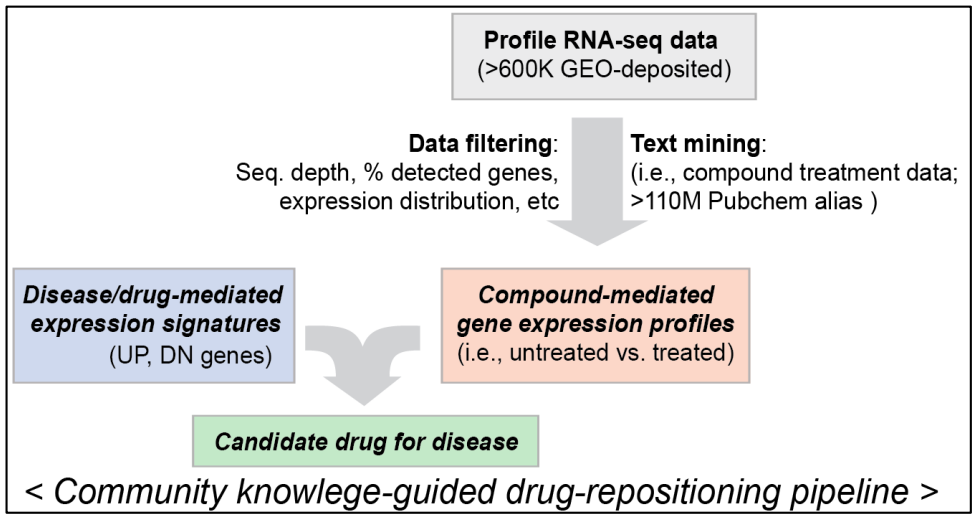
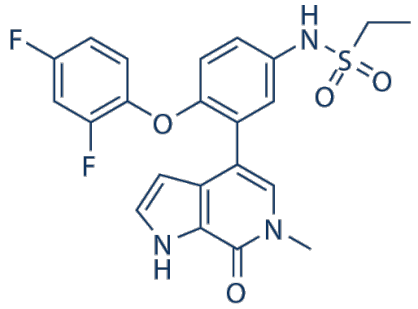
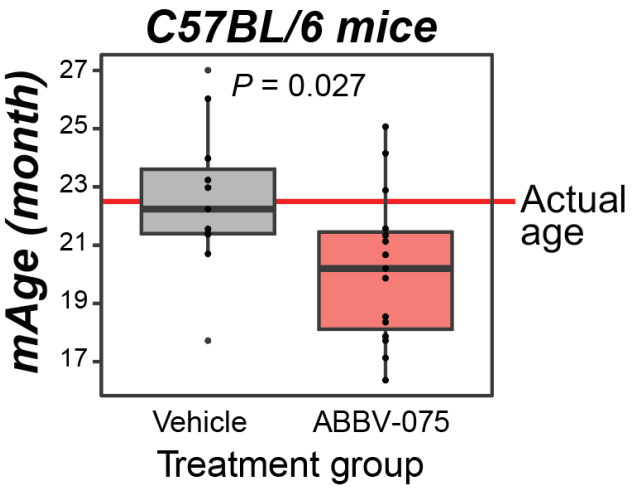
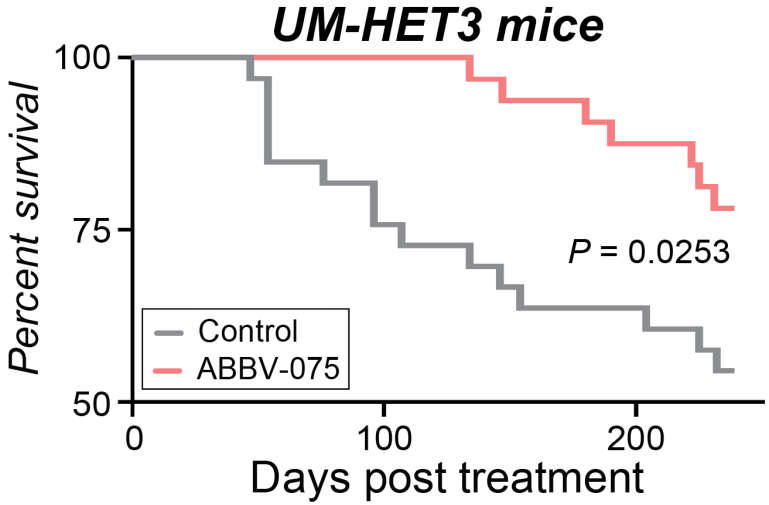
Crowdsourced drug discovery and validation





ABBV-075: BET inhibitor





Boston University Office of Research

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US Patent:18022948

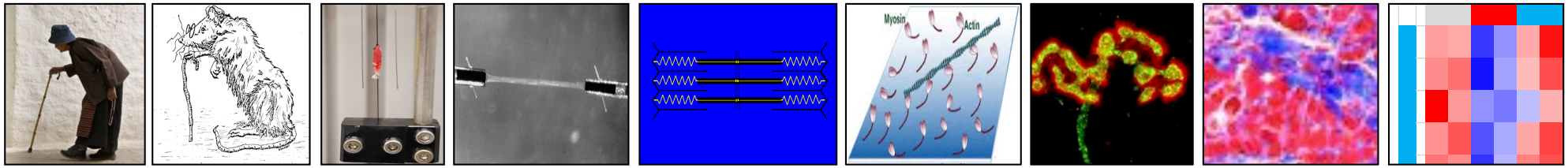
Living Longer, Healthier, and Better
(Can aging be cured?)

LaDora V. Thompson, PhD, PT, FAPTA

Travis M Roy Endowed Professor of Rehabilitation Sciences
Physical Therapy, Sargent College

Mission, Vision & Values

The Thompson research team is hard at work trying to understand what causes aging and how to help people stay healthy longer. Her research uses cutting-edge technologies to reveal the intricacies of muscle aging, which sparks research to slow it, or even reverse it.



We strive to make the world a better place by answering essential questions at the intersection between the biology of aging and healthy aging.

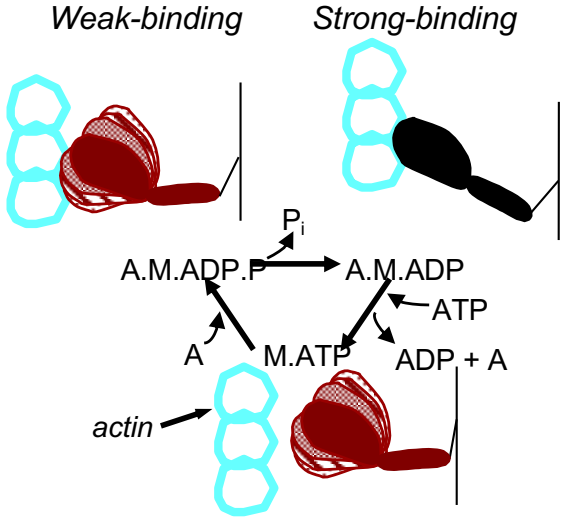
We believe that our discoveries will lead to fundamental new insights on how the muscle system adapts to stress to improve human health and combat disease.

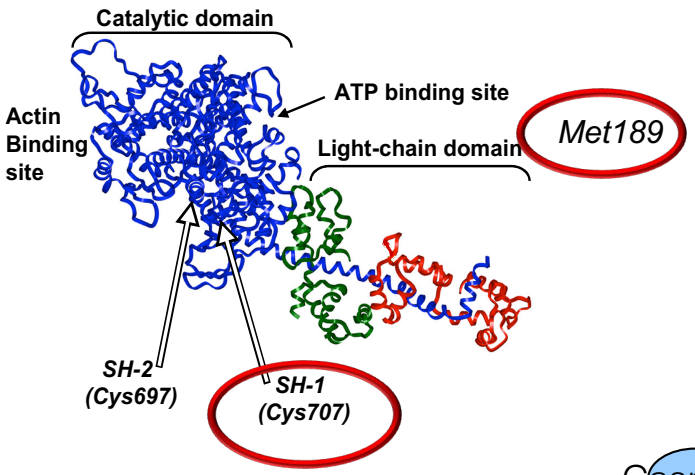
We commit to the core principles of rigor in science, objective evaluation, ethical conduct, collaboration, and honesty.

We foster an inclusive, constructive, and respectful training environment to educate the next generation of scientists and thinkers.

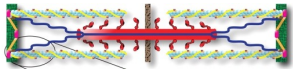
Mechanisms Contributing to Impaired Contractile Quality with Aging (weakness)

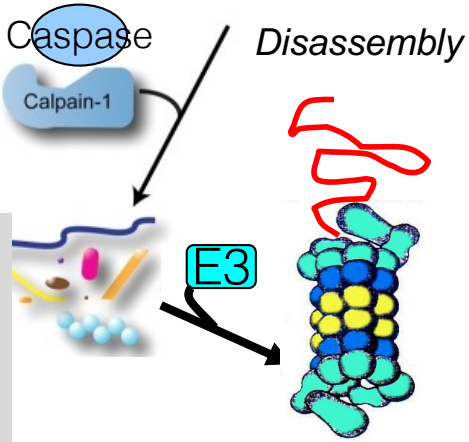
Protein Structure





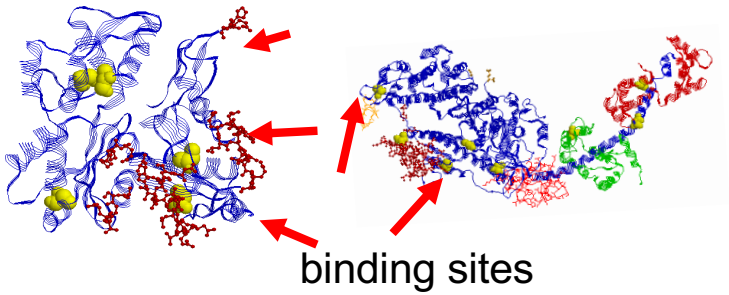
Site-specific post-translational modifications





Proteasome-mediated degradation

Protein-Protein Interactions



binding sites

Proteasome accumulates damage

Lowe et al.,. 2001 doi: 10.1016/j.exger.2007.06.015.
Prochniewicz et al., 2005 doi: 10.1152/ajpcell.00232.2007
Feng et al., 2008 doi: 10.1096/fj.04-2578fje
Chen et al. 2008 doi: 10.1152/ajpcell.2001.280.3.C540
doi: 10.1152/japplphysiol.00526.2005
doi: 10.1016/j.exger.2007.06.015

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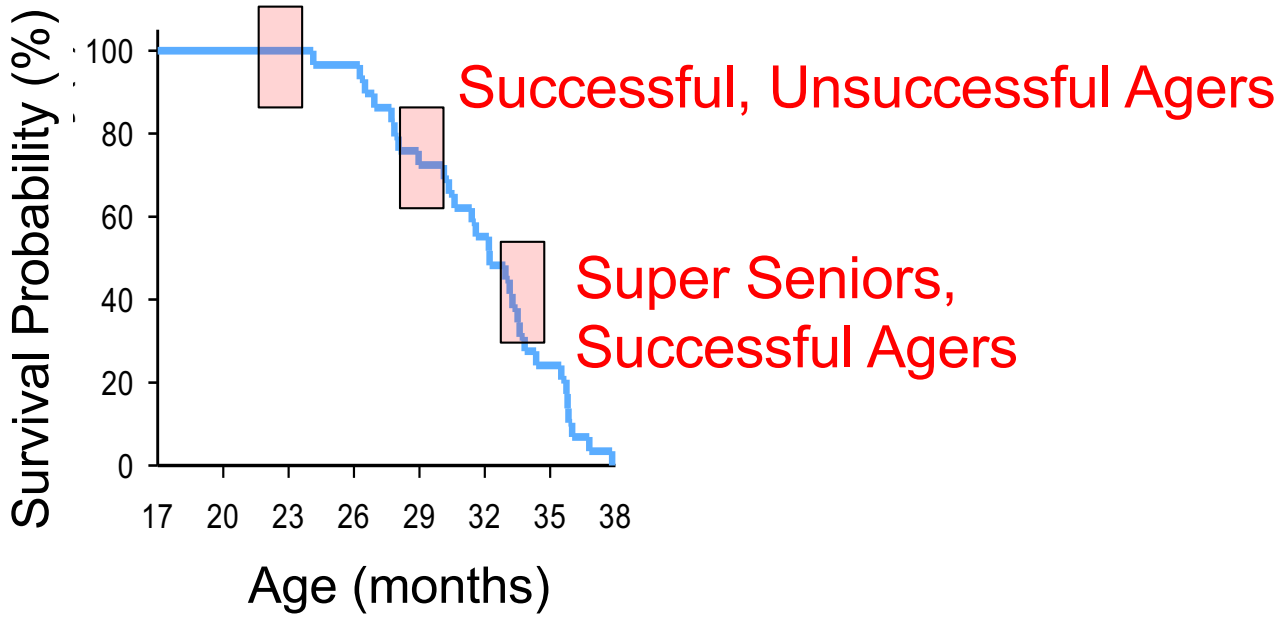
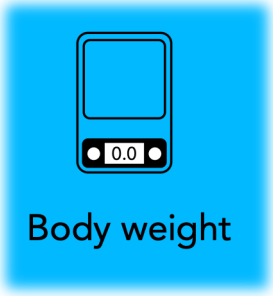
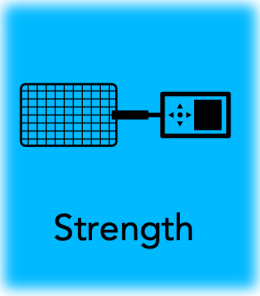
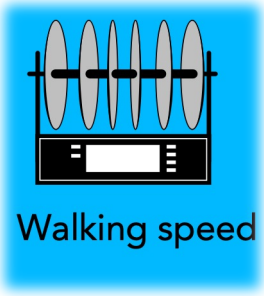
Chronological Age vs Biological Age



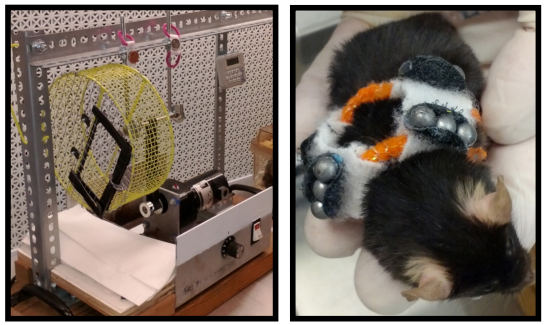






Therapeutics

Exercises

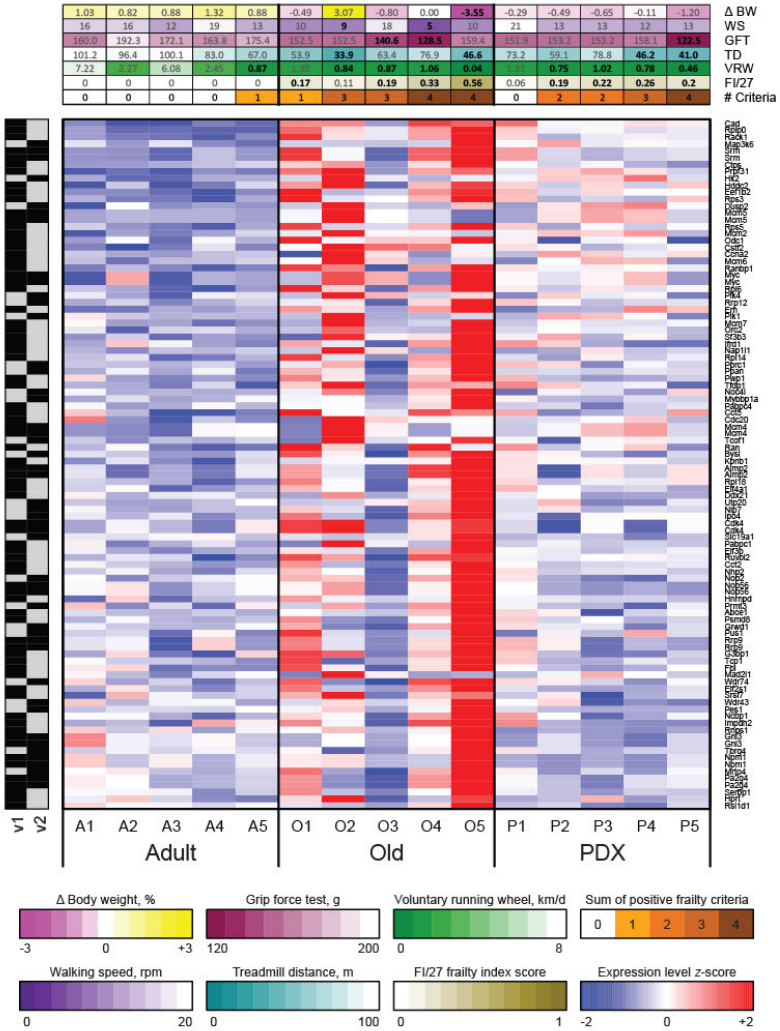


Precision Exercise

Pharmacological therapies

Inflammaging & senescence

PDX Treatment



Collaborators
Paola Divieti-Pajevic, MD, PhD
Brianne Connizzo, PhD
Chao Zhang, PhD
Beth Bragdon, PhD

THOMPSON LAB MEMBERS
PAST AND PRESENT

Funding
NIA/NIH
Hevolution Foundation
MHet BU ARC
Travis M Roy
Endowed Professorship

Tracking alternative gene boundaries in aging

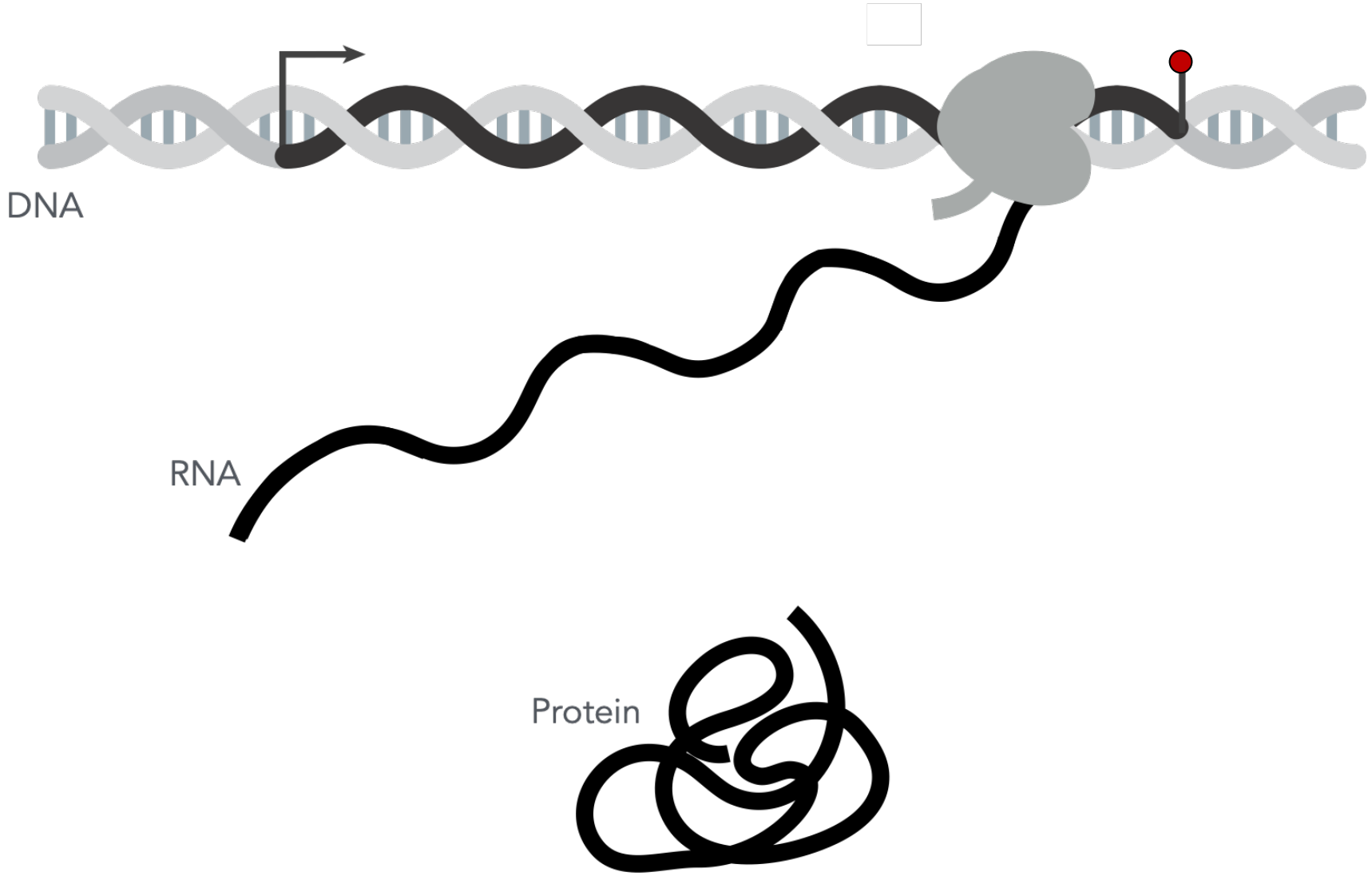
Ana Fiszbein

Assistant Professor

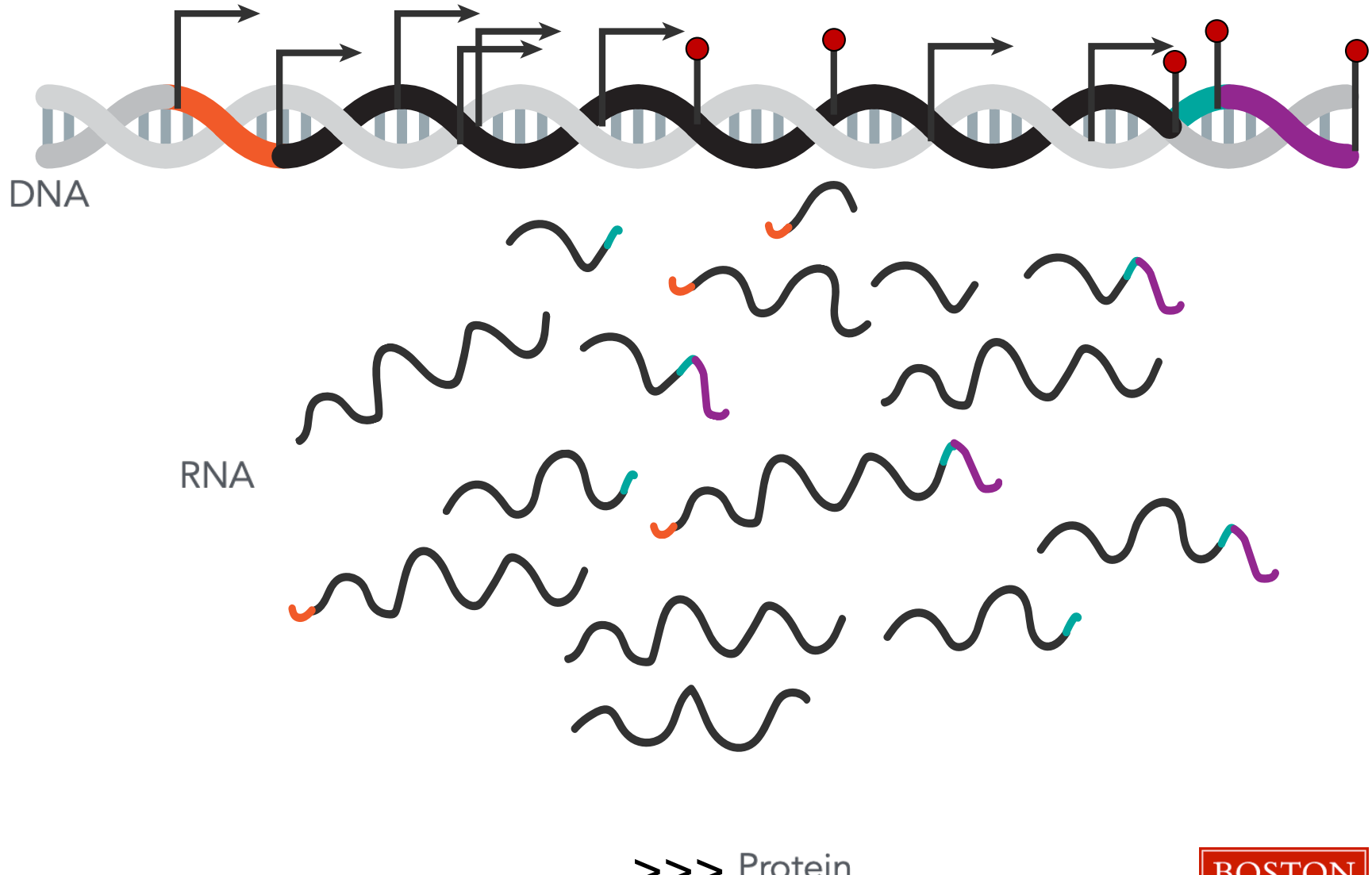
Biology Department, Computing & Data Sciences

College of Arts and Sciences

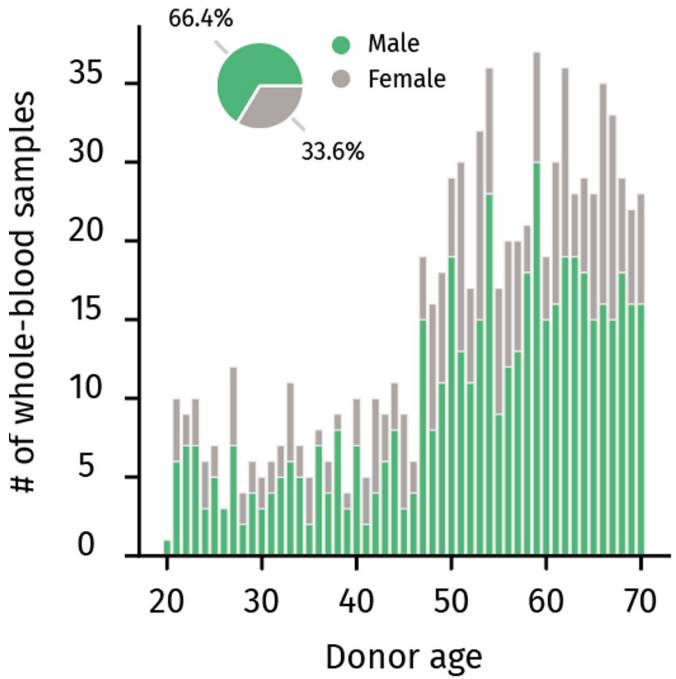
Gene expression controls cell identity

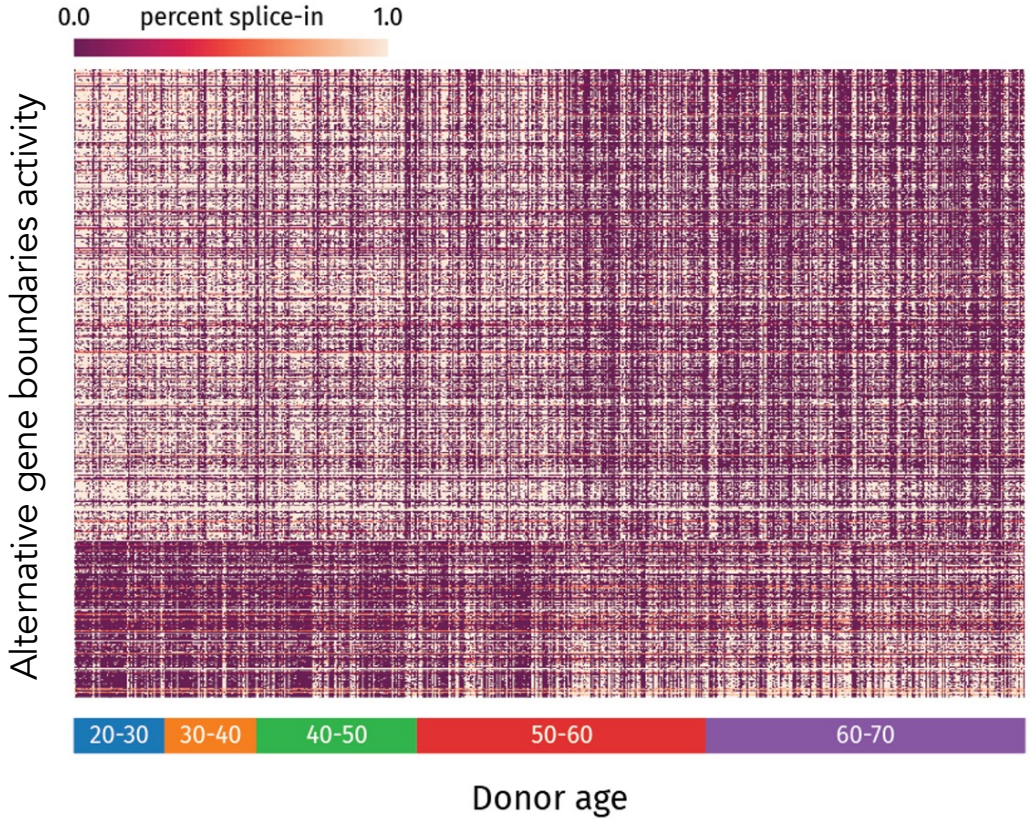


Human genes have alternative boundaries

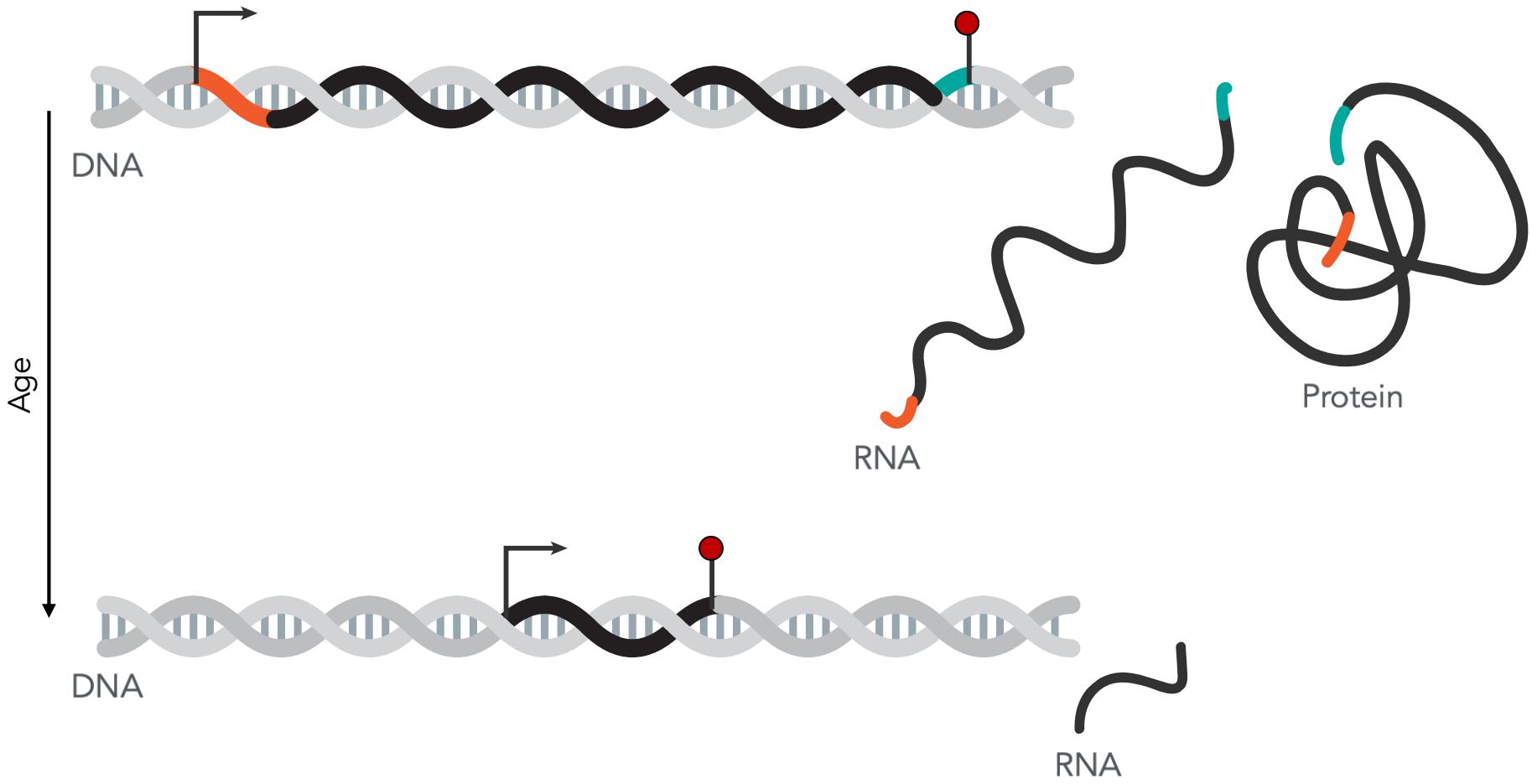


Gene boundaries change during aging





Aberrant gene isoforms are activated during aging



LaSER

BIOLOGICAL DESIGN CENTER

Deconvolving Aged Wound Healing

Jeroen Eyckmans

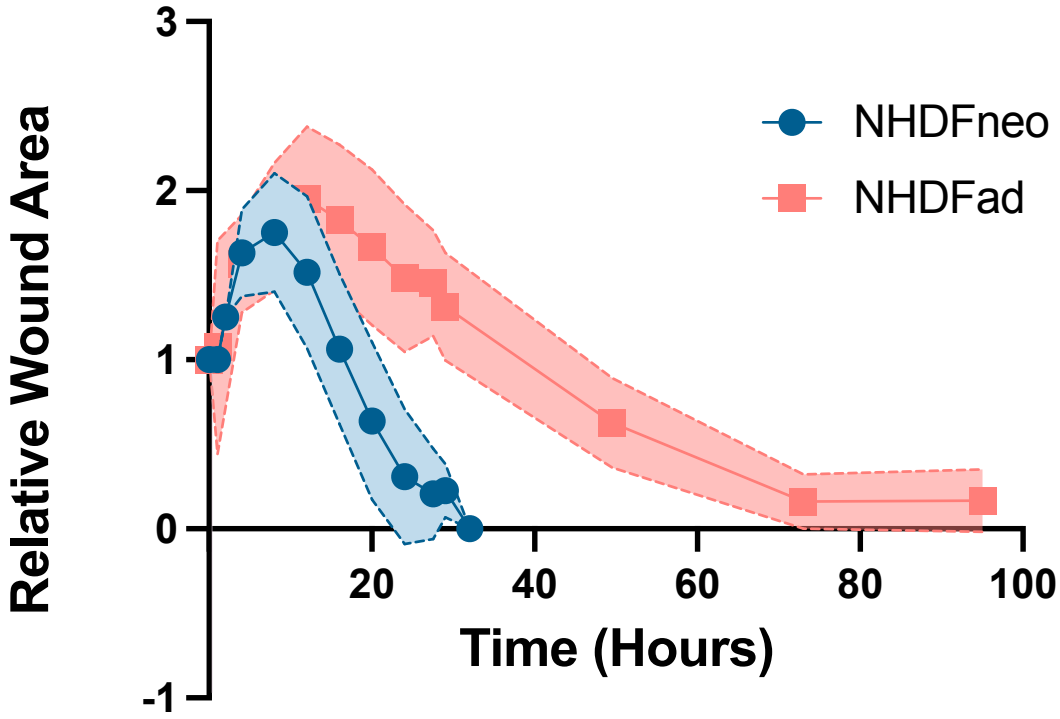
Research Assistant Professor
Biomedical Engineering, School of Engineering

Eyckmans@bu.edu

Wound Healing and Tissue Repair

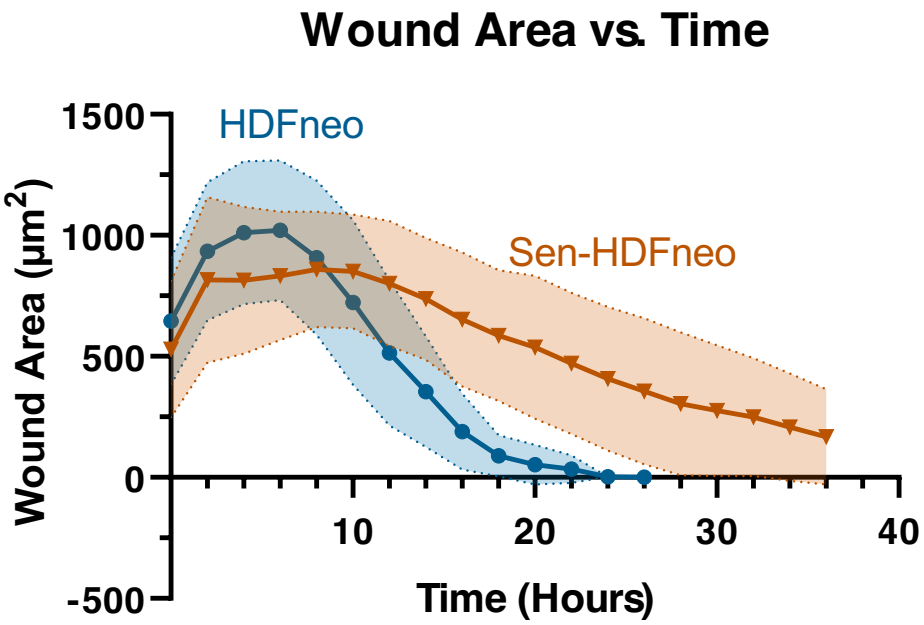
Hemostasis &
Inflammation

Wound-on-Chip Model

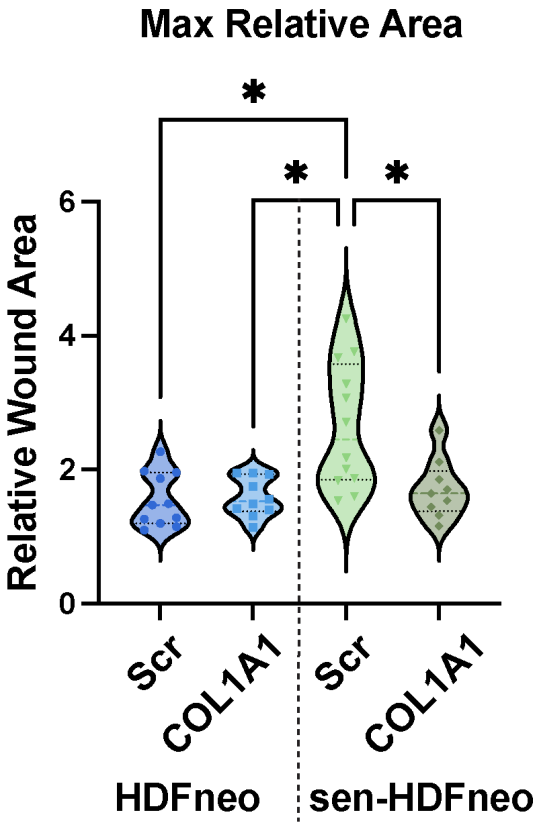


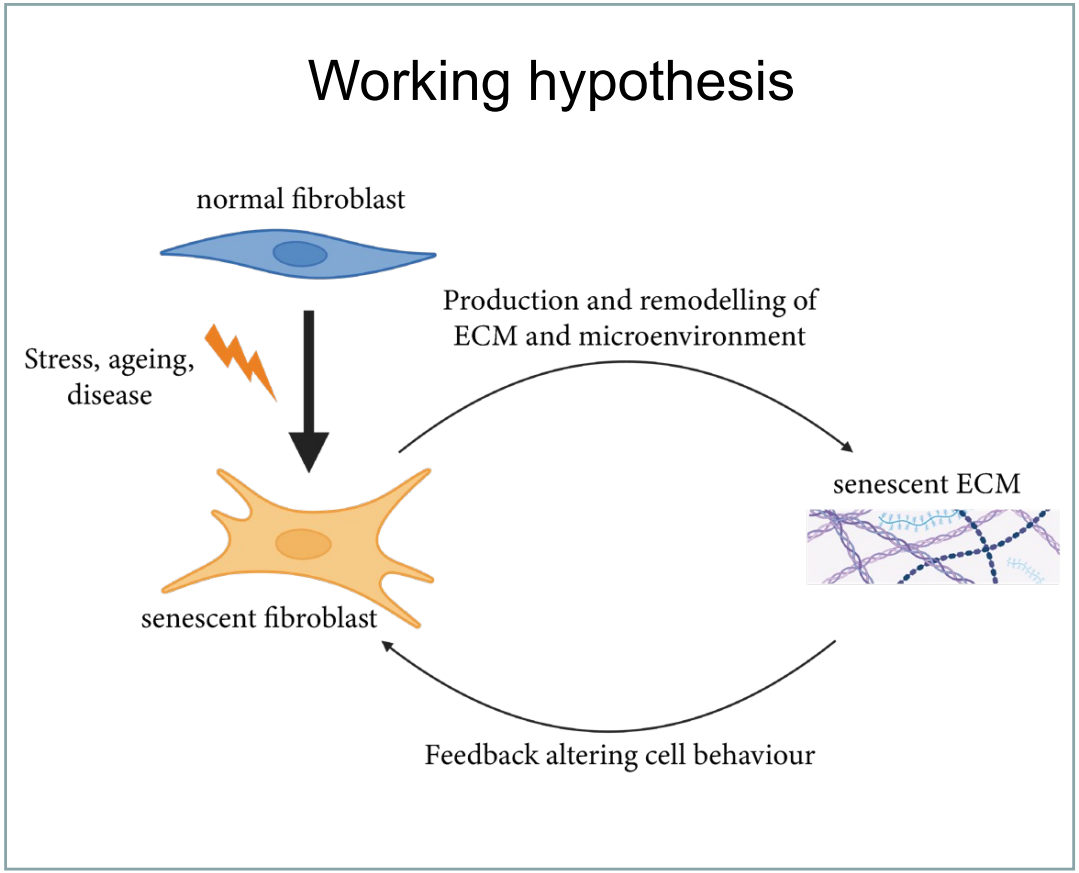
Senescent Cells and ECM Delay Gap Closure

Anish Vasan



Modulating the ECM to Increase Resilience to Injury





Unlocking the secrets of the ubiquitin-proteasome system and its role in age-related diseases

Daniel Dempsey

Assistant Professor
Departments of Pharmacology, Physiology, & Biophysics, and Dermatology
Boston University Chobanian and Avedisian School of Medicine

Mission statement

The mission of our lab is to understand the basic biological mechanisms of proteins that are essential to human health and disease. We use protein chemistry, biophysical, and cellular approaches to elucidate mechanisms of how chemical changes to proteins regulate their function. We are also interested in advancing new chemical strategies to investigate how proteins function and the regulatory purpose of these chemical changes.

Research area 1

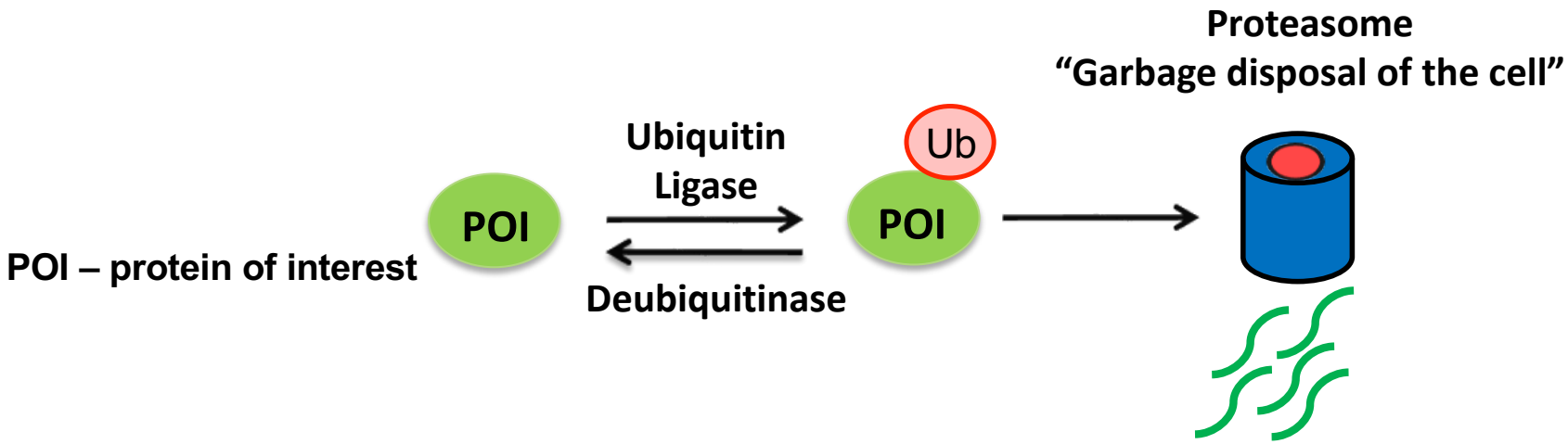
Unlocking the secrets of the ubiquitin-proteasome system and its role in in age-related diseases

Research area 2

Elucidate how protein modifications regulate RNA biology

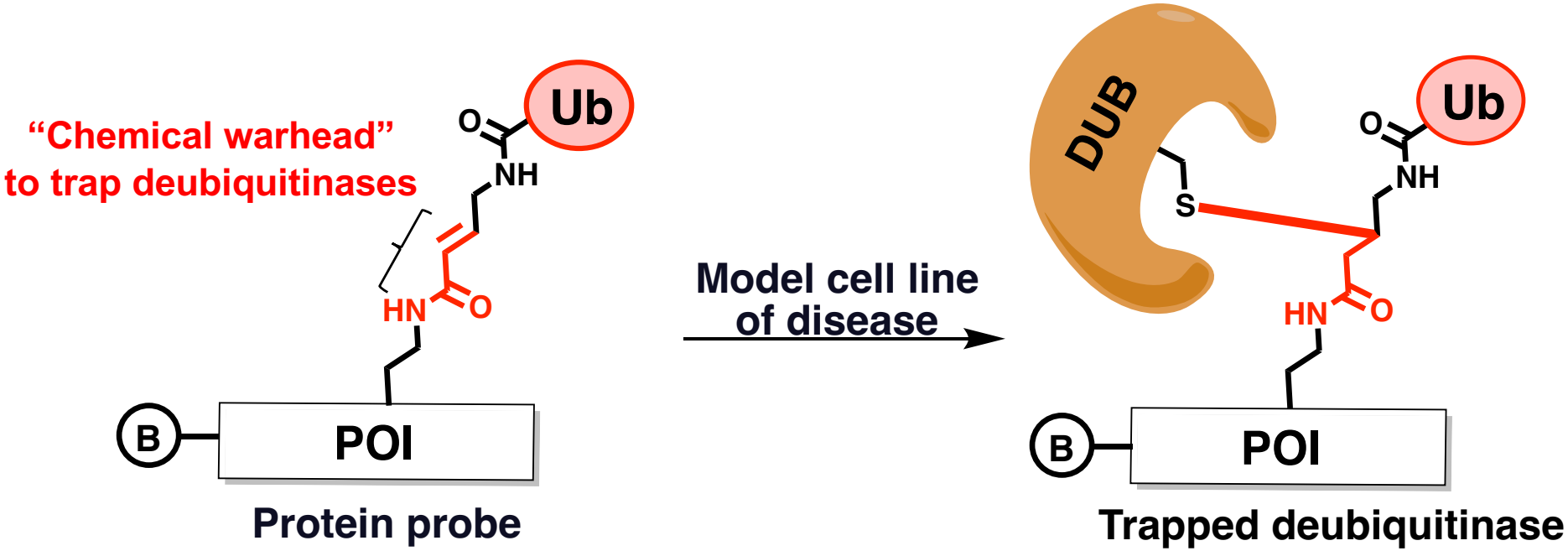
Unlocking the secrets of the ubiquitin-proteasome system and its role in age-related diseases

Research goal – Identify vulnerabilities in the ubiquitin-proteasome system (UPS) to target with novel therapeutics.



Can we leverage this system to destabilize proteins that drive age-related diseases?

Development of protein traps to discover deubiquitinases that stabilize disease causing proteins



Future goals of research program

1. Advance innovative chemical approaches to identify and characterize deubiquitinases that target proteins that cause disease.

2. Evaluate the contribution of deubiquitinases to the pathogenesis of the disease.

3. Assess other protein substrates of the deubiquitinases.

4. Begin screening and designing selective inhibitors of the deubiquitinases.

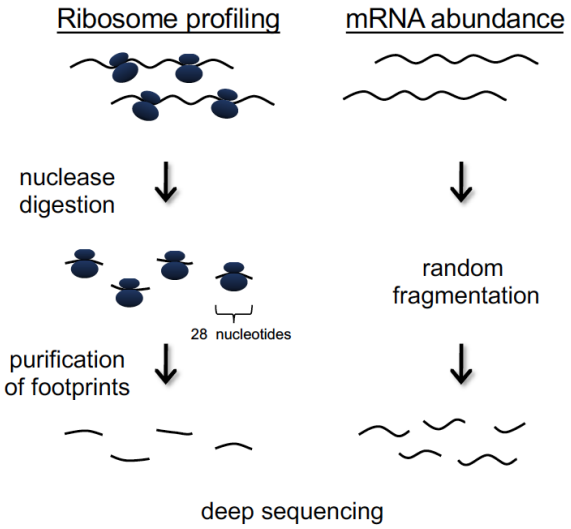
Targeting iron homeostasis to promote healthy lifespan

Slava Labunskyy

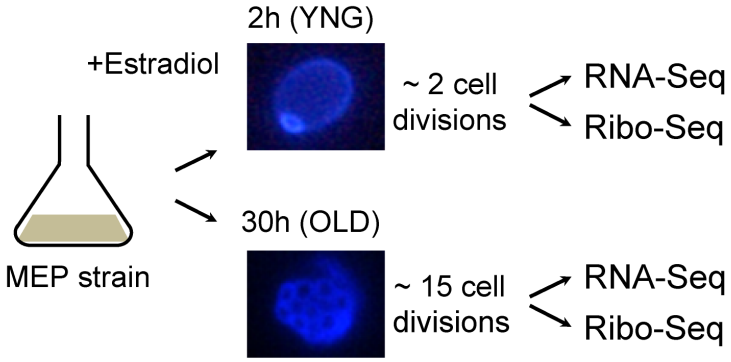
Co-Director
BUMC Center for Aging Research

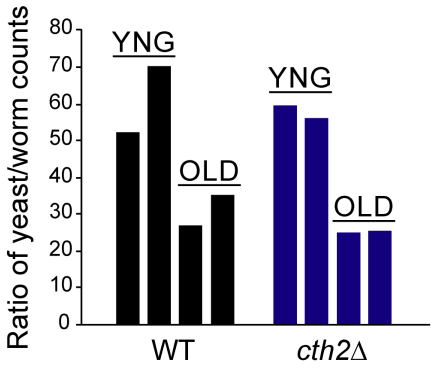
Systems Biology of Aging and Longevity

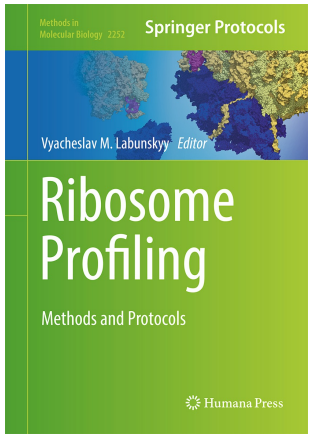
Genome-wide quantification of protein translation



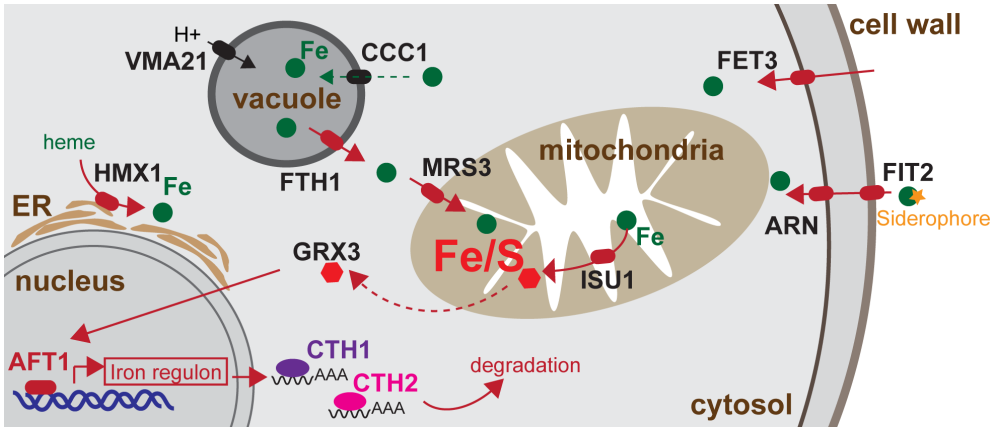
Changes in protein synthesis with age



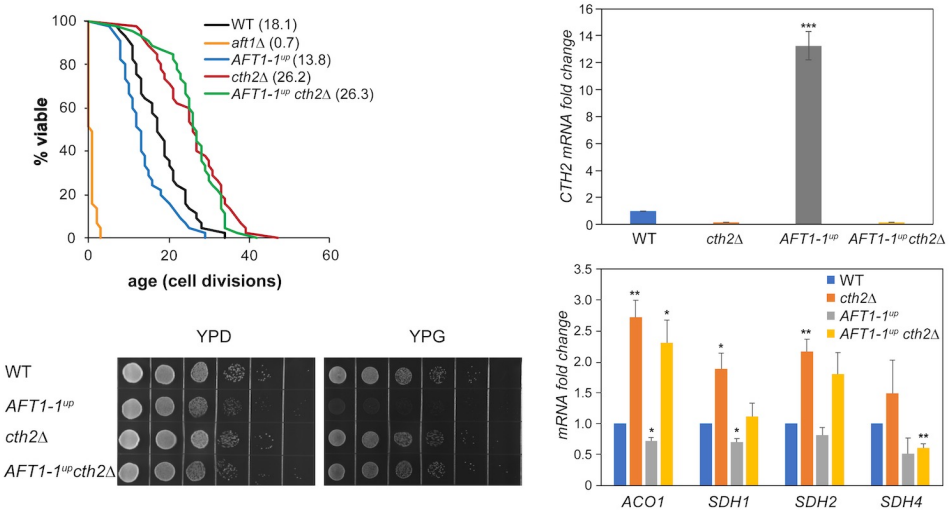




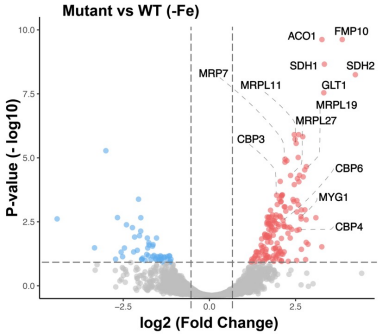
The Role of Iron Homeostasis in Aging

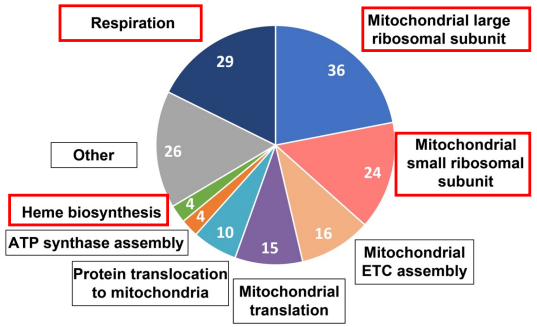


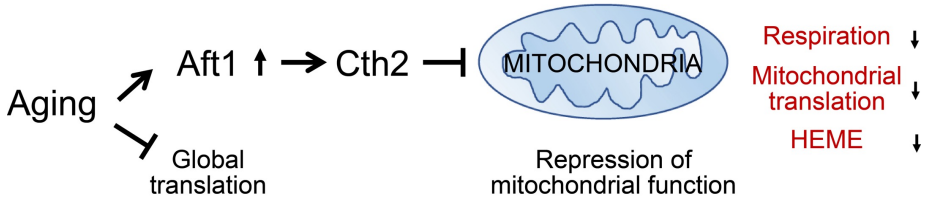
Iron starvation response is activated with age



mRNA-binding protein Cth2 mediates the negative effect of Aft1 on longevity







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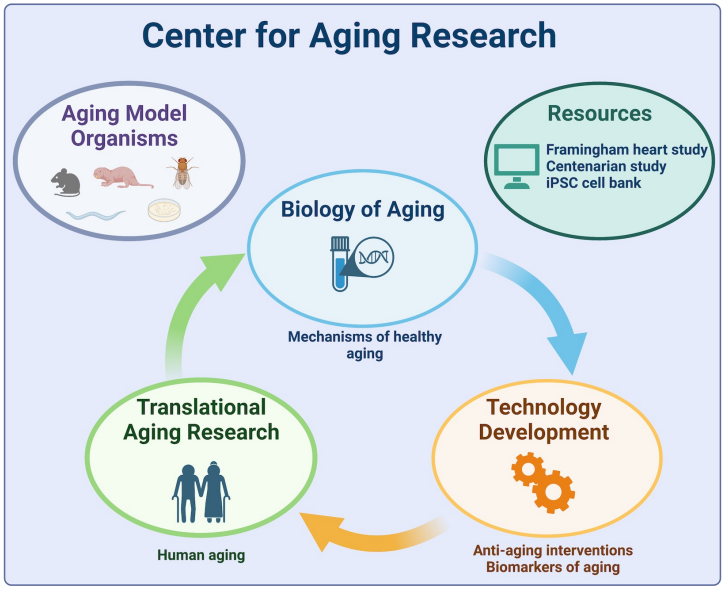
BUMC Center for Aging Research

The **mission** of our Center for Aging Research is to advance our knowledge of basic mechanisms driving aging and to translate these discoveries to clinical practice, to promote healthy aging in humans.

The **long-term objectives** of the Center include:

- Establish BU as a leader in translational aging research
- Foster interdisciplinary research collaborations among BU faculty
- Provide university-wide access to new technologies and aging models
- https://aging.bu.edu

Uncovering the Mechanisms of Healthy Aging

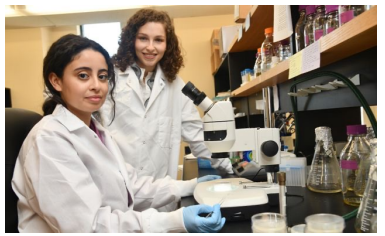


Communicating longevity science

- Monthly Seminar Series
- Annual Research Symposium
- Courses on Biology of Aging

Building critical infrastructure

- Aging Models
- Biomarkers of Aging



Bringing longevity innovations to people

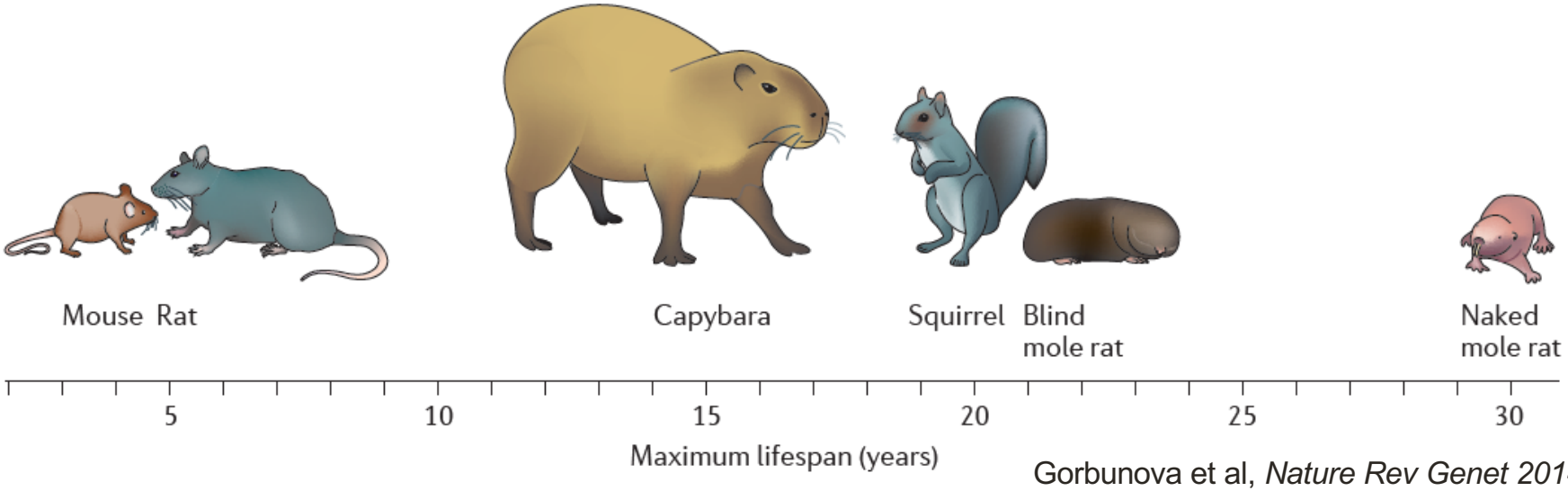
Naked mole-rats as unique mammalian model for aging research

Vladimir Botchkarev, MD, PhD, FRSB

Professor and Co-Director
Center for Aging Research
Department of Dermatology
Chobanian and Avedisian School of Medicine

Naked mole-rats are centenarians in a rodent world:

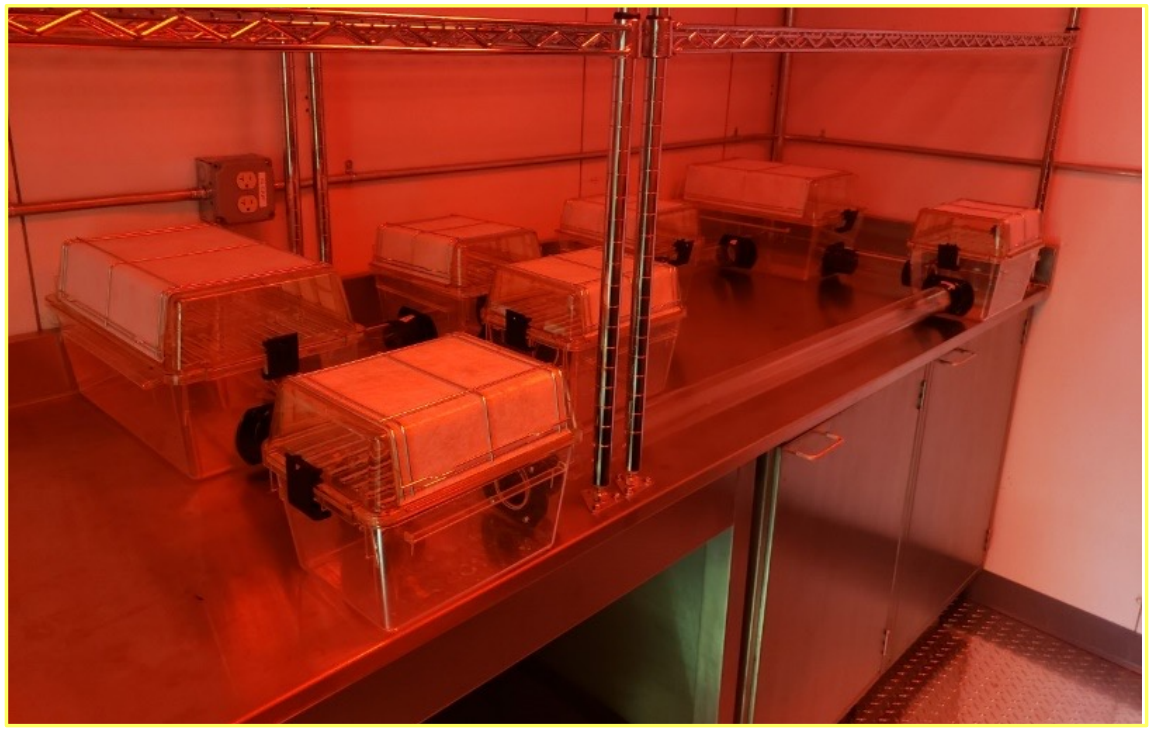
live over 30 years, which is equivalent of 800+ human years



Gorbunova et al, *Nature Rev Genet 2014*

- Highly resistant to cancer
- Can survive without oxygen for 18 minutes
- Can barely feel pain
- Anaerobic metabolism

Naked mole-rat facility at BUSM ASC is the only facility in New England harboring over 100 animals



Quantity of produce per one room

Sweet Potato	5, medium size
Apple	4 -5 , medium size
Corn	3 ears
Carrot	4-5, medium size
Carrot tops	1 medium bunch, tops and carrots together
Celery	4-5 sticks
Lettuce	1 medium bunch
Squash	1/3 of medium squash
White potato	5, medium size
Banana	3
Cucumber	2
Grapes	1 per animal, cut in half
Turnip	3-4, medium size

High temperature (90F)
Sensitive to noise & vibration
Water-enriched food

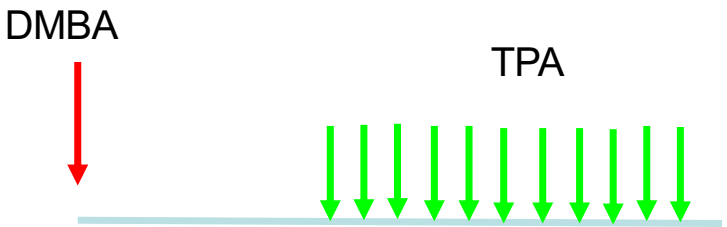
Skin aging in Naked mole-rats is accompanied by upregulation of anti-cancer genes

ORIGINAL ARTICLE

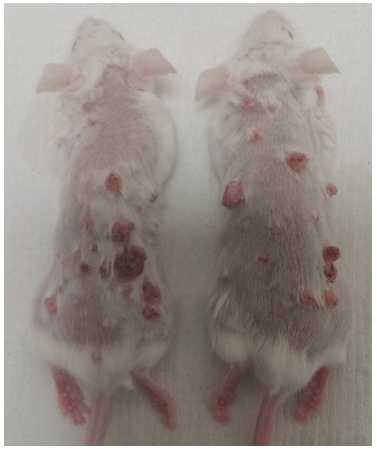
Skin Aging in Long-Lived Naked Mole-Rats Is Accompanied by Increased Expression of Longevity-Associated and Tumor Suppressor Genes

Iqra Fatima[1], Guodong Chen[2], Natalia V. Botchkareva[2], Andrey A. Sharov[2], Daniel Thornton[3], Holly N. Wilkinson[4], Matthew J. Hardman[4], Andreas Grutzkau[5], Joao Pedro de Magalhaes[3], Andrei Seluanov[6,7], Ewan St. J. Smith[8], Vera Gorbunova[6,7], Andrei N. Mardaryev[1,10], Chris G. Faulkes[9,10] and Vladimir A. Botchkarev[2,10]

Naked Mole-rats are completely resistant to chemically-induced skin carcinogenesis



Boston University Office of Research



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Comparative biology helps in discovery of novel mechanisms underlying aging and disease resistance

Naked mole rat skin serves as innovative model
for studying mechanisms of aging
and cancer resistance

The power of comparative biology helps
in identification of novel solutions for human medical problems
by studying animals that naturally possess
resistance to diseases

U.S. Department of Health and Human Services

Supported by the
National Institutes of Health

1R61AR078093
The skin of naked mole rats as a model for scar-free wound healing
BOTCHKAREV (Contact PI), GORBUNOVA, SHAROV, VEVES (BIDMC)

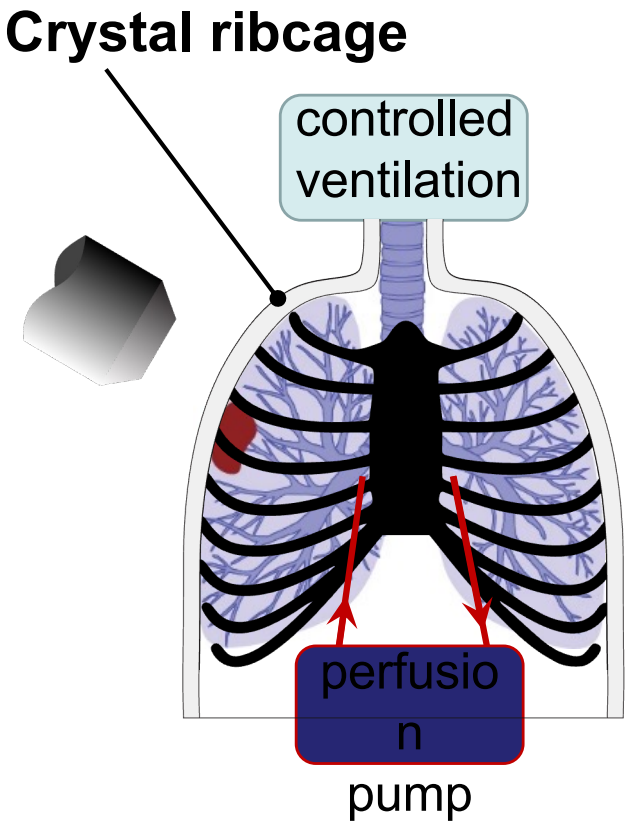
Crystal ribcage:

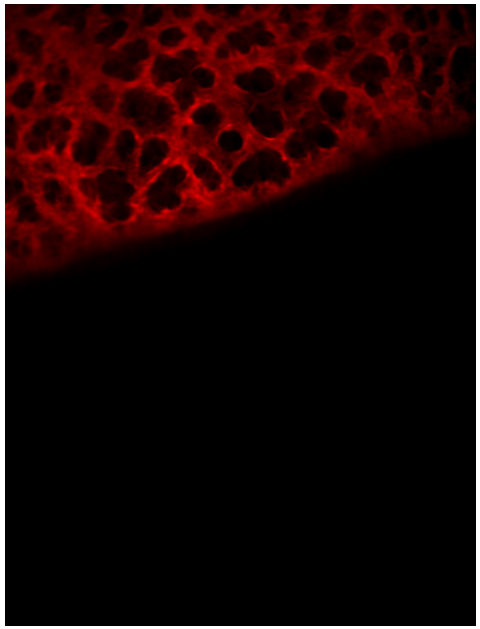
A platform for probing the effect of aging on lung function in health and disease

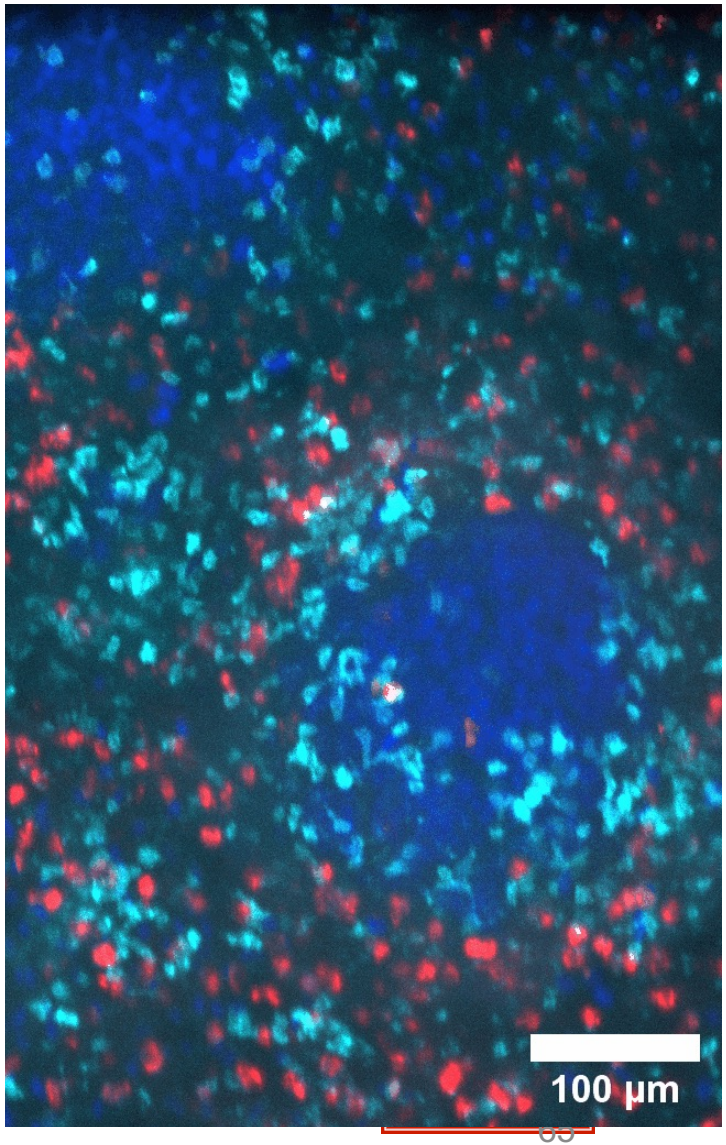
Hadi T. Nia, Ph.D.

Assistant Professor
Department of Biomedical Engineering
Boston University

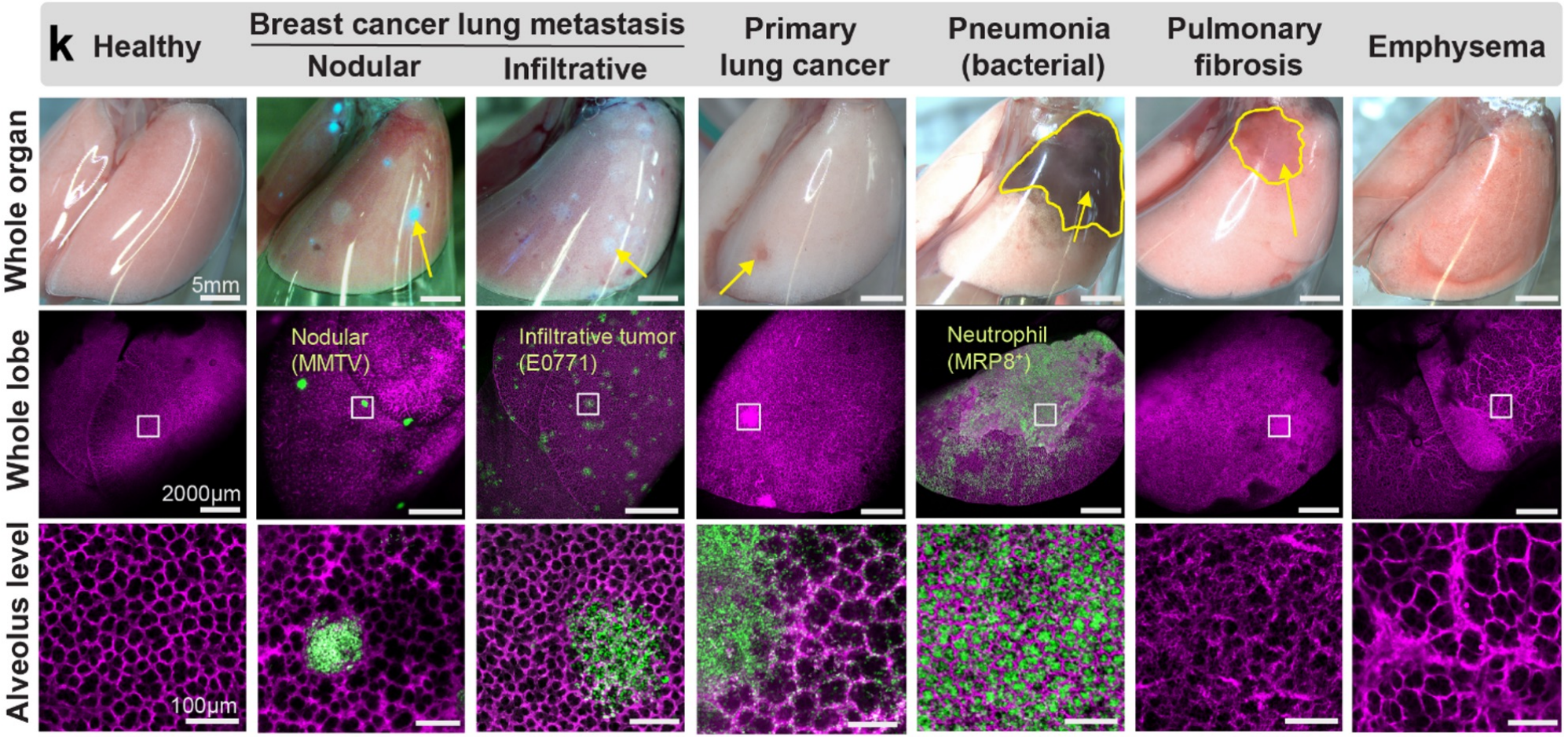
Proposed solution: Developing crystal ribcage to open the black box of the lung to optical microscopy







Crystal ribcage to probe nearly any pulmonary disease with parenchymal presentation



- R. Banerji*, G. Grifno*, …, H. Nia, ***Nature Methods***, 2023 *: equal contribution
- S. Zhang, …, H. Nia, ***Nature Biomedical Engineering***, 2023

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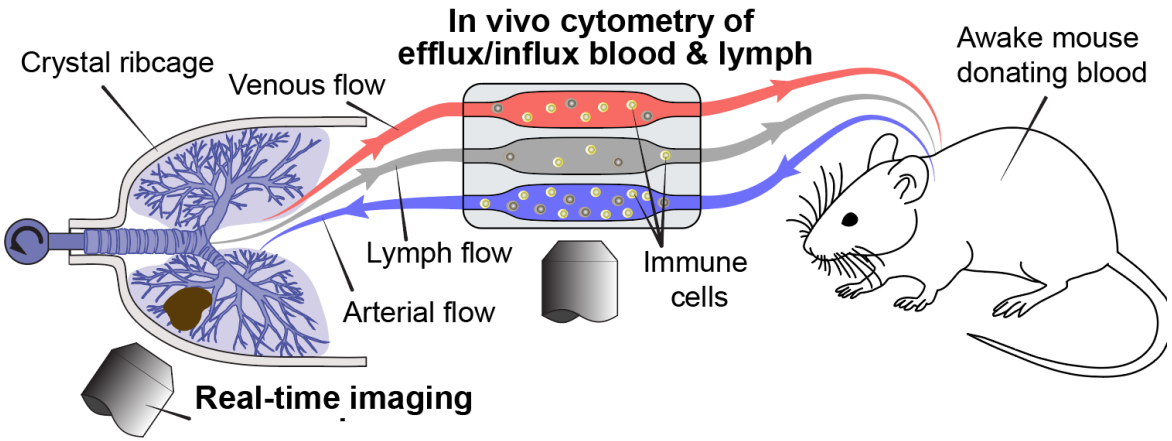
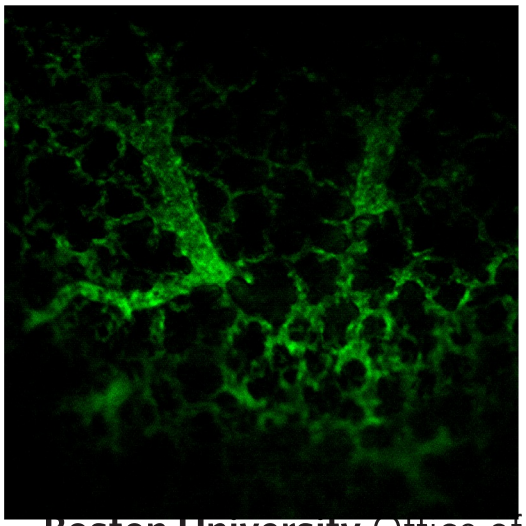
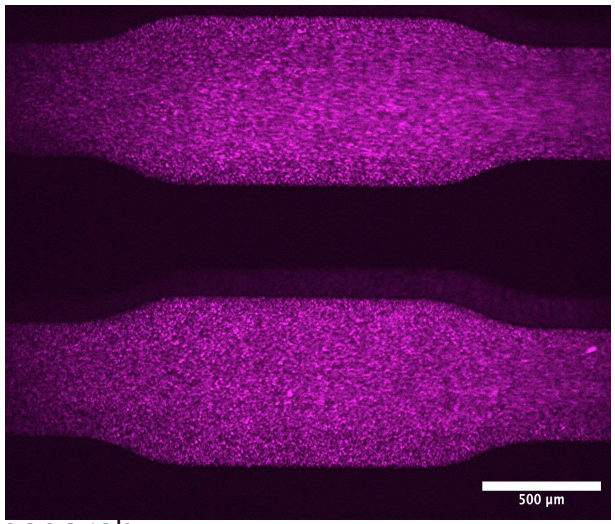
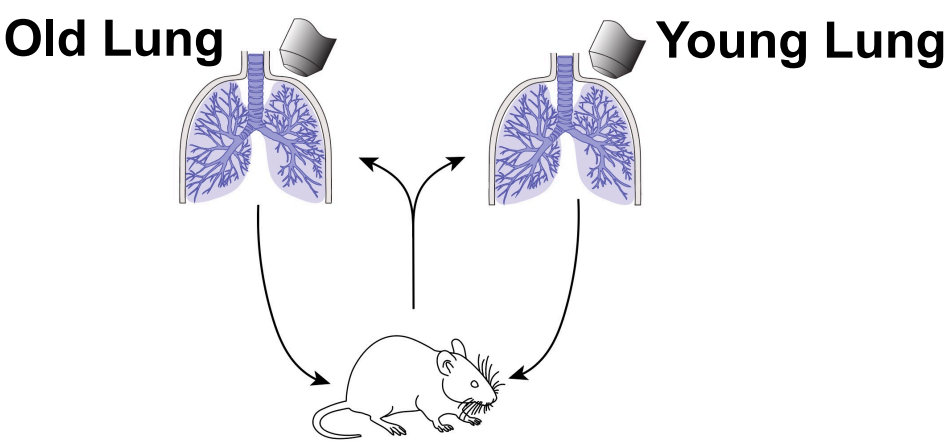
Crystal ribcage and cross-circulation of aged vs young mice

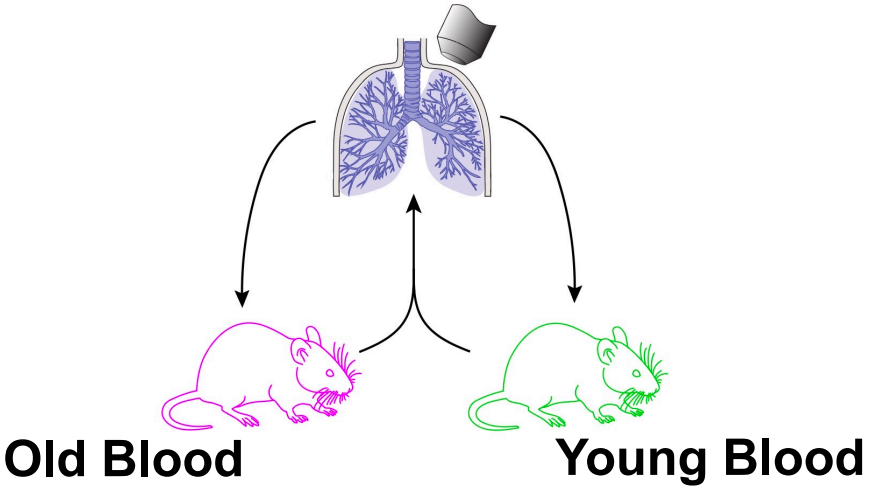


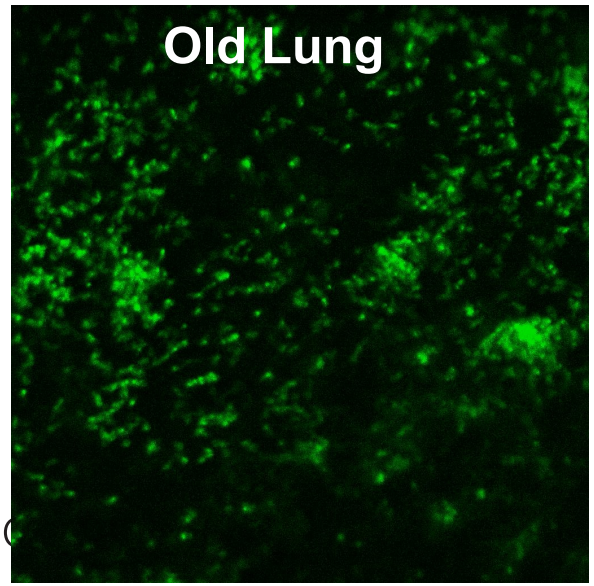


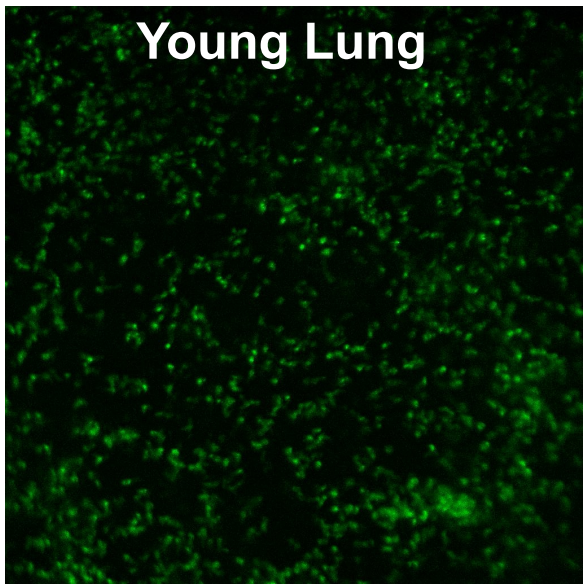


Decoupling the effect of aging on the resident vs circulatory factors during pneumonia progression









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Closing Remarks:

Glenn Foundation Centers in the Biology of Aging Research

- **Goal**: support centers of excellence in basic research into biology of aging and extension of healthspan with lifespan
- **Funding**: $4M over 4-5 years
- **Key people**: Kevin Lee, PhD, Senior Scientific Advisor; funded PIs (see next)
- **Centers**:
  - *Buck Institute:* mechanisms of aging, relationship to chronic conditions of aging; ***E. Verden, M. Hansen***; 2016-
  - *Harvard:* molecular basis of normal aging and age-related physiological decline; ***B. Yanker, M. Haigis***; 2006-
  - *Mayo:* senescent cells' mechanistic contributions to aging-related decline, disease; ***D. Baker, N. LeBrasseur***; 2013-
  - *Michigan:* multiple projects; ***R. Miller, S. Pletcher***; 2014-
  - *Princeton:* quantitative aging: tools, techniques to measure phenotypes that change with age; ***C. Murphy***; 2012-
  - *Salk:* genetic analysis, stem cell biology, metabolism; ***J. Karlseder, G. Shadel***; 2009-
  - *Stanford:* biological processes that drive aging, w/ emphasis on stem cell; ***A. Brunet, K. Cimprich, J. Frydman***; 2011-

  Previously: *Albert Einstein (2012-20); MIT (2008-22); Berkeley/UCSF (**S. Prusiner, A. Dillon**; 2014-17)*
- **Next steps**: network in; confirm process

BU Foundation Relations

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Upcoming Events

Research on Tap

4/2 Tackling Cancer Through Multidisciplinary Research, **BUMC**

4/16 AI and the Humanities, CRC

Research How-to

3/31 Research Meets Policy: Engaging with Federal Lawmakers, Virtual

4/3 From Insight to Impact: Crafting Op-Eds That Amplify Your Expertise, Virtual

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