

The Matthew E. Fairbank Lecture

University of Rochester Aging Institute

*Promoting Vitality in Aging through
Discovery, Collaboration, & Innovation*

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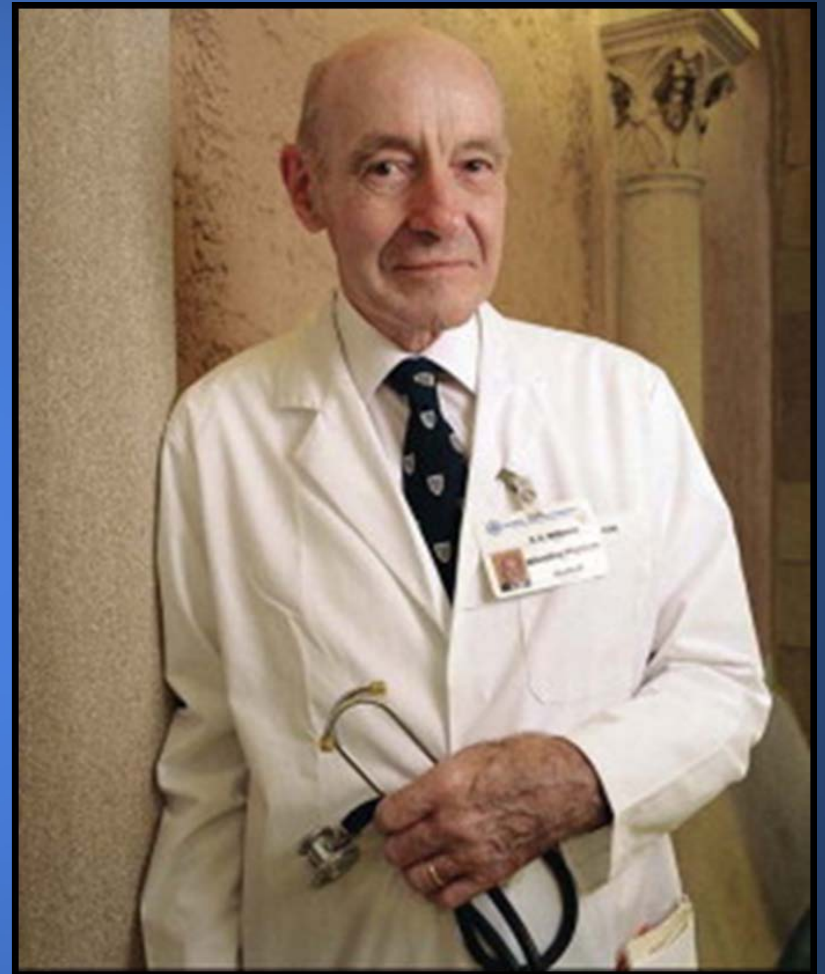
June 10, 2021



UR_Aging



Carter Catlett Williams



T. Franklin Williams





We're Always
Innovating

Teamwork

Older
Peoples'
Superheroes

Science of
Caring

The Best
Colleagues

Person-
Centered
Care







1850-PRESENT

TWO ROCHESTERS: A TIMELINE OF UNIVERSITY- COMMUNITY ENGAGEMENT



COMMUNITY

UNIVERSITY OF ROCHESTER



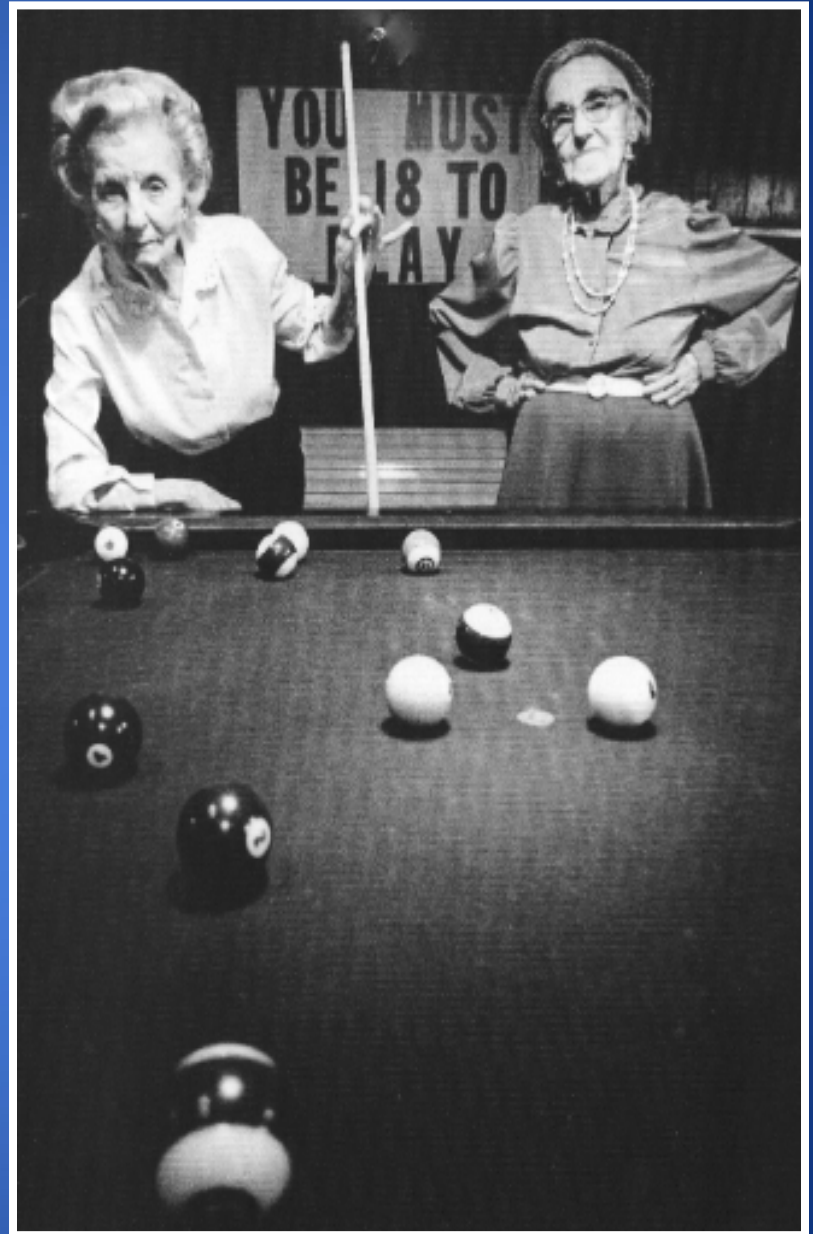
***University of Rochester
Aging Institute (URAI)***

Promoting Vitality in Aging through
Collaboration, Discovery and Innovation

*“Knowing is not enough;
we must apply.”*

*Willing is not enough;
we must do.”*

Johann Wolfgang



COMMUNITY

UNIVERSITY OF ROCHESTER



UR Aging Institute

Promoting Vitality in Aging through
Collaboration, Discovery and Innovation

Vision

With vitality and resilience,
aging adults have the power to thrive

Mission

Promote vitality in aging by transforming care
and communities through collaboration,
discovery and innovation

COMMUNITY

UNIVERSITY OF ROCHESTER



UR Aging Institute

Vital Discovery

Vital Care

Vital Living

COMMUNITY

UNIVERSITY OF ROCHESTER

School of
Medicine

UR Medicine

School of
Nursing

Finger Lakes
Center of Excellence
For Alzheimer's Disease

Alzheimer's
Association

Lifespan

Monroe County
Office of the Aging

YMCA

River Campus
Arts & Sciences
Data Science
Engineering
Education
Business
Music



UR Medical
Faculty Group

Accountable
Health Partners

UR Aging Institute

Older Adults & Families

Clinicians

Investigators

Educators

Aging with Vitality



New Horizons programs give seniors a chance to learn a new instrument

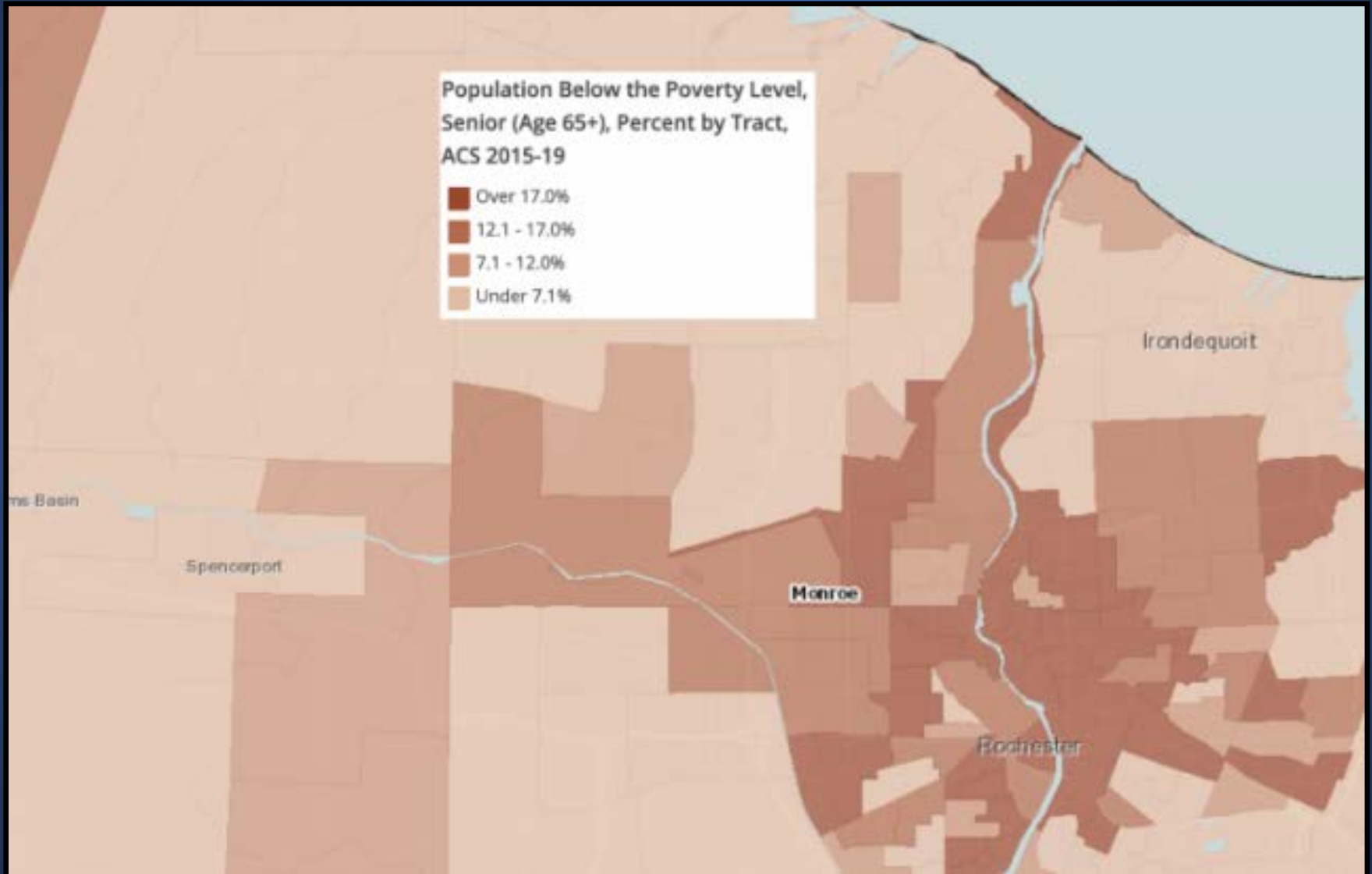
Programs run through the Eastman Community Music School



Why Rochester? Why Now?

- We (UR & URMC) have broad strengths across the spectrum of aging research, education and clinical geriatrics on which to draw
- URAI can impact strategic planning for other URMC Priorities (National Cancer Institute Designation for Wilmot Cancer Institute)
- The Rochester region is aging rapidly and is of a size & configuration to serve as a laboratory for aging well
- COVID-19 pandemic issues unveiled & lessons learned

Monroe County Aging Stats



URMC is also Aging...

HH and SMH 2020 Encounters

Visit Type	Total Encounters	Encounters Age ≥ 65 years Number	Encounters Age ≥ 65 years Percent
Highland Hospital			
Inpatient	20,179	7,489	37%
Outpatient	167,717	49,978	29%
Strong Memorial Hospital			
Inpatient	41,057	13,179	32%
Outpatient	930,180	282,405	30%

Aging Across the Lifespan



Birth



Death

VITAL DISCOVERY

Research

➤ How and why do we age?

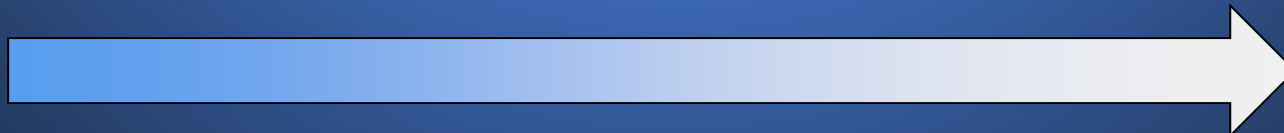
- What factors determine longevity, life span, health span?
- What interventions optimize health, well-being & vitality?

→ Population Health Promotion & Management

➤ Can we control aging to slow down the process?

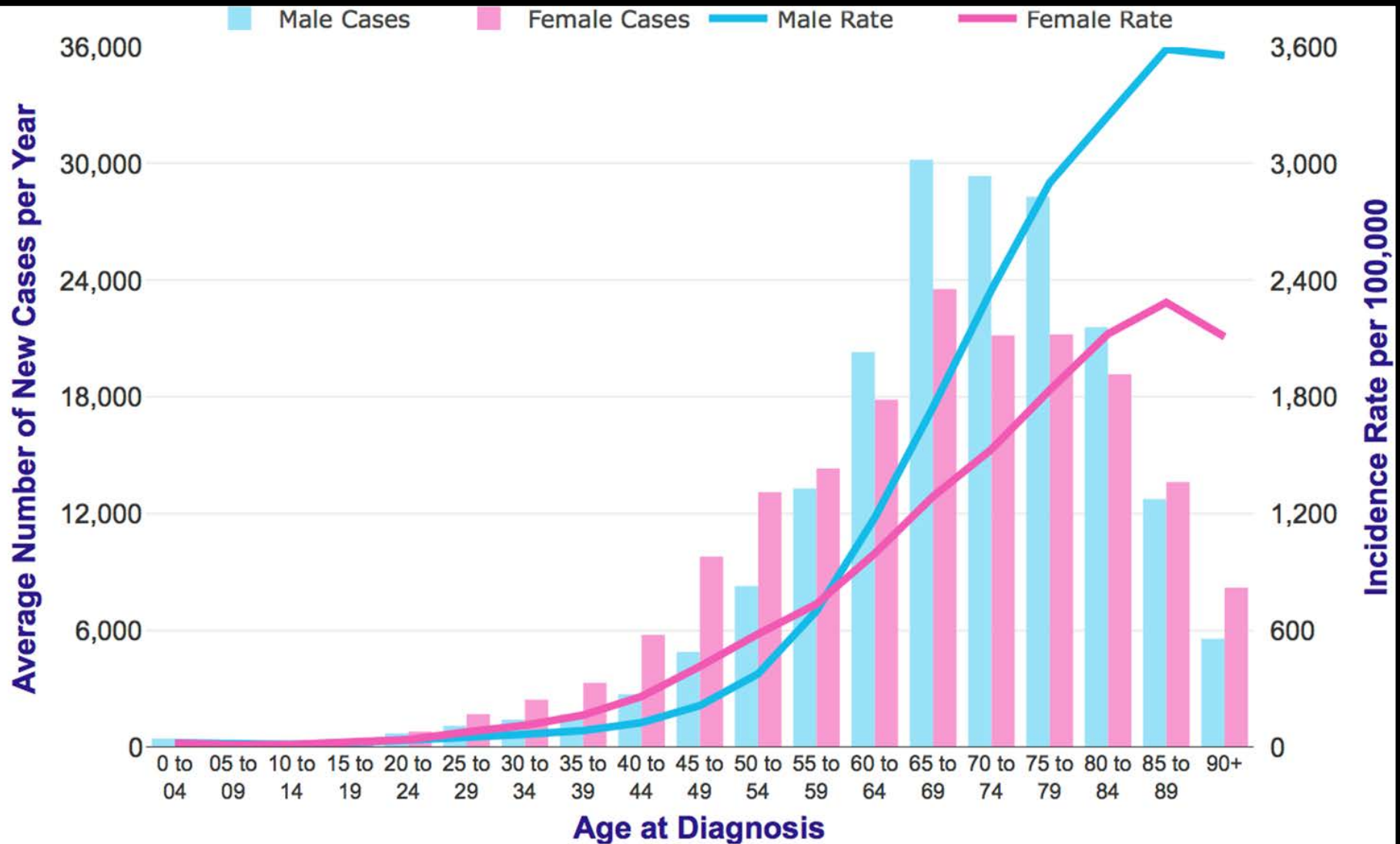
→ Ultimate Preventive Medicine

Birth



Death

Cancer and Aging





Arthritis

Cognitive Decline

Cancer

Immune Decline



Kidney Disease

Autoimmune Disorders

Cardiovascular Disease

Diabetes

The Gorbunova & Seluanov Laboratory

University of Rochester

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[COMPARATIVE BIOLOGY OF AGING](#) [AGING AND DNA REPAIR](#) [TELOMERASE](#) [CANCER](#)



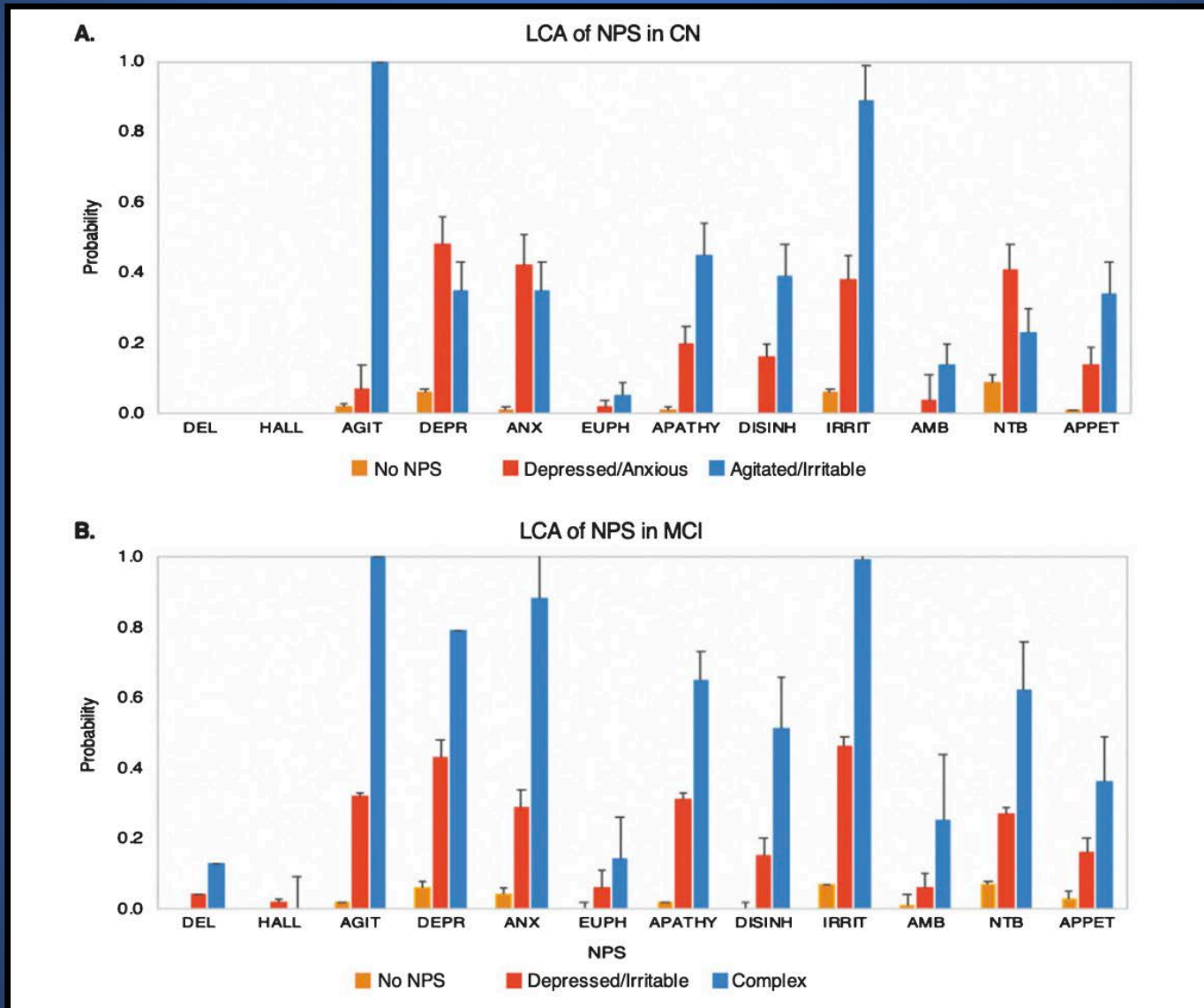
Dr. Gorbunova and Dr. Seluanov

Our research is focused on Aging, DNA repair, and Cancer.

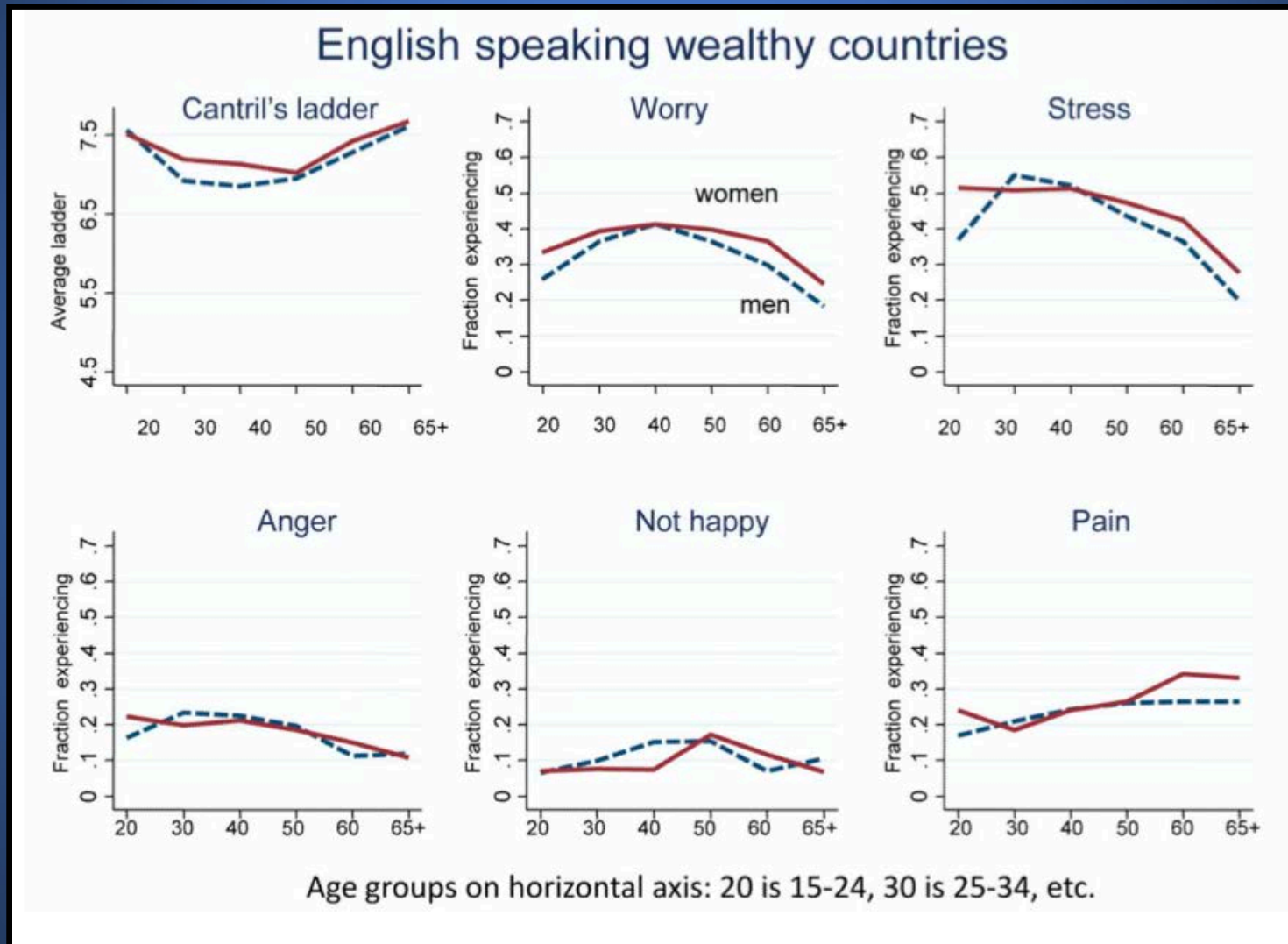
Emotional Wellbeing and Aging:
Implications for Addressing
Neuropsychiatric Symptoms in Old Age

F. Vankee Lin, PhD, RN

Neuropsychiatric Symptoms (NPS) in Old Age



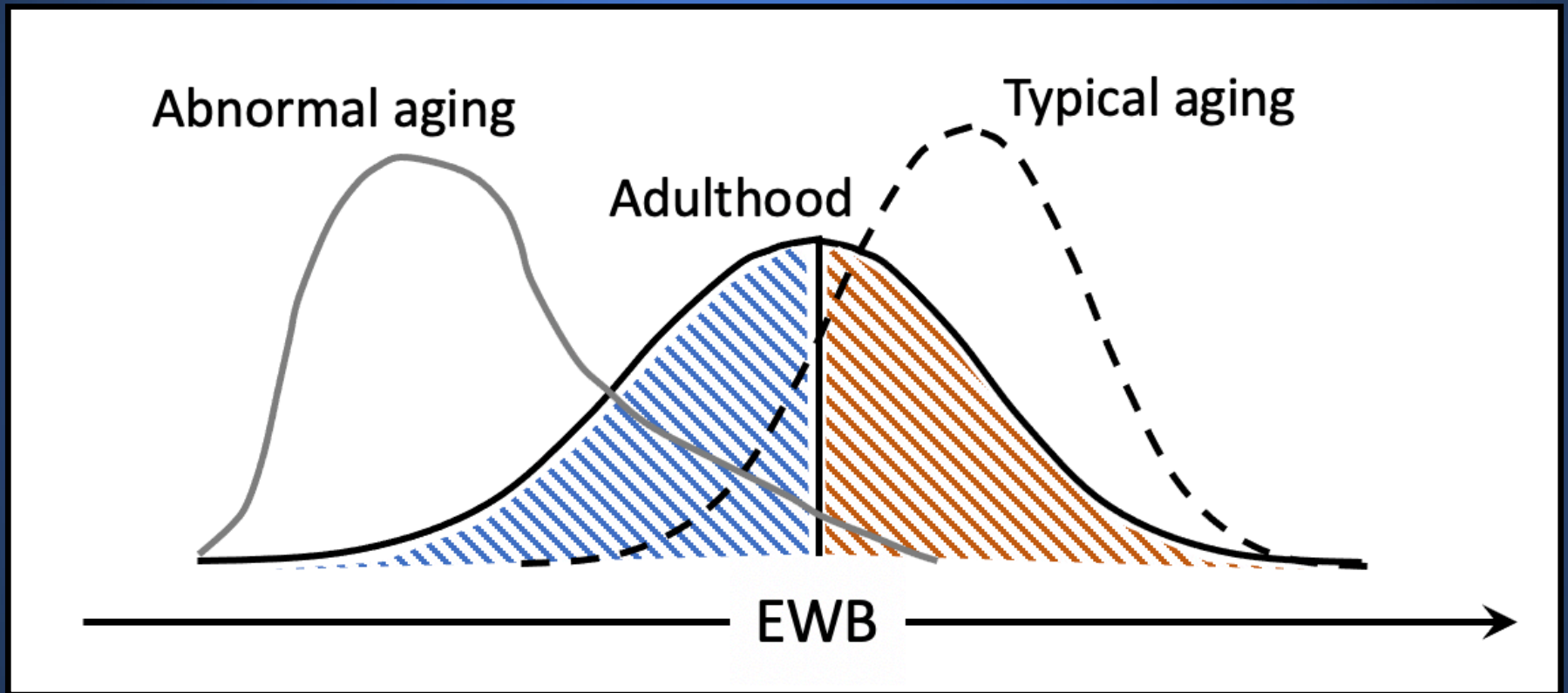
Emotional Wellbeing (EWB): Changes with Age



Examples of Appraisal and Adaptation Strategies: Reactivity

Behavior	Physiology	Brain Circuit
<ul style="list-style-type: none">• Affective arousal ↓• Positive valence ↑• Gaze or attention to negative stimuli ↓	<ul style="list-style-type: none">• ANS reactivity to negative stimuli ↓	<ul style="list-style-type: none">• Salience network to positive stimuli ↑• DMN to negative stimuli ↓• DMN to positive stimuli ↑• Amygdala to positive stimuli ↑

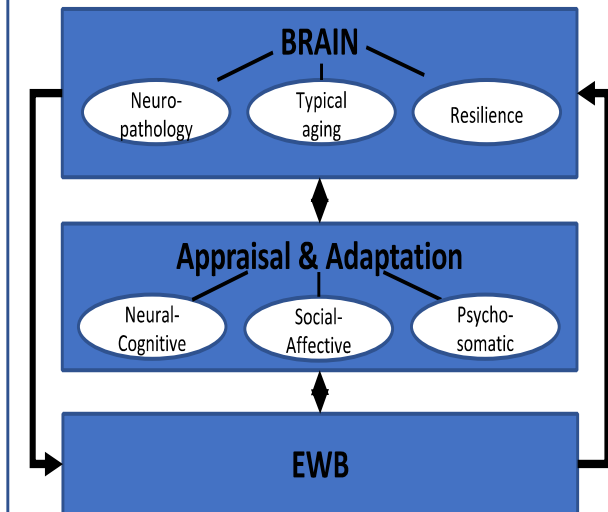
Emotional Wellbeing (EWB) and Aging



Red: Positive appraisal & adaptation
Blue: Negative appraisal & adaptation

Study of Emotional Wellbeing (EWB) and Aging Using a Cross-Species Model

CONCEPTUAL FRAMEWORK



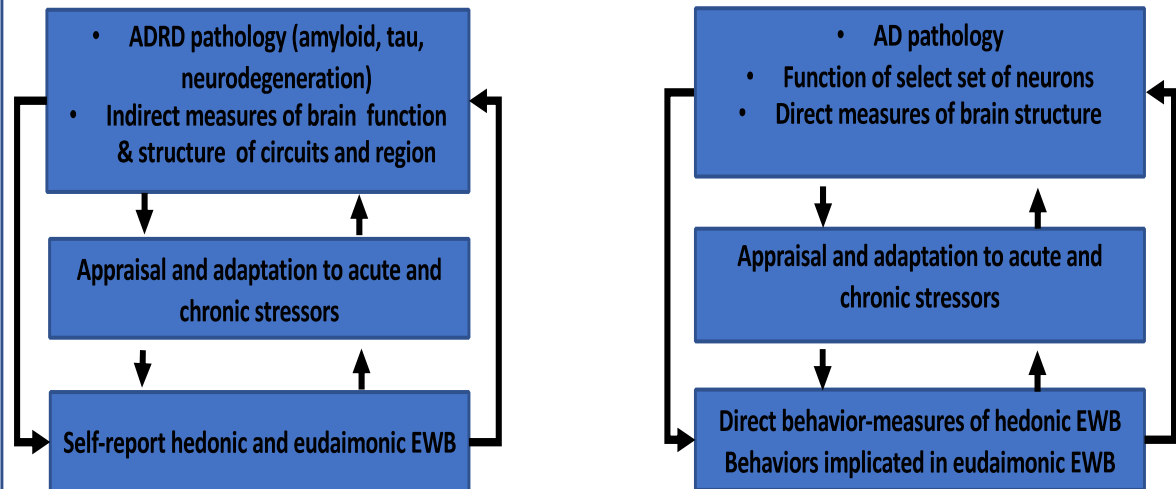
OPERATIONAL FRAMEWORK

Human model
(MCI/AD, cognitively typical
ager, and superager)

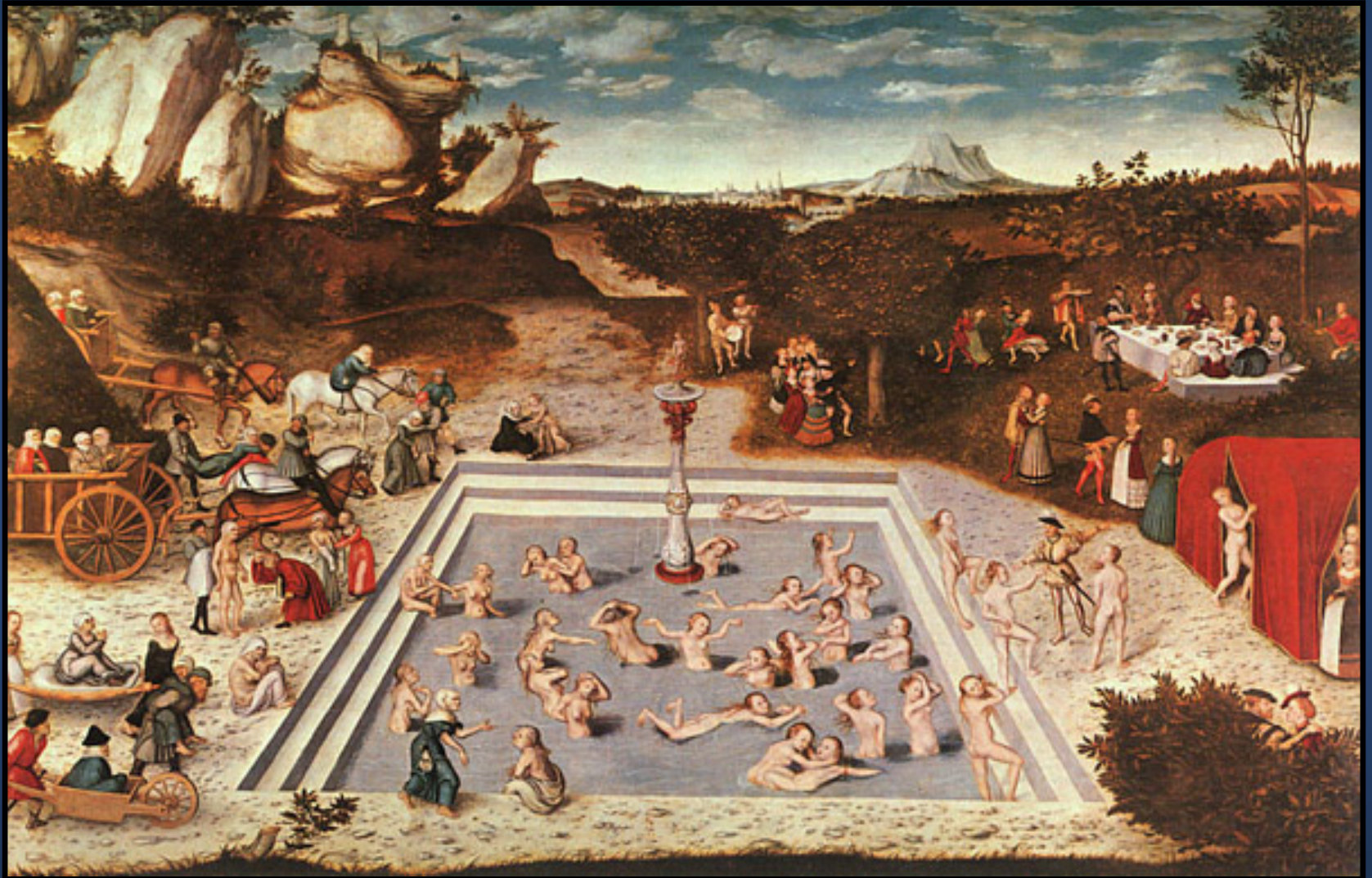
Clinically relevant content

Causality-driven mechanism

Animal model
(ADRD pathology, aging)



The Fountain of Youth (1546) Lucas Cranach



Mammals Differ up to 100-Fold in their Lifespan



Naked Mole Rat

Vertebrate of the Year 2013 (*Science* magazine)

Prince Hitachi Prize in Comparative Oncology

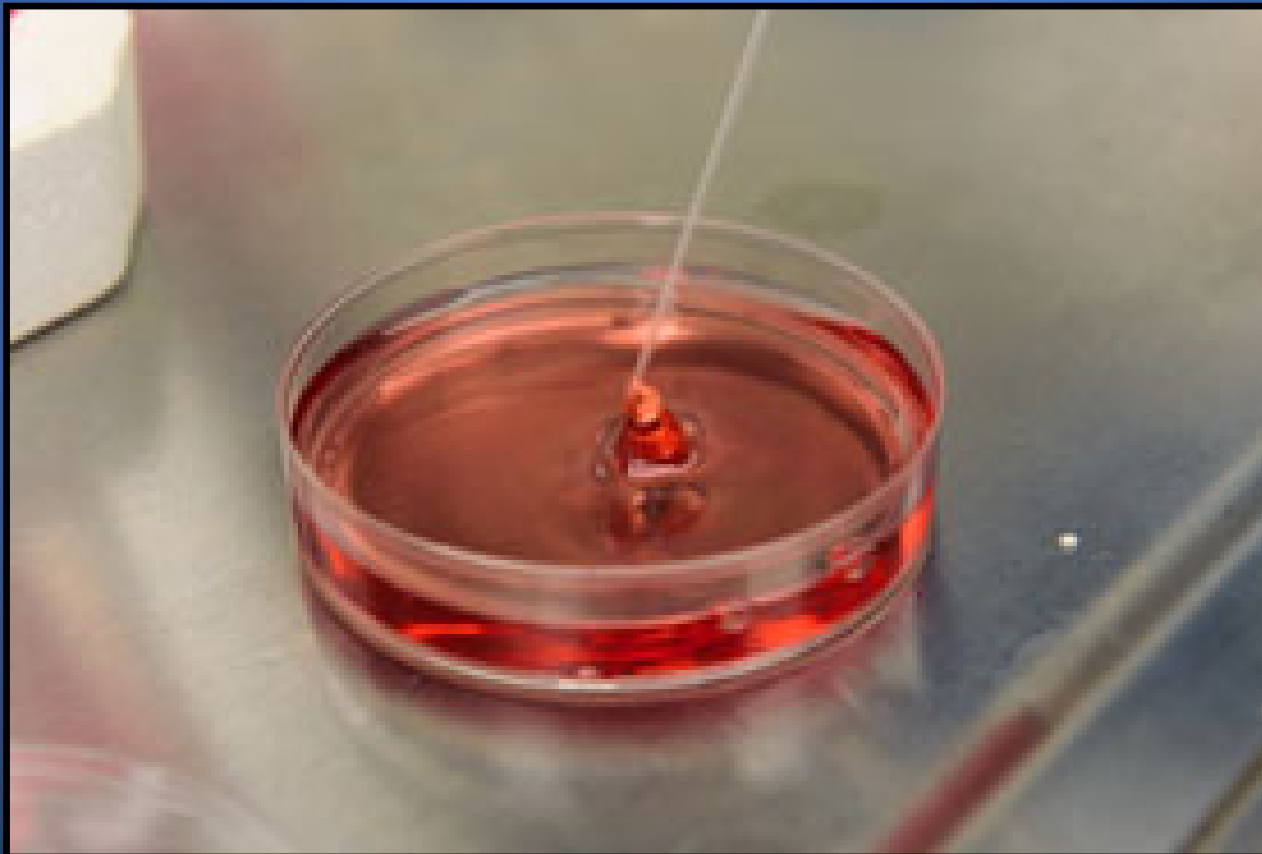
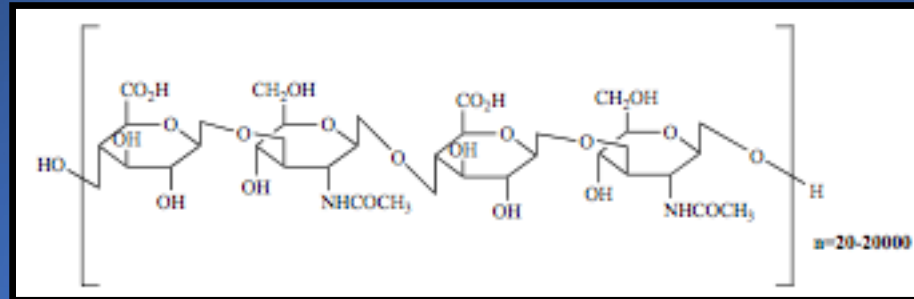


- Lifespan 35 years
- Resistant to Cancer
- Resistant to Osteoarthritis
- Resistant to ischemia reperfusion
- Do not develop neurodegeneration

Tian et al. 2013, Nature



Hyaluronan Produced by Naked Mole Rat Cells





Cancer
Resistant
Long-lived

- HA =



Cancer
Prone
Short-lived

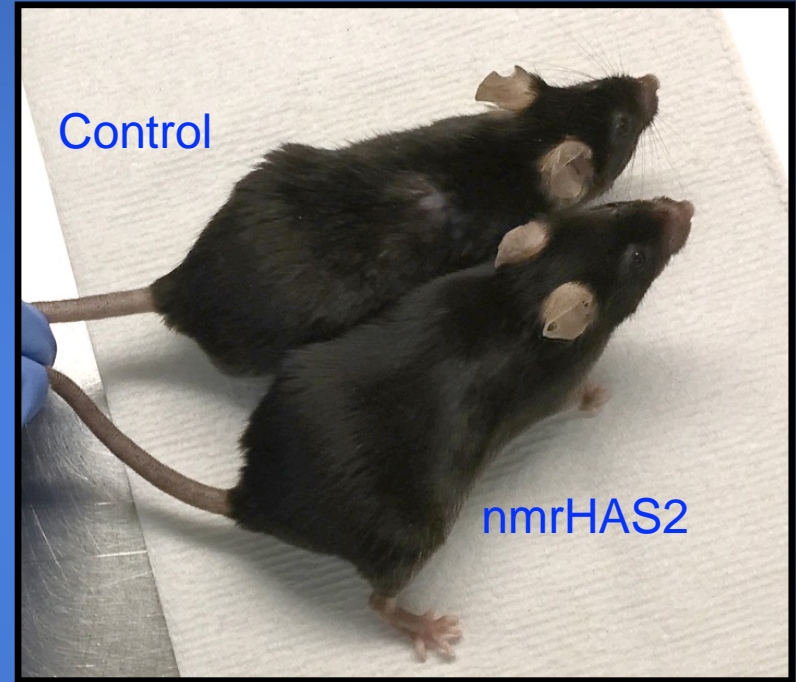
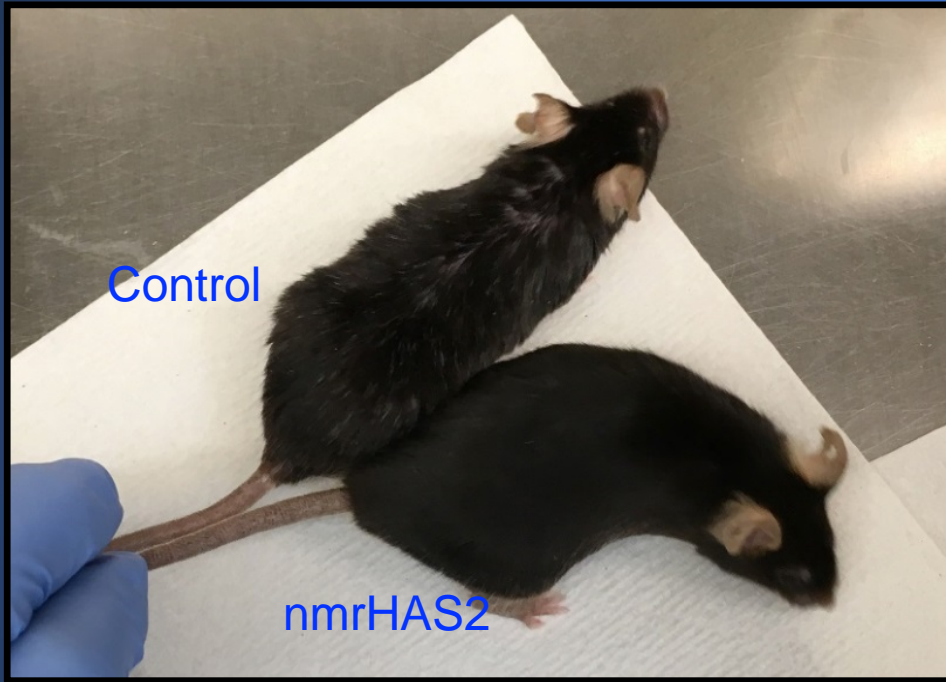


+ HA =



?

nmrHAS2 vs Control Mice (25 months old)



- Shinier fuller fur
- Less grey hair
 - Improved skin wound healing
- Generally younger appearance

nmrHAS2 vs Control Mice (2 years old)

nmrHAS2

Control





+ HA = ?

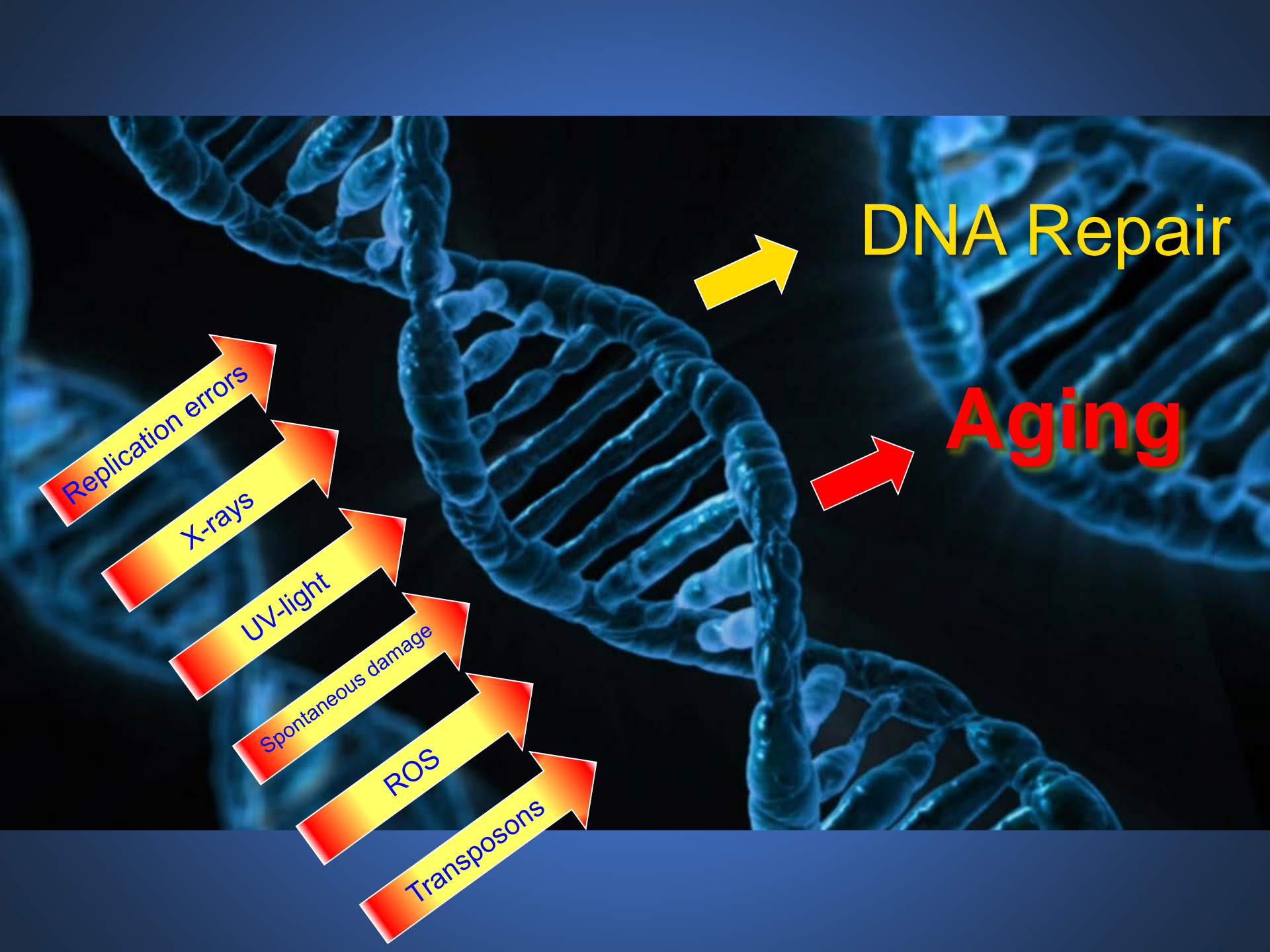
Cancer resistance
Longevity



HMW-HA



HAase inhibitors

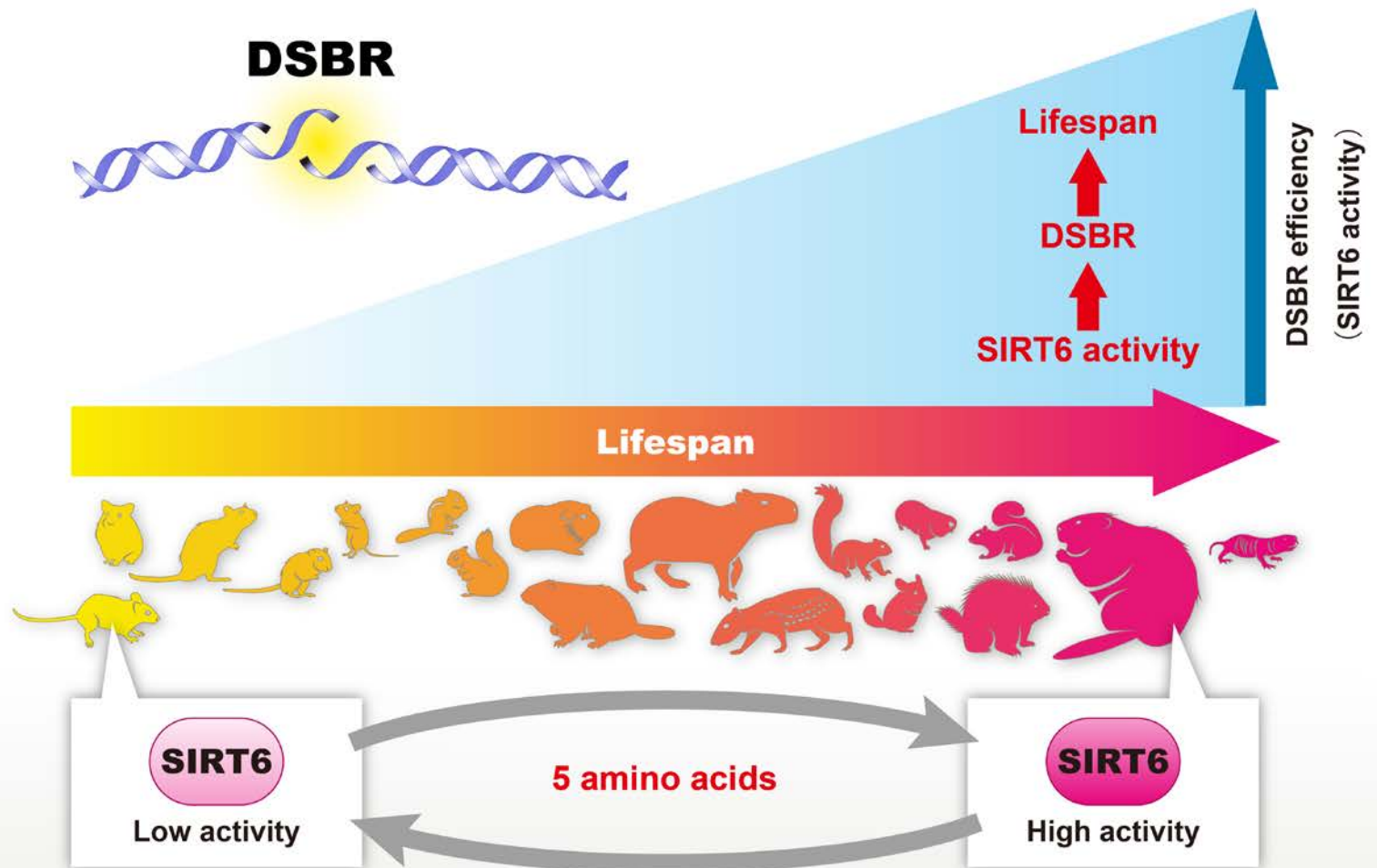


DNA Repair

Aging

- Replication errors
- X-rays
- UV-light
- Spontaneous damage
- ROS
- Transposons





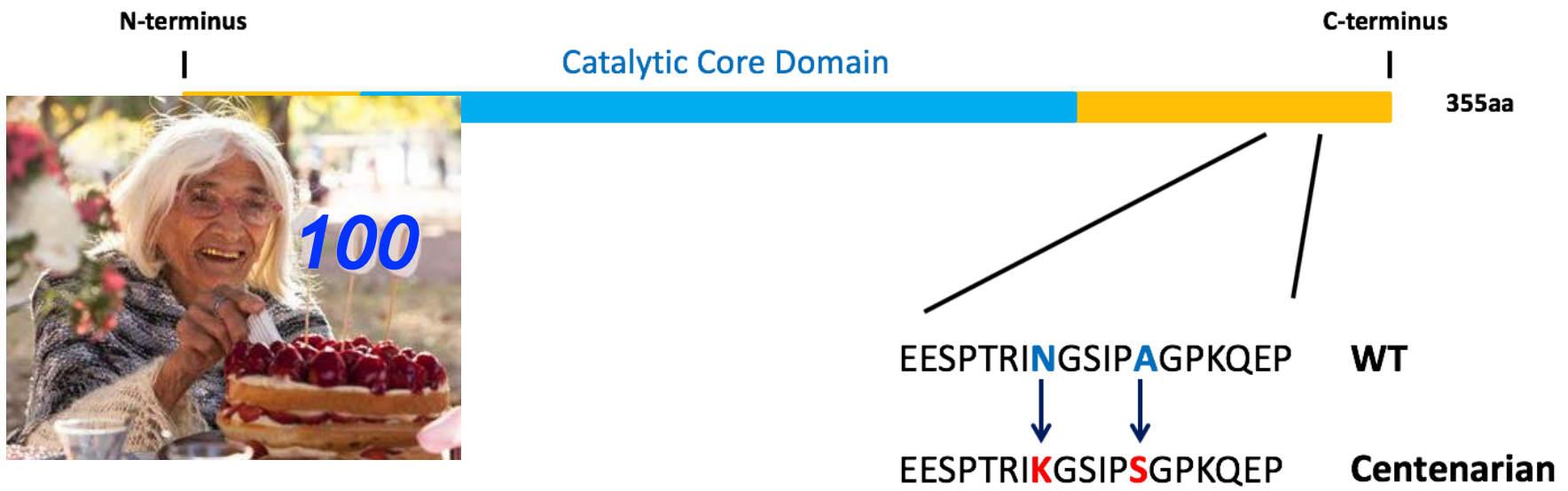
Bowhead Whale, the Largest and the Longest-Lived Mammal

- Maximum lifespan 211 years, Body mass up to 200,000 lbs

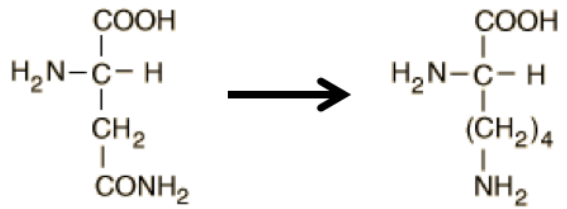


- Unique mechanisms to maintain stable genome and epigenome
 - Discovered two proteins enhanced in whale for accurate DNA repair

Human Centenarian SIRT6 Allele

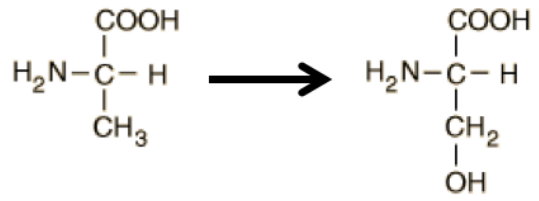


Asparagine to Lysine (N308K)



Polar → Charged(+)

Alanine to Serine (A313S)



Hydrophobic → Polar

Centenarians

Extreme health in old age



Sarah Knauss at age 100
Lived to 119

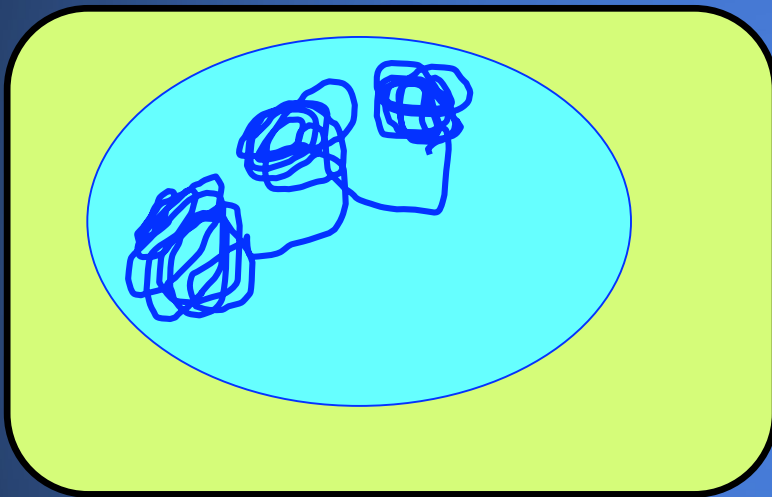


Alex Imich at age 111

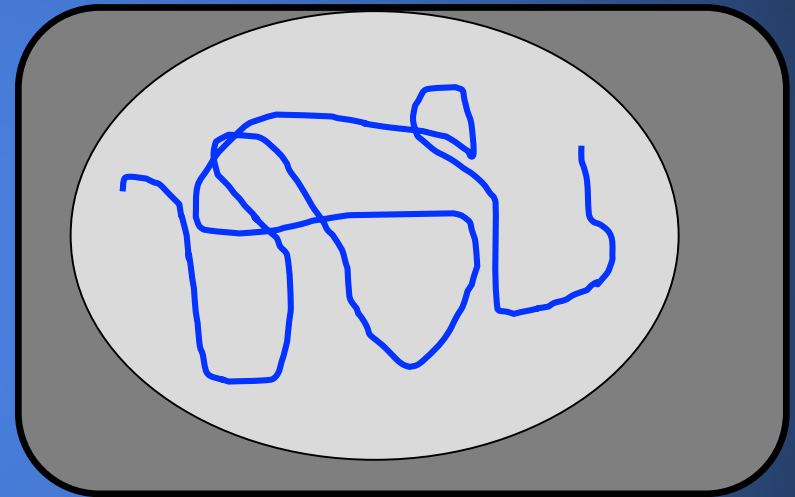
- Live independently
- Remain active
- Free from dementia, cardiovascular disease, diabetes

Chromatin Organization Unravels during Aging

Young Cell



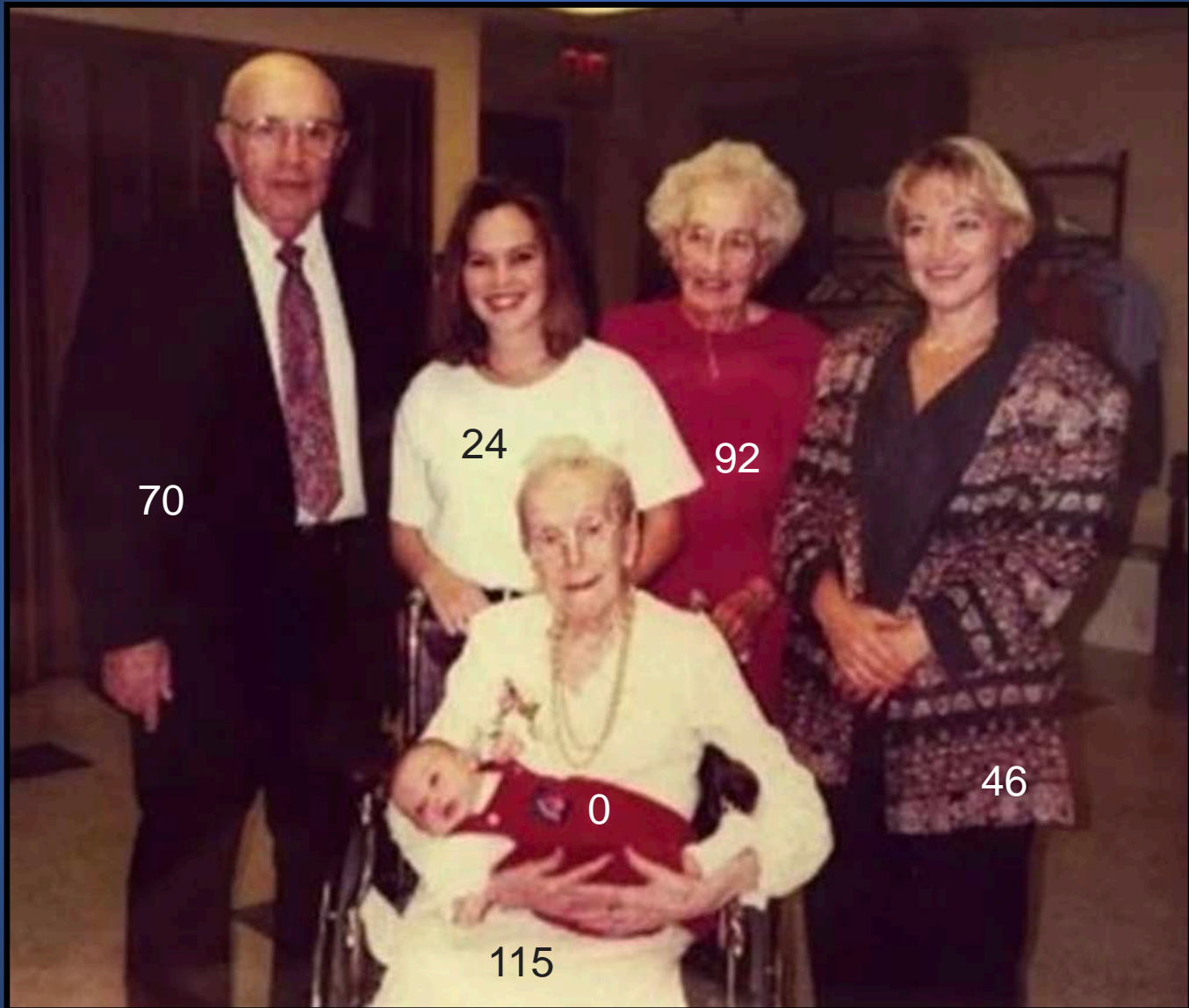
Old Cell



Epigenetic Rejuvenation
SIRT6, Yamanaka Factors

From Comparative Biology to the Clinic





Sarah Knauss and her Family (Five Generations)

NETWORK FOR EMOTIONAL WELLBEING AND BRAIN AGING

“NEW Brain Aging” (U24 AG0782701)

OVERALL GOAL:

- To define the mechanisms by which brain aging influences EWB and how EWB may impact risk for and progression of ADRD

OBJECTIVES:

- Form a national collaborative of researchers to:
 - coalesce best research practice resources for brain aging and EWB research;
 - form workgroups to establish priorities for the field
 - conduct pilot studies to address them.

COLLABORATORS

- Stanford University
- Johns Hopkins University
- UC Santa Cruz
- Duke University

The image shows a close-up of the Seal of the American Medical Association. The central banner contains the Latin motto "MELIORA" in raised, serif capital letters. Above and below the banner are circular medallions, and the entire seal is enclosed in a circular border.

MELIORA

Needn't end at 65

... or 75

...or 85!

VITAL DISCOVERY

Research Opportunities

➤ Research Centers & Grants

- Roybal Center for Social Ties & Aging
- Epigenetic Aging and Rejuvenation
- NEW Brain Aging Center
- Future Opportunities
 - Nathan Shock Center of Excellence
 - Claude D. Pepper Older Americans Independence Center

➤ Collaboration

- Wilmot Cancer Institute → National Cancer Institute Designation
- Delmonte Neuroscience Institute, Neurorestoration Institute, Musculoskeletal Research Center
- UPMC Health Lab – Aging Research Core
- Empire Discovery Institute



VITAL CARE

Patient Care & Education



University of Rochester **ECHO**

VITAL CARE

Patient Care & Education

- Access to high quality geriatrics care across region
- Preferred provider of older adult care
- Lead nation in geriatric workforce development
 - \$3.5 million Geriatric Workforce Enhancement Program grant



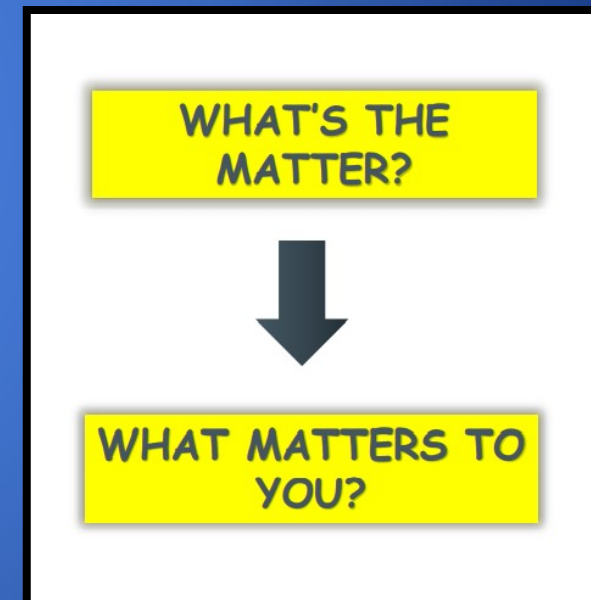
Age-Friendly Health System

Age-Friendly Health Systems



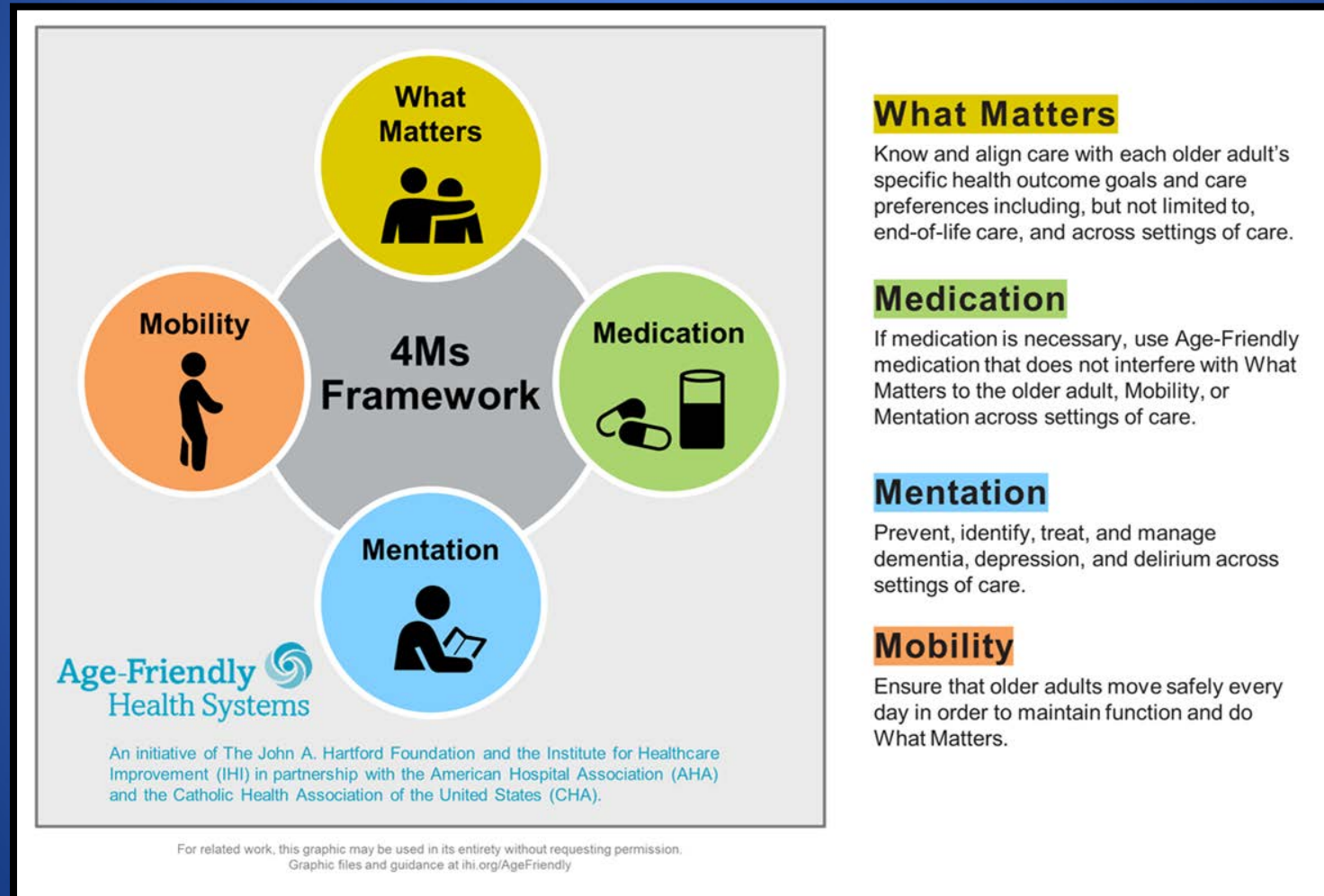
An initiative of The John A. Hartford Foundation and the Institute for Healthcare Improvement (IHI) in partnership with the American Hospital Association (AHA) and the Catholic Health Association of the United States (CHA).

- Provide older adults with the best care possible
- Follow an essential set of evidence-based practices
- Cause no harm
- Align with 'What Matters' to the older adult & family / caregivers
- Optimize value for all



The Age-Friendly Health System

4 Ms Framework



What Matters

Know and align care with each older adult's specific health outcome goals and care preferences including, but not limited to, end-of-life care, and across settings of care.

Medication

If medication is necessary, use Age-Friendly medication that does not interfere with What Matters to the older adult, Mobility, or Mentation across settings of care.

Mentation

Prevent, identify, treat, and manage dementia, depression, and delirium across settings of care.

Mobility

Ensure that older adults move safely every day in order to maintain function and do What Matters.

VITAL LIVING

Community Outreach

- Lifestyle interventions that promote vitality in aging
- New community partnerships that optimize quality of life, engagement and health
- Make Rochester the ideal place to age well



Age-Friendly University & Community

UR Aging Institute – The Future

- National and international renown as leader in aging
- Interventions that promote Health Span and Rejuvenation
- Growth and sustainability with funding & philanthropy
- Greater market share for UR Medicine as our region's destination of choice for older adult care and a geriatrics-trained healthcare workforce
- Success in managing an aging population and its impact on individuals, families & society
- New community & UR/URMC collaborations and partnerships that optimize quality of life, engagement and health
- An Age-Friendly Health System, University & Community



A Geriatrics Wish...



- Na ta ekatostisis (May you live to be 100). (Greek)
- May you live to be 100 years, with one extra year to repent. (Irish)
- May you live to be 100 and may the last voice you hear be mine. (Frank Sinatra)
- Sto lat, sto lat, niech zyje zyje nam (Good luck, good cheer, may you live a hundred years). (Polish)

May you Age with Vitality...

and if needed, may your care be from a UR Geriatrics Trained Health Professional in an Age-Friendly Health System!

URAI Website



<https://www.urmc.rochester.edu/university-of-rochester-aging-institute.aspx>