PERSONALIZED NUTRITION PLANS BASED ON MEASUREMENT OF SPECIFIC REDOX BIOMARKERS IN HUMAN BLOOD

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IS THERE A WAY TO BRIDGE THE GAP BETWEEN LIFESPAN AND HEALTHSPAN?
Is Your Lifespan (and/or Healthspan) “Programmed” in Your Genes?
Your Genetic Make-up Influences Life Expectancy

A glance at your family tree may indicate whether you have a tendency to live a long, healthy life.

1. Exceptional longevity (1 to 3 decades longer than average) tends to run in families.

2. Siblings of “super-centenarians” tend to live longer than average.
What Does Genetic Analysis of Exceptionally Long-lived People Reveal About Longevity?

There are “nodes” of exceptionally long-lived people throughout the world.
Genome Analysis [with “single nucleotide polymorphisms” (SNPs)] of Exceptionally Long-lived People Reveal...

- **Complex Genetic Signatures**
  - 19 different genetic groupings

- **Very Few Genes Consistently Involved**
  - FOXO3A
  - APOE
  - Many SNPs

- **No Genes Associated With Diseases**
  - Longevity genes confer resiliency

Genes do not solely govern whether you will live longer than an average lifespan.
Genetic Analysis Suggests that Environment & Diet are the Major Determinants for Healthy Aging

15-25% of longevity quotient

Healthy Eating
Accentuating Positive Lifestyle Factors & Eliminating the Adverse Ones Promotes Healthy Aging

**Activities of Daily Living**
- Faster Walk Times
- Greater Handgrip Strength

**Physiological**
- Lower Blood Pressure & glucose
- Lower Indices of Inflammation

Life- and health-span can be increased by as much as **10 years**!
Diet is the largest factor affecting longevity and healthy aging.

Nutrient influence on healthy aging is being extensively studied in humans and in many animal models of aging.
THE 3 PILLARS OF METABOLIC HEALTH
Consumption of plant-derived products rich in polyphenols promotes healthy lifespan.
Pomegranate juice consumption increases GSH levels and reduces lipid and protein oxidation in human blood

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T1: BEFORE JUICE
T2: IMMEDIATELY AFTER STOPPING JUICE (2 WEEKS)
T3: A WEEK AFTER THE JUICE ADMINISTRATION
T4: 3 WEEKS AFTER STOPPING JUICE ADMINISTRATION
Statistically significant increase in GSH with pomegranate juice for 2 weeks.

Statistically significant decrease in protein carbonyls with pomegranate juice for 2 weeks and maintained for 1 month.
The Strong Antioxidant Sheep/Goat Whey Protein Protects Against mTOR Overactivation in Rats: A Mode of Action Mimicking Fasting

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Sheep/Goat Whey Protein inactivates of mTOR

A

Control group (n=4)  Experimental group (n=4)

B

Control group (n=4)  Experimental group (n=4)

C

Phospho-p70 S6 kinase / GAPDH (% of control)

control group  whey group

liver  muscle

p70-S6K (70 kDa)

GAPDH (36 kDa)
The molecular pathway of amino-acid-related (over) activation of mammalian target of rapamycin complex 1 (mTORC1) and the beneficial action of sheep/goat whey protein administration that mimics fasting.
COMPARISON OF ANTIOXIDANTS

1 glass of pomegranate juice

3 cups espresso
1 cup instant coffee

5 glasses of red wine

17 cups of juice

23 glasses of beer

50 glasses of white wine

100 glasses of milk
2nd Pillar

Exercise promotes healthy lifespan
REACTIVE SPECIES AND PHYSIOLOGICAL ADAPTATIONS TO ENDURANCE TRAINING

Acute Exercise

VS

Exercise Training

Acute oxidative stress

Mitochondrial biogenesis ↑
Antioxidant capacity ↑
Insulin sensitivity ↑
Muscle hypertrophy ↑

Takuji Kawamura, Isao Muraoka. Exercise-Induced Oxidative Stress and the Effects of Antioxidant Intake from a Physiological Viewpoint. Chemistry, MedicinePublished in Antioxidants 2018. DOI: 10.3390/antiox7090119
Effects of Physical Activity on Oxidative Stress Status

Alessandro Pingitore M.D., Giuseppina Pace Pereira Lima Ph.D., Francesca Mastorci Ph.D., Alfredo Quinones M.D., Giorgio Iervasi M.D., Cristina Vassalle Ph.D. Exercise and oxidative stress: Potential effects of antioxidant dietary strategies in sports. Volume 31, Issues 7–8, July–August 2015, Pages 916-922
3rd Pillar

Fasting induces metabolic shift and promotes healthy lifespan

Fasting and Health

Cellular Responses to Energy Restriction That Integrate Cycles of Feeding and Fasting with Metabolism.
BUCHINGER WILHELM CLINIC

"WE EMPOWER PEOPLE TO LIVE A HEALTHY AND FULFILLING LIFE."
Influence of Long-Term Fasting on Blood Redox Status in Humans

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**Figure 1.** The effects of the 10-day fast on the mean levels of redox biomarkers in a group of 109 subjects. There was no change in GSH levels (A). We highlighted 3 subgroups based on the variations in their GSH levels (increase, light blue; decrease, dark blue; unchanged, black) to understand if baseline GSH levels could influence the response to fasting. Catalase (B) levels showed no changes either, while TAC (C) was significantly increased, and TBARS (D) levels were significantly decreased. GR (E) as well as GPx (F) levels were unchanged.
Figure 2. Changes in redox parameters during fasting were associated with changes in clinical parameters. We evaluated associations between the four redox parameters measured in this study (GSH, Catalase, TBARS, TAC) with weight, waist circumference, glucose and uric acid serum levels. The 5 significant associations (A–E) are presented in this figure. Dot plots shows the correlations between the different parameters for pre-fasting (dark blue) and post-fasting (light blue) levels.
Figure 3. Associations between the different redox parameters measured in this study. We evaluated associations between the six redox parameters measured in this study (GSH, Catalase, TBARS, TAC, GR, GPx). The 5 significant associations (A–E) are presented in this figure. Dot plots show the correlations between the different parameters for pre-fasting (dark blue) and post-fasting (light blue) levels.
Post fasting findings of the present study in plasma and erythrocytes

10-day fasting period

- Metabolic switch
- Mild increase of ROS generation at the beginning of fasting
- Enhancement of antioxidant defence at the end of fasting

Unaffected GSH levels in the pool of the subjects (n=109)

On the basis of GSH

- **Group 1** (n=51)
  - high pre fasting values
  - decreased post fasting levels

- **Group 2** (n=31)
  - low pre fasting values
  - increased post fasting levels

- **Group 3** (n=27)
  - intermediary pre fasting values
  - unaltered post fasting levels

- Lipid peroxidation
- Total antioxidant capacity
- Unaffected catalase activity
- Unaffected GR activity
- Unaffected GPx activity

Long-term fasting improves blood redox status regardless of the pre and post fasting values of GSH
HUMAN BIOMARKER MEASUREMENT SERVICES

HOLISTIC EVALUATION OF BLOOD REDOX STATUS MEASURING A WIDE RANGE OF BIOMARKERS, BEFORE AND AFTER A PROPOSED NUTRITIONAL SCHEME
WE MEASURE THE FOLLOWING BIOMARKERS

- **Control of antioxidants**
  - GSH (reduced glutathione),
  - TAC (total antioxidant capacity),
  - Reducing Power,
  - ABTS Radical scavenging
  - Hydroxyl Radical scavenging
  - Superoxide Radical scavenging

- **Control of critical gene products**
  - Catalase,
  - GPx (glutathione peroxidase),
  - SOD (peroxidase dismutase),
  - GR (glutathione reductase) – enzymatic antioxidants that are involved in protecting the cell against free radicals.

- **Control of oxidative damage products**
  - TBARS (lipid peroxidation),
  - Protein Carbonyls (oxidative protein damage) - the end products of free radical action.

The effect of personalized nutrition on human redox status is evaluated and human health is improved.
ANTIOXIDANT CONSUMPTION, EXERCISE AND FASTING REGULATE BASELINE GSH LEVELS IN BLOOD AND IMPROVE HUMAN REDOX STATUS

1ST PILLAR

2ND PILLAR

3RD PILLAR
How increased oxidative stress promotes longevity and metabolic health: The concept of mitochondrial hormesis (mitohormesis)

Michael Ristow, Kim Zarse. Biology, Medicine
Published in Experimental Gerontology 2010
DOI: 10.1016/j.exger.2010.03.014
THANK YOU VERY MUCH FOR YOUR ATTENTION

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