JEAN MAYER USDA HUMAN NUTRITION RESEARCH CENTER ON AGING

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Age-Related Changes in Dietary Intakes and Nutrient Needs

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Disclosures

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  - *USDA/ARS, NIH/NIA, NIH/NIAMS, NIH/NIGMS*
- President, *American Society of Nutrition, 2024-2025*
- Chair, *HHS/USDA 2025 Dietary Guidelines for Americans Advisory Committee*
- Panel Member, *ILSI Europe Vitamin K2 Task Force*
- Editorial Board, *Annual Review of Nutrition*

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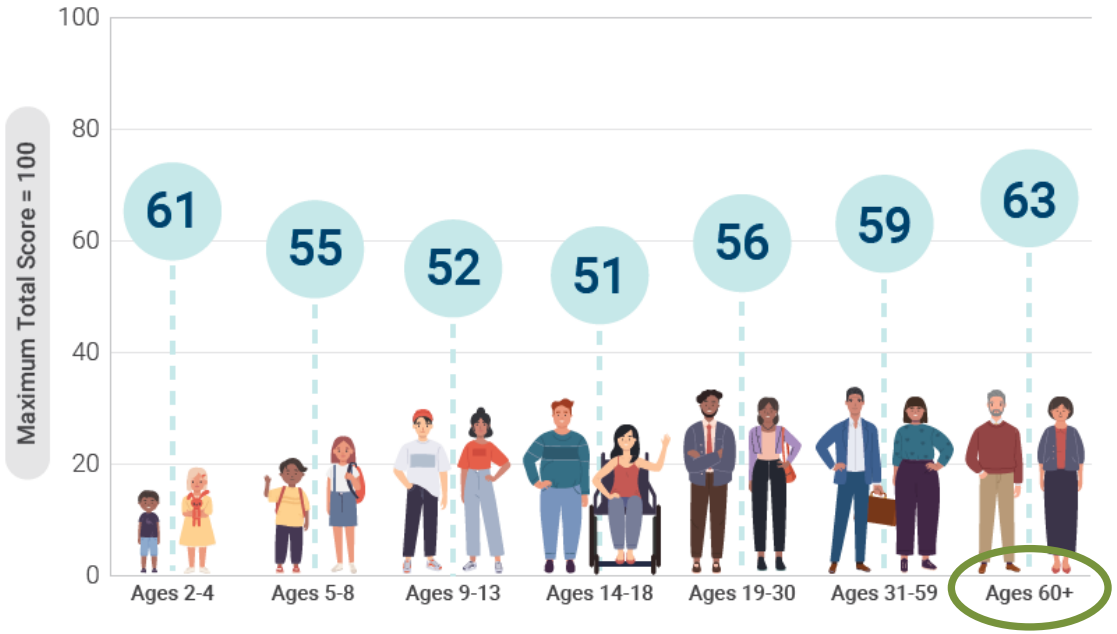
Age-Related Changes in Dietary Intakes

Adherence to the Dietary Guidelines for Americans across Life-stages.



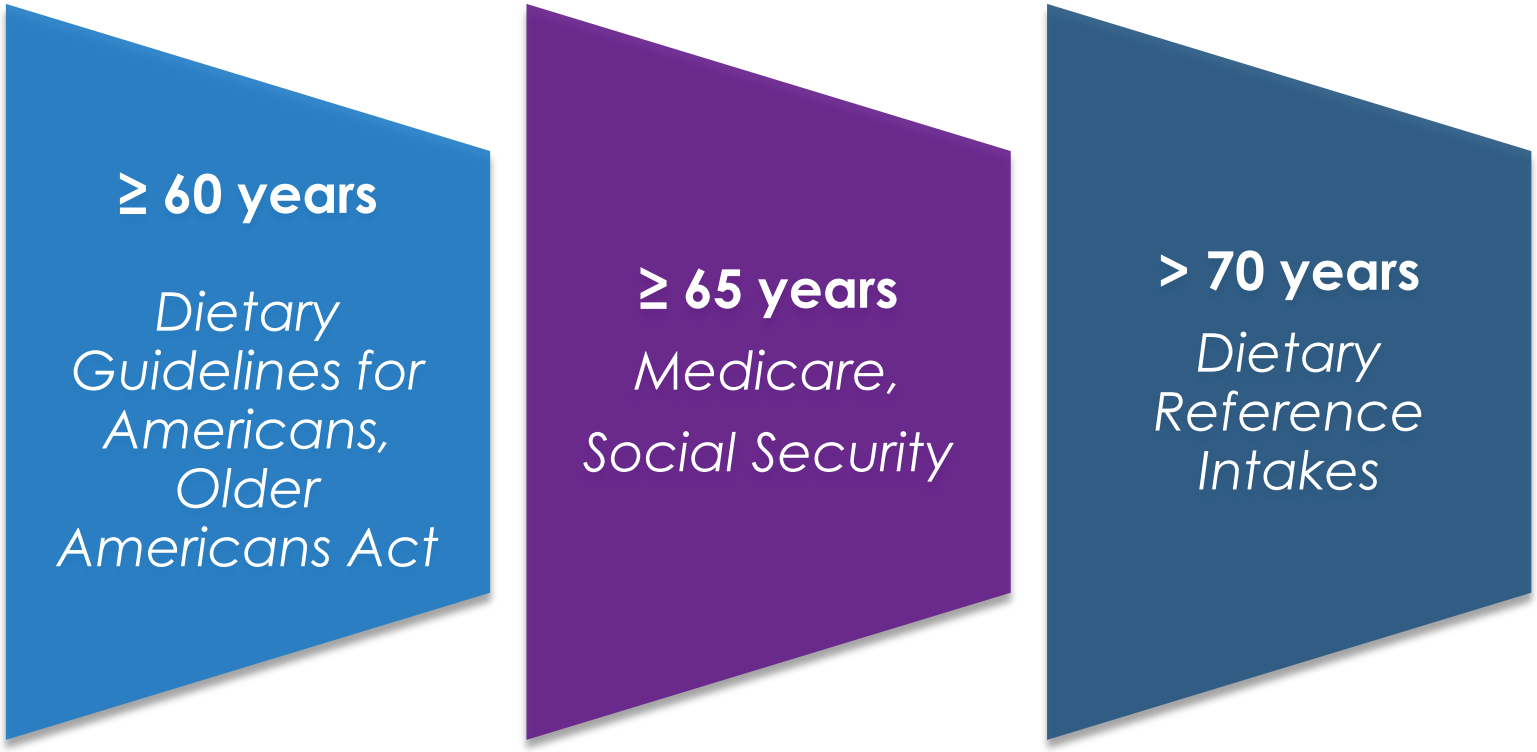
NOTE: HEI-2015 total scores are out of 100 possible points. A score of 100 indicates that recommendations on average were met or exceeded. A higher total score indicates a higher quality diet.

Data Source: Analysis of What We Eat in America, NHANES 2015-2016, ages 2 and older, day 1 dietary intake data, weighted.

How does diet change throughout older adulthood?

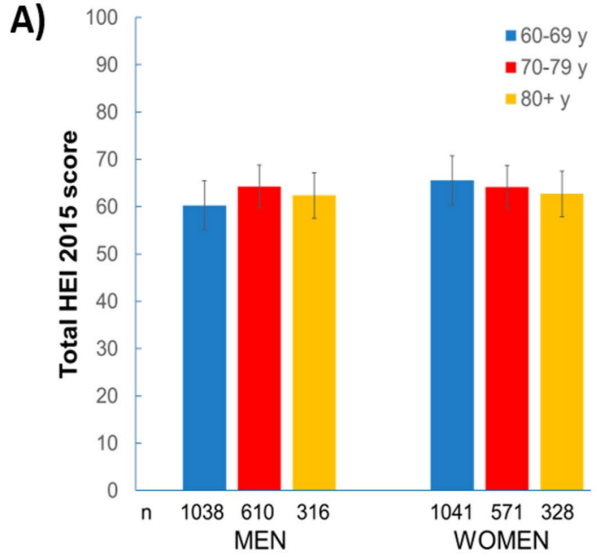
Dietary Guidelines for Americans 2020-2025

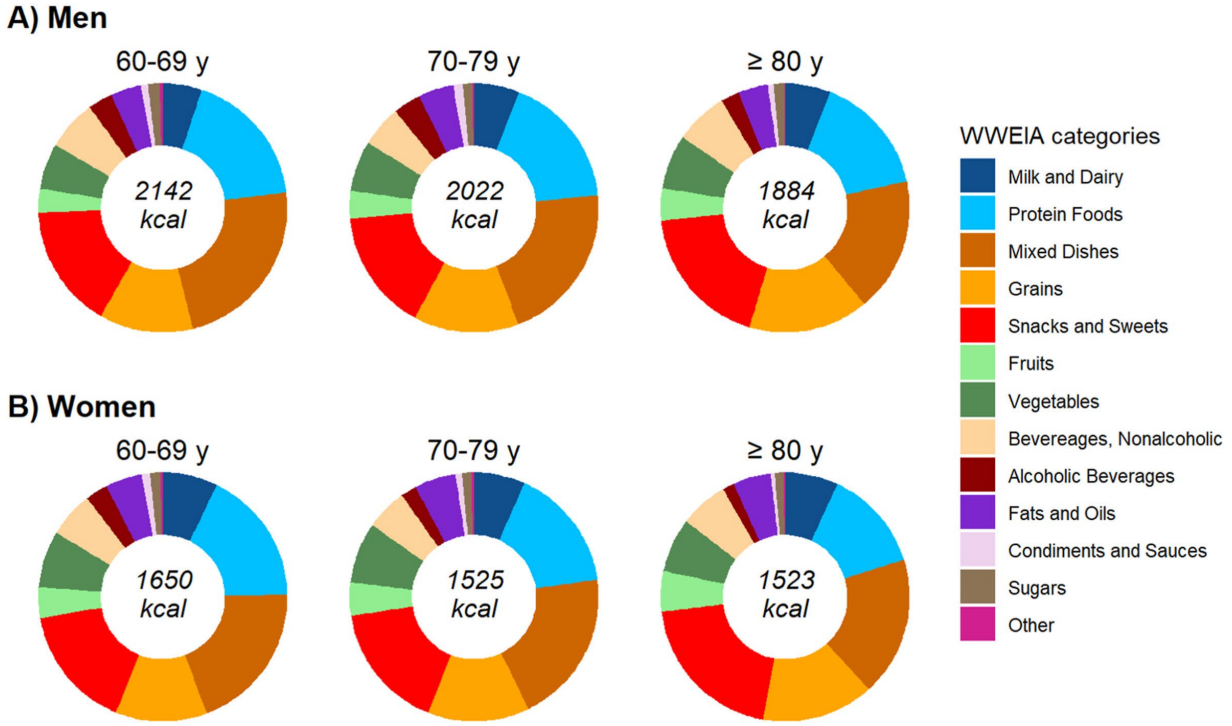
How to define older adults?



Overall diet quality is similar, but diet of 80+ year-olds differed from 60-69-year-olds in some components.

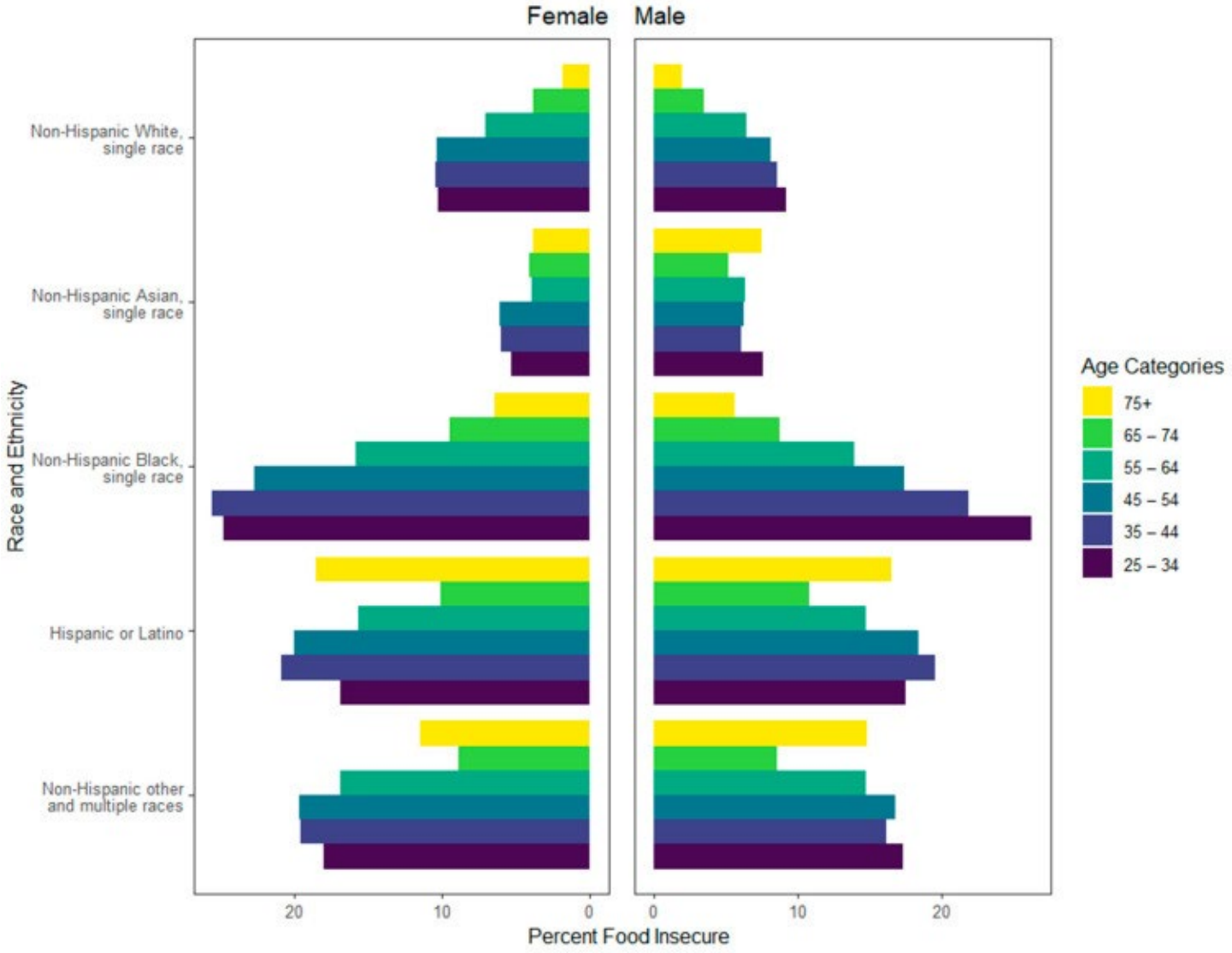
National Health and Nutrition Examination Survey
2015–March, 2020





doi: 10.1016/j.tnutr.2023.12.014

Food Insecurity Varies by Age, Sex, and Race/Ethnicity.



Household Pulse Survey
23 April 2020, through 8 May 2023

The United States Department of Agriculture defines food insecurity as the lack of consistent access to enough food for an active, healthy life.

doi: 10.3390/ijerph21081078

There are No Dietary Pattern Studies in Centenarians.

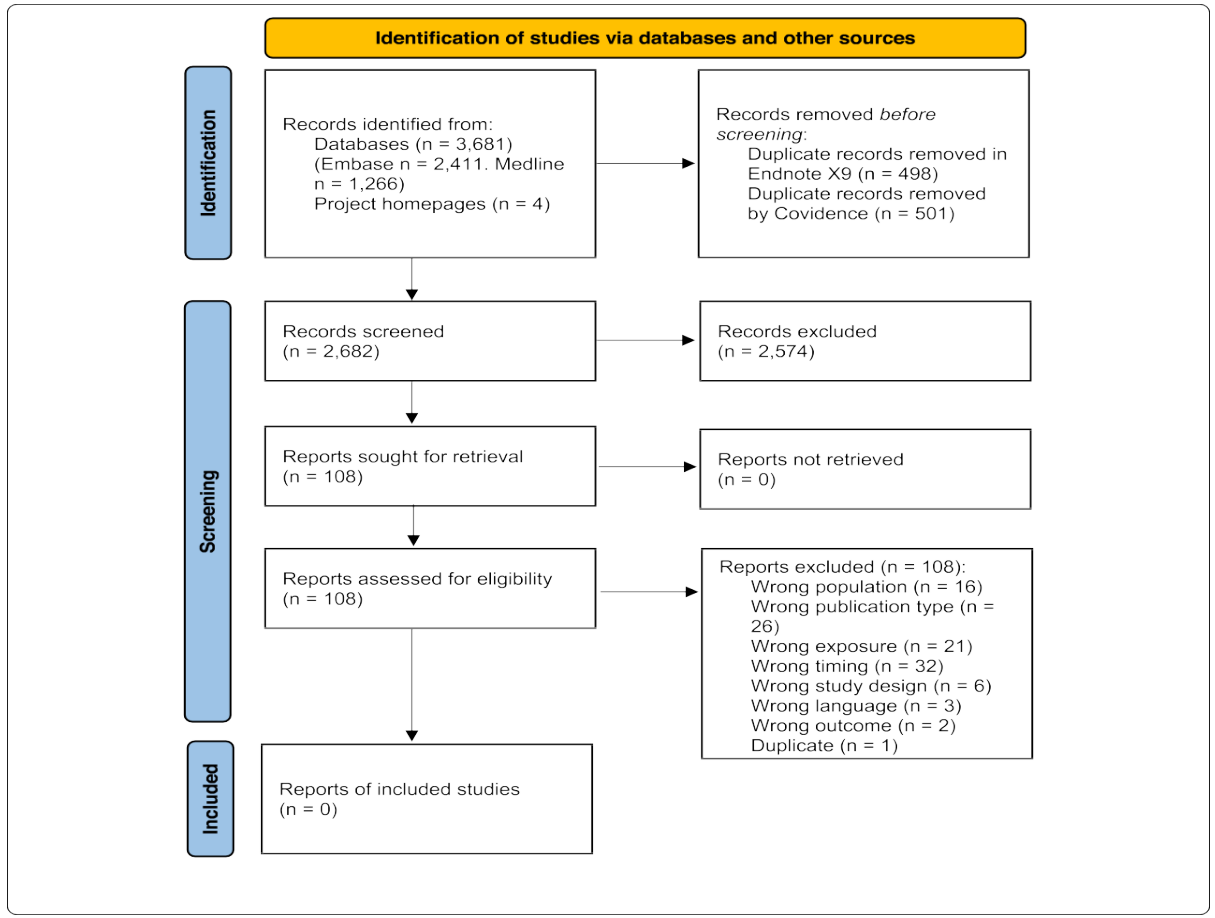


Fig. 1 PRISMA flow diagram detailing the flow of records through the review process in the systematic review of cohort and case–control studies on dietary patterns and survival to 100 + years

"Centenarians are used as a model of healthy ageing and longevity. Diet is a factor known to affect mortality in middle aged adults and elderly …. No studies have investigated dietary patterns in late adult life in relation to survival to 100 + years of age."

doi.org/10.1186/s13690-022-00914-2

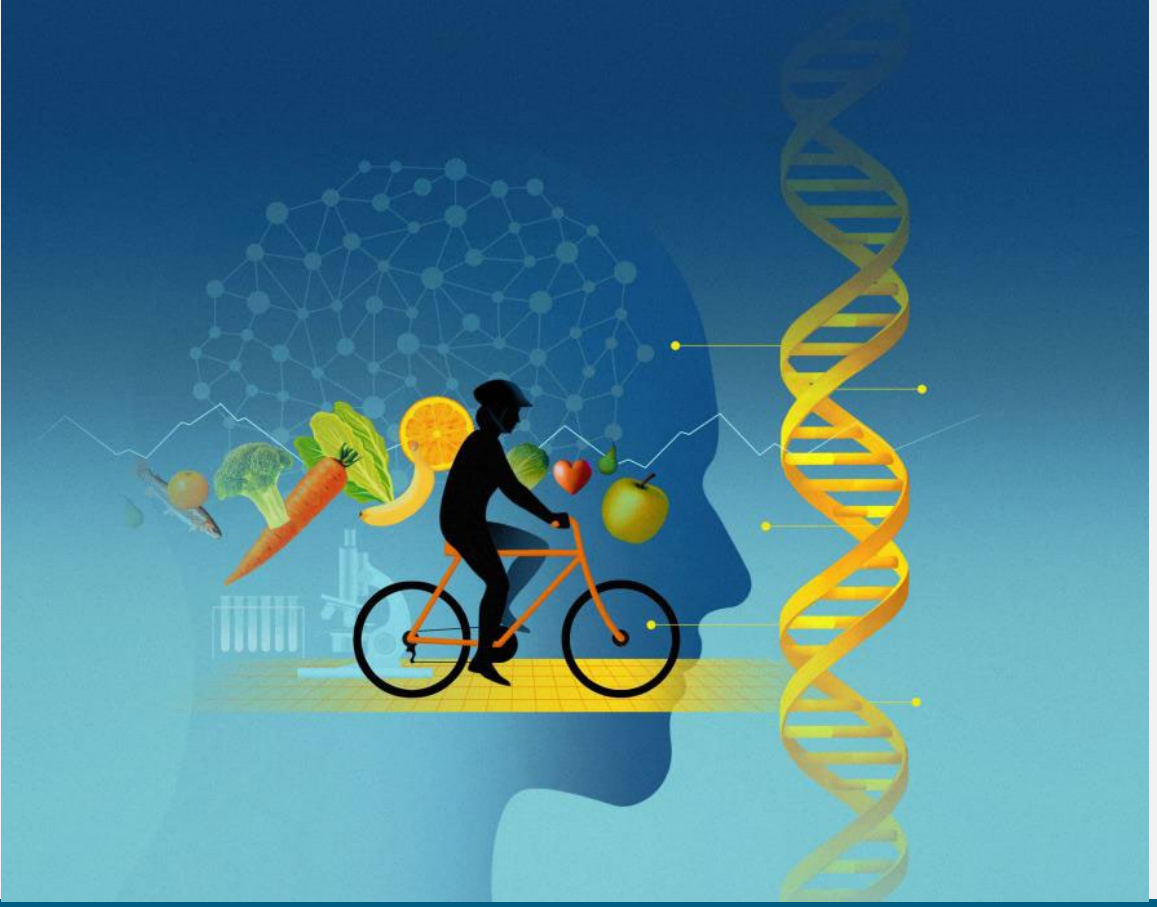
Opportunities

- Dietary intake data are available in > 750,000 individuals from ~32 prospective federally-funded US cohorts.
- Add dietary assessment to ongoing cohorts which currently lack it.

Obstacles

- Reliance on recall ability.
- Cultural adaption of FFQs.
- Currently, follow-up dietary assessments are available primarily on non-Hispanic whites.

doi: 10.1093/advances/nmac031



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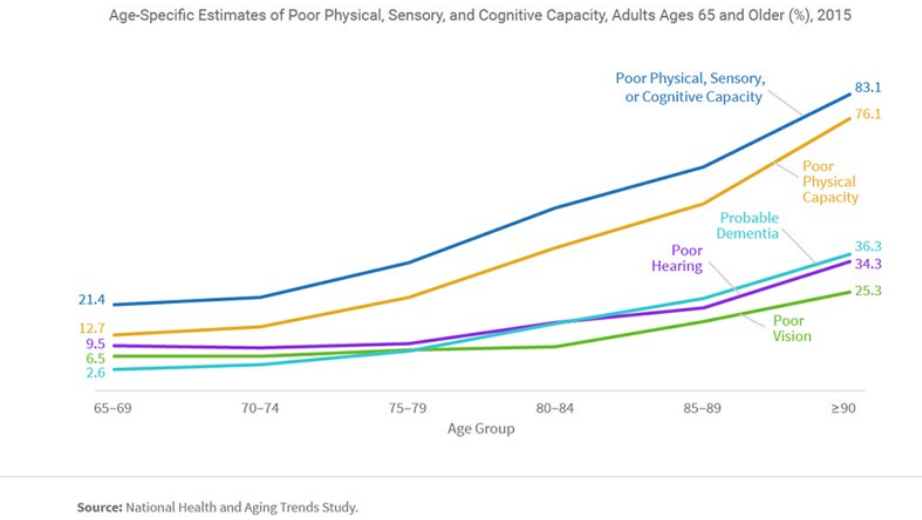
Age-Related Changes in Nutrient Needs

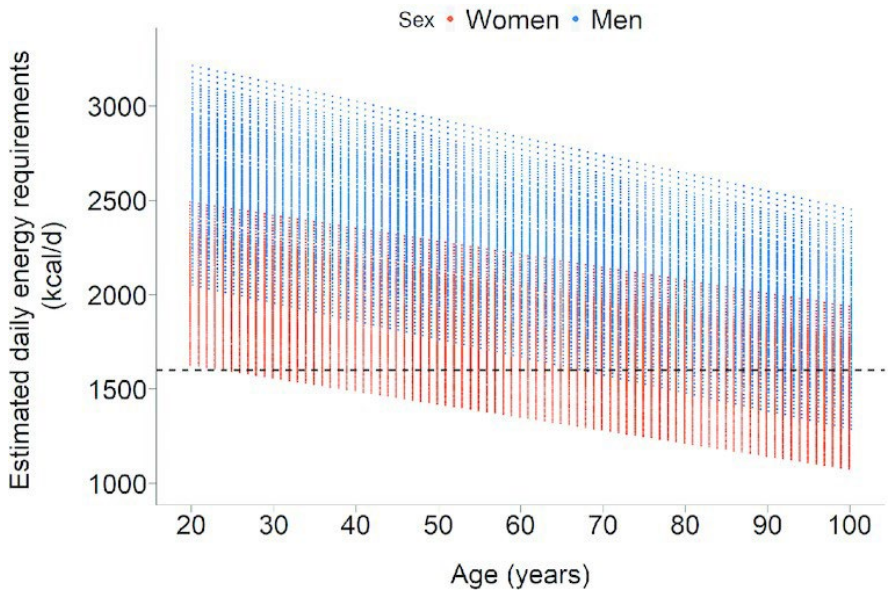
Are 60-year-olds & 80-year-olds the same?

The likelihood of having a disability increases with age.



https://www.prb.org/resources/eight-demographic-trends-transforming-americas-older-population/

Energy requirements decrease with age.



doi: 10.1093/advances/nmab032

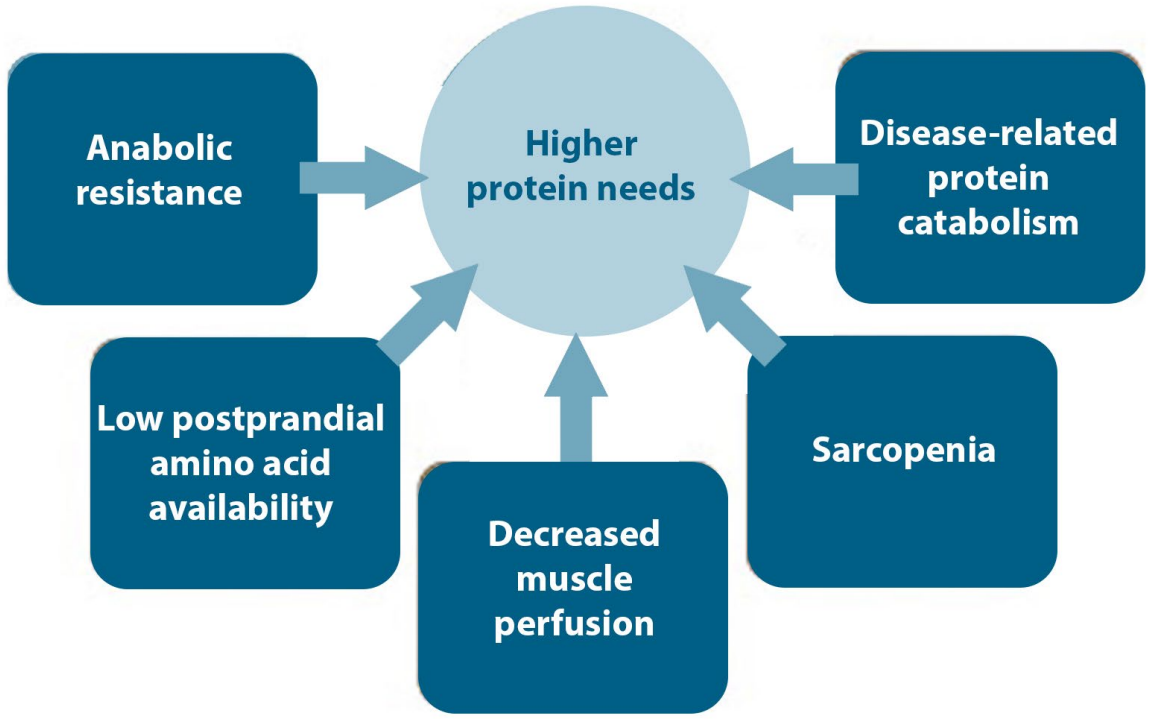
Estimated Energy Requirements Decline with Age.

MALES									
Age in years	Age range represented	Median ht. in cm (2023)	Median wt. in kg (2023)	EER Equation for Age/Sex/PA Level	EER (2023 data)	Median ht. in cm (2005)	Median wt. in kg (2005)	EER (2005 data)	Difference (2023 vs. 2005)
2		87.9	12.6	-716.45 – (1.00 × age) + (17.82 × height) + (15.06 × weight) + 20	1,058	87.2	12.7	1,047	11
3		99.2	15.5	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 20	1,078	95	14.3	1,008	70
4		105.4	17.8	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 15	1,188	102	16.2	1,122	65
5		112.4	20.5	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 15	1,318	109	18.4	1,246	72
6		118.0	22.5	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 15	1,421	115	20.7	1,358	63
7		126.1	26.2	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 15	1,578	122	23.1	1,484	94
8		131.8	29.5	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 15	1,700	128	25.6	1,599	101
9		136.4	31.8	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 25	1,803	134	28.6	1,730	73
10		141.1	38.7	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 25	1,959	139	31.9	1,842	117
11		148.3	44.6	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 25	2,134	144	35.9	1,963	170
12		153.9	46.4	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 25	2,234	149	40.5	2,093	141
13		163.6	55.4	-447.51 + (3.68 × age) + (13.01 × height) + (13.15 × weight) + 25	2,482	156	45.6	2,255	228
14		170	59.9	-447.51 + (3.68 * age) + (13.01 * height) + (13.15 *weight) + 20	2,623	164	51	2,428	195
15		172.7	66.1	-447.51 + (3.68 * age) + (13.01 * height) + (13.15 *weight) + 20	2,744	170	56.3	2,580	164
16		172.6	66.8	-447.51 + (3.68 * age) + (13.01 * height) + (13.15 *weight) + 20	2,755	174	60.9	2,696	59
17		174.9	72.1	-447.51 + (3.68 * age) + (13.01 * height) + (13.15 *weight) + 20	2,859	175	64.6	2,761	97
18		175.5	71.0	-447.51 + (3.68 * age) + (13.01 * height) + (13.15 *weight) + 20	2,856	176	67.2	2,812	43
19		176.1	77.7	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,788	175.9	69	2,838	-51
25	20-29	176.0	81.3	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,773	176	69	2,599	173
35	30-39	176.7	89.7	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,787	176	69	2,491	296
45	40-49	176.5	90.5	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,689	176	69	2,383	306
55	50-59	175.3	89.6	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,560	176	69	2,274	286
65	60-69	174.3	89.5	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,444	176	69	2,166	278
75	70-79	173.1	85.3	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,269	176	69	2,058	211
85	80+	170.3	79.6	753.07 – (10.83 × age) + (6.50 × height) + (14.10 × weight)	2,062	176	69	1,949	112

Courtesy of D Silva, C Cruz, T Pannucci, J Obbagy

doi: 10.17226/26818

Protein Requirements May Increase with Age.



Dietary Protein Intake

- Older adults have greater protein needs to compensate for anabolic resistance and hypermetabolic disease
- Older adults may also have decreased intake due to age-related appetite loss, medical conditions, financial limits
- Optimal intake of at least 1.0 to 1.5 g protein/kg BW/day is recommeded; individual needs depend upon the severity of malnutrition risk

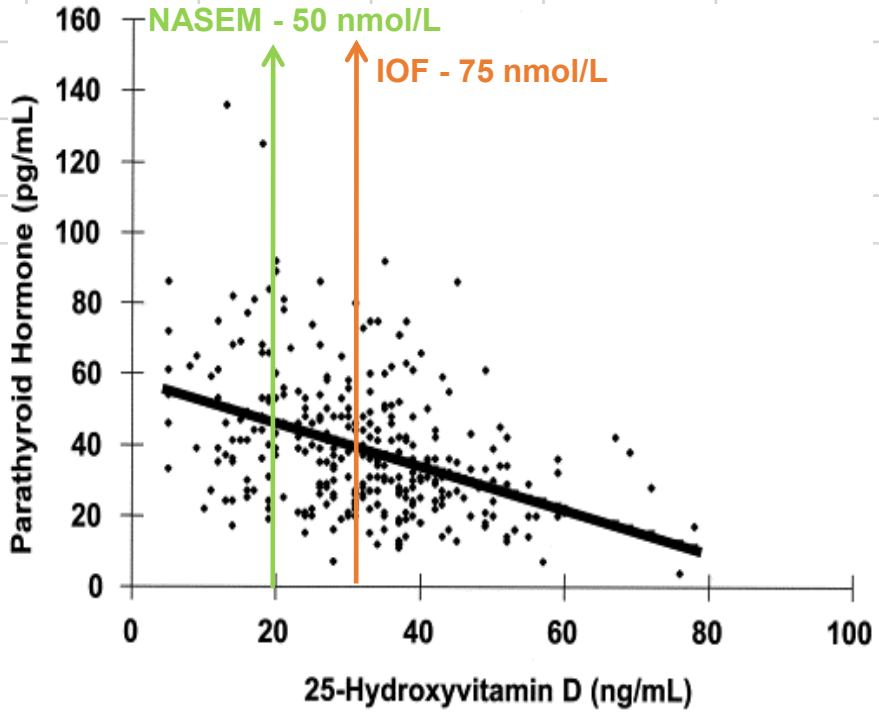
Exercise

- Regular exercise helps maintain skeletal muscle strength and function in older adults
- Resistance training has limited but positive effects on recovery of muscle in older people
- A combination of resistance training and adequate dietary protein/amino acid intake for healthy muscle aging is recommended

doi.org/10.1016/j.clnu.2014.04.007

Global Diet and Serum 25(OH)D Recommendations

	NASEM		EFSA		SACN		WHO		NCM		Endocrine Society	
	Diet (µg/d)	25(OH)D (nmol/L)	Diet (µg/d)	25(OH)D (nmol/L)	Diet (µg/d)	25(OH)D (nmol/L)	Diet (µg/d)	25(OH)D (nmol/L)	Diet (µg/d)	25(OH)D (nmol/L)	Diet (µg/d)	25(OH)D (nmol/L)
Children	15	50	15	50	10	25	5	27	10	50	15–25	52.5–72.5
Adults*	15	50	15	50	10	25	5	27	10	50	37.5–50	52.5–72.5
>50 years							15					
>65 years							15					
>70 years	20											
>75 years									20			

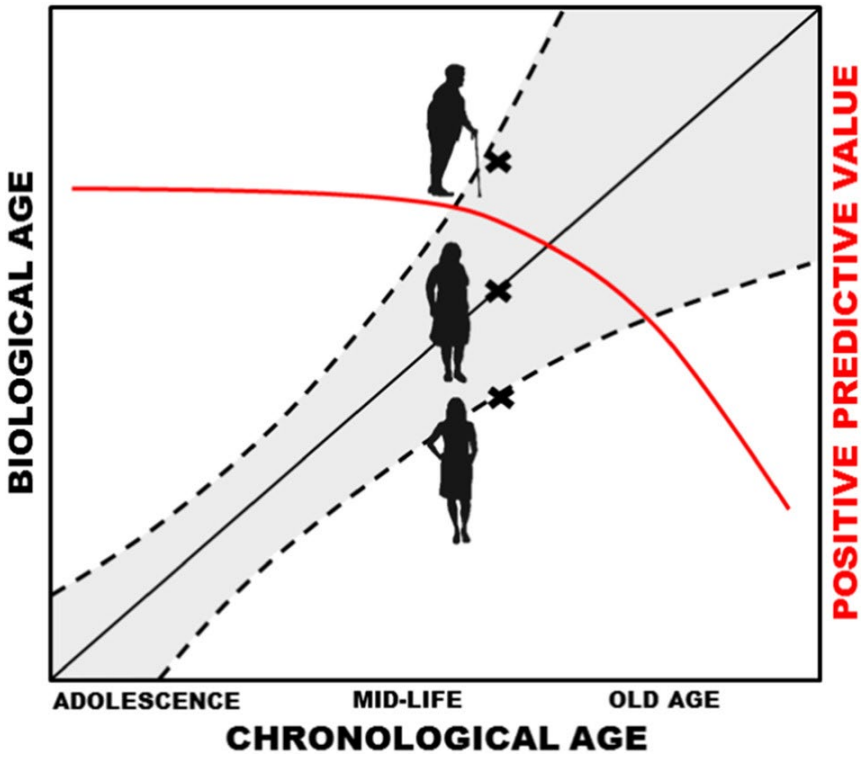


EFSA: European Food Safety Authority, NCM: Nordic Council of Ministers,
NASEM-NAM: National Academy of Science, Engineering, and Medicine (USA and Canada),
SCAN: Scientific Advisory Committee on Nutrition (United Kingdom), WHO: World Health Organization

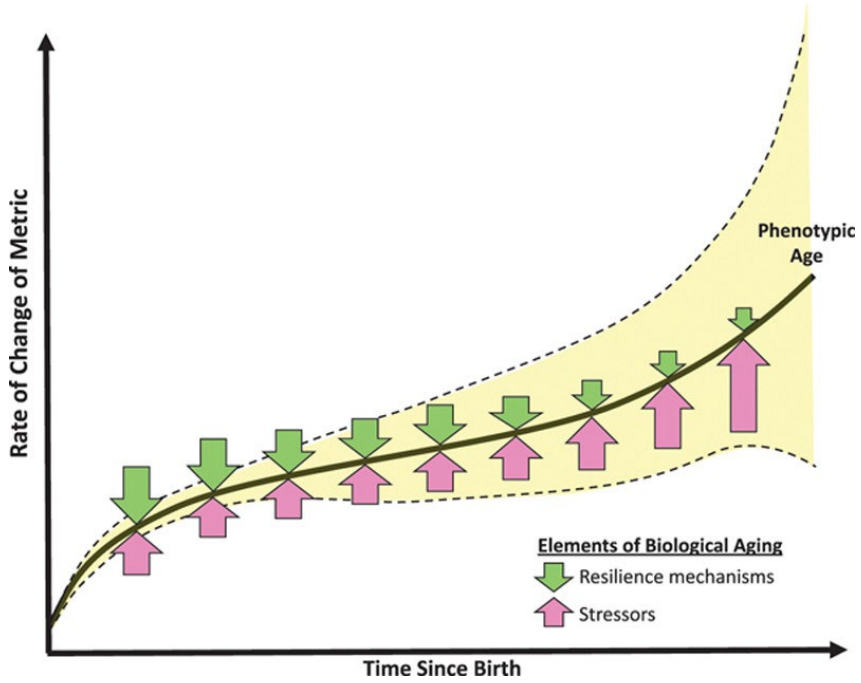
*Except as noted below

doi:10.1007/s11914-024-00893-z

Older Adults are a Heterogeneous Group.

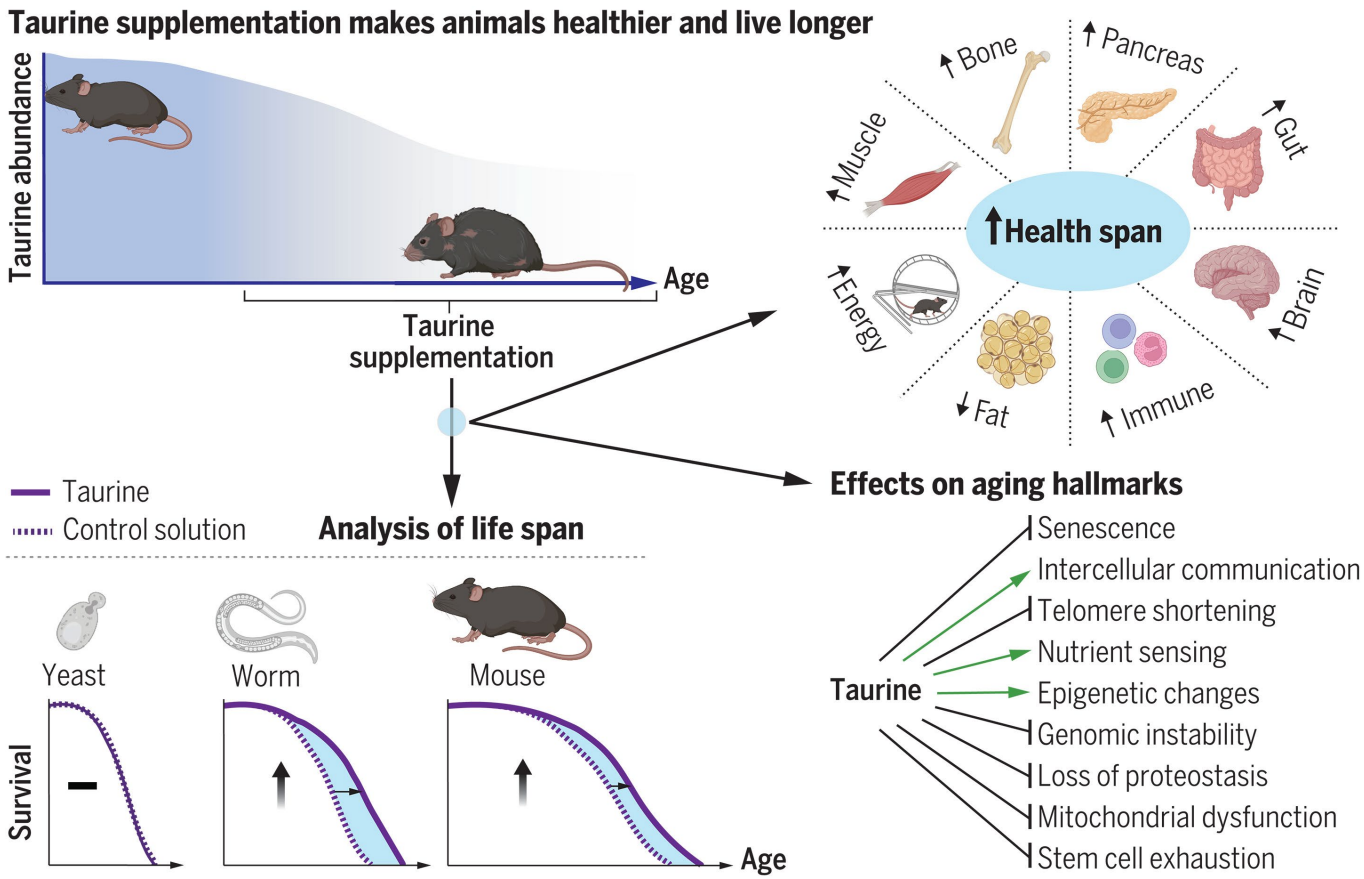


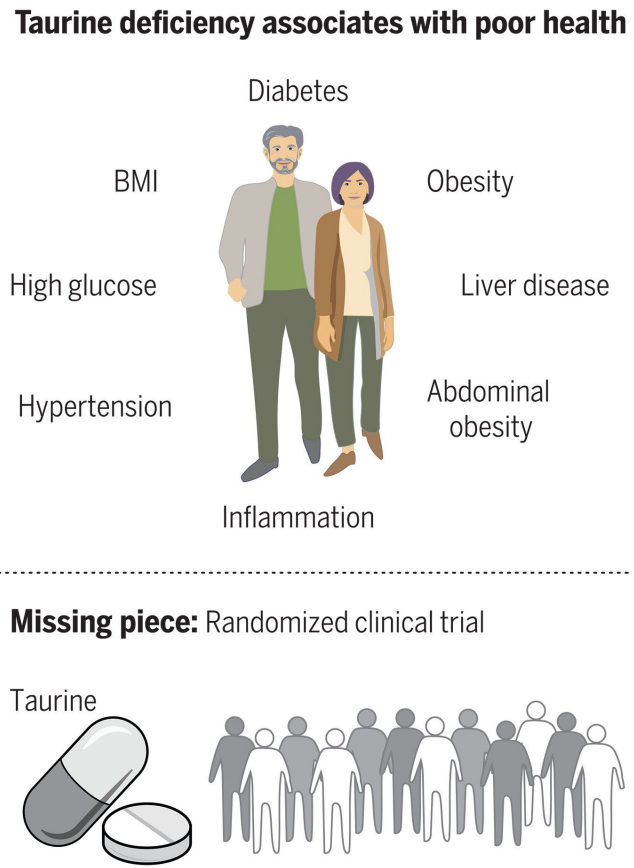
doi: 10.1016/j.ebiom.2017.03.046



doi: 10.1161/CIRCRESAHA.118.312816

Taurine Supplementation Linked with Healthy Aging.





Doi:10.1126/science.abn9257

Lower Folate Intake in Later Life Linked to Healthy Aging.

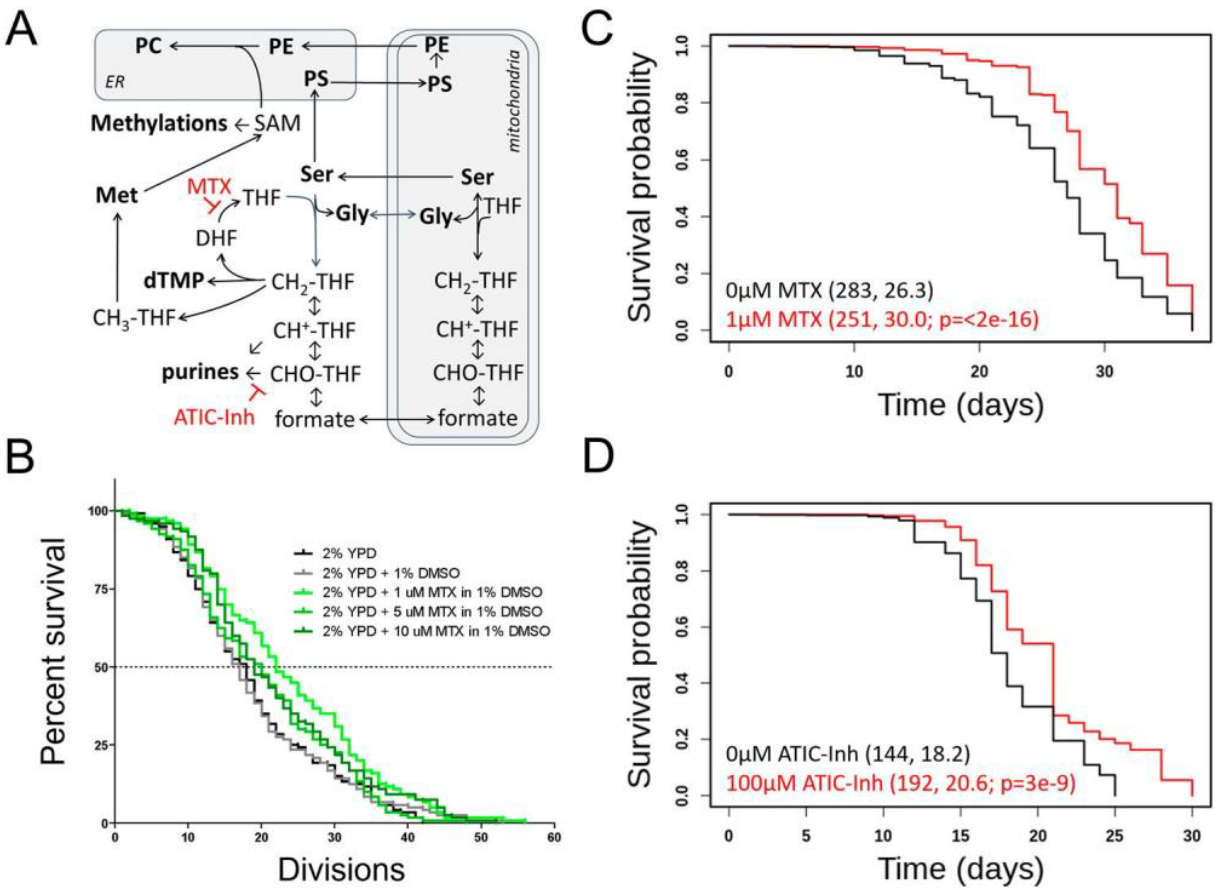
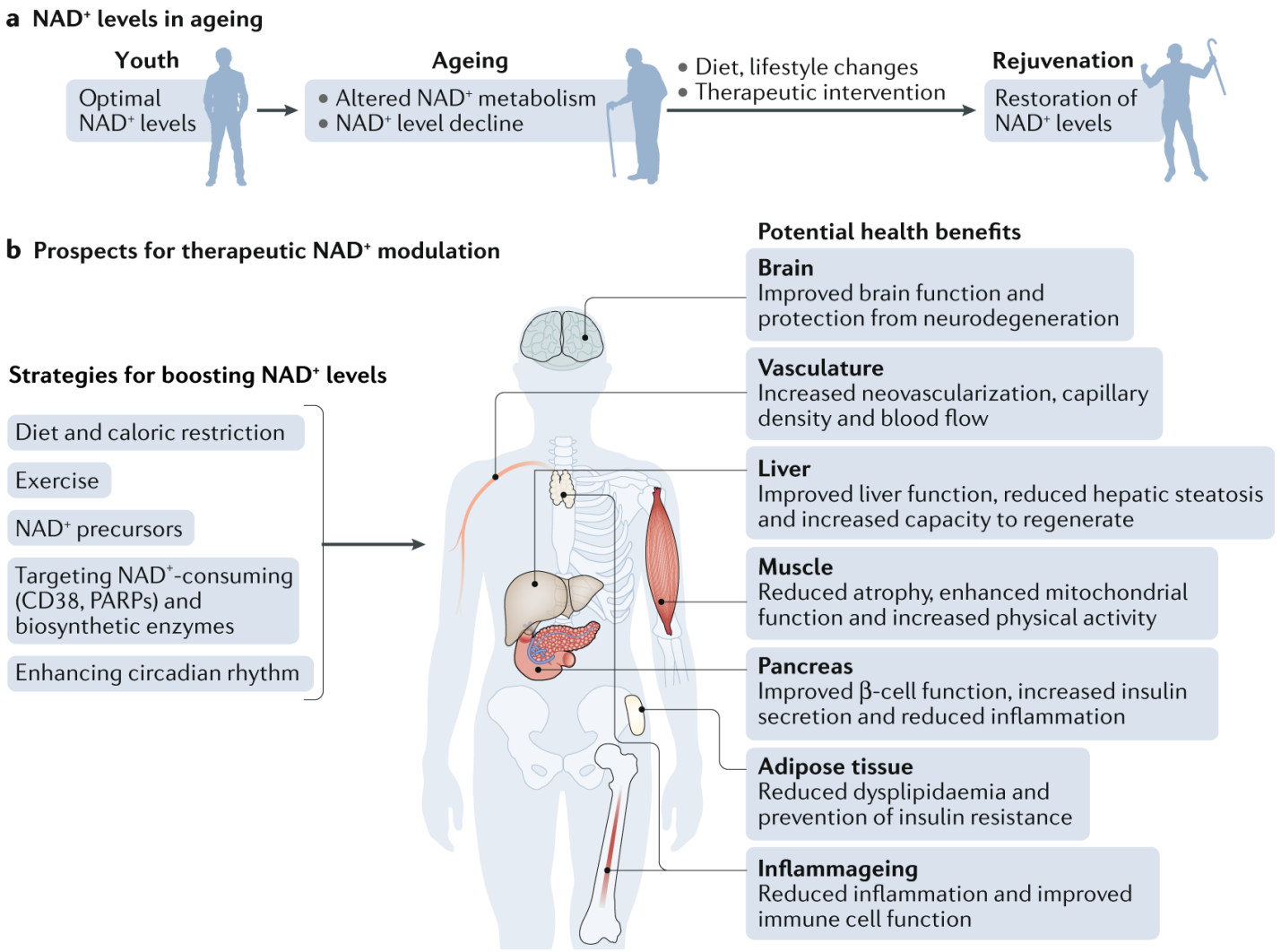


Figure 1. Inhibitors of 1C metabolism extend the lifespan of yeast and worms.

doi.org/10.26508/lsa.202402868

Restored NAD⁺ Levels and Their Impact on Healthy Aging.



Doi:10.1038.s41580-020.00313.x

Aging is Broader Than Chronic Disease Risk.

The Metrics of Aging

***Functional Aging** (impact on daily life)*

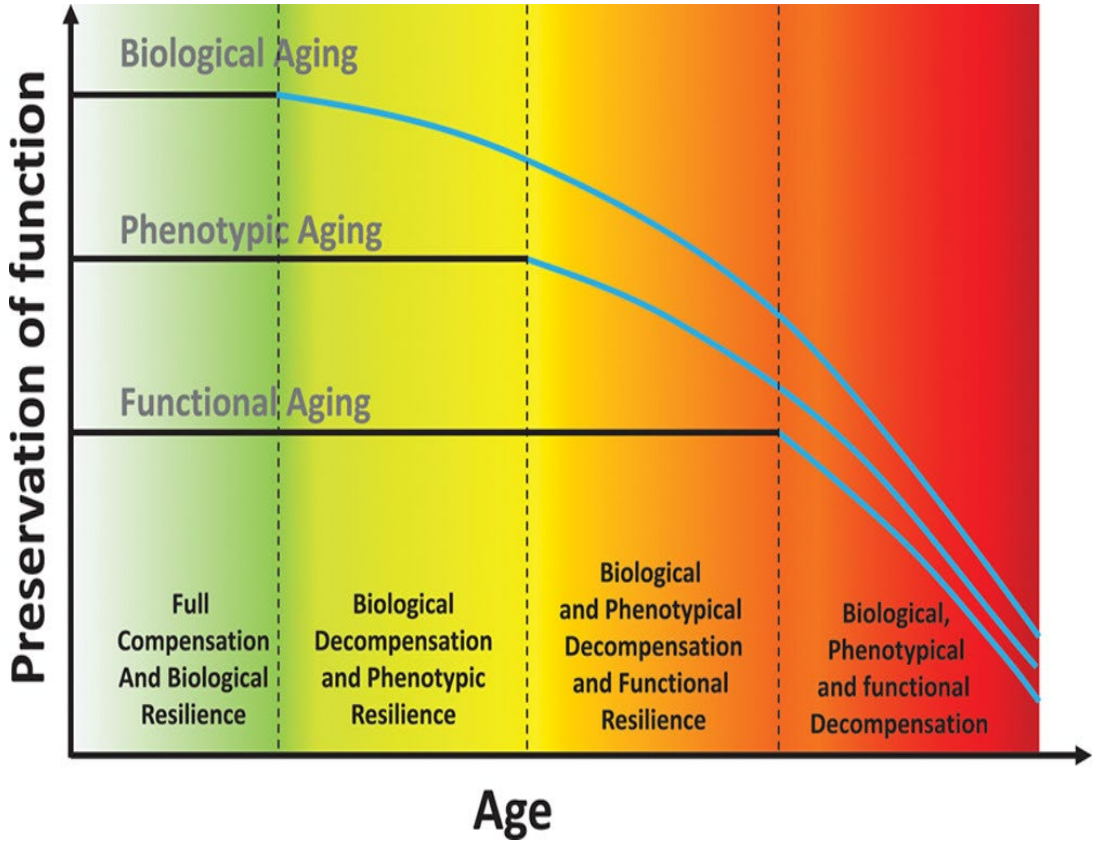
- Cognitive Function
- Physical Function
- Mood
- Mental Health

***Phenotypic Aging** (phenotypes that change)*

- Body Composition
- Energetics
- Homeostatic Mechanisms
- Brain health

***Biological Aging** (root mechanisms)*

- Molecular Damage
- Defective Repair
- Energy Exhaustion
- Signal/Noise Reduction



doi: 10.1161/CIRCRESAHA.118.312816

How does diet impact biological, phenotypical and/or functional aging?

Do dietary requirements change in older adulthood?

How important are diet changes throughout older adulthood?

Are these the questions to address?

THANK YOU

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