

CARDIAC LONGEVITY: PLANNING FOR 100 YEARS

JOEL KAHN, MD, FACC

KAHN CENTER FOR CARDIAC LONGEVITY

BINGHAM FARMS, MI

CLINICAL PROFESSOR, WAYNE STATE UNIVERISTY

Happy 969th Birthday Mr.
Methuselah.. Happy Birthday
to you.



AND THE CANDLES ON METHUSELAH'S CAKE COULD
BE SEEN FROM 7 MILES AWAY. **GE 5:25-27**

The Long Lives of Antediluvians



	Age	Birth	Death
➤ Adam	930	0	930 AC*
➤ Seth	912	130 AC	1042 AC
➤ Enos	905	235 AC	1140 AC
➤ Cainan	910	325 AC	1235 AC
➤ Mahalaleel	895	395 AC	1290 AC
➤ Jared	962	460 AC	1422 AC
➤ Enoch	365	622 AC	Missing
➤ Methuselah	969	687 AC	1656 AC
➤ Lamech	777	874 AC	1651 AC
➤ Noah	950	1056 AC	2006 AC

*After Creation



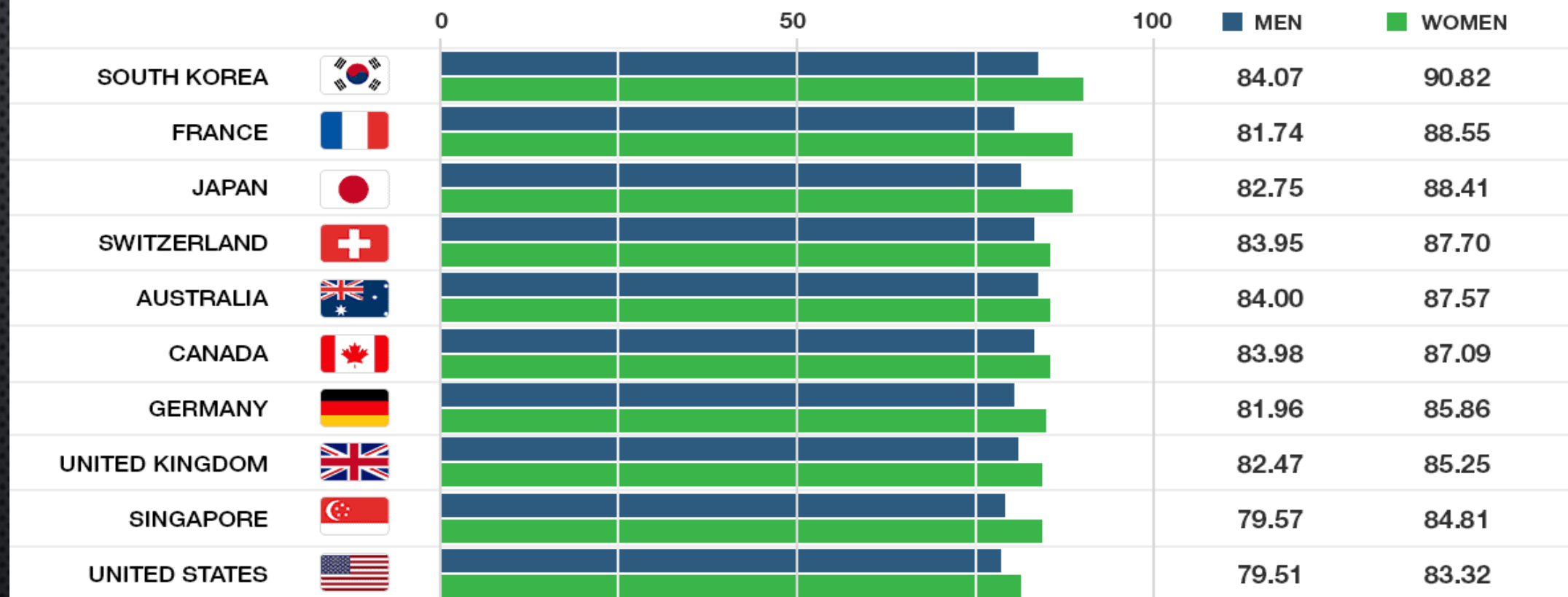
God's Healing Plants

Then God said, "I give you every seed-bearing plant on the face of the whole earth and every tree that has fruit with seed in it. They will be yours for food."

Genesis 1:29

Projected US Life Expectancy Compared With Other Rich Nations

Average life expectancy at birth by 2030 (in years)



Source: Statista chart: 8286

JEANNE CALMENT 122 YEARS OLD





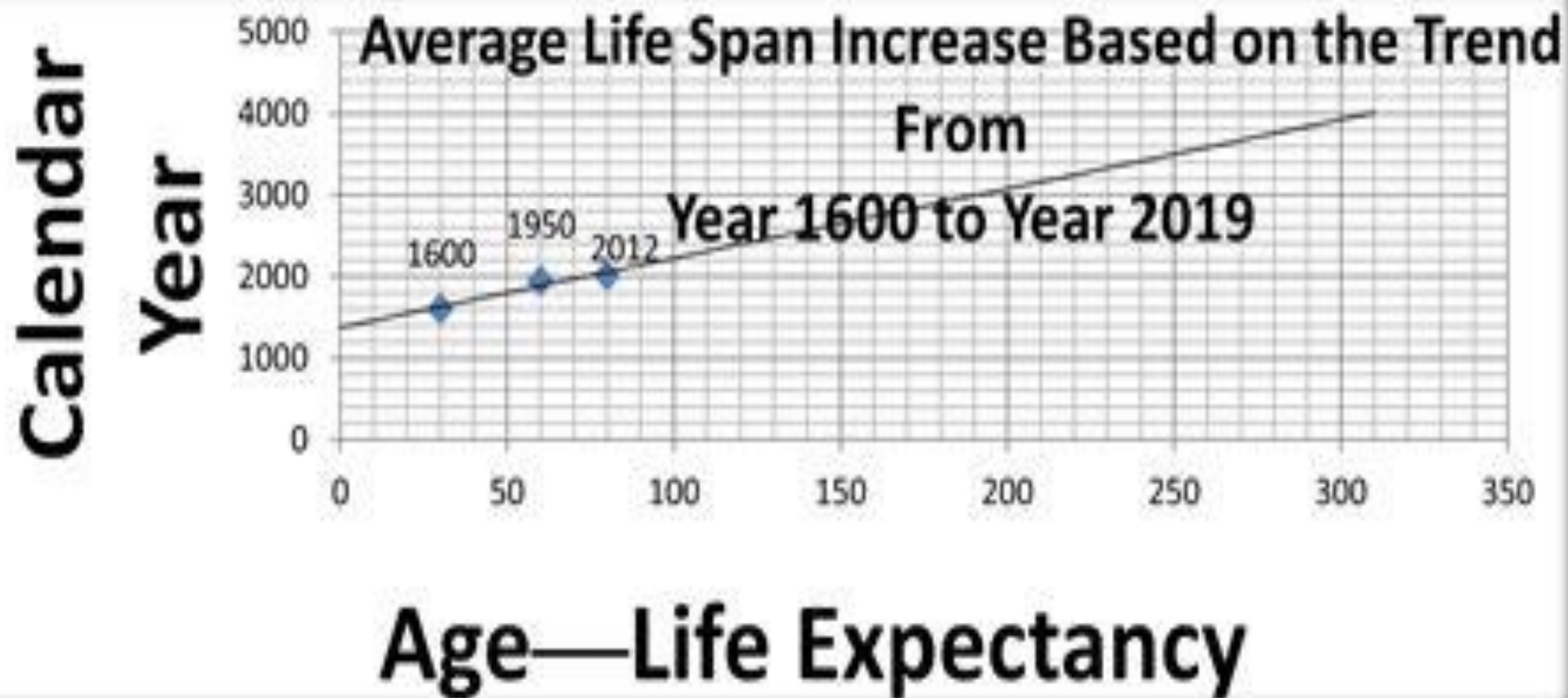
I only have one wrinkle and I'm
sitting on it.

— *Jeanne Calment* —

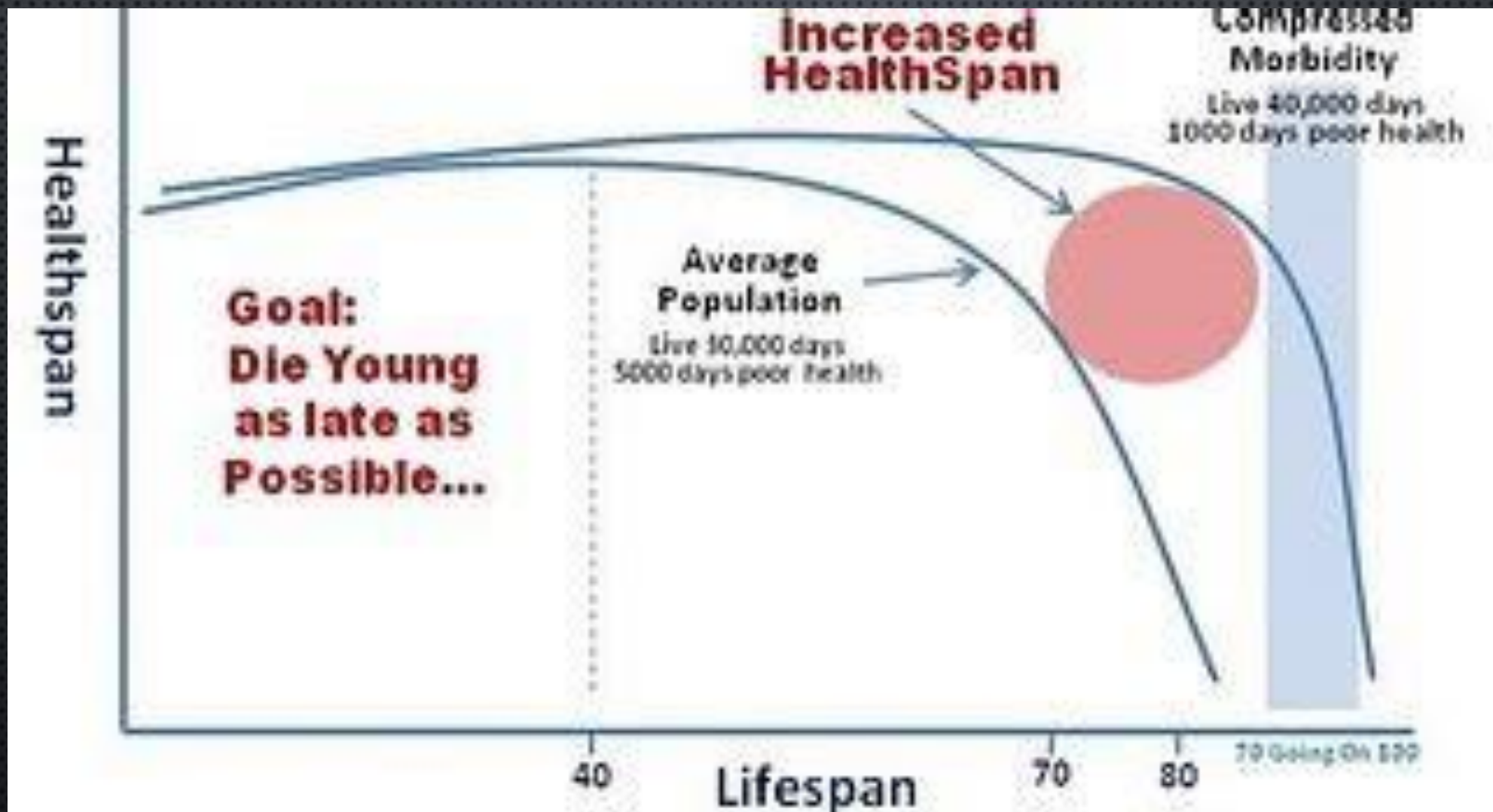
AZ QUOTES

HOW LONG CAN WE LIVE?

WANT TO LIVE?



LIFESPAN VERSUS HEALTHSPAN



LIVE 10 MORE HEALTHY YEARS....

uploaded in HD @ TunesToTube.com

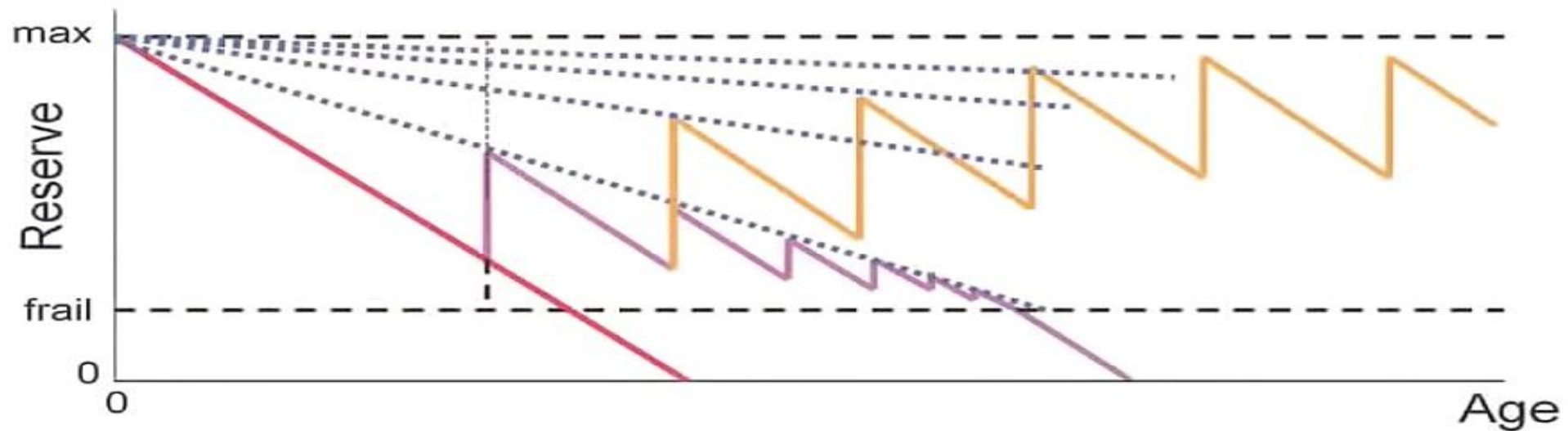


**"IT'S QUITE LIKELY THAT THE
FIRST PERSON TO LIVE TO A
THOUSAND YEARS IS ALREADY
IN THEIR 40S OR 50S"**

AUBREY DE GREY
CHIEF SCIENCE OFFICER AT SENS RESEARCH FOUNDATION

LONGEVITY ESCAPE VELOCITY

Progress avoids diminishing returns



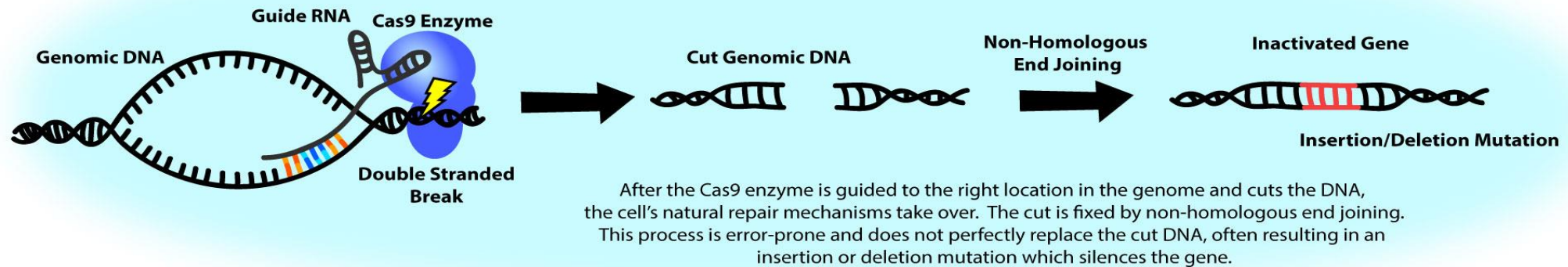
Fixing half the damage, then $\frac{3}{4}$, then $\frac{7}{8}$, ...

(a) outpaces the so-far-unfixable damage, and

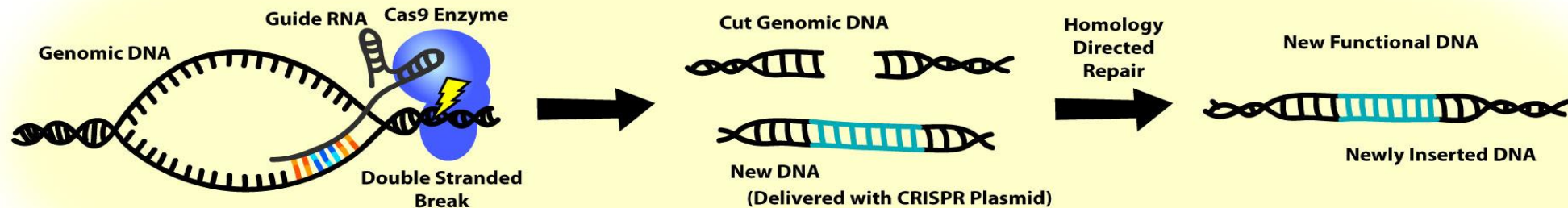
(b) maintains healthspan indefinitely.

THE FUTURE IS NEAR AND BRIGHT

Gene Silencing with CRISPR



Gene Insertion with CRISPR



To insert a gene, the new gene is added into the original CRISPR plasmid. It is designed to line up perfectly with the cut DNA strands, so the cell uses a different technique, homology directed repair, to incorporate a new stretch of DNA into the genome.

By 2030, CRISPR has the potential to cure these 13 diseases.

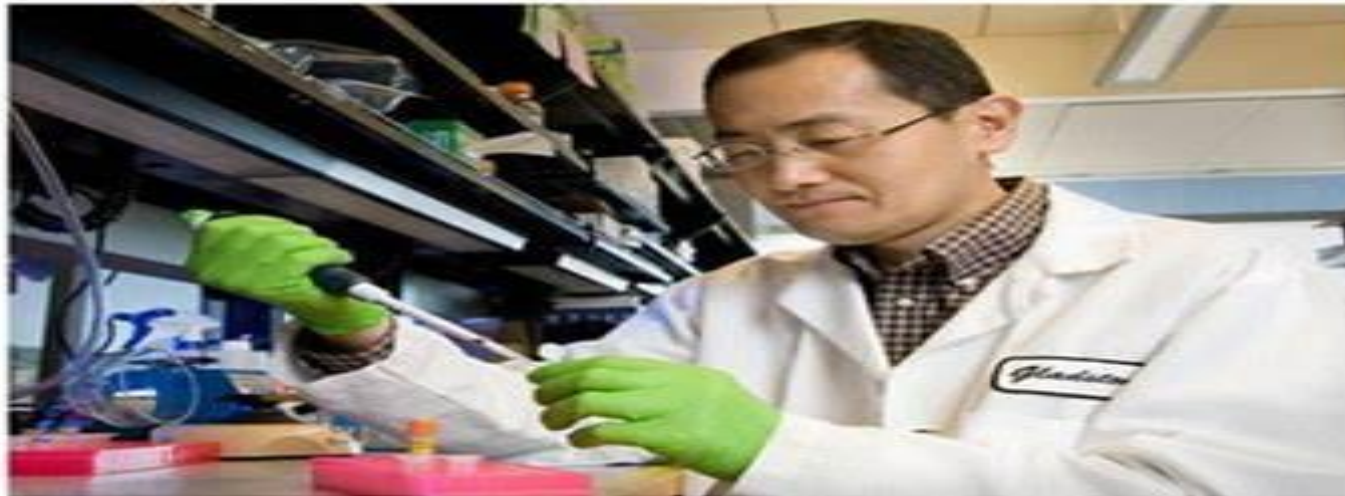


DUCHENNE MUSCULAR DYSTROPHY
SICKLE CELL DISEASE
BETA THALASSEMIA
HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION
ALZHEIMER'S DISEASE
HUNTINGTON'S DISEASE
AUTISM SPECTRUM DISORDER
RETINITIS PIGMENTOSA
SPECIFIC (BIALLELIC RPE65 MUTATION-ASSOCIATED) RETINAL
DYSTROPHY
LEBER CONGENITAL AMAUROSIS
LUNG AND ESOPHAGEAL CANCERS
B-CELL ACUTE LYMPHOBLASTIC LEUKEMIA
CERVICAL CANCER

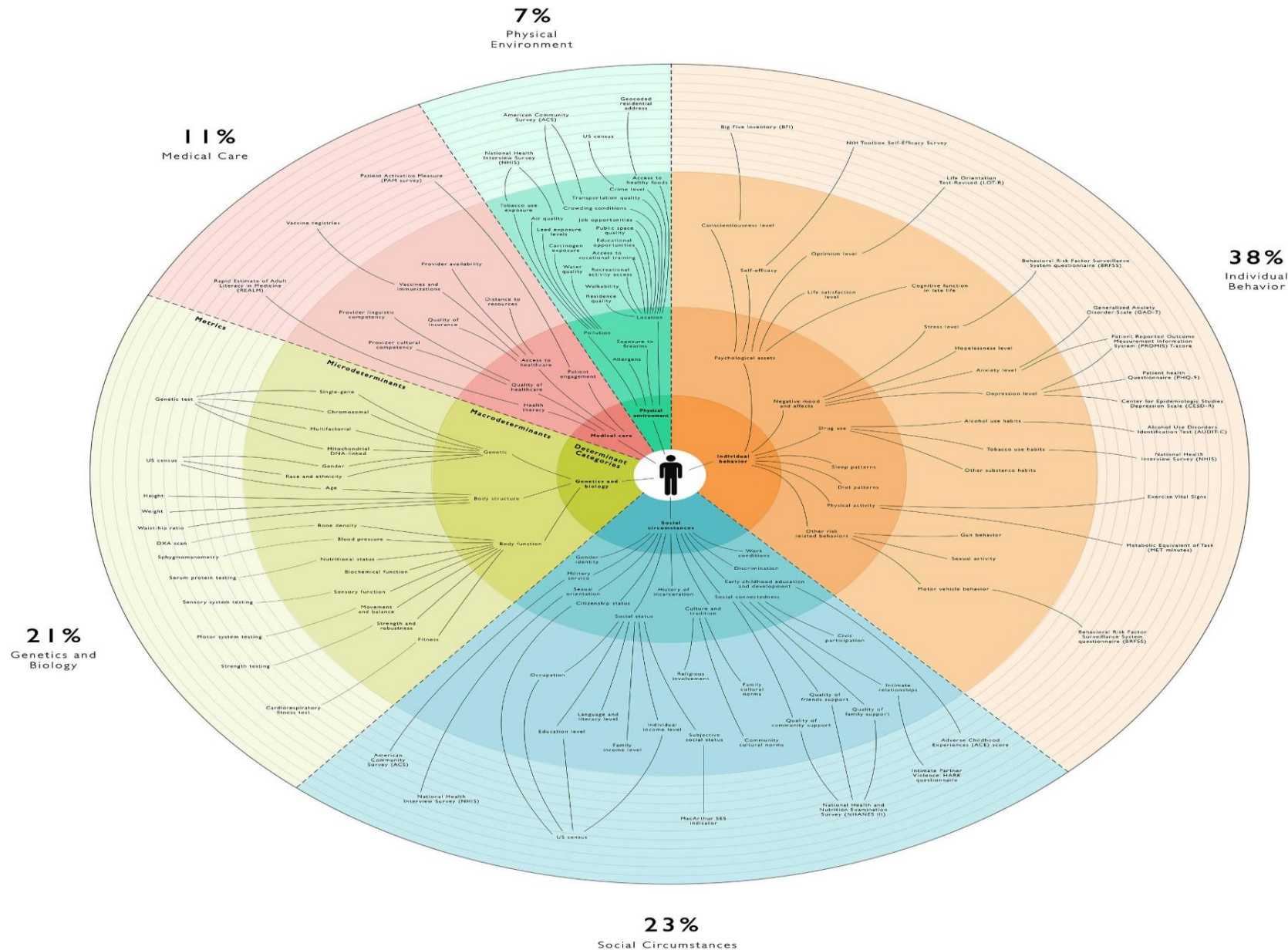
YAMANAKA FACTORS

Shinya Yamanaka Wins 2012 Nobel Prize in Medicine

Gladstone and UCSF Scientist
Recognized for Stem Cell Discovery

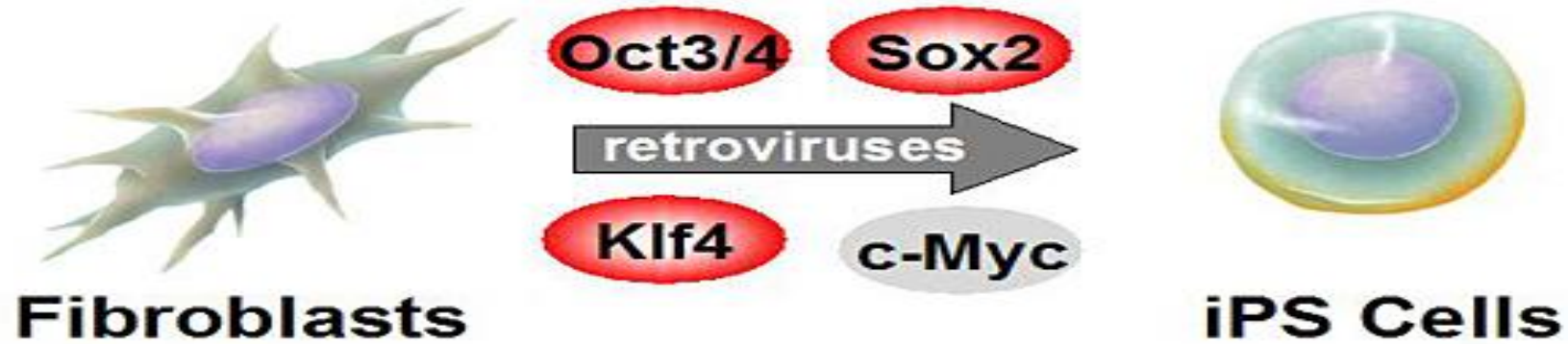


DETERMINANTS OF HEALTH: GENETIC 21%



IPS

Induced Pluripotent Stem (iPS) Cells



Mouse iPS cells reported in 2006

Human iPS cells reported in 2007

GENES AND LONGEVITY OF LIFESPAN

- AGING IS A COMPLEX PROCESS INDICATED BY LOW ENERGY LEVELS, DECLINED PHYSIOLOGICAL ACTIVITY, STRESS INDUCED LOSS OF HOMEOSTASIS LEADING TO THE RISK OF DISEASES AND MORTALITY. SEVERAL ENVIRONMENTAL AND PHYSIOLOGICAL FACTORS CONTRIBUTE TO THE AGING PROCESS. HOWEVER, ABOUT 40% HUMAN LIFE EXPECTANCY IS INHERITED AMONG GENERATIONS, MANY LIFESPAN ASSOCIATED GENES, GENETIC MECHANISMS AND PATHWAYS HAVE BEEN DEMONSTRATED DURING LAST DECADES.
- [INT J MOL SCI.](#) 2022 FEB; 23(3): 1499.

BE THE CEO OF YOUR OWN HEALTH

**"You Are The
CEO
Of Your Own
LIFE
start making executive
decisions Today!"**

Stephen Luke

DON'T DIET OF HEART DISEASE: KNOW YOUR ARTERIAL AGE



**EVERY
40 SECONDS**

someone in the US has a **heart attack**.

THOMAS SYDENHAM, MD

1624-1689

**A MAN IS AS OLD
AS HIS
ARTERIES.**

QUOTEHD.COM

Thomas Sydenham
English Scientist

CAROTID INTIMAL MEDIAL THICKNESS ULTRASOUND: CIMT

Carotid Intima Media Thickness (CIMT)

- Direct *in vivo* measurement of thickness of carotid artery wall by B-mode ultrasound
- Vessel wall thickness correlates with status of atherosclerosis and CV events
- Atherosclerosis is a systemic disorder
 - Atherosclerosis in the carotid artery is predictive of disease in other vascular beds



CIMT ARTERIAL AGE

Current and Previous CIMT Measurements

	Date	Age	Arterial Age	CIMT	Percentile
●	Aug 2018	61	52	0.677	35th
●	Aug 2017	60	60	0.756	52nd
●	Dec 2016	59	65	0.806	67th

Mean Distal 1 cm CCA IMT of General Population with No Coronary Heart History



CORONARY ARTERY CALCIUM SCORE: CT

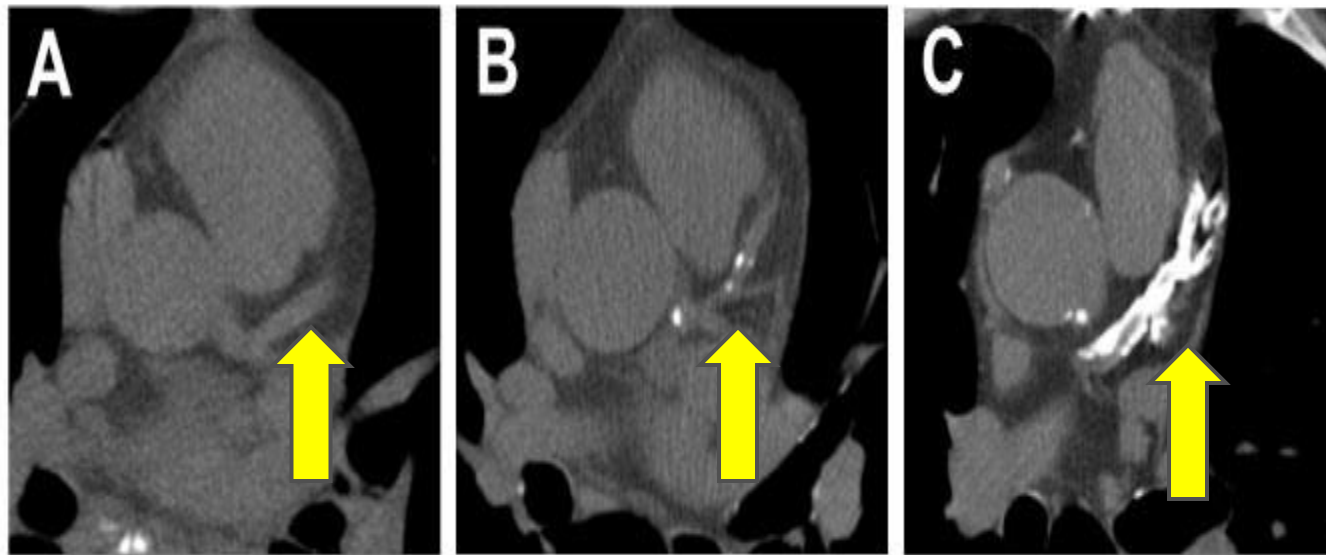
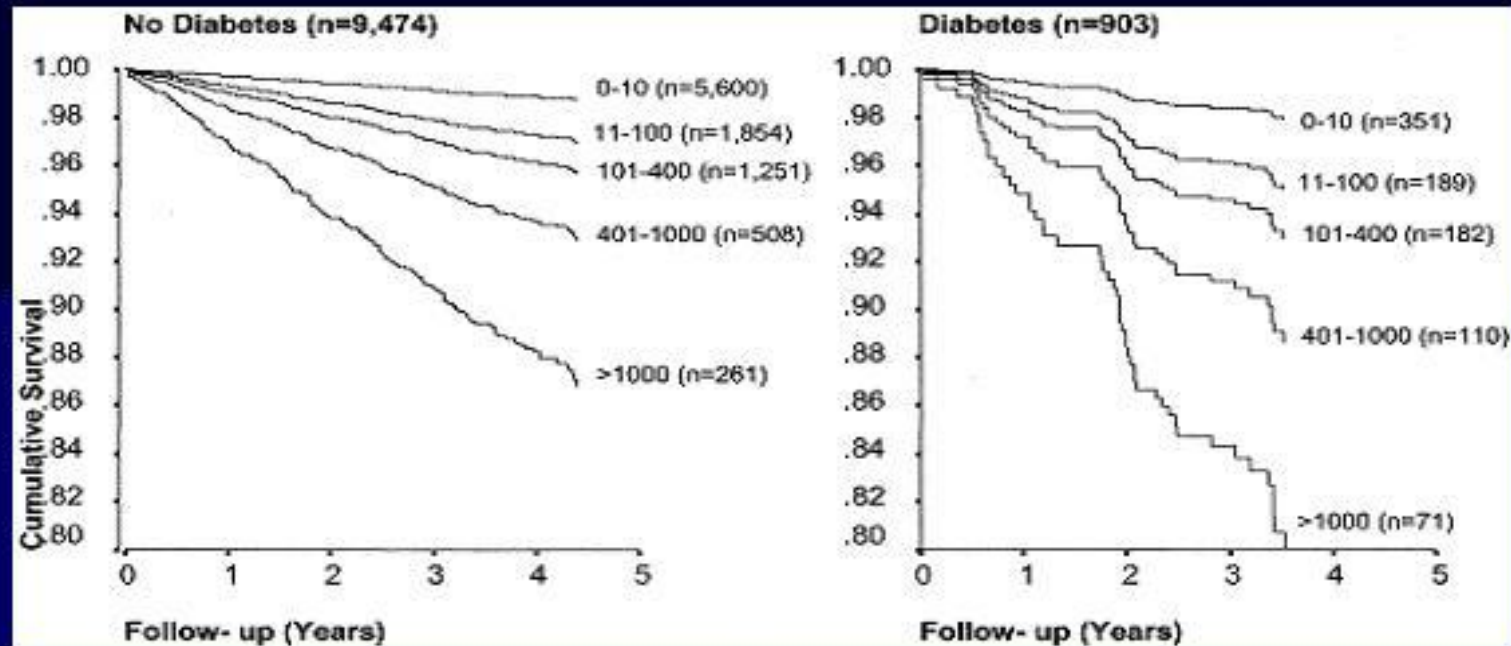


Figure 1 - Images illustrating the coronary artery calcium score of three patients with increasing calcification grades in the territory of the anterior descending artery: A. no calcification; B. mild calcification; C. severe calcification.

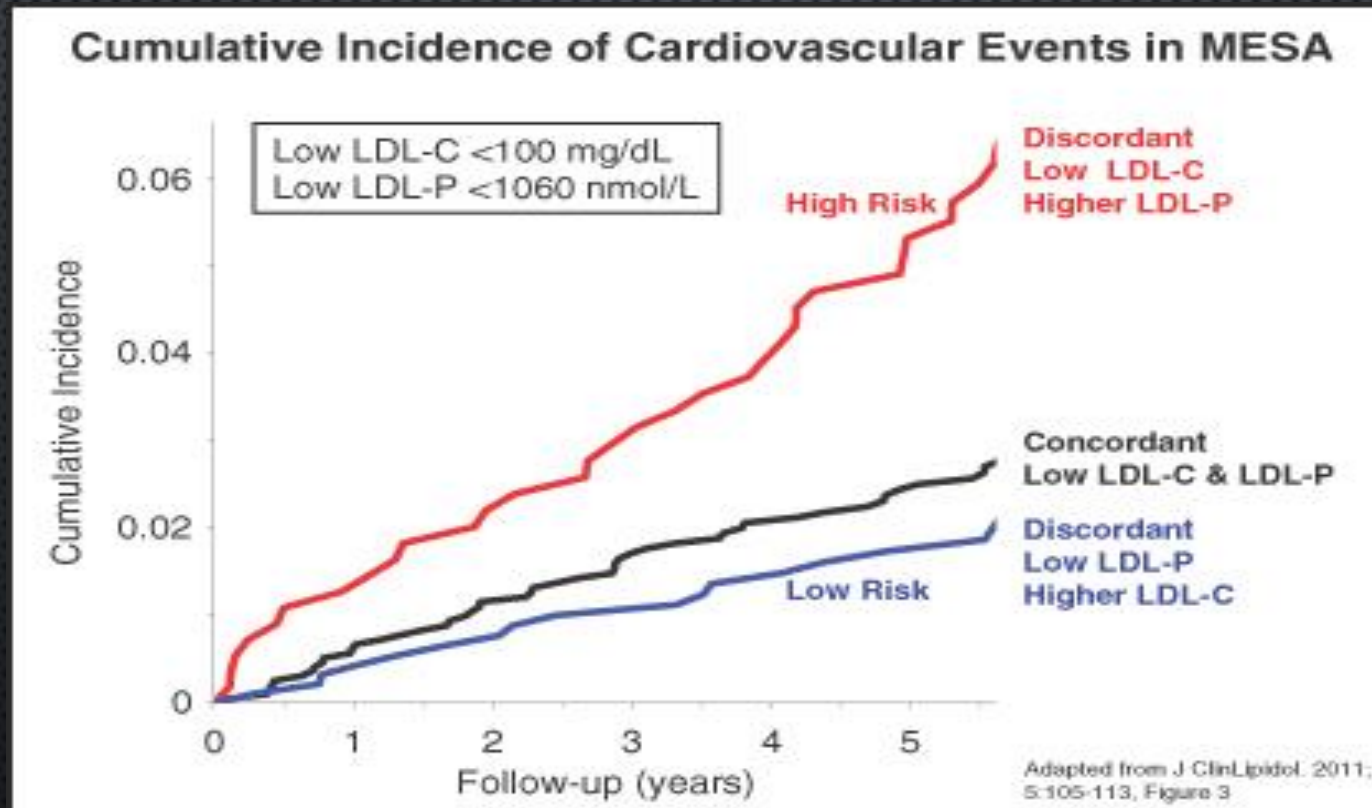
CACS MATTERS

Coronary Artery Calcium Imaging predicts All Cause Mortality: Observational study

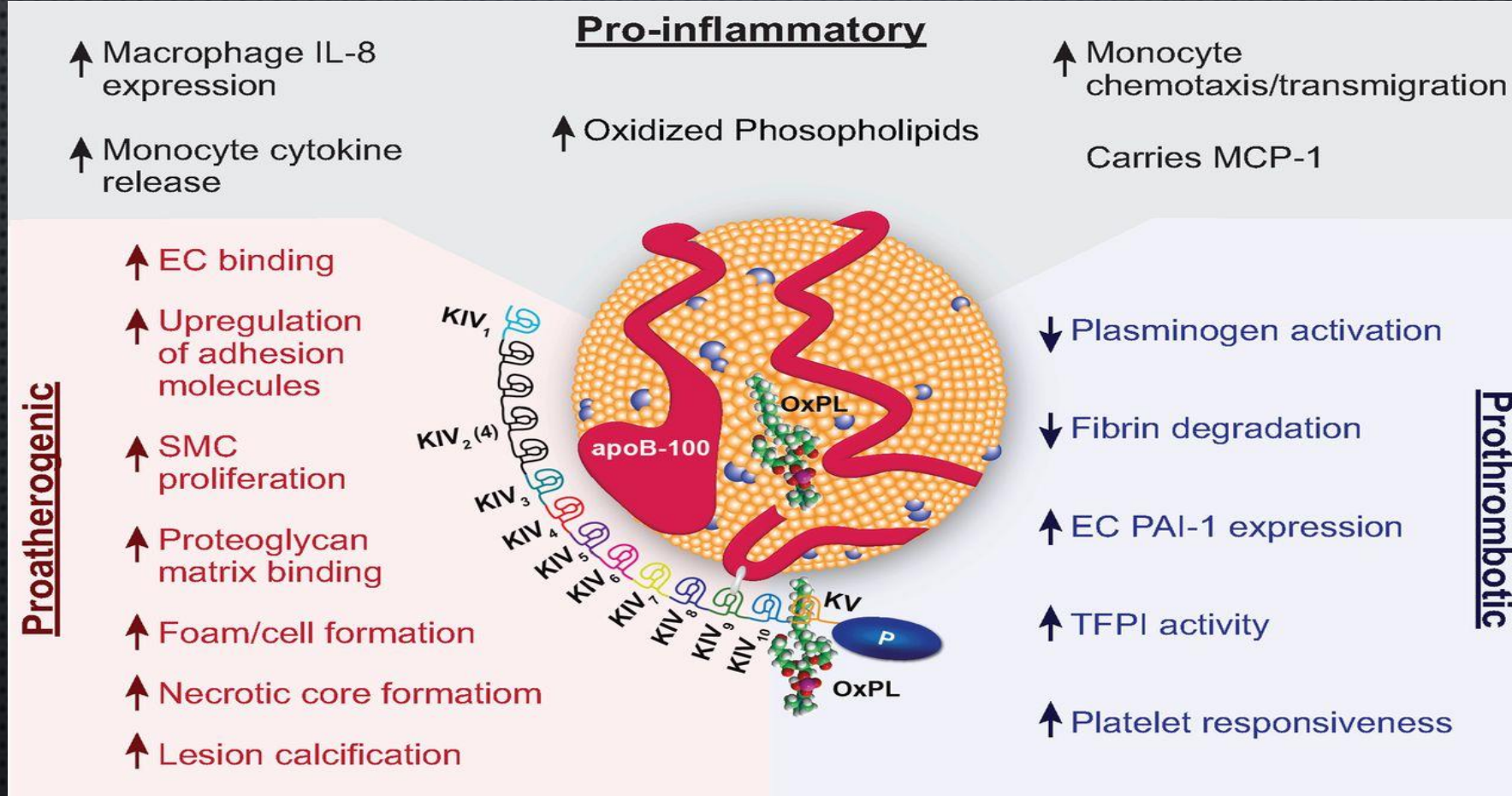


Raggi et al, JACC 2004; 43: 1663-69

ADVANCED LABS: LDL-PARTICLE NUMBER



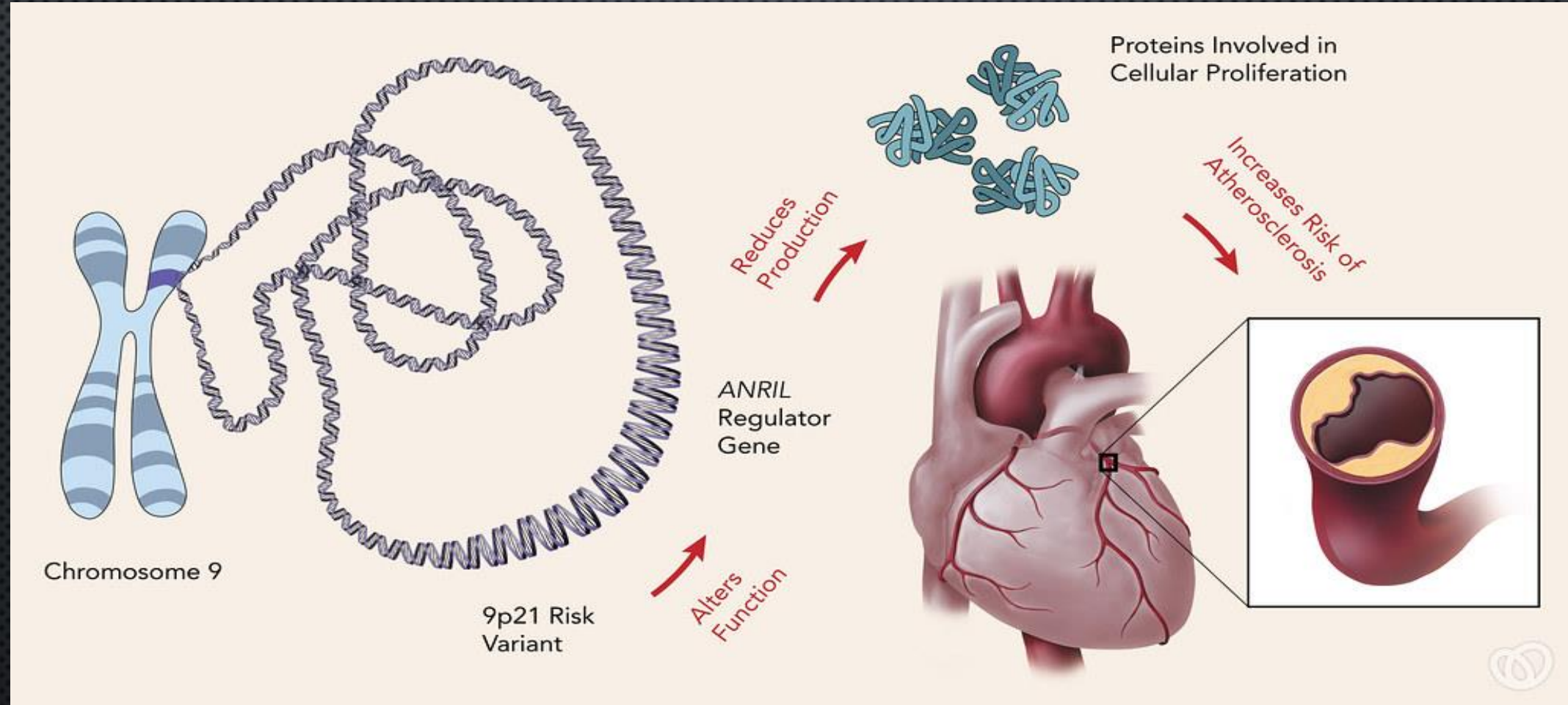
ADVANCED LABS: LIPOPROTEIN(A)

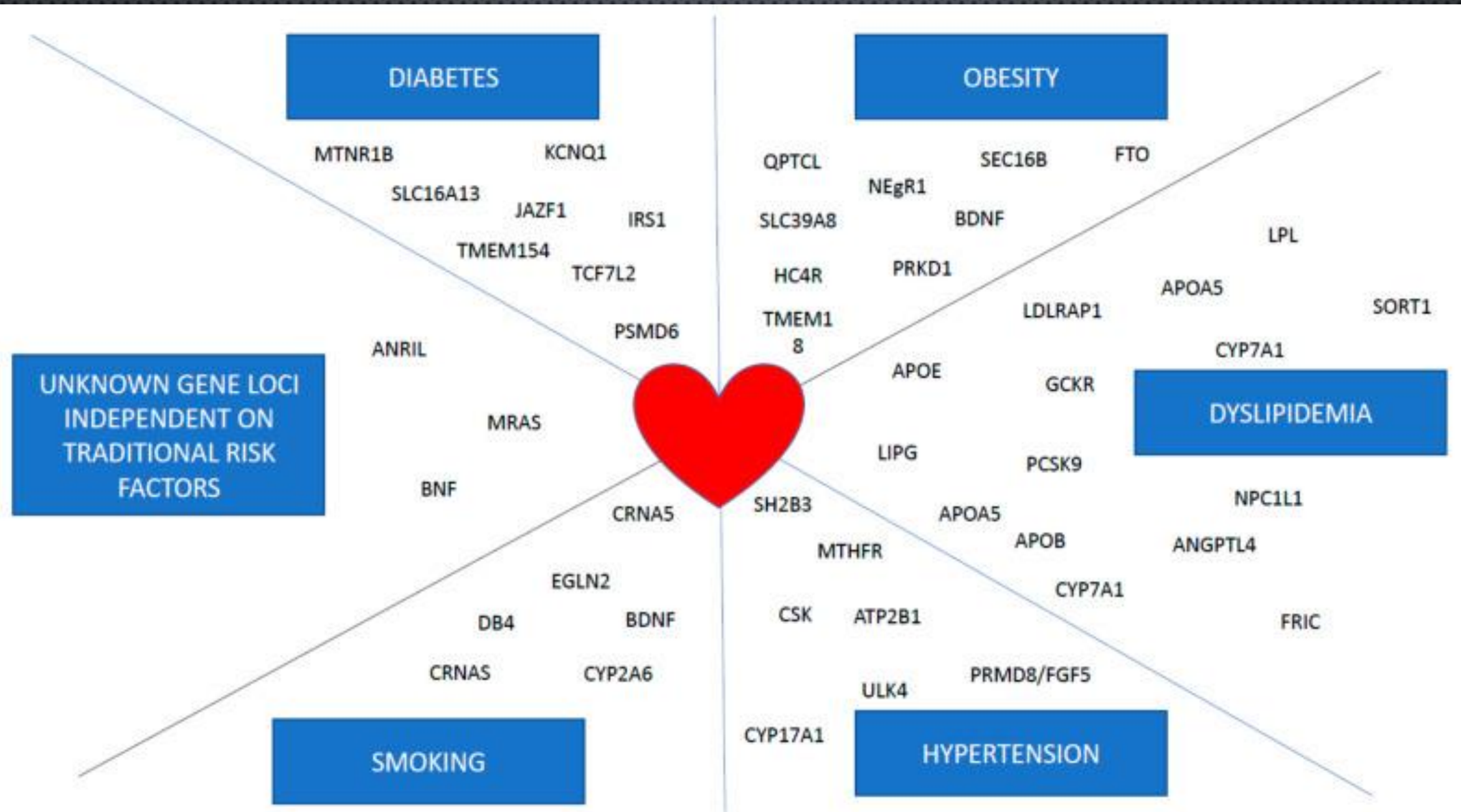


INTEGRATIVE PRIORITIZATION OF CAUSAL GENES FOR CORONARY ARTERY DISEASE

- WE IDENTIFIED 162 UNIQUE CANDIDATE CAUSAL CAD GENES
- WHEN THEIR CAUSAL EFFECT WAS RANKED, THE TOP CANDIDATE CAUSAL CAD GENES WERE *CDKN2B* (ASSOCIATED WITH THE 9P21.3 RISK LOCUS) AND *PHACTR1*; BOTH EXERTING THEIR CAUSAL EFFECT IN THE ARTERIAL WALL.
- CIRCULATION GENOMIC AND PRECISION MEDICINE VOLUME 15, ISSUE 1, FEBRUARY 2022; PAGE E003365

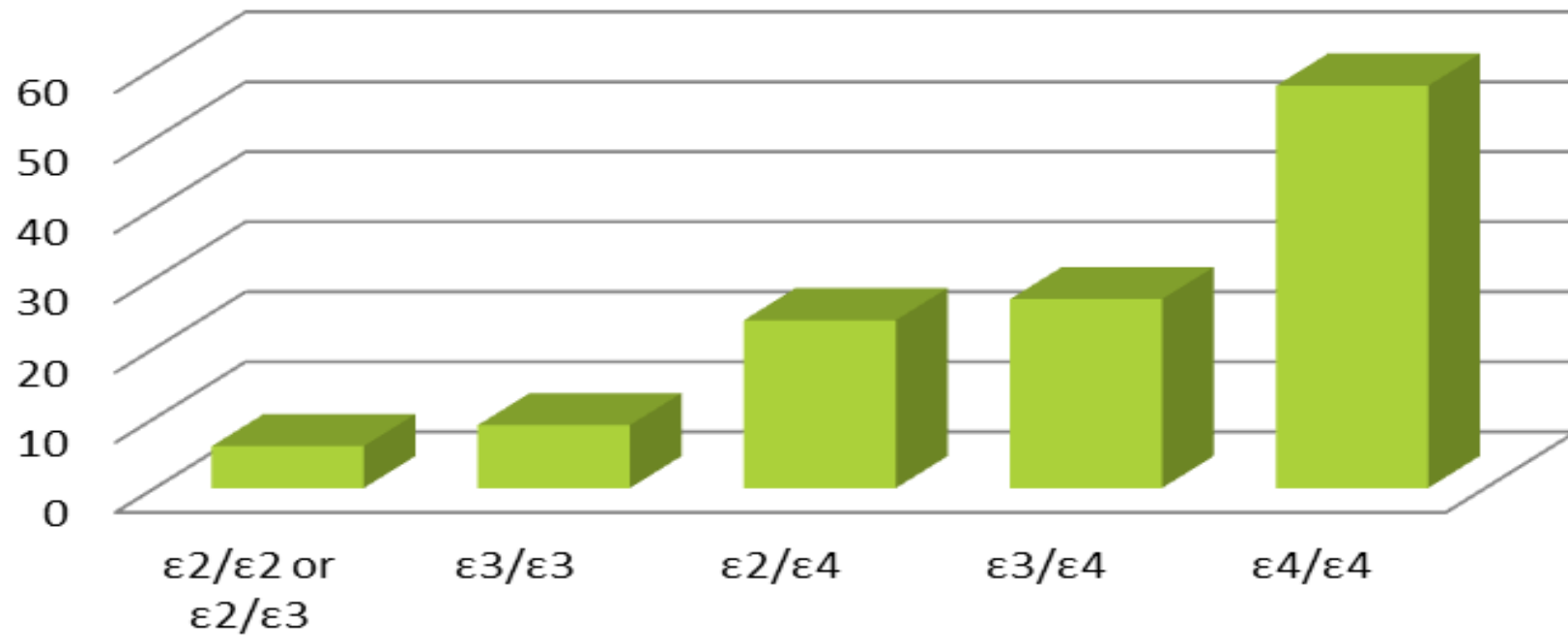
LABS: 9P21 GENE





LABS: APOE4

Approximate Lifetime Risk (%) of Alzheimer's Disease Based on ApoE Genotype*



HEAVY METALS BLOOD DRAW



NEW CANCER SCREENING BLOOD PANEL: GALLERI

 **Galleri**



**Expected LDT
Launch 2021**

1

Required Blood Draws

43%

Positive Predictive Value (modeled)

44%

Sensitivity for All Cancers (Stages 1-3)¹

50+

Cancers Detected

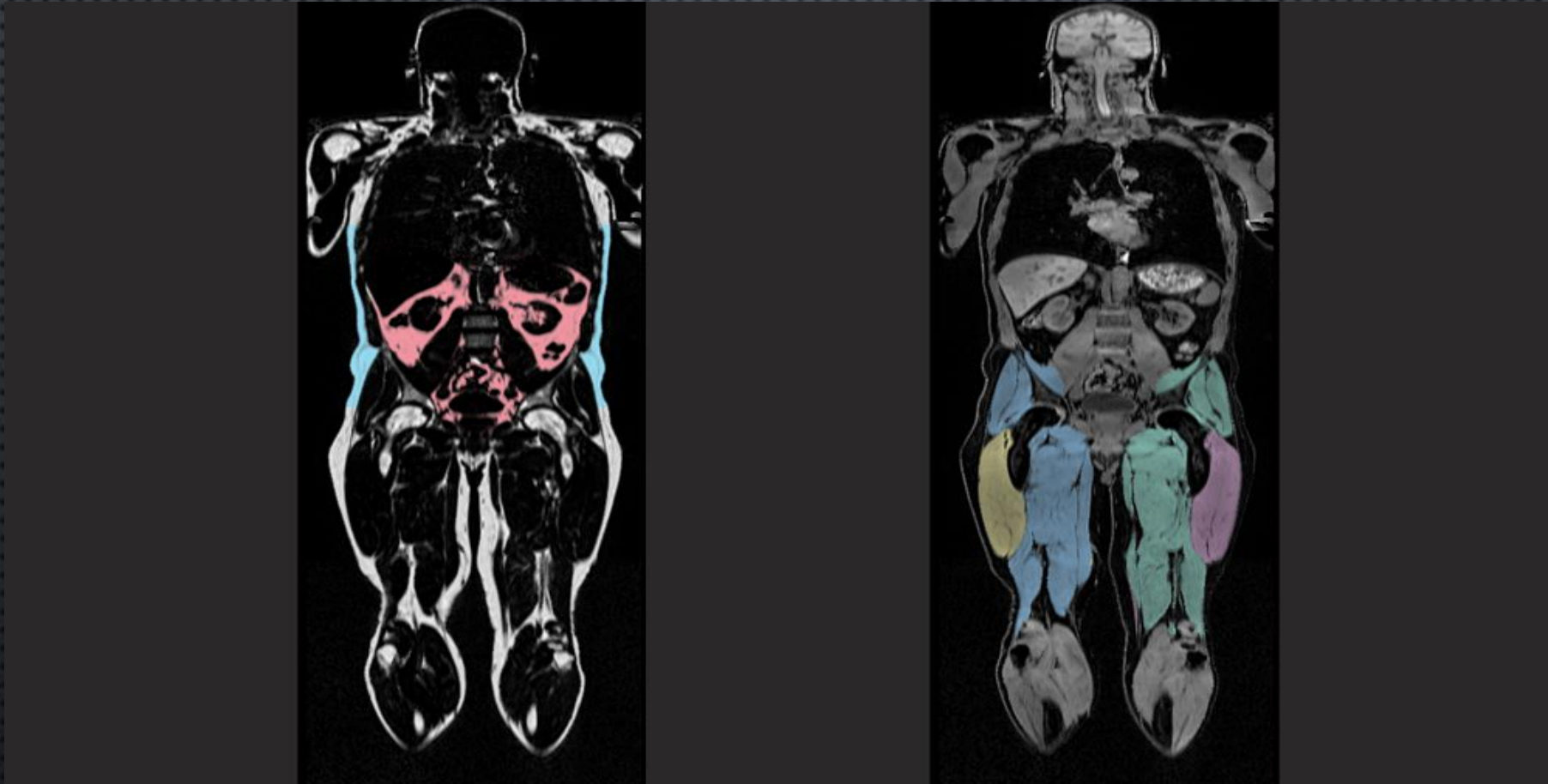
93%

Tissue of Origin Accuracy

>99%

Specificity

TOTAL BODY MRI NON-CONTRAST



BRAIN VOLUME QUANTIFICATION



HOME SLEEP STUDIES FOR APNEA



LIFESTYLE AND LONGEVITY

- RESEARCHERS FROM THE HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH CONDUCTED A MASSIVE STUDY OF THE IMPACT OF HEALTH HABITS ON LIFE EXPECTANCY, USING DATA FROM THE WELL-KNOWN NURSES' HEALTH STUDY (NHS) AND THE HEALTH PROFESSIONALS FOLLOW-UP STUDY (HPFS).
- THE NHS INCLUDED OVER 78,000 WOMEN AND FOLLOWED THEM FROM 1980 TO 2014. THE HPFS INCLUDED OVER 40,000 MEN AND FOLLOWED THEM FROM 1986 TO 2014.
- THIS IS OVER 120,000 PARTICIPANTS, 34 YEARS OF DATA FOR WOMEN, AND 28 YEARS OF DATA FOR MEN.
- CIRCULATION VOLUME 138, ISSUE 4, 24 JULY 2018; PAGES 345-355

LIFESTYLE AND LONGEVITY

HEALTHY LIFESTYLE AT AGE 50 ADDS 12-14 YRS

- **EAT A HEALTHY DIET**
- **EXERCISE 30 MINUTES OR MORE A DAY**
- **MAINTAIN A HEALTHY WEIGHT, SPECIFICALLY,
A HEALTHY BODY MASS INDEX)**
- **DON'T DRINK TOO MUCH ALCOHOL, WHICH
MEANS NO MORE THAN ONE 5 OZ GLASS OF
WINE A DAY FOR WOMEN, AND TWO FOR MEN**
- **NEVER SMOKE**

THREE TOP FOODS FOR LIFE EXPECTANCY

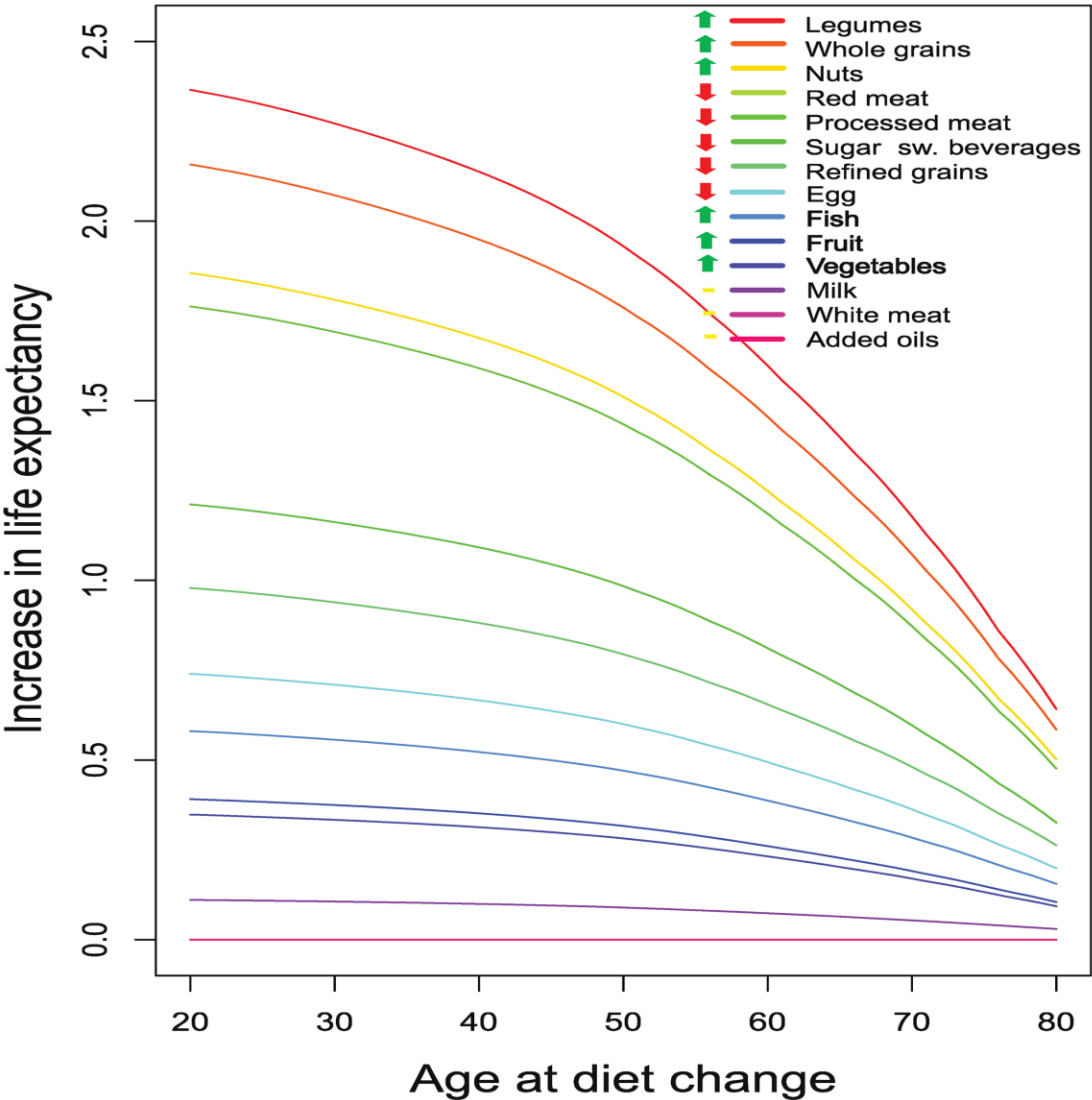


CELEBRATING 20 YEARS
OF COLLABORATION AND INNOVATION

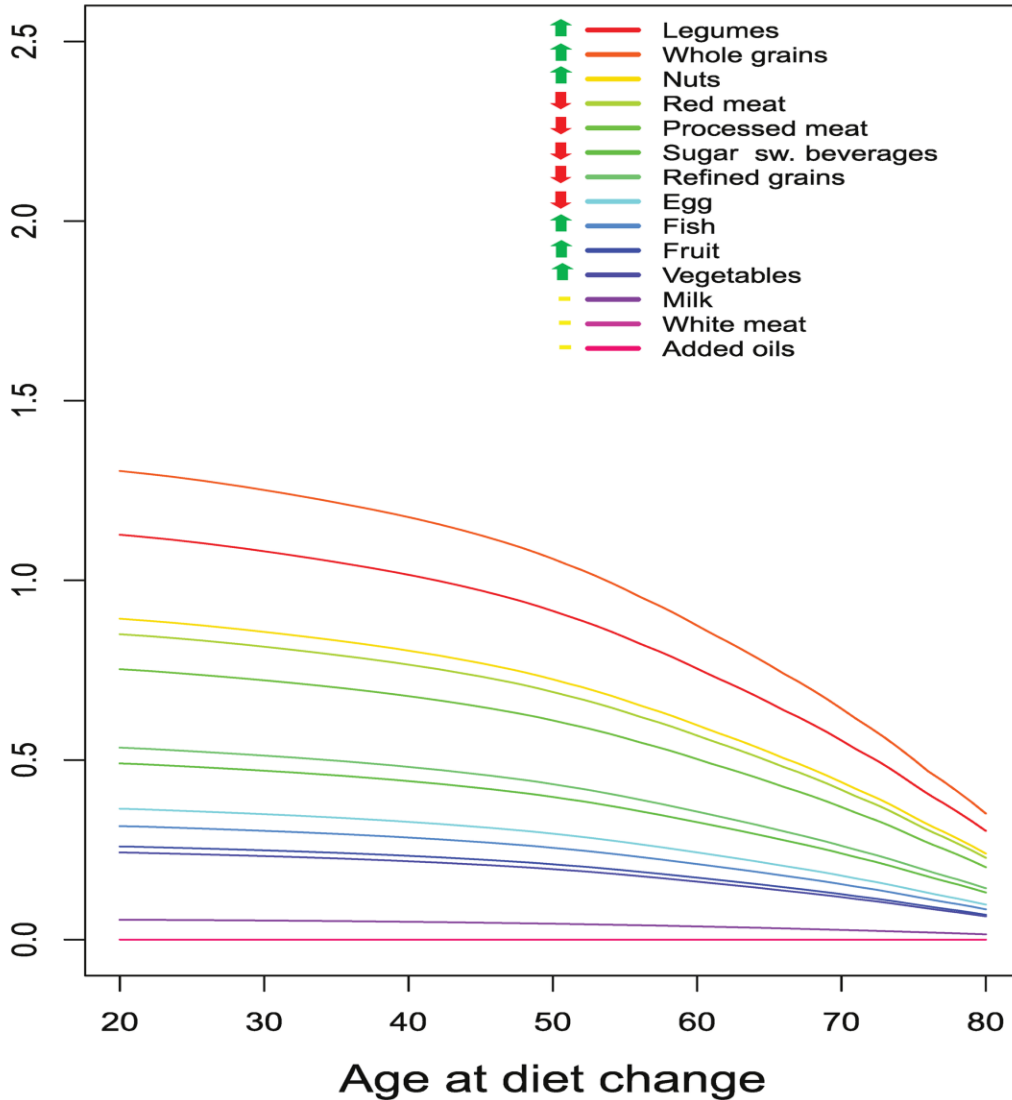
ESTIMATING IMPACT OF FOOD CHOICES ON LIFE EXPECTANCY: A MODELING STUDY

- THE LARGEST GAINS WOULD BE MADE BY EATING MORE: LEGUMES (FEMALES: 2.2, MALES: 2.5)
- WHOLE GRAINS (FEMALES: 2.0, MALES: 2.3)
- NUTS (FEMALES: 1.7 MALES: 2.0)
- LESS RED MEAT (FEMALES: 1.6 MALES: 1.9) AND LESS PROCESSED MEAT FEMALES: 1.6 MALES: 1.9

Optimal diet



Feasible diet



BLUE ZONES



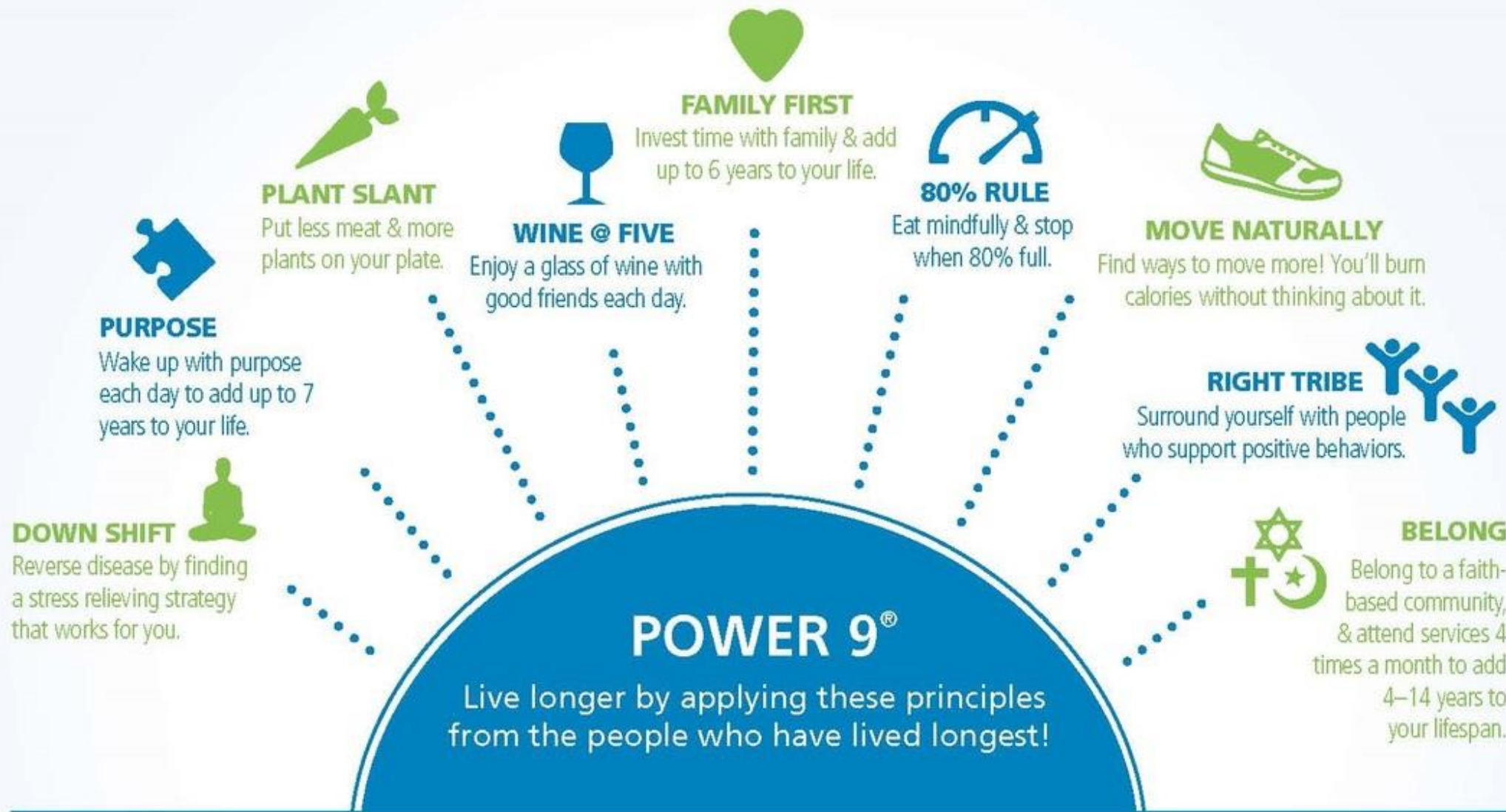
The Blue Zone

Where are people living the longest?

The top 5 countries by average life expectancy

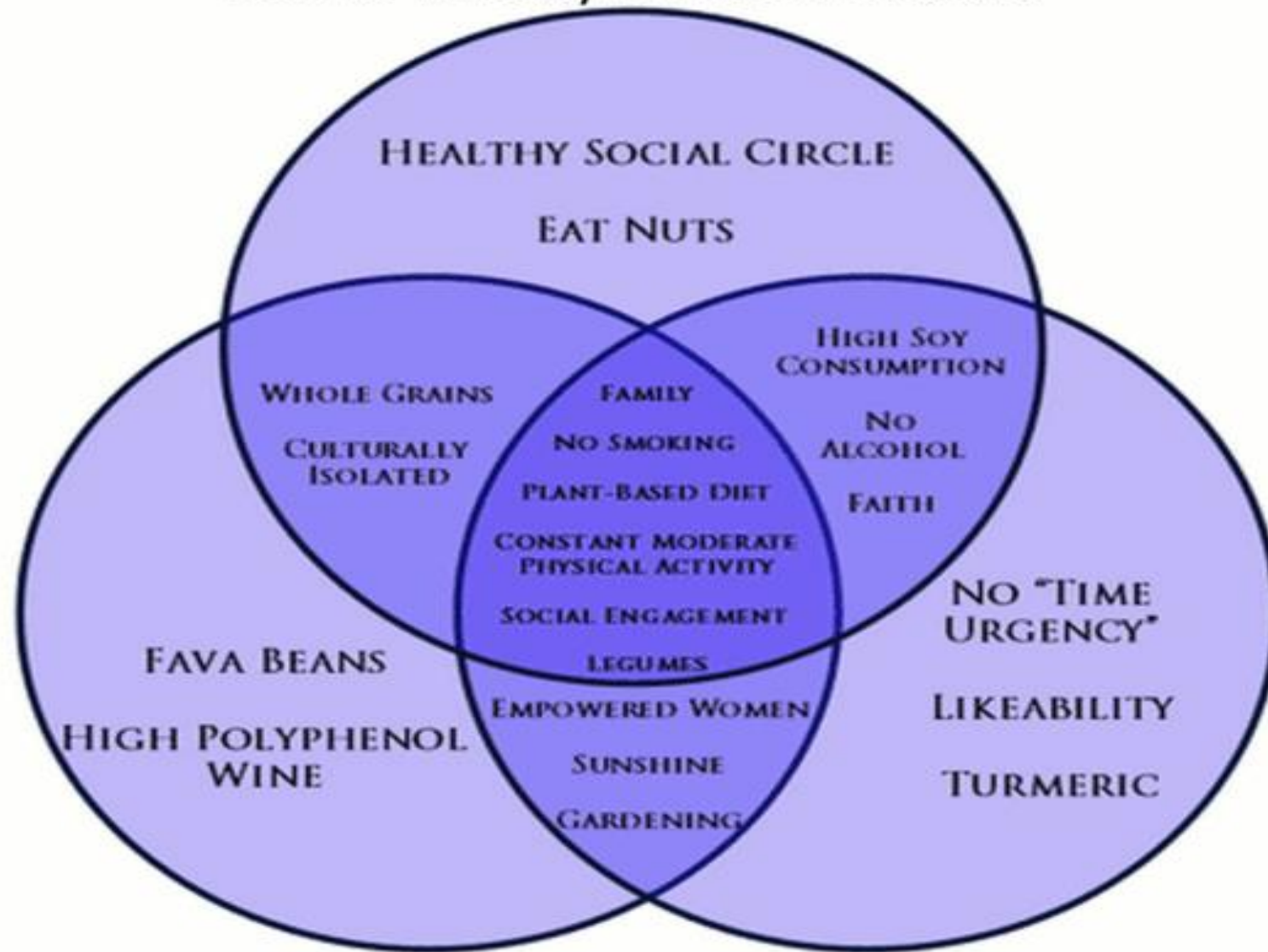


The Blue Zone contains the highest concentrations of people
who are active past the age of 100.



Loma Linda, United States

Sardinia,
Italy



Okinawa,
Japan

LEGUMES: THE MOST IMPORTANT DIETARY PREDICTOR OF SURVIVAL IN OLDER PEOPLE OF DIFFERENT ETHNICITIES

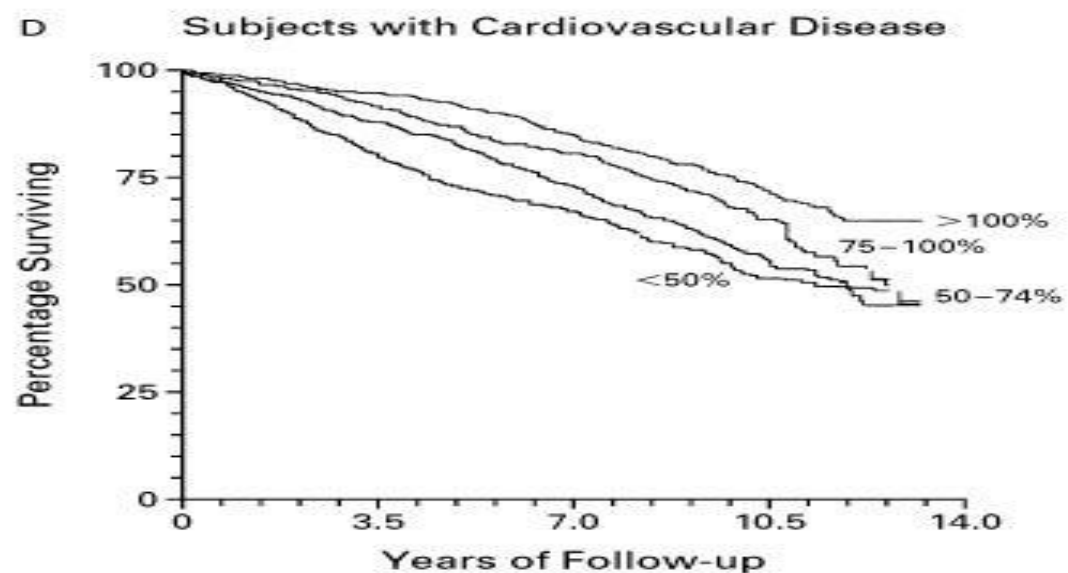
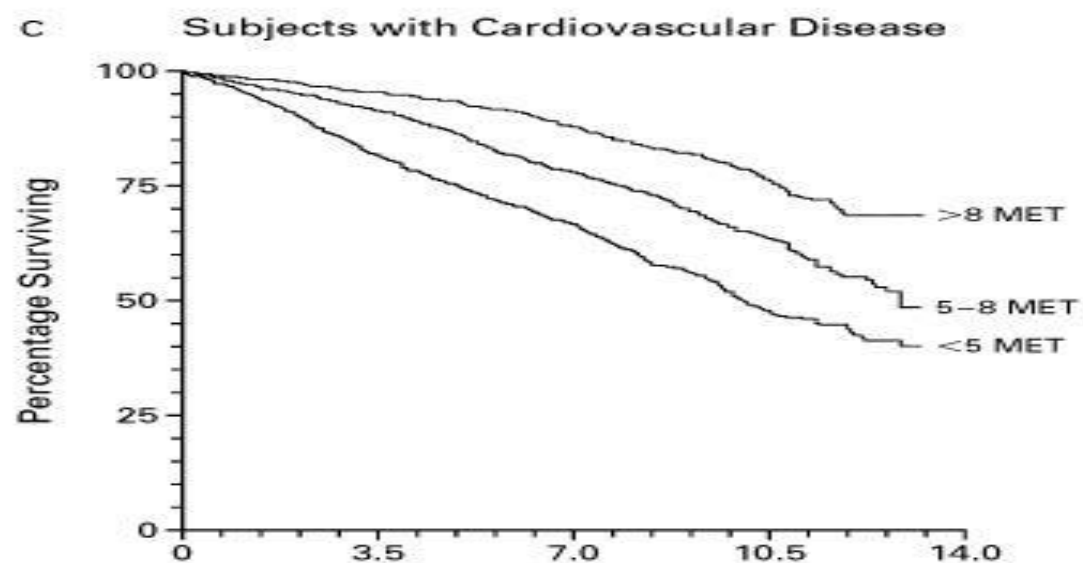
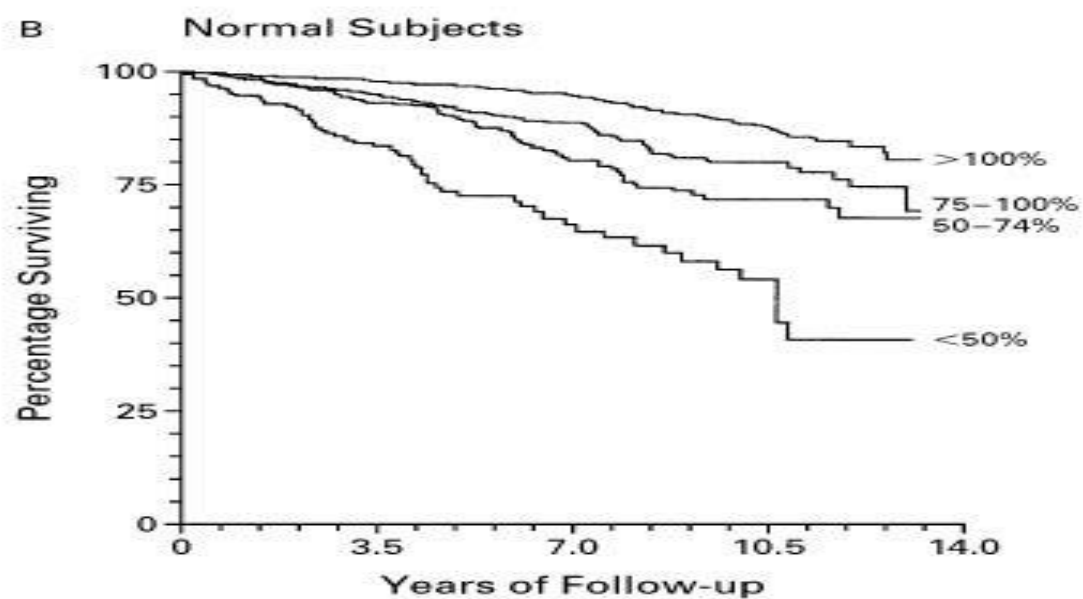
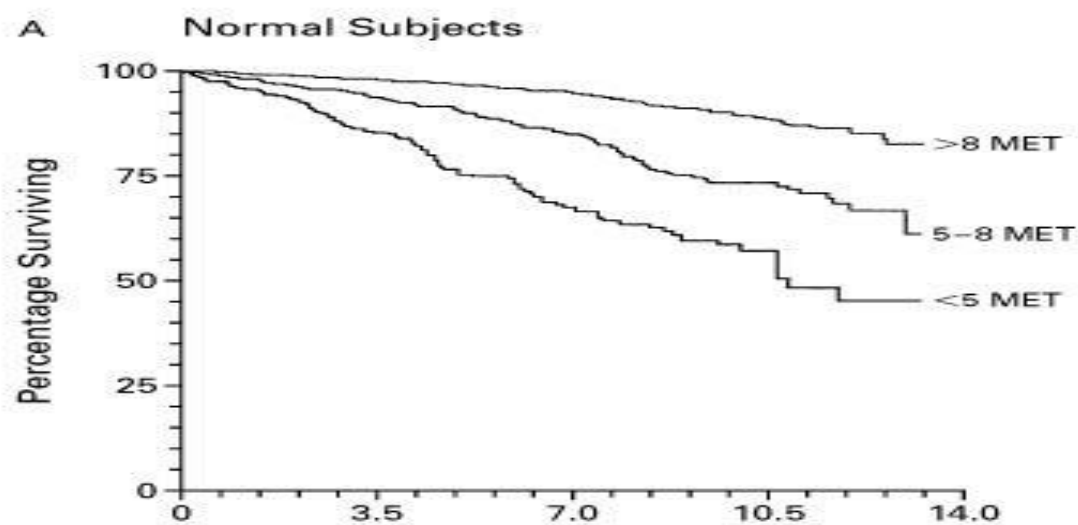
- TO IDENTIFY PROTECTIVE DIETARY PREDICTORS AMONGST LONG-LIVED ELDERLY PEOPLE, THE "FOOD HABITS IN LATER LIFE STUDY WAS UNDERTAKEN AMONG FIVE COHORTS IN JAPAN, SWEDEN, GREECE AND AUSTRALIA.
- THERE WERE 785 PARTICIPANTS AGED 70 AND OVER THAT WERE FOLLOWED UP TO SEVEN YEARS.
- THE LEGUME FOOD GROUP SHOWED 7-8% REDUCTION IN MORTALITY HAZARD RATIO FOR EVERY 20G INCREASE IN DAILY INTAKE WITH OR WITHOUT CONTROLLING FOR ETHNICITY
- ASIA PAC J CLIN NUTR 2004;13(2):217-20.

SIMPLE FITNESS TESTS AND LONGEVITY



EXERCISE CAPACITY AND MORTALITY AMONG MEN REFERRED FOR EXERCISE TESTING (TREADMILL)

- **WE STUDIED A TOTAL OF 6213 CONSECUTIVE MEN REFERRED FOR TREADMILL EXERCISE TESTING FOR CLINICAL REASONS DURING A MEAN 6.2 YEARS OF FOLLOW-UP.**
- **THE PEAK EXERCISE CAPACITY MEASURED IN METABOLIC EQUIVALENTS (MET) WAS THE STRONGEST PREDICTOR OF THE RISK OF DEATH AMONG BOTH NORMAL SUBJECTS AND THOSE WITH CARDIOVASCULAR DISEASE.**
- **N ENGL J MED 2002; 346:793-801**



PUSHUP CAPACITY AND HEART EVENTS

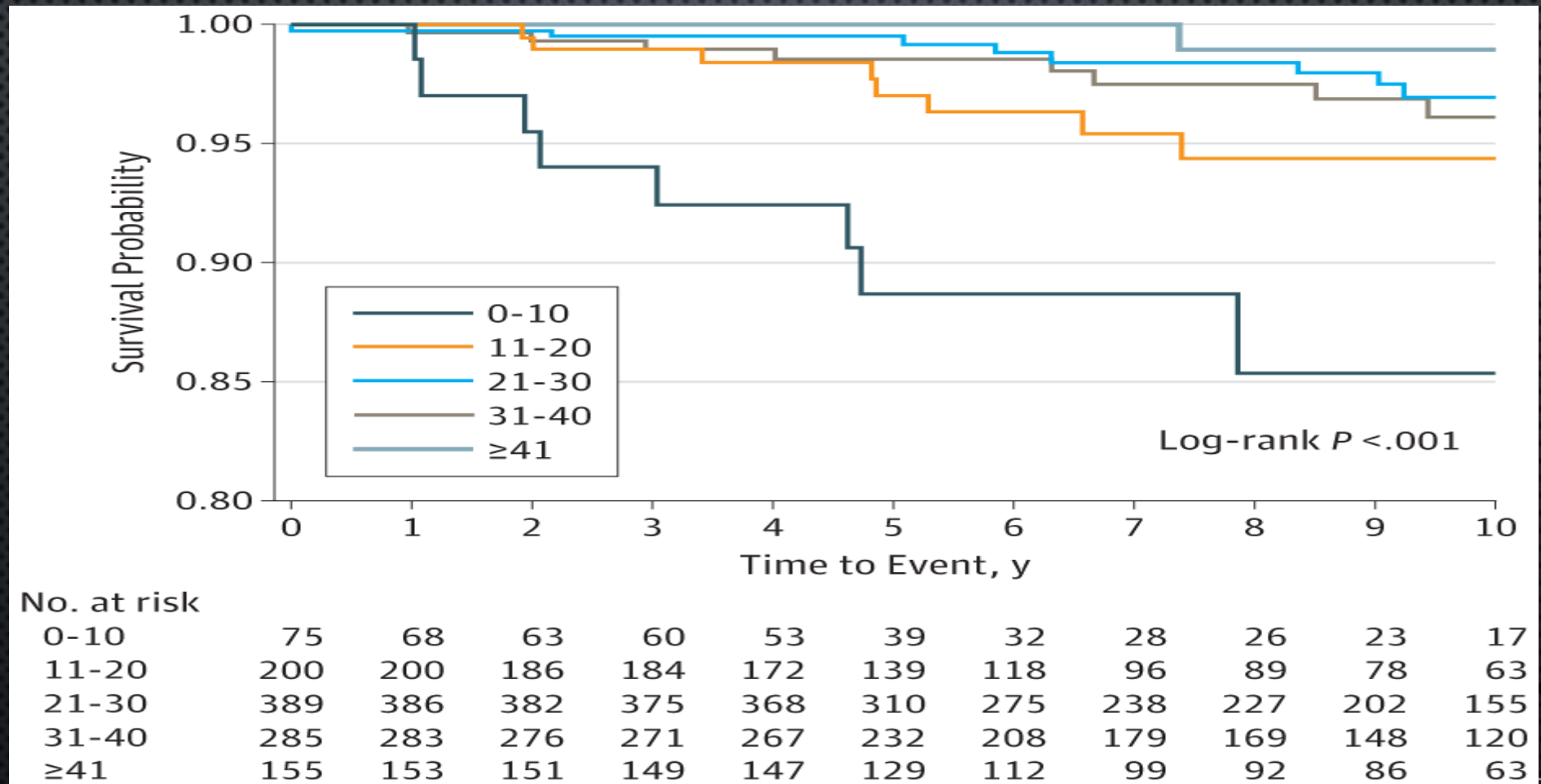


ASSOCIATION BETWEEN PUSH-UP EXERCISE CAPACITY AND FUTURE CARDIOVASCULAR EVENTS AMONG ACTIVE ADULT MEN

- THIS STUDY OF 1104 OCCUPATIONALLY ACTIVE ADULT MEN FOUND A SIGNIFICANT NEGATIVE ASSOCIATION BETWEEN BASELINE PUSH-UP CAPACITY AND INCIDENT CARDIOVASCULAR DISEASE RISK ACROSS 10 YEARS OF FOLLOW-UP.
- PARTICIPANTS ABLE TO COMPLETE MORE THAN **40 PUSH-UPS** WERE ASSOCIATED WITH A SIGNIFICANT REDUCTION IN INCIDENT CARDIOVASCULAR DISEASE EVENT RISK COMPARED WITH THOSE COMPLETING FEWER THAN 10 PUSH-UPS.
- PUSH-UP CAPACITY IS A NO-COST, FAST, AND SIMPLE MEASURE THAT MAY BE A USEFUL AND OBJECTIVE CLINICAL ASSESSMENT TOOL FOR EVALUATING FUNCTIONAL CAPACITY AND CARDIOVASCULAR DISEASE RISK.
- [JAMA NETW OPEN.](#) 2019 FEB; 2(2):E188341

From: **Association Between Push-up Exercise Capacity and Future Cardiovascular Events Among Active Adult Men**

JAMA Netw Open. 2019;2(2):e188341. doi:10.1001/jamanetworkopen.2018.8341



HOW FAST CAN YOU CLIMB 4 FLIGHTS OF STAIRS? IT MAY REVEAL YOUR HEART HEALTH

- RESEARCHERS SAY HOW QUICKLY A PERSON CAN WALK UP FOUR FLIGHTS OF STAIRS MAY BE AN INDICATOR OF THEIR HEART HEALTH.
- PARTICIPANTS WHO CLIMBED THE STAIRS IN LESS THAN 40 TO 45 SECONDS ACHIEVED MORE THAN 9 TO 10 METs.
- THEY ALSO SAY THERE ARE OTHER TASKS, SUCH AS CARRYING A BAG OF GROCERIES TO A CAR, THAT CAN BE USED AS A PRELIMINARY GAUGE OF HEART HEALTH.
- [HTTPS://WWW.HEALTHLINE.COM/HEALTH-NEWS/HOW-FAST-CAN-YOU-CLIMB-4-FLIGHTS-OF-STAIRS-IT-MAY-REVEAL-YOUR-HEART-HEALTH](https://www.healthline.com/health-news/how-fast-can-you-climb-4-flights-of-stairs-it-may-reveal-your-heart-health)

A 3-MINUTE TEST OF CARDIORESPIRATORY FITNESS

30 SQUATS IN 45 SECONDS

We recruited a convenient sample of 40 adults between 18 and 64 years from the general U.S. population. Participants completed 30 squats in 45 seconds, paced by a metronome.

Results

Of the 40 participants, there were 18 men and 22 women. Mean age was 31.2 years (SD = 9.9). We found that the best predictors were HR features $P1/height$ and $(P2-P3)/age^3$.

Conclusions

The study provided strong evidence for the validity of the squat test in the clinical setting.

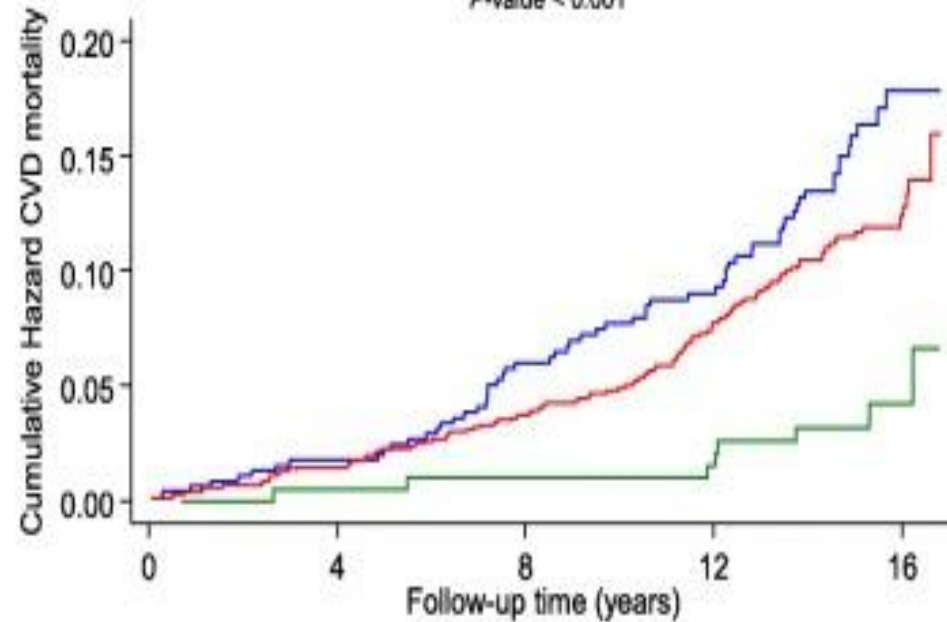
BONUS LONGEVITY HABITS: SAUNA

- **SAUNA BATHING IS ASSOCIATED WITH REDUCED CARDIOVASCULAR MORTALITY AND IMPROVES RISK PREDICTION IN MEN AND WOMEN: A PROSPECTIVE COHORT STUDY**
- **“HIGHER FREQUENCY AND DURATION OF SAUNA BATHING ARE EACH STRONGLY, INVERSELY, AND INDEPENDENTLY ASSOCIATED WITH FATAL CVD EVENTS IN MIDDLE-AGED TO ELDERLY MALES AND FEMALES. THE FREQUENCY OF SAUNA BATHING IMPROVES THE PREDICTION OF THE LONG-TERM RISK FOR CVD MORTALITY”**
- BMC MED 2018 Nov 29;16(1):219

SAUNA AND CVD MORTALITY

Sauna frequency

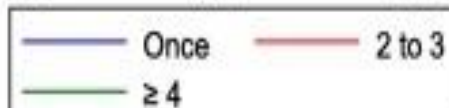
P-value < 0.001



Number at risk

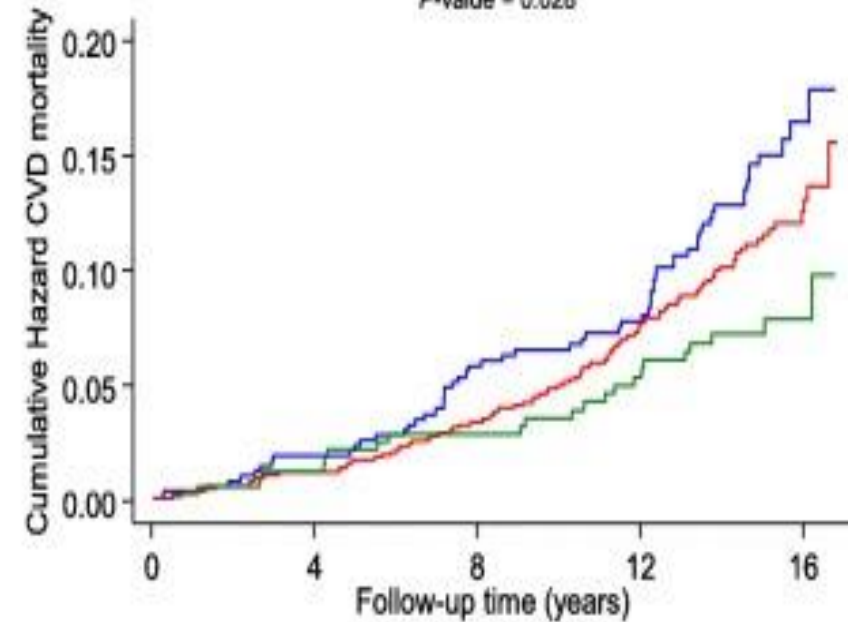
Sauna frequency (times/week)

Once	455	440	410	372	90
2 to 3	1028	999	949	860	212
≥ 4	205	200	192	188	58



Sauna duration

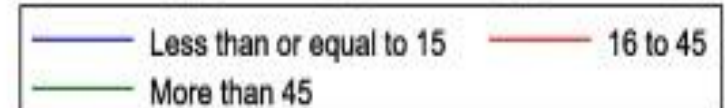
P-value = 0.028



Number at risk

Sauna duration (minutes/week)

Less than or equal to 15	463	450	423	391	90
16 to 45	906	879	835	756	195
More than 45	319	310	293	273	75

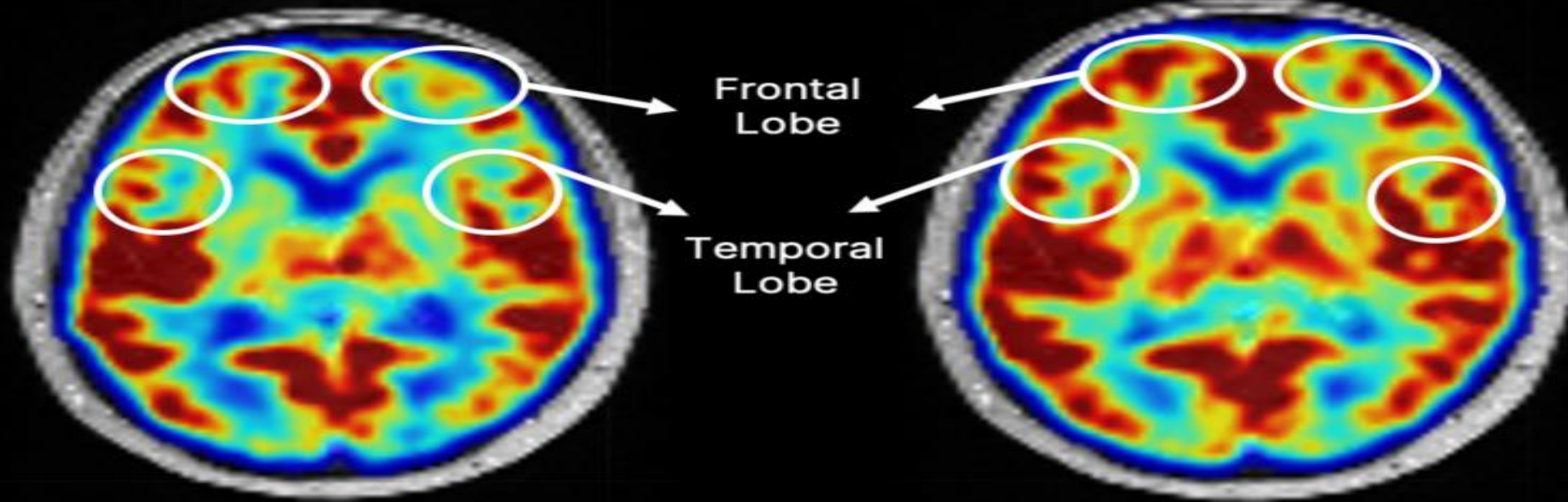


HYPERBARIC OXYGEN THERAPY HBOT



BRAIN BLOOD FLOW INCREASES

MRI Brain Blood Flow



Pre HBOT

Post HBOT

Cerebral blood flow (ml\min\100gr)



EAT LESS SOMETIMES

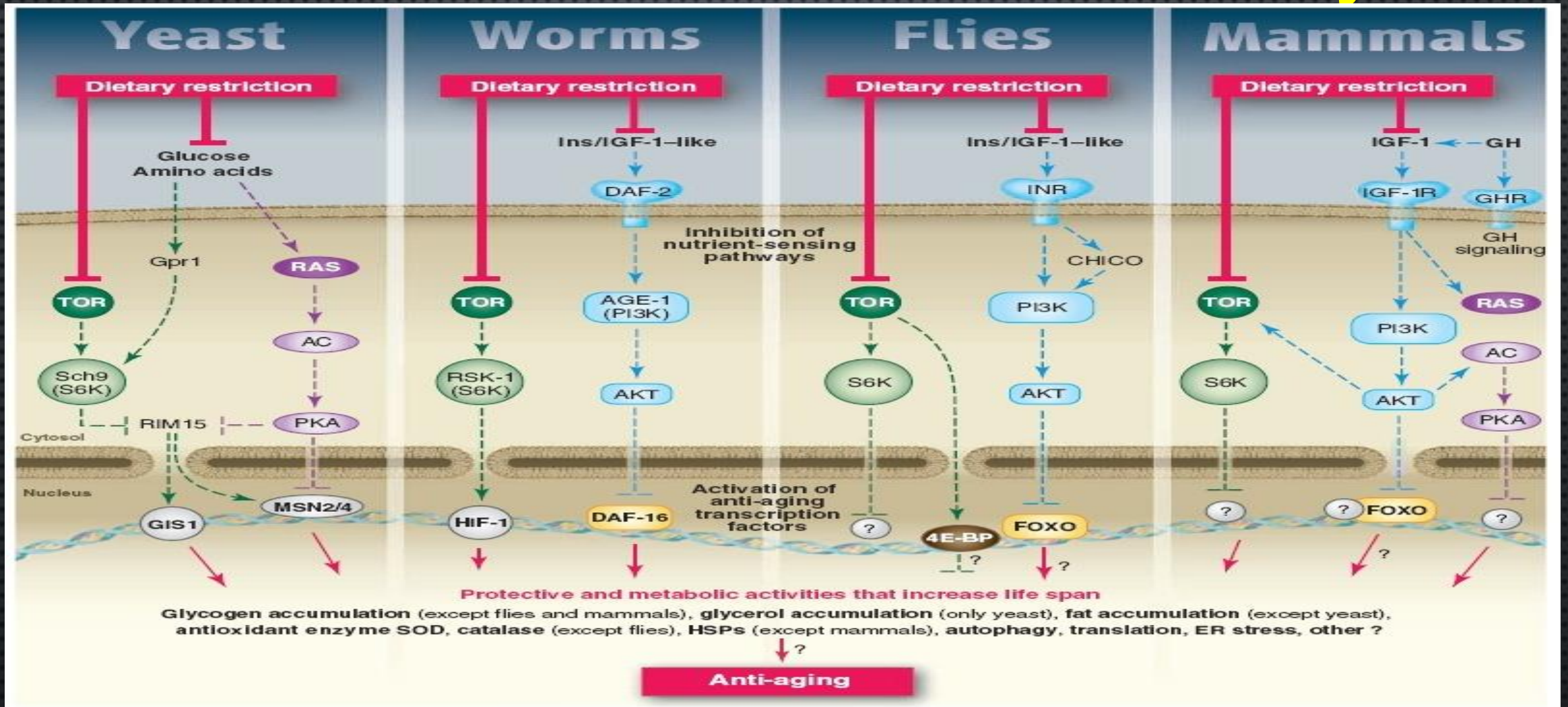
"Fasting is like spring
cleaning for your body"

Jentezen Franklin



proLon®

Eat Less: Conserved Cellular Pathways



Fasting Options

Research has suggested that different versions of fasting diets, such as reducing caloric intake on certain days or at certain times, not only can help with weight loss, but also can extend longevity in animals and improve health in humans. Here are some different approaches under study:

The Daniel Fast

A 21-day partial fast based on the Old Testament fasts recorded in Daniel 1 and Daniel 10. A vegan diet, with no additives, preservatives, sweeteners, caffeine, alcohol, white flour or processed foods. Can be modified to include some animal products.

Fasting-Mimicking Diet (FMD)

Reduced caloric intake for five consecutive days, done once a month for patients who are obese or have multiple disease risk factors, every three to four months for others. Starts at 1,100 calories the first day and about 750 calories each of the next four days, before returning to normal eating. Food choices are high in unsaturated fats and low in sugars and protein.

Alternate-Day Fasting (ADF)

No food or reduced calories on "fast" days, alternating with "feast" days, on which food is consumed as desired.

5 and 2 Regimen

Five days of eating as desired, with two consecutive or nonconsecutive "fast" days with minimal caloric intake: 500 calories for women, 600 for men.

Early Time-Restricted Feeding (ETRF)

Last meal is eaten by midafternoon with no food again until breakfast the next morning.

THE WALL STREET JOURNAL.

Fasting Mimicking Diets

Dr. Valter Longo pioneered the research that characterized these nutrient-sensing pathways

- **He demonstrated that the IGF-1, mTOR and PKA pathways are critical for promoting aging**
- **Elevation of these nutrient-sensing pathways accelerates aging processes**



Low levels of IGF-1 are associated with the longest living human populations (centenarians)

Category	Weight Loss	Lean Body Mass Protection	Cholesterol Reduction	Fasting Blood Glucose	Rejuvenation & Regeneration	Food
Calorie Restriction	✓		✓	✓		✓
Intermittent Fasting	✓✓		✓	✓✓		
Time-Restricted Feeding	✓		✓	✓		✓
Periodic Fasting	✓✓	✓	✓	✓✓✓	✓✓✓	
Fasting Mimicking Diet	✓✓✓	✓✓	✓	✓✓✓	✓✓✓	✓

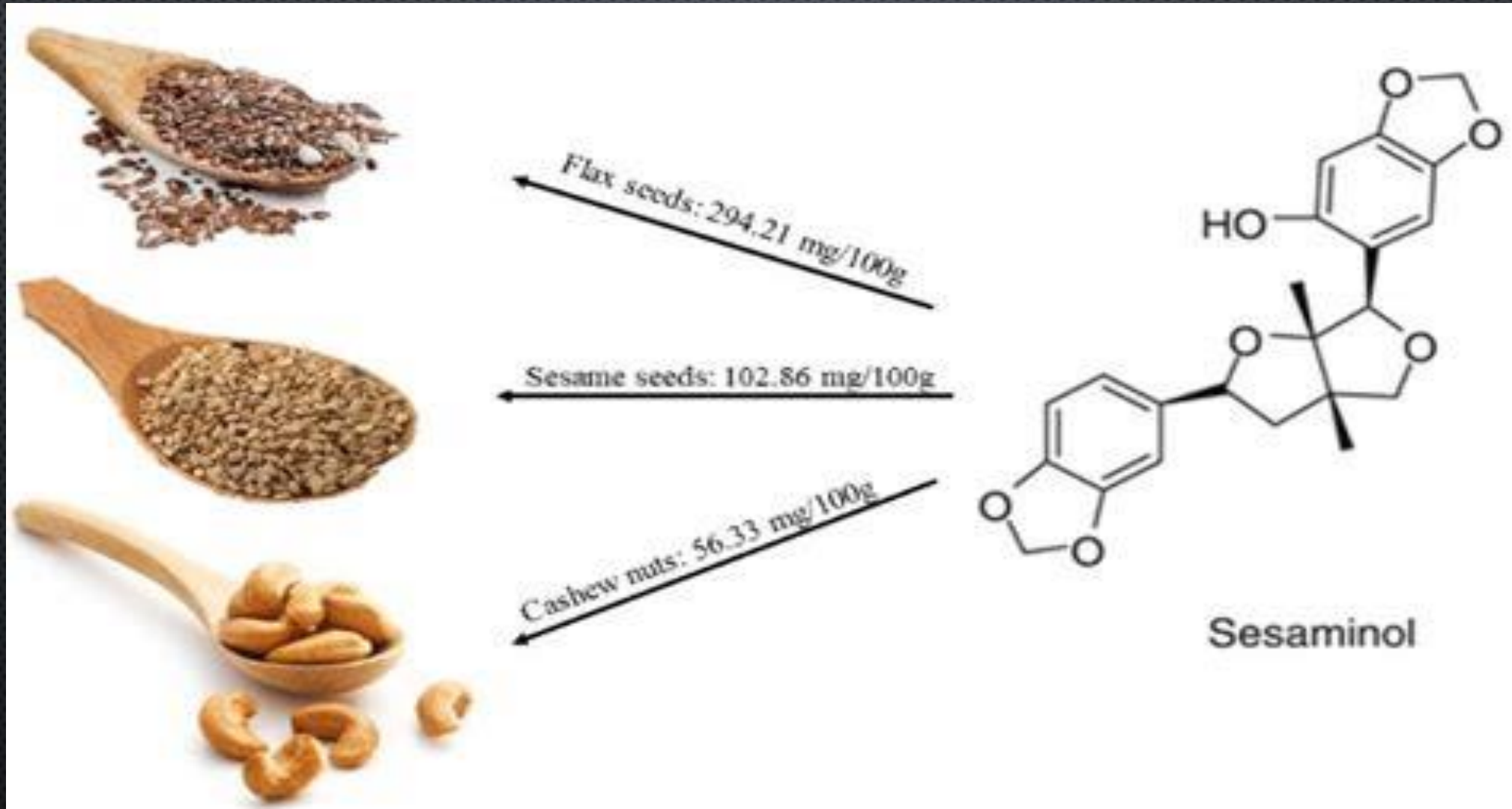
PROLON: THE FMD



EAT LIGNAN RICH FOODS

- LIGNANS ARE POLYPHENOLIC COMPOUNDS FOUND IN PLANTS.
- LIGNAN PRECURSORS ARE FOUND IN A WIDE VARIETY OF PLANT-BASED FOODS, INCLUDING SEEDS, WHOLE GRAINS, LEGUMES, FRUIT, AND VEGETABLES.
- **FLAXSEEDS ARE THE RICHEST DIETARY SOURCE OF LIGNAN PRECURSORS.**

TOP THREE SOURCES OF LIGNANS IN FOOD



LIGNAN INTAKE AND RISK OF CORONARY HEART DISEASE

- WE PROSPECTIVELY FOLLOWED 214,108 MEN AND WOMEN IN 3 COHORTS WHO DID NOT HAVE CARDIOVASCULAR DISEASE OR CANCER AT BASELINE. DIET WAS REPEATEDLY ASSESSED USING A VALIDATED FOOD FREQUENCY QUESTIONNAIRE EVERY 2-4 YEARS SINCE BASELINE
- **INCREASED LONG-TERM INTAKE OF LIGNANS WAS ASSOCIATED WITH A SIGNIFICANTLY LOWER RISK OF TOTAL CHD IN BOTH MEN AND WOMEN.** POSSIBLE SYNERGISTIC EFFECTS MAY EXIST BETWEEN LIGNAN AND FIBER INTAKE IN RELATION TO CHD RISK REDUCTION, POSSIBLY THROUGH ENHANCING THE PRODUCTION OF ENTEROLIGNANS.
- J AM COLL CARDIOL 2021 AUG 17;78(7):666-678

THE ASSOCIATION OF HOT RED CHILI PEPPER CONSUMPTION AND MORTALITY: A LARGE POPULATION-BASED COHORT STUDY

- THE FREQUENCY OF HOT RED CHILI PEPPER CONSUMPTION WAS MEASURED IN 16,179 PARTICIPANTS AT LEAST 18 YEARS OF AGE. TOTAL AND CAUSE-SPECIFIC MORTALITY WERE THE MAIN OUTCOME MEASURES OVER 19 YEARS OF FOLLOW-UP.
- HOT RED CHILI PEPPERS WAS ASSOCIATED WITH A 13% REDUCTION IN THE INSTANTANEOUS HAZARD OF DEATH.
- , THE CONSUMPTION OF HOT RED CHILI PEPPER WAS ASSOCIATED WITH REDUCED MORTALITY. HOT RED CHILI PEPPERS MAY BE A BENEFICIAL COMPONENT OF THE DIET.

SPICE IT UP



VITAMINS?

COQ10 AND SELENIUM

- RESEARCHERS FROM SWEDEN CONDUCTED A DOUBLE-BLIND, PLACEBO-CONTROLLED STUDY THAT INCLUDED 443 HEALTHY ADULTS BETWEEN 70 AND 88 YEARS OLD. THE PARTICIPANTS RECEIVED EITHER A PLACEBO OR A COMBINATION OF 200 MG A DAY OF CoQ10 AND 200 MCG A DAY OF SELENIUM TABLETS.
- DURING AN EXTENSIVE FOLLOW UP TIME OF 5.2 YEARS, 12.6% OF THE PLACEBO RECIPIENTS HAD DIED OF CARDIOVASCULAR DISEASE, COMPARED TO ONLY 5.9% IN THE SUPPLEMENT GROUP, WHICH IS AN IMPRESSIVE AND SIGNIFICANT DIFFERENCE.
- *INT J CARDIOL.* 2013;167(5):1860-6

SENESCENCE AND SENESCENT CELLS: SENOLYTICS

WHY ARE SENESCENT CELLS HARMFUL ?



SENESCENT CELLS
PRODUCE MOLECULES
THAT
DISTURB FUNCTION OF
NEIGHBOURING CELLS



SENESCENT CELLS CAN EVEN MISGUIDE THEIR NEIGHBOURS
TO BECOME CANCER CELLS

SENOLYTICS: UNDER HUMAN STUDY CURRENTLY

Senolytics

Senolytic Cocktail of:

- 1) Dasatinib
- 2) Quercetin
- 3) Fisetin

Selective removal of senescent cells - Age-related accumulation of senescent cells contributes to atherosclerosis, aging of the eye (cataracts, AMD), osteoporosis, skin and brain aging, Kirkland and colleagues at Mayo Clinic show that senescent cells are selectively eliminated by "senolytic" drugs.



RX FOR LONGEVITY?

- **METFORMIN (TAME STUDY)**
- **RAPAMYCIN**
- **DASATINAB AND QUERCETIN**

AVAILABLE AND INTRIGUING

- GLY-NAC (GLYCINE AND NAC)
- SPERMIDINE (WHEAT GERM)
- QUERCETIN AND Fisetin
- GINGER COMPOUNDS
- NAD⁺ BOOSTERS (NR, NMN)

LIVE LONG ENOUGH TO LIVE FOREVER?

