

COVID-19 Response: Personal Protective Nutrition (PPN) & Personal Protective Lifestyle (PPL)

**Optimizing Performance, Resilience, and Readiness
PANEL: Col(ret) Mylene Huynh, Maj Regan Stiegmenn, CPT
Bryan Stepanenko**

23 July 2020

1645 – 1745 (EST)



“Medically Ready Force...Ready Medical Force”

Dr. Mylene T. Huynh (Col (ret), USAF)



Mylene T. Huynh, MD, MPH, IFMCP

Pain Clinic

Department of Anesthesia

Walter Reed National Military Medical Center

Bethesda, MD

Col(ret) Mylene Huynh, MD, MPH, IFMCP



- Board certified Preventive Medicine, Family Medicine, and Functional Medicine Physician
- Adjunct Assistant Professor, Department of Preventive Medicine and Biometrics, USUHS
- Certified Food for Life instructor, Physician Committee for Responsible Medicine
- Practices pain management at the Walter Reed National Military Medical Center.
- Prevents and reverses chronic health conditions by providing personalized medical care that addresses root causes

Regan A. Stiegmann, DO, MPH, FACLM
Flight Surgeon/Preventive Medicine
Lifestyle & Performance Medicine
USAF Academy - Operational Medicine Flight
USAF Academy - Colorado Springs, CO

Maj Regan A. Stiegmann, DO, MPH, FACLM



- Board certified in Preventive Medicine and Lifestyle Medicine
- Founded USAF's first Lifestyle & Performance Medicine consultation clinic at USAF Academy, 10AMDS
- Clinical champion for human performance optimization in Flight Medicine (AFI 48-101)
- Adjunct Clinical Professor, University of Colorado Anschutz School of Medicine
- Director, Digital Health Track, Rocky Vista University College of Osteopathic Medicine

Dr. Bryan Stepanenko (CPT, USA)



Bryan Stepanenko, MD, MPH, IFMCP
Army Family Physician
Dept of Primary Care
Womack Medical Center
Ft Bragg, NC

CPT Bryan Stepanenko, MD, MPH, IFMCP



- Board Certified in Family Medicine and Functional Medicine
- Clinical Champion for Shared Medical Appointments (SMA) in the Military Health System
- Teaching faculty for the DoD's only Functional Medicine training pathway through the National Capital Region Pain Initiative (NCRPI) based at Walter Reed National Military Medical Center.
- Delivers Personalized Lifestyle & Integrative Medicine that addresses root cause dysfunction for the warfighter community
- Educates on Military Operational Environment and Root Cause Dysfunction

Disclosures



- Drs. Huynh, Stiegmann, and Stepanenko have no relevant financial or non-financial relationships to disclose relating to the content of this activity
- The views expressed in this presentation are those of the presenter(s) and do not necessarily reflect the official policy or position of the Department of Defense, nor the U.S. Government.
- This continuing education activity is managed and accredited by the Defense Health Agency J-7 Continuing Education Program Office (DHA J-7 CEPO). DHA J-7 CEPO and all accrediting organizations do not support or endorse any product or service mentioned in this activity.
- DHA J-7 CEPO staff, as well as activity planners and reviewers have no relevant financial or non-financial interest to disclose.
- Commercial support was not received for this activity.

Learning Objectives

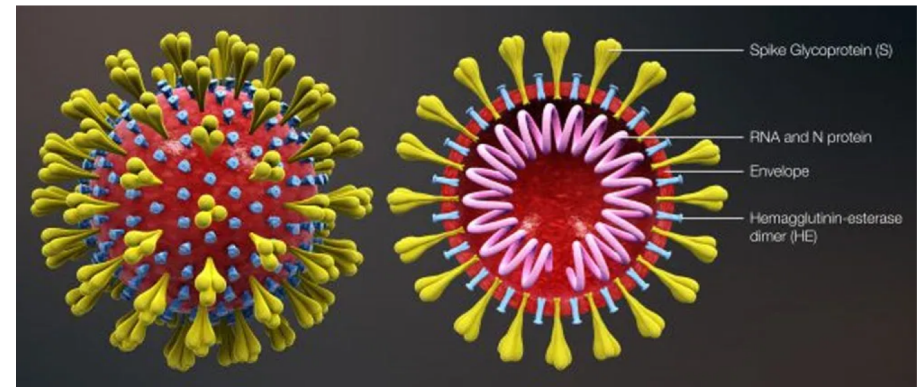


At the conclusion of this activity, participants will be able to:

1. Describe PPN & PPL and discuss relevance utility of these concepts.
2. Outline the basic tenets of PPN and PPL as part of COVID response.
3. Comprehend a simple system of care delivery that identifies, engages, and empowers high-risk patients to make PPN & PPL choices.
4. Predict how to include PPN & PPL in health care delivery to optimize military performance, resilience, and readiness.

Threat: Coronavirus disease (COVID-19)

- Severe acute respiratory syndrome coronavirus (SARS-CoV-2)
 - ❑ Novel RNA virus; no adaptive immunity
 - ❑ Some resemblance to SARS-CoV (2003)
 - ❑ Disables macrophage (innate immunity)
 - ❑ Severe complications associated with:
 - . Cytokine storm
 - . Inflammation
 - . Oxidative stress
 - . Endothelial dysfunction
 - . Microperfusion
 - . Microemboli

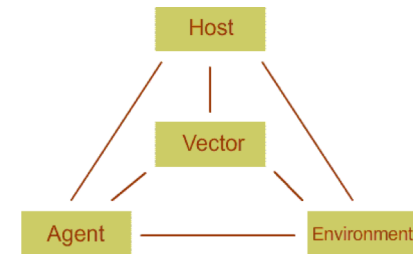


<https://www.southampton.ac.uk/news/2020/03/covid-19-china.page>

Current Approach + Immune Resilience



- **Current Approach: Contain and Treat**
 - **Personal Protective Equipment (PPE) & physical distancing to prevent exposure**
 - **“Flatten the curve” for hospital/Intensive Care Units (ICU) preparedness**
 - **Lab testing (secondary prevention)**
 - **Variation in clinical manifestation (asymptomatic to severe illness)**
 - **Treatment: unique to patient’s immunity/inflammatory status**
 - **Does not address host (human factor)**
- **Immune Resilience Approach**
 - **Integrate the science of prevention with human factor**
 - **Stratify high-risk populations:**
 - **Front-line personnel, Health Care Workers (HCWs), caregivers, household contacts**
 - **Conditions associated with oxidative stress, NLRP3 inflammasome trigger**
 - **Obesity, Diabetes Mellitus 2 (DM2), immune dysregulation (cancer, autoimmune)**



Immune Resilience: The Human Factor



Prevention
Physical Distancing

Presymptomatic

25% Asymptomatic

Resilience

75% Symptomatic

80% Home care
(mild/moderate)

2 - 14 Days
(can spread SARS-CoV-2 without symptoms)

COVID-19 Symptoms



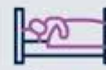
Fever



Cough



Difficulty
Breathing



Severe
Illness

@NCDHHS

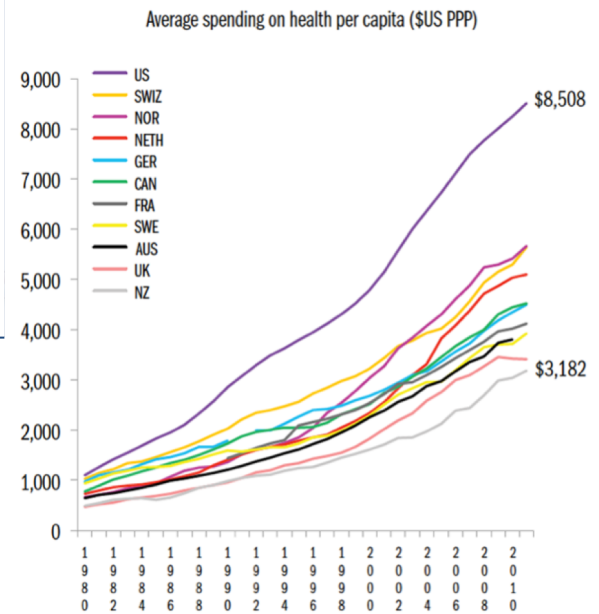
20% Hospitalized
(severe/critical)

Vulnerable population: Age > 60 yrs,
obese, comorbidities such as Chronic
Kidney Disease (CKD), Chronic Obstructive
Pulmonary Disease (COPD),
immunocompromised, serious cardiac
conditions, sickle cell disease, type 2 DM

Source: CDC

Americans Have Worse Health Than People in Other High-Income Countries; Health Disadvantage Is Pervasive Across Age and Socio-Economic Groups

News Release | January 9, 2013



Note: \$US PPP = purchasing power parity.

Source: Organization for Economic Cooperation and Development, OECD Health Data, 2013 (Paris: OECD, Nov. 2013)

“On average, Americans die sooner and experience higher rates of disease and injury than people in other high-income countries....this health disadvantage exists at all ages from birth to age 75 and that even advantaged Americans appear to be sicker than their peers in other rich nations.”

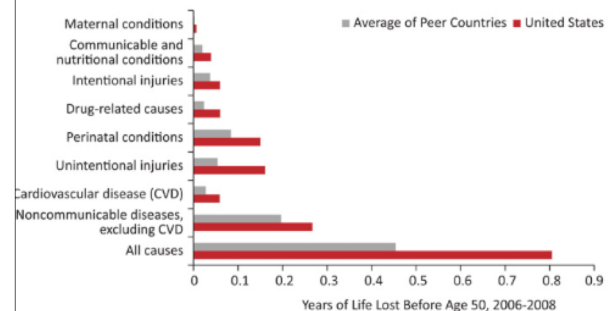
--National Academies of Sciences, 2013

U.S. HEALTH IN INTERNATIONAL PERSPECTIVE

Shorter Lives, Poorer Health

NATIONAL RESEARCH COUNCIL AND
INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

FIGURE: Causes of Death for U.S. Women Before Age 50, Compared with Average of Peer Countries, 2006-2008



NOTE: CVD is cardiovascular disease

SOURCE: Data from the Human Mortality Database, the World Health Organization Mortality Database, and Statistics Canada, as reported in Ho, J.Y. and S.H. Preston (2011). *International Comparisons of U.S. Mortality*. Data analyses prepared for the National Academy of Sciences/Institute of Medicine Panel on Understanding Cross-National Health Differences Among High-Income Countries. Population Studies Center, University of Pennsylvania. *U.S. Health in International Perspective: Shorter Lives, Poorer Health*, January 2013

NATIONAL RESEARCH COUNCIL AND
INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

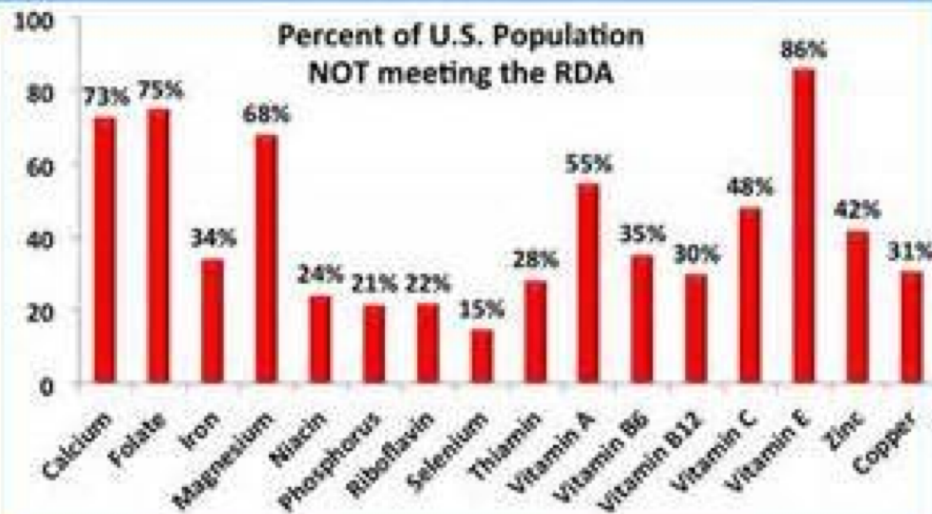
Standard American Diet (SAD):

“Nearly entire U.S. population eats a diet NOT on par with recommendations”



- 1 in 10 Americans eat recommended amount of vegetables and fruits (CDC, Nov 2017)
 - 3 cups vegetables & 2 cups fruits
- Most exceed in added sugars, saturated fats and sodium
- Widespread macro & micro-nutrient deficiencies

Deficiencies in our Diets



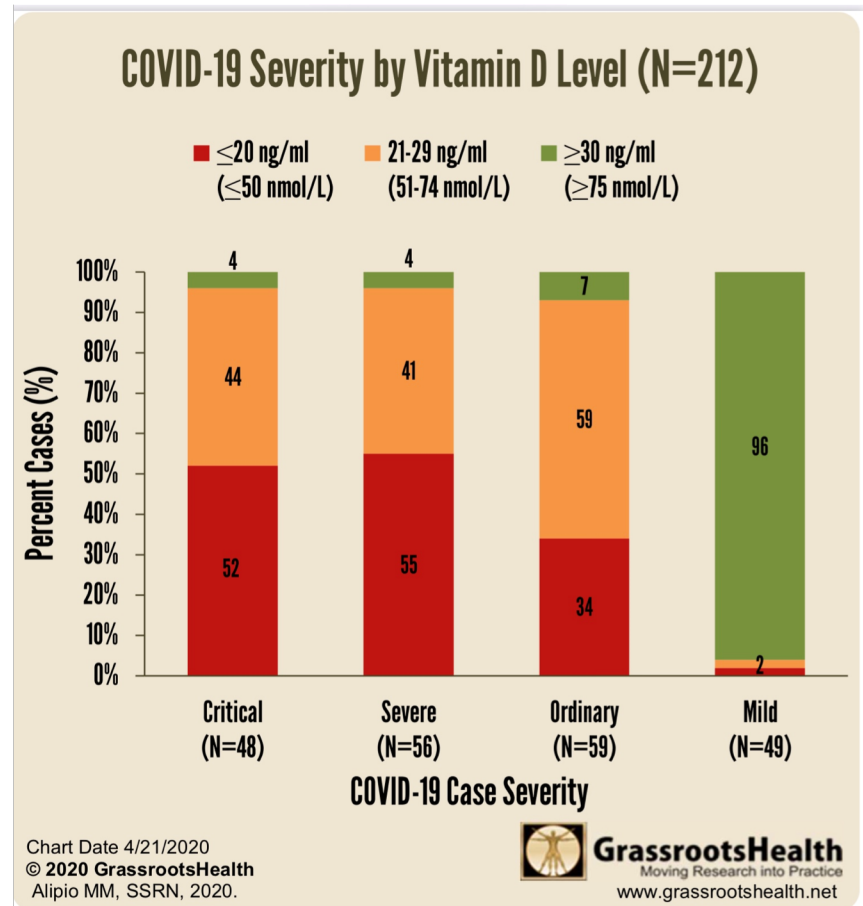
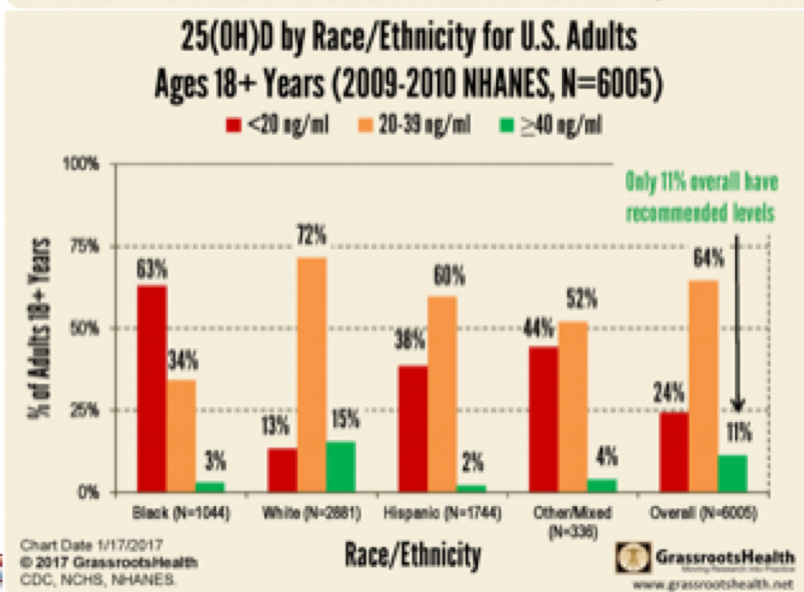
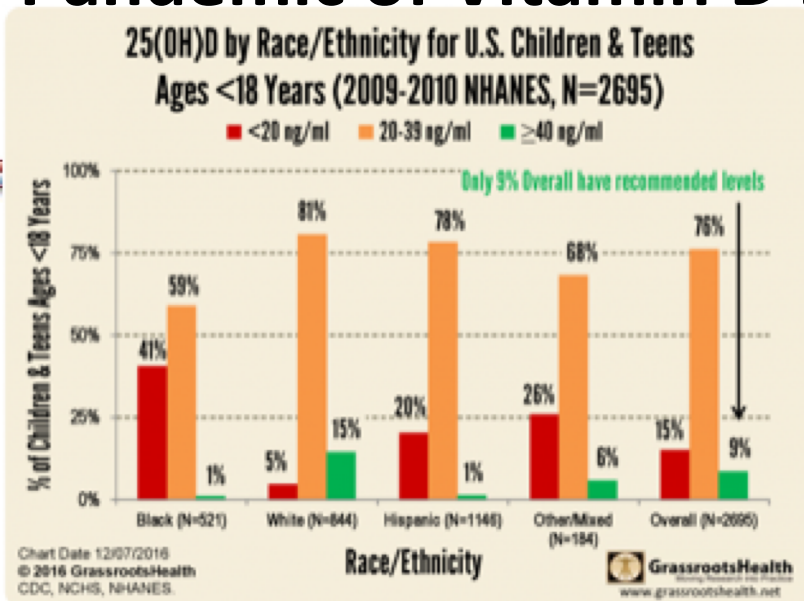
Source: United States Department of Agriculture (2009)

Dietary Intakes Compared to Recommendations. Percent of the U.S. Population Ages 1 Year and Older Who Are Below, At, or Above Each Dietary Goal or Limit



Source: What We Eat in America, NHANES 2007-2010

Pandemic of Vitamin D Deficiency...



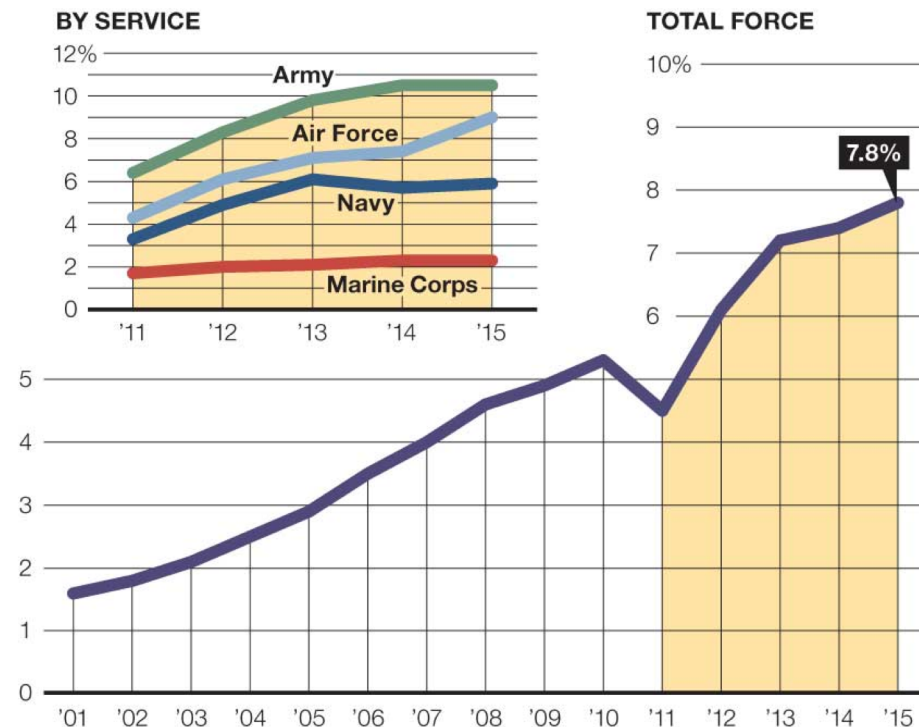
“Medically Ready Force...Ready Medical Force”

Obesity: A Growing U.S. Military Threat



TROOPS & OBESITY

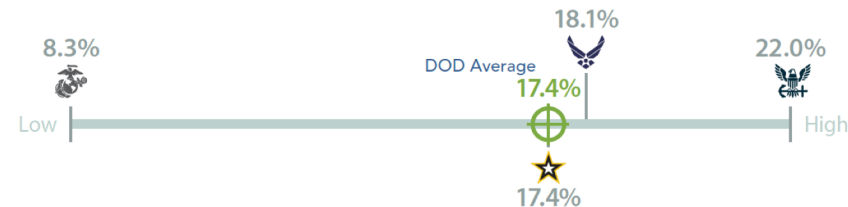
Since 2001, the percentage of military personnel deemed overweight has skyrocketed and now accounts for nearly 8 percent of the entire active-duty force. The obesity problem appears worst in the Army.



Source: Defense Department

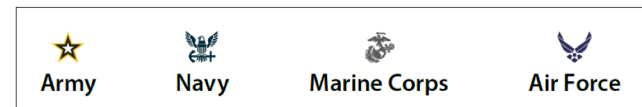
Credit: Military.com

- Basic Military Training graduates add
 - ~ 4 pounds per year
 - ~ 0.5 inches in abdominal circumference per year
- Over 4 years of military service:
 - 37.3% transitioned to a higher Body Mass Index (BMI) category



Overall, 17.4% of AC Service members were classified as obese in 2018.

Rates ranged from 8.3% to 22.0% across Services.

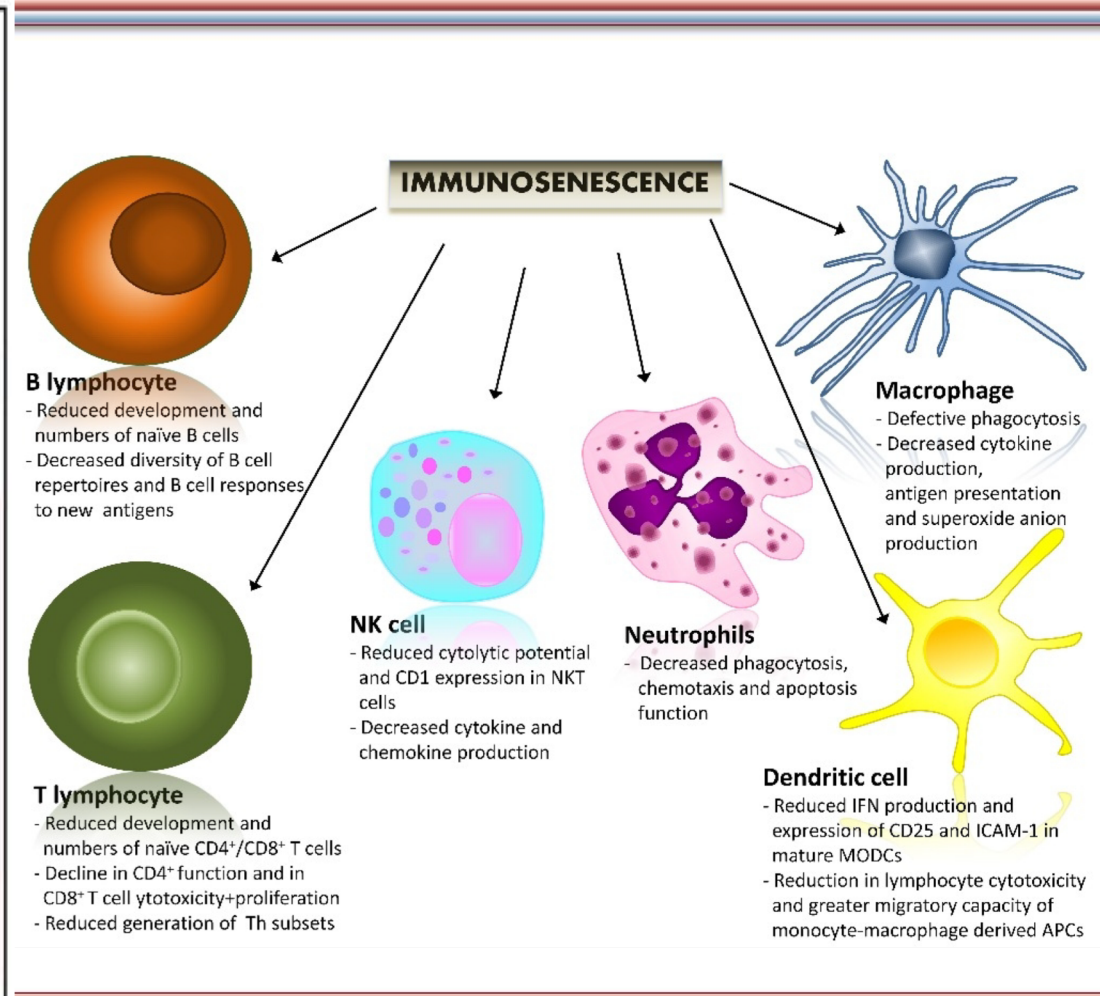
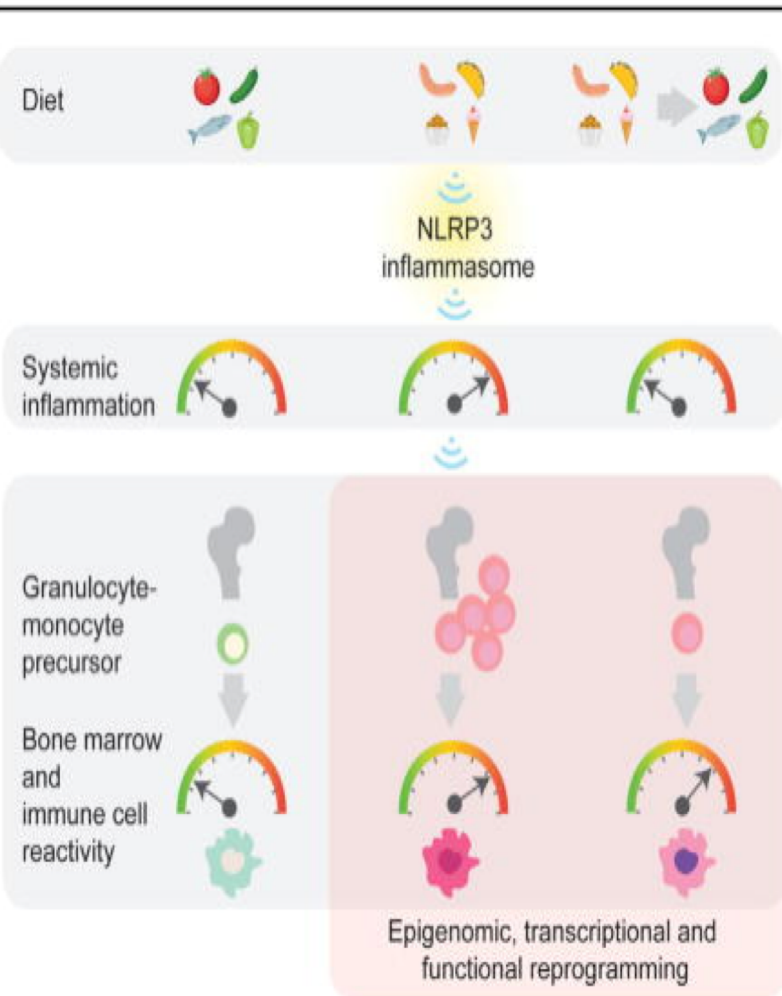


Prevalence of Obesity by Sex and Age, AC Service Members, 2018

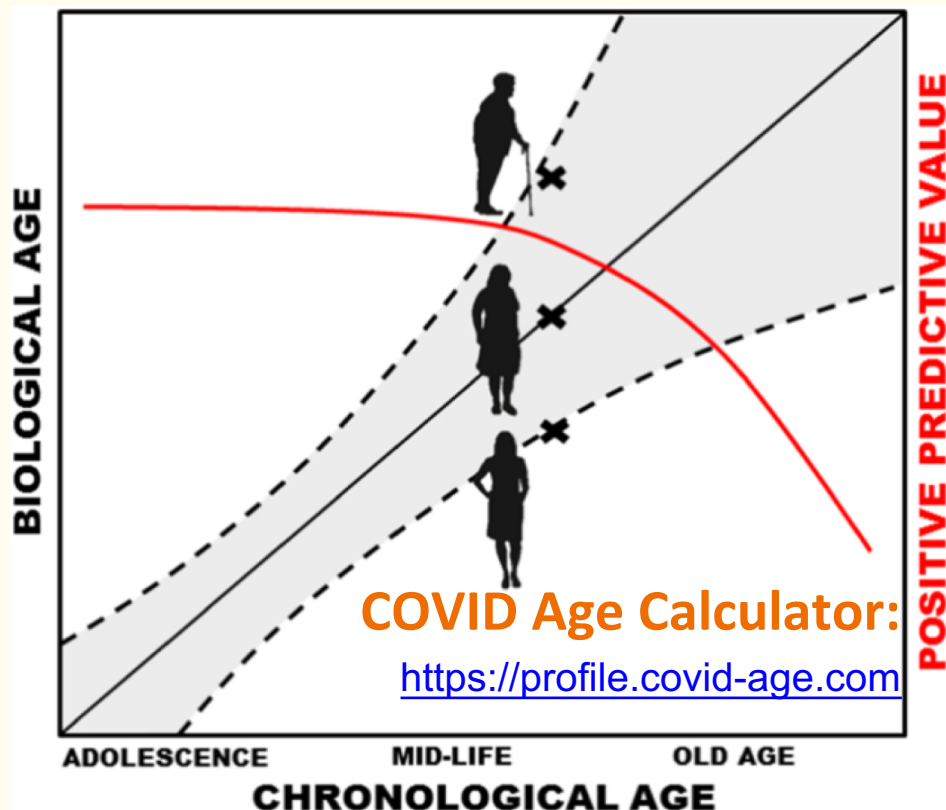
"Medically Ready Force...Ready Medical Force"

Sources:
 2019 Year of the Force Report, Jan 2019
 Am J Prev Med 2020; 58(1):117–121

Standard American Diet (SAD) triggers inflammasome pathway, biological aging & immunosenescence



Does Chronological Age Predict Biological Age?



Credit: <https://www.semanticscholar.org>. EBioMedicine 2017

Fig. 1

The concept of biological age predictors. A biological age predictor could be defined as a biomarker correlated with chronological age (black line), which brings additive information in the risk assessments for age-related conditions on top of chronological age. Hence, adult individuals of the same chronological age could possess different risks for age-associated diseases as judged from their biological ages (x's in figure). Usually, the positive predictive value (red line) of a biological age predictor decreases from mid-life and onwards due to the increased biological heterogeneity at old age (conditioned by the increased biological heterogeneity at old age).

“Medically Ready Force...Ready Medical Force”

UNHEALTHY BEHAVIORS ARE CAUSING AMERICANS TO AGE FASTER

On average, Americans are 5 years older than they think, according to research from Discovery's Vitality Institute*

The incidence of chronic diseases like **cardiovascular disease, cancer, chronic respiratory disease and diabetes** is rapidly increasing



In fact, **25% of Americans are 8 years older than they think**, with Vitality Age gaps averages varying based on gender, age, education and income:

GENDER Males are on average one year older than females



MALES:
+5.4 YEARS

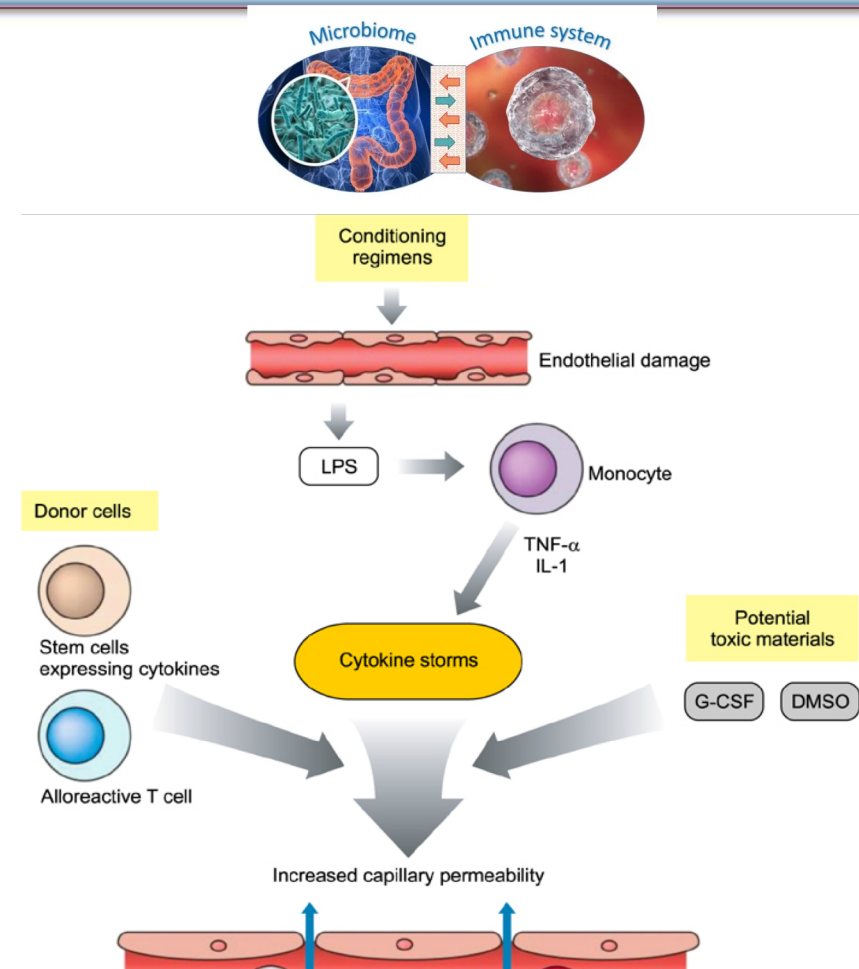
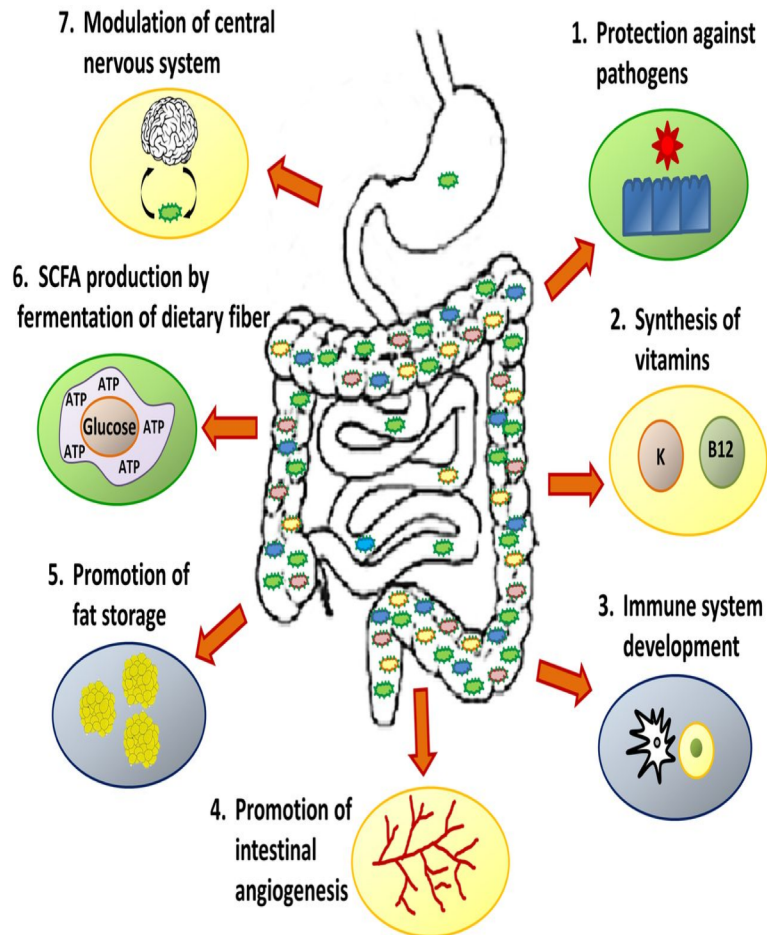


FEMALES:
+4.6 YEARS

Source: VitalityGroup.com

AGE The age gap goes up by 2 years after the age of 36, and this stays consistent through Americans up to age 65

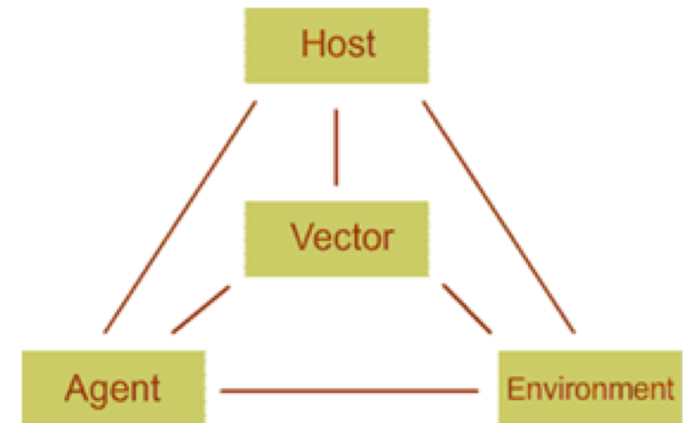
Gastrointestinal (GI) Tract: “Headquarters & Boot Camp” for the Immune System



Human Factor: Immune & Metabolic Resilience



- Increase innate immune effectiveness
- Increase immune tolerance
- Decrease inflammation
- Decrease oxidative stress
- Support healthy gut microbiome
- Support brain health



Resilience = PPE + PPN + PPL

DEFINITIONS:



- **PPN:**

Food and nutrients that enhance immune and metabolic resiliency to reverse disease and optimize performance.

- **PPL:**

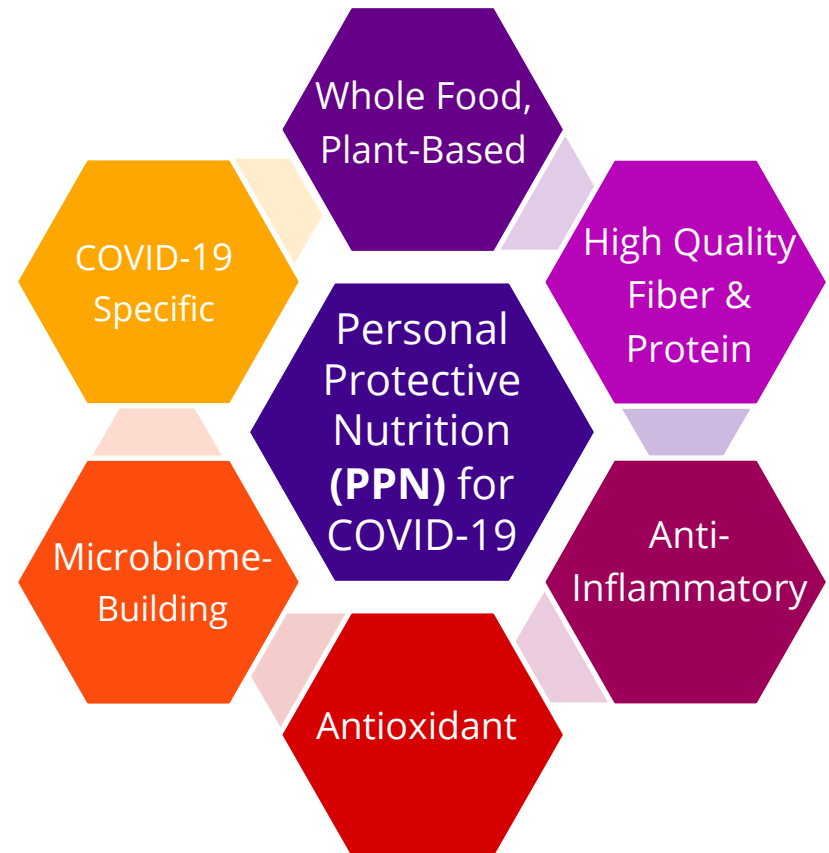
Activities of daily living that enhance immune and metabolic resiliency to reverse disease and optimize performance.

Personal Protective Nutrition (PPN)



DEFINITION:

Food and nutrients that enhance immune and metabolic resiliency to reverse disease and optimize performance.



Personal Protective Nutrition: What Do They Have in Common?

- **American Cancer Society**
- **American Association of Clinical Endocrinologists**
- **Academy of Nutrition and Dietetics**
- **American Heart Association**
- **American College of Cardiology**
- **US National Dietary Guidelines**
- **Government of Canada: Nutritional Guidelines**
- **World Health Organization**

Eat a variety of healthy foods each day

Have plenty of
vegetables and fruits

Eat protein foods

Make water
your drink
of choice



Choose
whole grain
foods

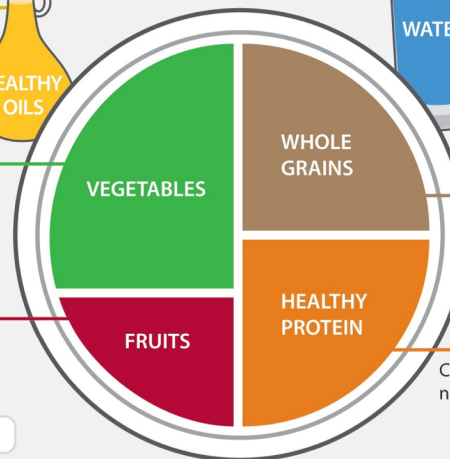
HEALTHY EATING PLATE

Use healthy oils (like olive and canola oil) for cooking, on salad, and at the table. Limit butter. Avoid trans fat.



The more veggies – and the greater the variety – the better. Potatoes and French fries don't count.

Eat plenty of fruits of all colors.



Drink water, tea, or coffee (with little or no sugar). Limit milk/dairy (1-2 servings/day) and juice (1 small glass/day). Avoid sugary drinks.

Eat a variety of whole grains (like whole-wheat bread, whole-grain pasta, and brown rice). Limit refined grains (like white rice and white bread).

Choose fish, poultry, beans, and nuts; limit red meat and cheese; avoid bacon, cold cuts, and other processed meats.



STAY ACTIVE!

© Harvard University



Harvard T.H. Chan School of Public Health
The Nutrition Source
www.hsph.harvard.edu/nutritionsource

Harvard Medical School
Harvard Health Publications
www.health.harvard.edu



Sources:

<https://food-guide.canada.ca/en/>, 2020

Harvard Healthy Plate, 2011

Canada's food guide

Healthy food choices

Make it a habit to eat a variety of healthy foods each day.

Eat plenty of vegetables and fruits, whole grain foods and protein foods. Choose protein foods that come from plants more often.

- Choose foods with healthy fats instead of saturated fat

Limit highly processed foods. If you choose these foods, eat them less often and in small amounts.

- Prepare meals and snacks using ingredients that have little to no added sodium, sugars or saturated fat
- Choose healthier menu options when eating out

Make water your drink of choice

- Replace sugary drinks with water

Use food labels

Be aware that food marketing can influence your choices

Sources:

<https://food-guide.canada.ca/en/>, 2020

FIBER

**and high quality
protein sources**

**Only 3% of Americans
eat the recommended
daily amount of fiber.**

(National Health and Nutrition Examination Survey (NHANES) 2003-2006)

Source:
USDA/NHANES 2003-2006

Why fiber matters?

**Low-density Lipoprotein (LDL) clearance,
glucose regulation/insulin sensitivity,
hormone balance, coronary heart disease,
stroke,**

**GI disorders, obesity, prediabetes, DM2,
metabolic dysfunctions, weight loss**

Personal Protective Nutrition: RECOMMENDED DAILY FIBER

30-40 grams
of natural fiber daily
(American Heart Association, 2016)
(FDA, 2016)

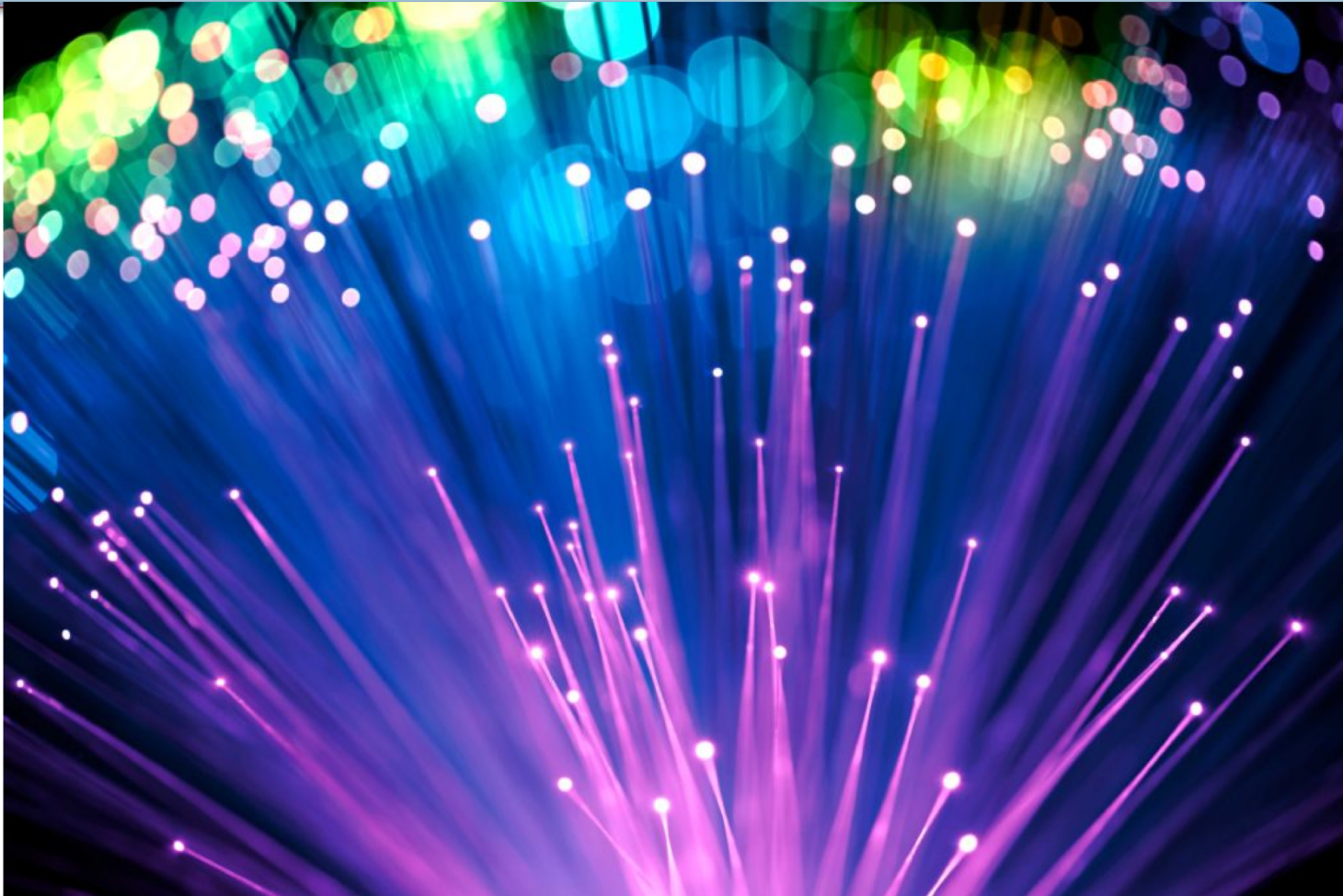
Sources:

AHA 2016

FDA 2016

High Quality
Fiber &
Protein

Personal Protective Nutrition: FIBEROPTIC VISION



Sources:
ofsoptics.com

“Medically Ready Force...Ready Medical Force”

Personal Protective Nutrition: “FIBER-OPTIC” VISION



= 4 grams



= 3 grams



Sources:
ADD

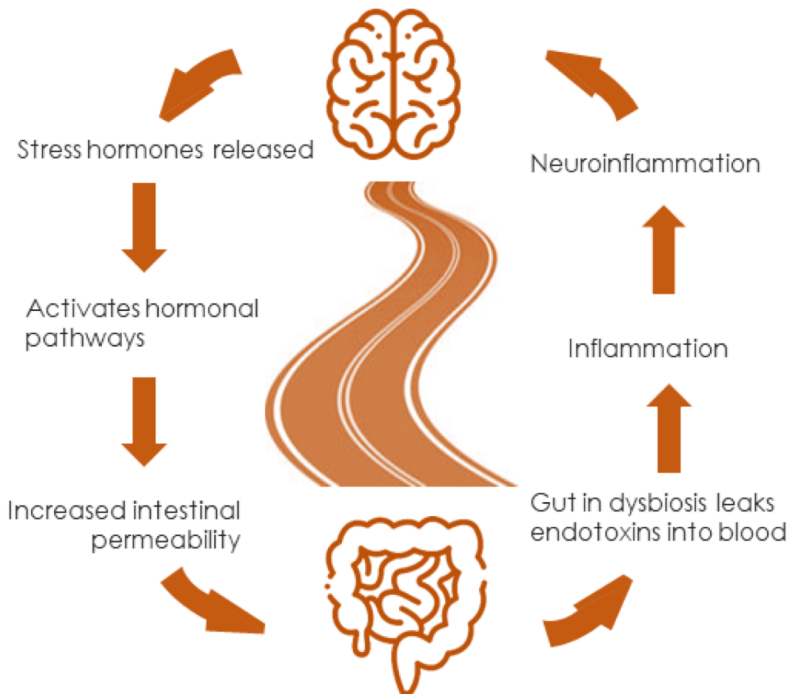
**GOOD FIBER =
HAPPY, HEALTHY
GUTS**

YOUR GUT IS YOUR SECOND BRAIN

Personal Protective Nutrition: GUT BIOME LINK TO HEALTH

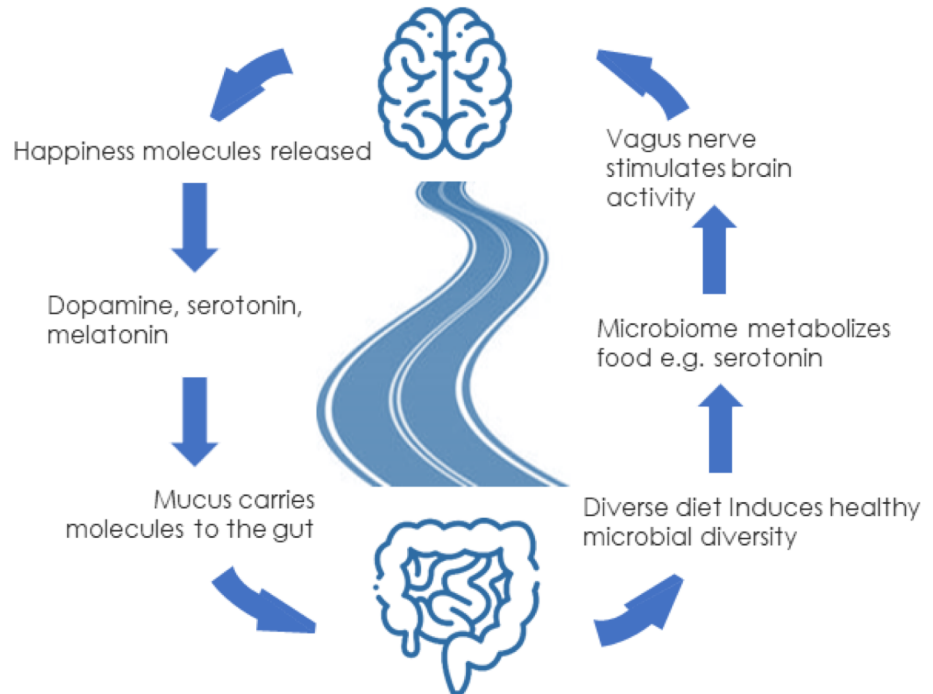
DISEASE

Depression, anxiety, stress



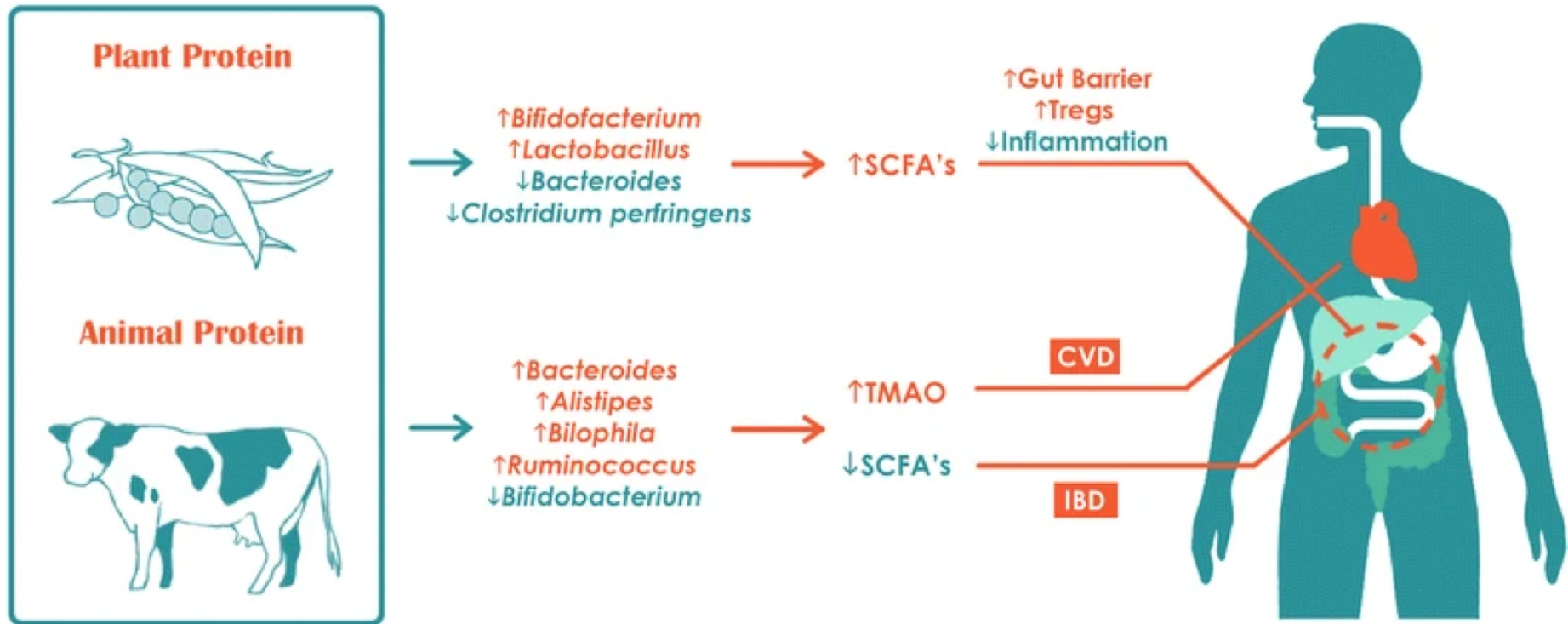
HEALTH

Good mood, good sleep, physical exercise

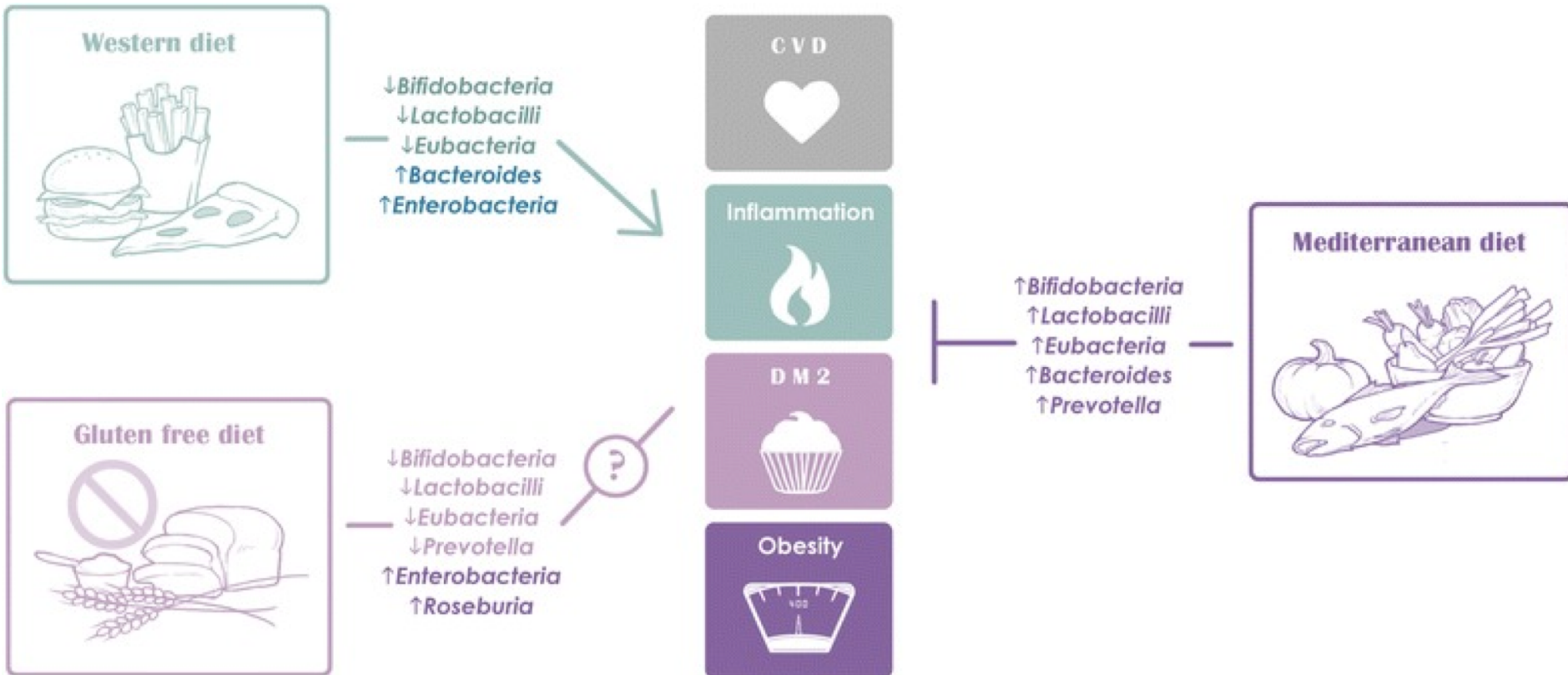


Sources: <https://lifetimeomics.com/the-omics-gut-brain-axis-2/>, Accessed 2020

EPIGENETIC REGULATION OF HEALTH GENES



Sources:
[J Transl Med. 2017; 15: 73.](#)



Sources:
[J Transl Med. 2017; 15: 73.](#)

DON'T GIVE FREE RADICALS A CHANCE!

 **OXIDATIVE STRESS**  **BIO-DAMAGE**

**MINIMIZING YOUR
SYSTEMIC INFLAMMATION**

Personal Protective Nutrition: OPTIMIZING ANTIOXIDANTS

Nutrition Journal



Antioxidant content in mmol/100 g

	n	mean	median	min	max	25th percentile	75th percentile	90th percentile
Plant based foods ^{a)}	1943	11.57	0.88	0.00	2897.11	0.27	4.11	24.30
Animal based foods ^{b)}	211	0.18	0.10	0.00	1.00	0.05	0.21	0.46
Mixed foods ^{c)}	854	0.91	0.31	0.00	18.52	0.14	0.68	1.50
Categories								
1 Berries and berry products	119	9.86	3.34	0.06	261.53	1.90	6.31	37.08
2 Beverages	283	8.30	0.60	0.00	1347.83	0.15	2.37	3.64
3 Breakfast cereals	90	1.09	0.89	0.16	4.84	0.53	1.24	1.95
4 Chocolates and sweets	80	4.93	2.33	0.05	14.98	0.82	8.98	13.23
5 Dairy products	86	0.14	0.06	0.00	0.78	0.04	0.14	0.44
6 Desserts and cakes	134	0.45	0.20	0.00	4.10	0.09	0.52	1.04
7 Egg	12	0.04	0.04	0.00	0.16	0.01	0.06	0.14
8 Fats and oils	38	0.51	0.39	0.19	1.66	0.30	0.50	1.40
9 Fish and seafood	32	0.11	0.08	0.03	0.65	0.07	0.12	0.21
10 Fruit and fruit juices	278	1.25	0.69	0.03	55.52	0.31	1.21	2.36
11 Grains and grain products	227	0.34	0.18	0.00	3.31	0.06	0.38	0.73
12 Herbal/traditional plant	59	91.72	14.18	0.28	2897.11	5.66	39.67	120.18

Source:
Carlsen MH, Halvorsen BL, Holte K, et al. The total antioxidant content of more than 3100 foods, beverages, spices, herbs and supplements used worldwide. *Nutr J.* 2010;9:3. Published 2010 Jan 22. doi:10.1186/1475-2891-9-3

Personal Protective Nutrition: OPTIMIZING ANTIOXIDANTS

Table 1

Best sources of dietary antioxidants: Top 20 fruits, vegetables, and nuts
(as measured by total antioxidant capacity per serving size)

Rank	Food Item	Serving Size	Total Antioxidant Capacity/ Serving Size
1	Small red bean (dried)	½ C	13,727
2	Wild blueberry	1 C	13,427
3	Red kidney bean (dried)	½ C	13,259
4	Pinto bean	½ C	11,864
5	Blueberry (cultivated)	1 C	9,019
6	Cranberry	1 C (whole)	8,983
7	Artichoke (cooked)	1 C (hearts)	7,904
8	Blackberry	1 C	7,701
9	Prune	½ C	7,291
10	Raspberry	1 C	6,058
11	Strawberry	1 C	5,938
12	Red Delicious apple	1	5,900
13	Granny Smith apple	1	5,381
14	Pecan	1 oz	5,095
15	Sweet cherry	1 C	4,873
16	Black plum	1	4,844
17	Russet potato (cooked)	1	4,649
18	Black bean (dried)	½ C	4,181
19	Plum	1	4,118
20	Gala apple	1	3,903

Source: American Chemical Society. Largest USDA study of food antioxidants reveals best sources. Available at: www.eurekalert.org/pub_releases/2004-06/aas-lus061504.php. Accessed Oct. 3, 2005.

*Eat foods
with rich hues*

*Maximize
Phytonutrient
Density*

Personal Protective Nutrition: OPTIMIZING ANTIOXIDANTS



Sources:
ADD

Personal Protective Nutrition: INFLAMMATION ESTIMATION



Sources: <https://www.frontiersin.org/research-topics/9855/smoldering-inflammation-in-cardio-immune-metabolic-diseases>

Anti-
Inflammatory

Personal Protective Nutrition: INFLAMMATION + COVID



CPR News

SIGN IN

NPR SHOP

DONATE NOW

NEWS

ARTS & LIFE

MUSIC

SHOWS & PODCASTS

SEARCH



HEALTH NEWS FROM NPR

THE CORONAVIRUS CRISIS



Why Some COVID-19 Patients Crash: The Body's Immune System Might Be To Blame

April 7, 2020 · 9:00 AM ET

Heard on [Morning Edition](#)

Sources:
NPR, 2020

"Medically Ready Force...Ready Medical Force"



Centers for Disease Control and Prevention
CDC 24/7: Saving Lives, Protecting People™



EMERGING INFECTIOUS DISEASES®

45.4% of US adults are at increased risk for complications from coronavirus because of cardiovascular disease, diabetes, respiratory disease, hypertension, or cancer.
(Emerg Infect Dis, 2020)

Sources:
Emerg Infect Dis, 2020

“Medically Ready Force...Ready Medical Force”

**PRE-EXISTING
INFLAMMATION
(CHRONIC DISEASE)**

WORSENS COURSE OF COVID

CORRESPONDENCE | [VOLUME 395, ISSUE 10234, P1417-1418, MAY 02, 2020](#)



PDF [409 KB]

[Figures](#)

Endothelial cell infection and endotheliitis in COVID-19

[Zsuzsanna Varga](#) • [Andreas J Flammer](#) • [Peter Steiger](#) • [Martina Haberecker](#) • [Rea Andermatt](#) • [Annelies S Zinkernagel](#) • et al. [Show all authors](#)

Published: April 20, 2020 • DOI: [https://doi.org/10.1016/S0140-6736\(20\)30937-5](https://doi.org/10.1016/S0140-6736(20)30937-5)

[Supplementary Material](#)

[References](#)

[Article Info](#)

[Figures](#)

Cardiovascular complications are rapidly emerging as a key threat in coronavirus disease 2019 (COVID-19) in addition to respiratory disease. The mechanisms underlying the disproportionate effect of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection on patients with cardiovascular comorbidities, however, remain incompletely understood.^{[1](#), [2](#)}

Personal Protective Nutrition: COVID-19 + Inflammation

- **VASCULOTROPIC VIRUS**
- **Exacerbates endothelial cell dysfunction**
 - **Infection of blood vessels**
 - **Impact of pre-existing conditions**
- **COVID-19:
RESPIRATORY + VASCULAR INFECTION**

Elsevier Public Health Emergency Collection

Public Health Emergency COVID-19 Initiative

[Microbes Infect.](#) 2020 May-June; 22(4): 149–150.

PMCID: PMC7229726

Published online 2020 May 16. doi: [10.1016/j.micinf.2020.05.006](https://doi.org/10.1016/j.micinf.2020.05.006)

PMID: [32425647](https://pubmed.ncbi.nlm.nih.gov/32425647/)

Covid-19 accelerates endothelial dysfunction and nitric oxide deficiency

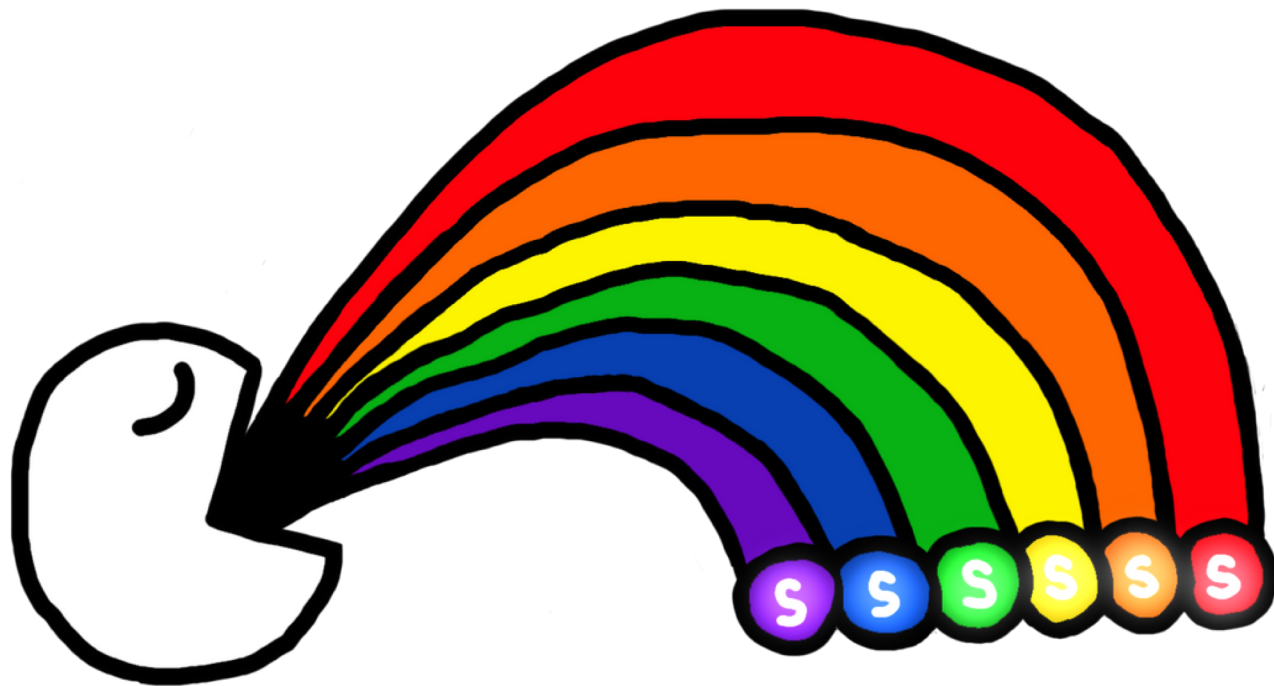
[Shawn J. Green](#)

► [Author information](#) ► [Article notes](#) ► [Copyright and License information](#) [Disclaimer](#)

Martel and colleagues provide a thoughtful review on strategies to increase airway nitric oxide to treat and possibly prevent Covid-19 [¹]. However, it is becoming apparent that the clinical presentation of Covid-19 begins with acute respiratory distress in the lungs that moves quickly to vascular networks throughout the gut, kidney, heart, and brain with associated platelet-endothelial dysfunction and abnormally rapid life-threatening blood clotting [²]. SARS-CoV-2 is emerging as a thrombotic and vascular disease targeting endothelial cells throughout the body and is particularly evident in patients with cardiometabolic comorbidities, in particular hypertension, with associated endothelial dysfunction [³].

TRANSLATION?

Personal Protective Nutrition: INFLAMMATION MINIMIZATION



TASTE THE RAINBOW

Personal Protective Nutrition: INFLAMMATION MINIMIZATION



EAT ~~TASTE~~ THE RAINBOW

Personal Protective Nutrition: SMART SUPPLEMENTATION

Daily Essentials

- Zinc: 30 - 60 mg (prevent viral replication)
- Vitamin C: 500-1000 mg with lots of water
- Vitamin D: 2000-5000 IU (immune modulator)
- Age > 50 years: Consider Multi Vitamin
 - Vits A, C, D, E, Bs, selenium, zinc

Additional Consideration

- Quercetin: 250-500mg (zinc ionophore)
 - 2-4 cups of green tea
- Curcumin: 500-1000 mg (effective IL-6 inhibitor)
 - ¼-½ tsp of turmeric + sprinkle black pepper
- Omega-3: 3000 mg EPA/DHA (pro-resolvin)
- Melatonin 5-10 mg 30-60 min before bed
- N-Acetyl Cysteine 600 - 1200 mg daily (Antioxidant)
- Fiber & Fermented Foods

Sources:
Huynh, Edens, 2020

Look for National Sanitation Foundation (NSF) or United States Pharmacopeia (USP) labels. Don't purchase from third-party sellers.



“Medically Ready Force...Ready Medical Force”

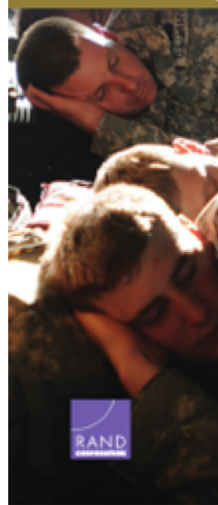
Personal Protective Lifestyle (PPL)

DEFINITION:

Activities of daily living that enhance immune and metabolic resiliency to reverse disease and optimize performance.



Restorative Sleep



85% military members had sleep disorder

- 51% OSA
- 25% insomnia

Mean sleep duration: 5.74 hours/night

- 42% < 5 hours/night

58% with comorbidities

- 23% depression
- 17% anxiety
- 13% PTSD
- 13% TBI
- 25% taking pain medications

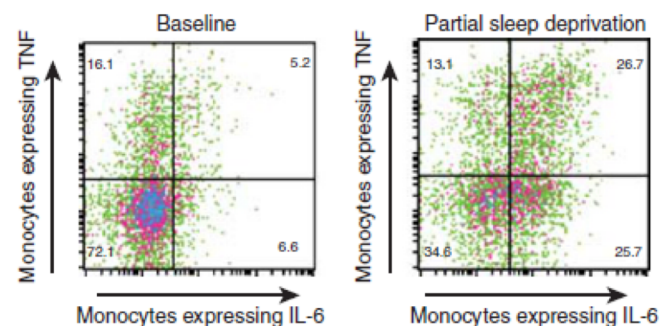
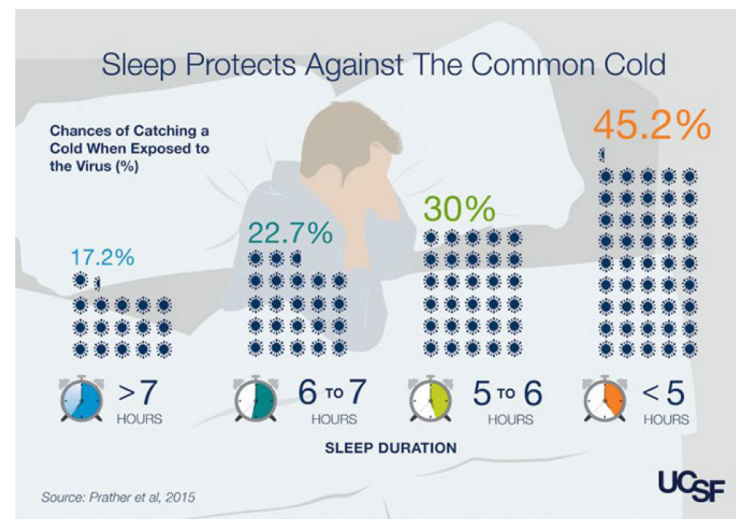


Figure 3. Representative expression of IL-6 and TNF in LPS-stimulated



Received: 20 June 2016

Accepted: 5 August 2016

DOI: 10.1111/jpi.12360

REVIEW ARTICLE

WILEY

 Journal of Pineal Research
 Molecular, Biological, Physiological and
 Clinical Aspects of Melatonin

Melatonin as an antioxidant: under promises but over delivers

“Melatonin has been effectively used to combat oxidative stress, inflammation and cellular apoptosis and to restore tissue function in a number of human trials; its efficacy supports its more extensive use in a wider variety of human studies. The uncommonly high-safety profile of melatonin also bolsters this conclusion.”

Biology, University of Texas Health Science
 Center, San Antonio, TX, USA

Correspondence

Russel J. Reiter, Department of Cellular and
 Structural Biology, University of Texas Health
 Science Center, San Antonio, TX, USA.
 Email: reiter@uthscsa.edu

Abstract

Me

lar

det

stin

zyn

late

Melatonin

- Produced in the pineal gland
- Activated by darkness
- Suppressed by light
- Induces sleep
- Reduces inflammation
- Antioxidant activity

under a rema

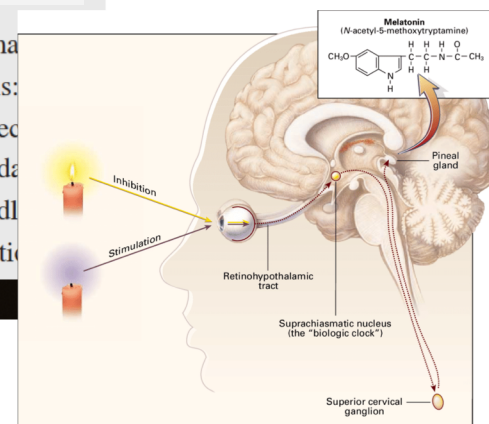
y of means:

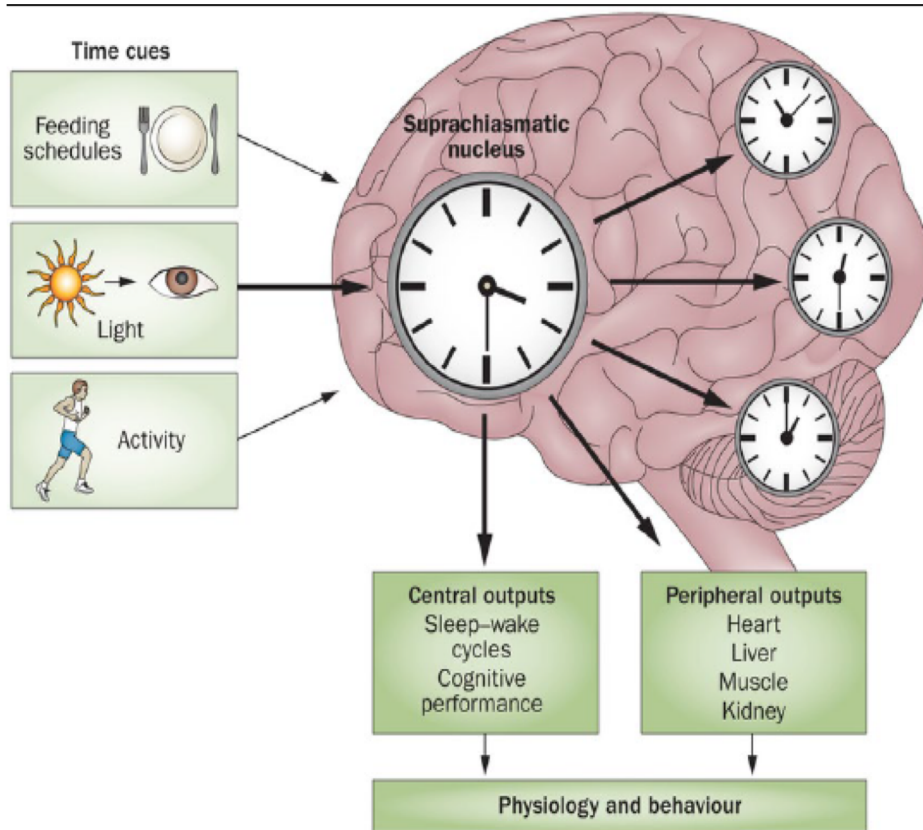
and indirec

of pro-oxida

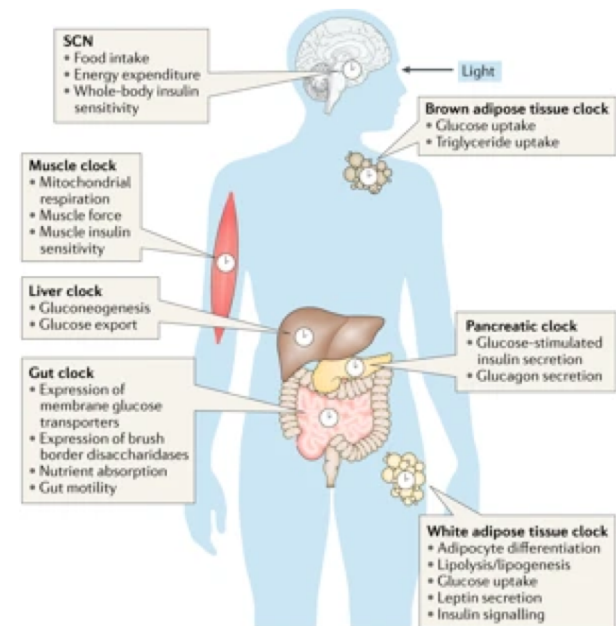
so reported

Weiss reacti





Circadian rhythms in endocrinology and metabolism



The Stress is Killer... Literally



ELSEVIER

Acute and chronic disease: Insights from studies

H. Maxime Lagraauw, J

Division of Biopharmaceutics, Leiden A

ARTICLE INFO

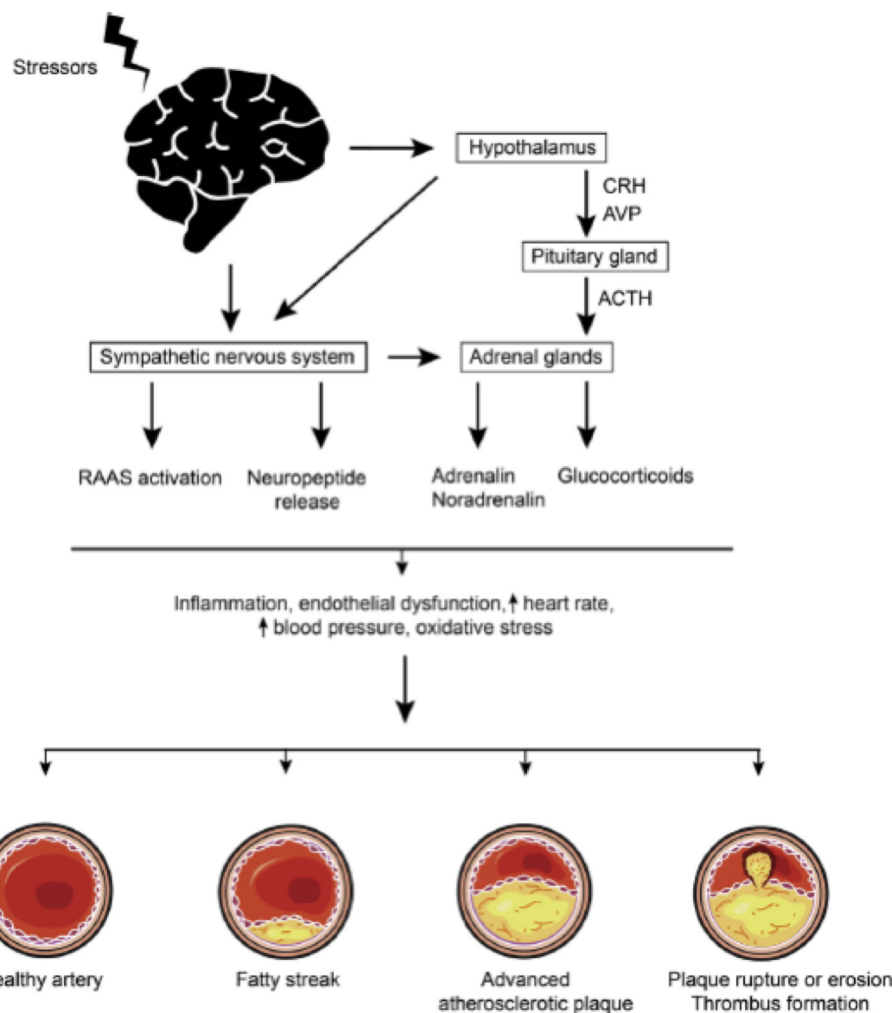
Article history:

Received 21 April 2015

Received in revised form 4 August 2015

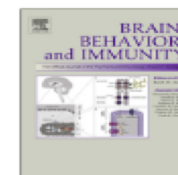
Accepted 5 August 2015

H.M. Lagraauw et al. / Brain, Behavior, and Immunity 50 (2015) 18–30



Atherosclerosis initiation and progression

Clinical complications

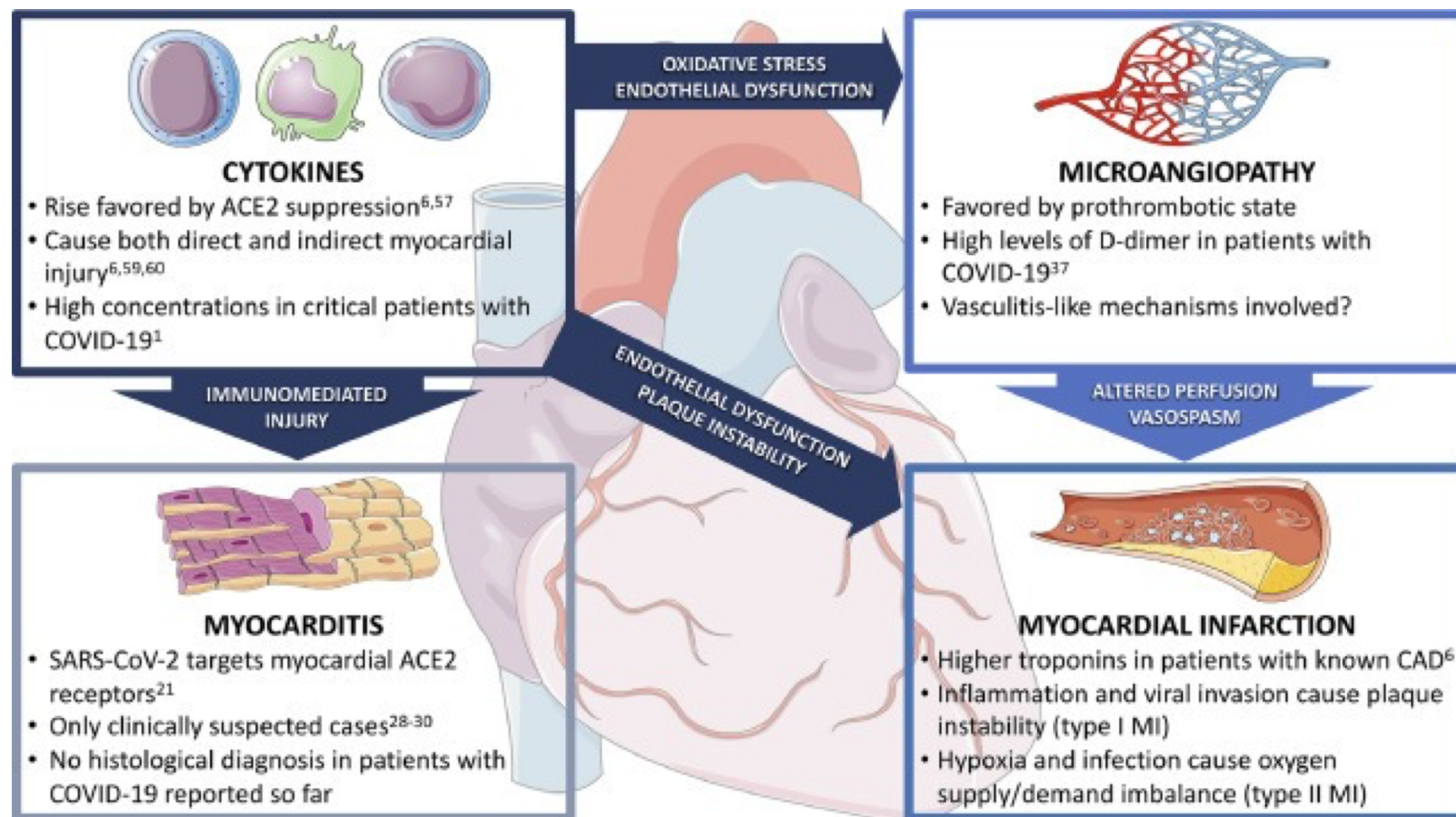


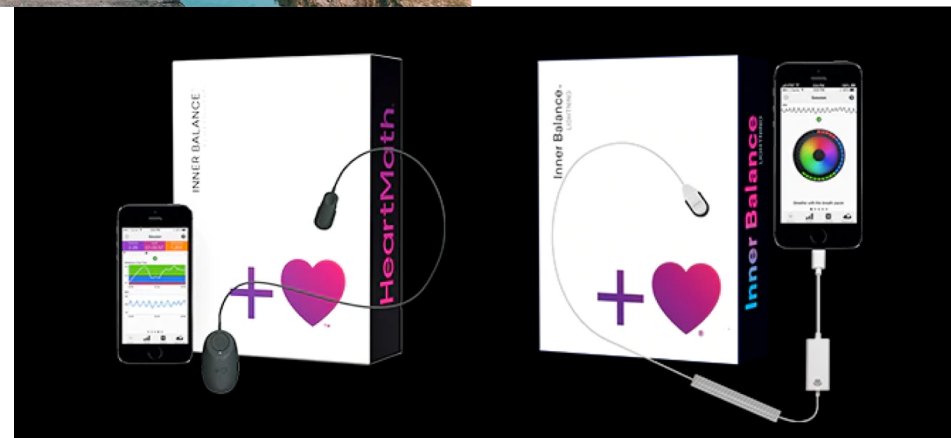
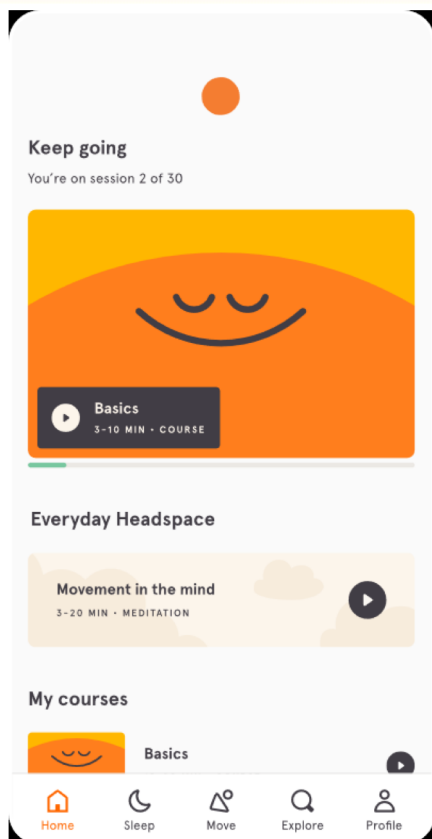
Article
al



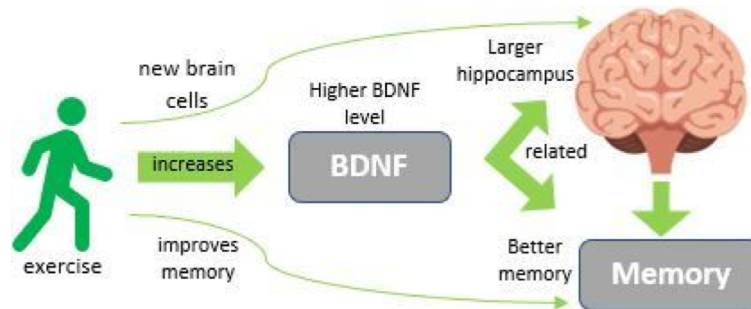
CrossMark

Identification and therapeutic patient and on soci-recognized as a potent





- Decreases stress hormones
- Improves mental health
- Releases endorphins and endocannabinoids
 - Decreases pain
 - Improves sleep
- Increases circulation
 - Circulate blood and nutrients
 - Eliminate waste from cells
- Increases infection-fighting white blood cells and antibodies
- Increases brain-derived neurotrophic factors
- Increases extracellular superoxide dismutase



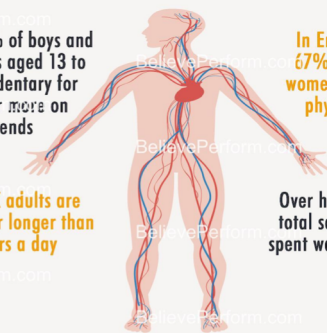
THE BENEFITS OF EXERCISE ON MENTAL HEALTH

In 2012, 43% of boys and 37% of girls aged 13 to 15 were sedentary for 6 hours or more on weekends

In England and Scotland 67% of men and 55% of women meet recommended physical activity levels

13% of UK adults are sedentary for longer than 8.5 hours a day

Over half of children's total sedentary time is spent watching television



What are the benefits of exercise on mental health?



Reduce stress levels

Exercise can help to reduce your cortisol levels



Improves social well-being

Whilst exercising you might meet new people and develop more friendships



Reduced anxiety

When you exercise your brain releases endorphins which can help to calm you down



Increased self esteem

As you become faster, fitter and stronger you start to improve your self confidence



Reduced risk of depression

Exercise can help to improve your mood



Boost Brainpower

Exercise can help to improve cognitive functioning including decision making and learning

Statistics from PHYSICAL ACTIVITY STATISTICS, 2015 BRITISH PHYSICAL FOUNDATION

Extracellular superoxide dismutase, a molecular transducer of health benefits of exercise

Zhen Yan^{a,b,c,d,*}, Hannah R. Spaulding^a

^a Center for Skeletal Muscle Research at Robert M. Berne Cardiovascular Research Center, University of Virginia School of Medicine, Charlottesville, VA, 22908

^b Department of Medicine, University of Virginia School of Medicine, Charlottesville, VA, 22908, USA

^c Department of Pharmacology, University of Virginia School of Medicine, Charlottesville, VA, 22908, USA

^d Department of Molecular Physiology and Biological Physics, University of Virginia School of Medicine, Charlottesville, VA, 22908, USA



Z. Yan and H.R. Spaulding

ARTICLE INFO

Keywords:

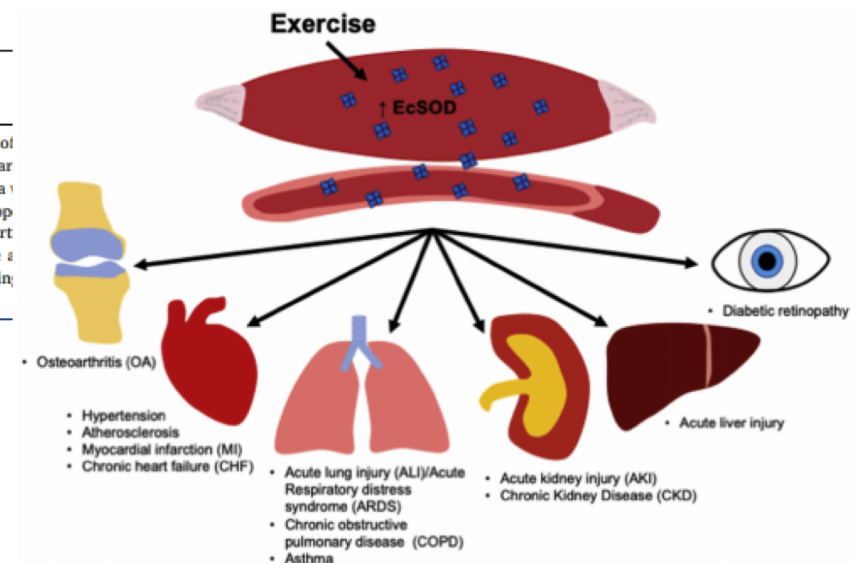
EcSOD
Exercise
Oxidative stress
Endothelial dysfunction
Endothelial cell activation

ABSTRACT

Extracellular superoxide dismutase (EcSOD) is the only extracellular scavenger of superoxide with a unique binding capacity to cell surface and extracellular matrix through its heparan sulfate. EcSOD activity prevents oxidative stress and damage, which are fundamental in a variety of diseases. In this review we will discuss the findings in humans and animal studies supporting the importance of skeletal muscle EcSOD, which is induced by endurance exercise and its circulation to the peripheral tissues, as a molecular transducer of exercise training in reducing oxidative stress and damage in various disease conditions.

Regular exercise may prevent Acute Lung Injury (ALI)/Acute Respiratory Distress Syndrome (ARDS), severe COVID complication

Extracellular Superoxide Dismutase (EcSOD) gene/protein therapy might be effective in treating ALI/ARDS under the condition of COVID-19 infection



Exercise



The American Heart Association Recommendations for Physical Activity in Adults



At least 30 minutes of moderate-intensity aerobic activity **At least 5 days** per week for a **total of 150 minutes**

OR

At least 25 minutes of vigorous aerobic activity **At least 3 days** per week for a **total of 75 minutes**

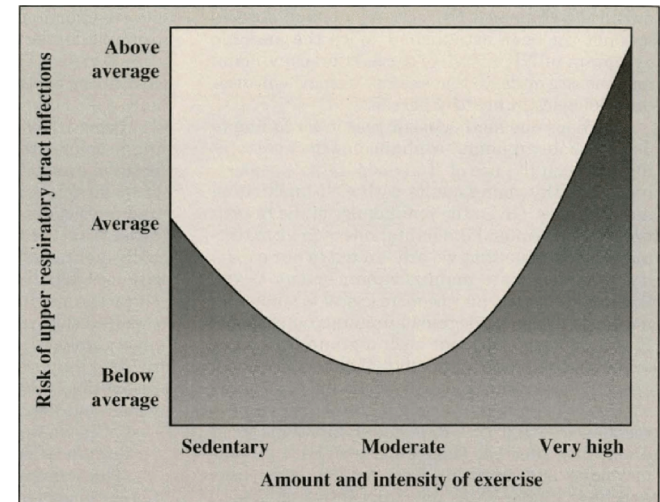
or a combination of the two

AND

Moderate to HIGH INTENSITY muscle-strengthening activity **At least 2 days** per week for additional health benefits

© 2013

Learn more at heart.org/ActivityRecommendations.



At least 60 minutes of moderate- to vigorous-intensity aerobic activity **Every day**

© 2014 Learn more at heart.org/KidsActivityRecommendations.

“Medically Ready Force...Ready Medical Force”

American Journal of Lifestyle Medicine

[Am J Lifestyle Med](#). 2017 Nov-Dec; 11(6): 466–475.

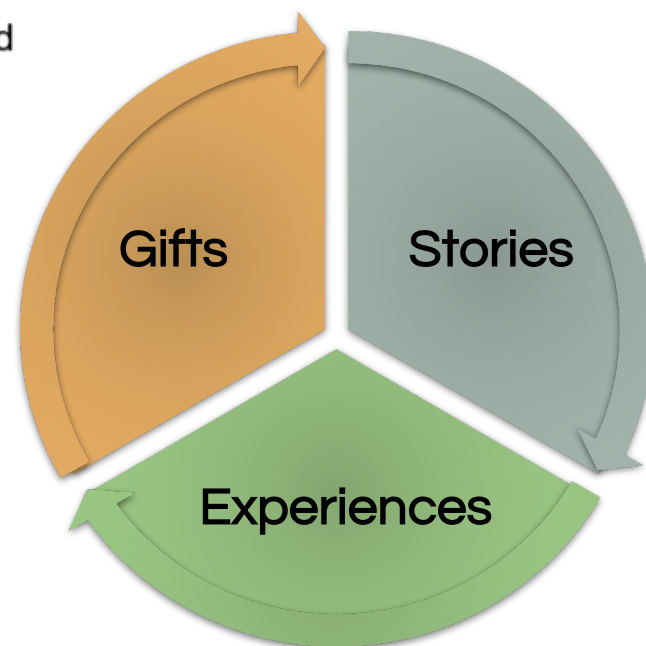
PMCID: PMC6125010

Published online 2015 Oct 7. doi: [10.1177/1559827615608788](#)

PMID: [30202372](#)

The Connection Prescription: Using the Power of Social Interactions and the Deep Desire for Connectedness to Empower Health and Wellness

[Jessica Martino](#), [Jennifer Pegg](#), and [Elizabeth Pegg Frates](#), MD



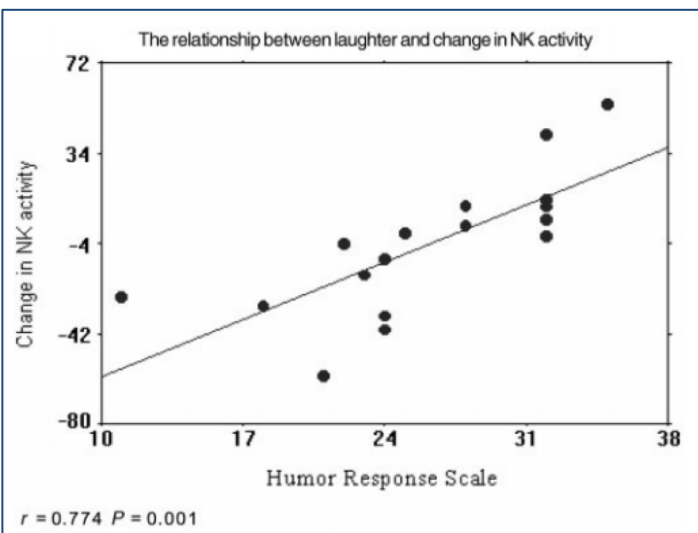
Review

Humor and Laughter May Influence Health IV. Humor and Immune Function

Mary Payne Bennett¹ and Cecile Lengacher²

¹Western Kentucky University, School of Nursing and ²University of South Florida

Humor & laughter increases NK cell activities



LAUGHTER IS THE BEST MEDICINE ITS NO JOKE!

1 LAUGHTER IS CONTAGIOUS

The discovery of mirror neurons—what causes you to smile when someone smiles at you—gives credence to the belief that laughter is contagious.

LAUGHTER COMBATS DEPRESSION

Even forced laughter releases a cocktail of hormones, neuropeptides, and dopamine that can start to improve your mood.

3 LAUGHTER BOOSTS IMMUNITY

According to one study done at Indiana State School of nursing, mirthful laughter may increase natural killer cell levels, a type of white blood cell that attacks cancer cells.

REMEMBER!

Your ability to laugh can be cultivated with practice so start by prioritizing fun. Find occasion to be silly. Remember laughter, like smiling, is never depleted when you share it.

ps://chopra.com/articles/6-reasons-why-laughter-is-the-best-medicine



“Medically Ready Force...Ready Medical Force”

Forest Bathing = Mindfully Present in Nature

Environ Health Prev Med (2010) 15:9–17
DOI 10.1007/s12199-008-0068-3

SPECIAL FEATURE

The Trends on the Research of Forest Bathing in Japan, Korea and in the World

Effect of forest bathing trips on human immune function

Qing Li

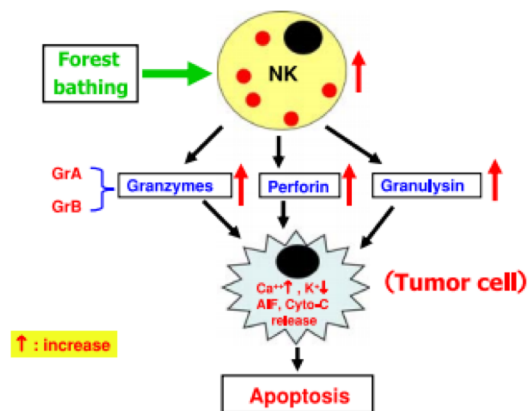


Fig. 10 Mechanism of forest bathing-induced induction in NK activity. AIF Apoptosis-inducing factor, Cyto-c cytochrome c

Forest bathing increased natural killer (NK) cell activities and numbers...lasted 30 days

Phytoncides from trees decreased stress hormones

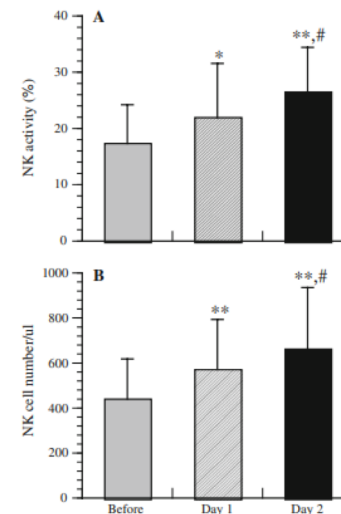
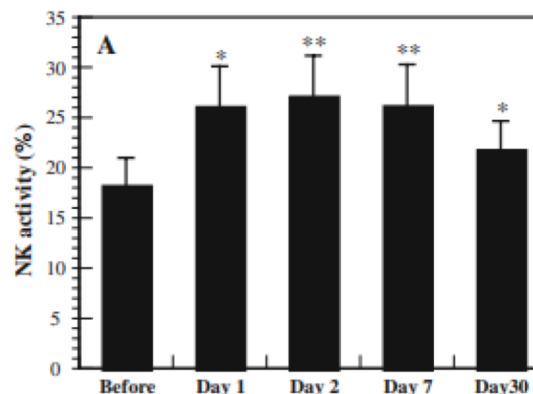


Fig. 1 Effect of a forest bathing trip on natural killer (NK) activity (a) and the number of NK cells (b). Columns: Before values obtained before the trip, Day 1 values obtained after the first day of the trip, Day 2 values obtained after the second day of the trip. Data are presented as the mean \pm standard deviation (SD) ($n = 12$). * $P < 0.05$, ** $P < 0.01$, significantly different from before the trip, # $P < 0.05$ significantly different from day 1 by paired t test. Cited from Li et al. [2]

Time in
Nature

Forest Bathing = Mindfully Present in Nature



“Medically Ready Force...Ready Medical Force”

I Can't Control
(I will let go of these)

Others' attitude

Politics

Others' behavior

The weather

I Can Control

(I will focus on these)

What and
When I eat

My thoughts and
emotions
(Meditation)

How I
Forgive and
Let Go

Self-discipline/Mindfulness

Who I spend
my time with

How and When
I sleep

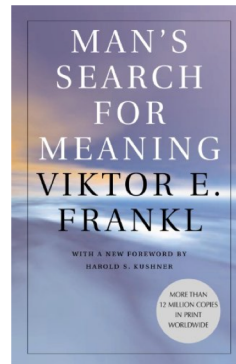
How and when I
express
Gratitude

What I focus on as
purpose and
motivation

My attitude
and behavior

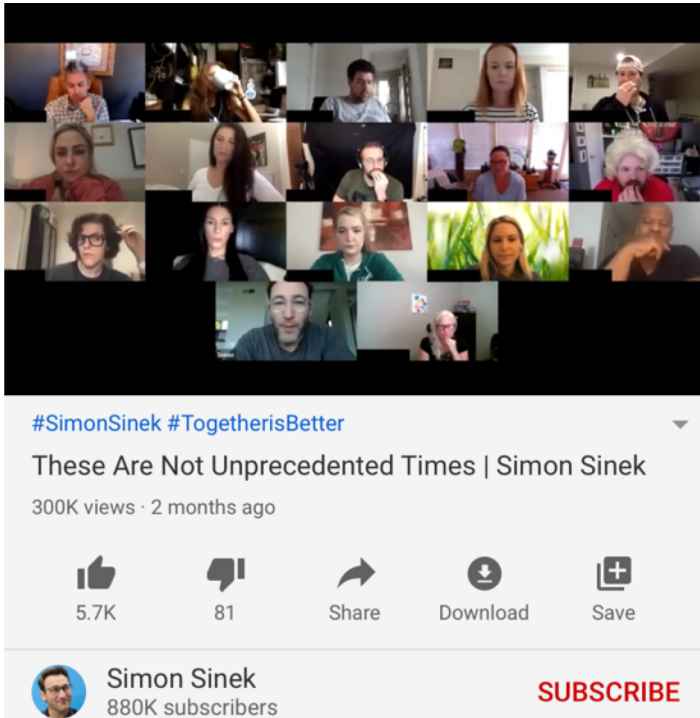
Other people's
social distancing and
use of masks

The outcome of
this pandemic



"Between stimulus and response there is a space. In that space lies our power to choose. In that choice lies our growth and freedom"

--Viktor Frankl



<https://youtu.be/6spNnsD-XOY>

INFINITE Mindset

"... How are we going to change to get through this"

"... How will we do what we're doing in a different world"

"The opportunity is what will we be - not how do we preserve what we had"

"Medically Ready Force...Ready Medical Force"



Stoicism Explained Through Conor McGregor - 7
Lessons to Adapt a Stoic Mindset

749K views · 3 years ago



15K



875



Share



Download



Save



Primed
276K subscribers

SUBSCRIBE

<https://youtu.be/r1zyVGooNME>

STOIC Mindset

“Is it my favorite thing - no - but it is what it is. Maybe my next contract, I’ll negotiate a little bit better.”

“This is the fight business. I’ve been on the end of many defeats in my life and I’ve rose back. I will not shy away from it. I will not make excuses for it. I will assess it and come back.”

“The more you seek the uncomfortable - the more you will become comfortable”

PPN & PPL Communication Tool



- ☐ Vitamin D3: 2,000-4,000 IU daily
- ☐ Vitamin C: 500-1000 mg daily
- ☐ Multivitamin: containing Zinc (15 – 30 mg) and Magnesium (200-400mg); consider foods and separate supplements if needed (USP or NSF seals of approval)
- ☐ EGCG (green tea or matcha; 200-250 mg or 2-4 cups tea daily) OR Quercetin (from foods like onions and apples daily)
- ☐ Melatonin, N-acetyl cysteine, Omega-3, and Curcumin on case-by-case basis

- ☐ Build a robust and diverse microbiome to educate and optimize immune function
- ☐ Increase PREbiotic foods (vegetable/fruit fiber feeds healthy bacteria)
- ☐ Increase PRObiotic foods (e.g., kimchi, sauerkraut, kombucha, kefir)
- ☐ Supplemental probiotics: case-by-case basis - may need following GI illness or antibiotics
- ☐ Ask your doctor/pharmacist if probiotics are right for you

DEFINITION of PPN:
Food and nutrients that enhance immune and metabolic resiliency to reverse disease and optimize performance.

- ☐ "Eat real food, mostly plants, not too much" – Dr. Pollan
- ☐ Every meal: 50% vegetables/fruits (5-10 servings daily), 25% whole grains, 25% other quality protein source
- ☐ Herbs/Spices: (e.g., turmeric, cinnamon, cumin, ginger)
- ☐ Add more nutrient-dense and low glycemic index foods
- ☐ Hydrate! [weight (lbs) ÷ 2 = daily intake of water (oz)]



- ☐ Eat the rainbow of colors daily (FOOD FIRST!)
- ☐ Veg & fruits: rich/variety colors = higher antioxidant activity
- ☐ Consider supplements to boost food sources: Vitamin C, resveratrol, curcumin (USP or NSF seals of approval on bottle)

- ☐ Eat FIBER (30 - 40 g daily) from natural sources including vegetables, beans, and fruits
- ☐ Plants have PROTEIN! Add more plant sources of protein
- ☐ Reduce toxins, chemicals, and hormones from food sources: know the dirty dozen and clean fifteen to select produce – Buy grass fed, free range, wild caught when possible
- ☐ Minimize processed/red meat consumption
- ☐ Have at least 1 bowel movement daily. May need more fiber, fluid, or movement to achieve

- ☐ Avoid high glycemic foods that spike insulin and cause inflammation (Glycemic Index)
- ☐ Minimize fried foods, "browned" meats, saturated/trans-fats
- ☐ Minimize sweets & avoid added sugar (read labels - sugar has many names!)
- ☐ Avoid sodas & sweet beverages (zero-calorie sweeteners can spike insulin – stevia is better)
- ☐ Use more herbs & spices and healthy fats (plant-derived Omega-3s, MUFA, PUFA)

Created by Task Force Resilience members:
Dr. Bryan Stepanenko (CPT USA)
Dr. Regan Stiegmann (Maj, USAF)
Dr. Mylene Huynh (Col (ret) USAF)

V1

JUN 2020

"...Ready Medical Force"

PPN & PPL Communication Tool



- ☐ Seek the good: challenges and barriers are opportunities to innovate and grow
- ☐ Change what you can, find peace with what you cannot, and learn to recognize the difference
- ☐ Be courageous enough to ask for, to offer, and to accept help
- ☐ Maintain an adaptable mindset: How will you change to do what is needed?
- ☐ Seek to understand the perspective of others (Tactical Empathy): perspective = their truth + reality

- ☐ Take breaks from technology
- ☐ Get outdoors and get dirty (start a garden/ play in yard)
- ☐ 15-20 min sun on exposed skin between 1100 – 1500 hr daily
- ☐ Be mindfully present in nature (hiking/forest bathing)
- ☐ Exercise outdoors whenever possible

DEFINITION of PPL:
Activities of daily living that enhance immune and metabolic resiliency to reverse disease and optimize performance.

- ☐ 7-9 hours of restorative sleep nightly
- ☐ Be consistent with sleep/wake times (including weekends)
- ☐ Sleep trackers/apps for quantity & quality
- ☐ Ask family/friends for support & accountability
- ☐ Seek professional help if poor sleep persists



- ☐ Build community by sharing experiences, stories, and gifts
- ☐ Foster trusting relationships with family/friends to allow for vulnerability
- ☐ Pursue mentorship and accountability partners who challenge you to grow
- ☐ Share meals, walks, and workouts with others as opportunities to check-in
- ☐ Maintain connection to spirituality and higher purpose/meaning

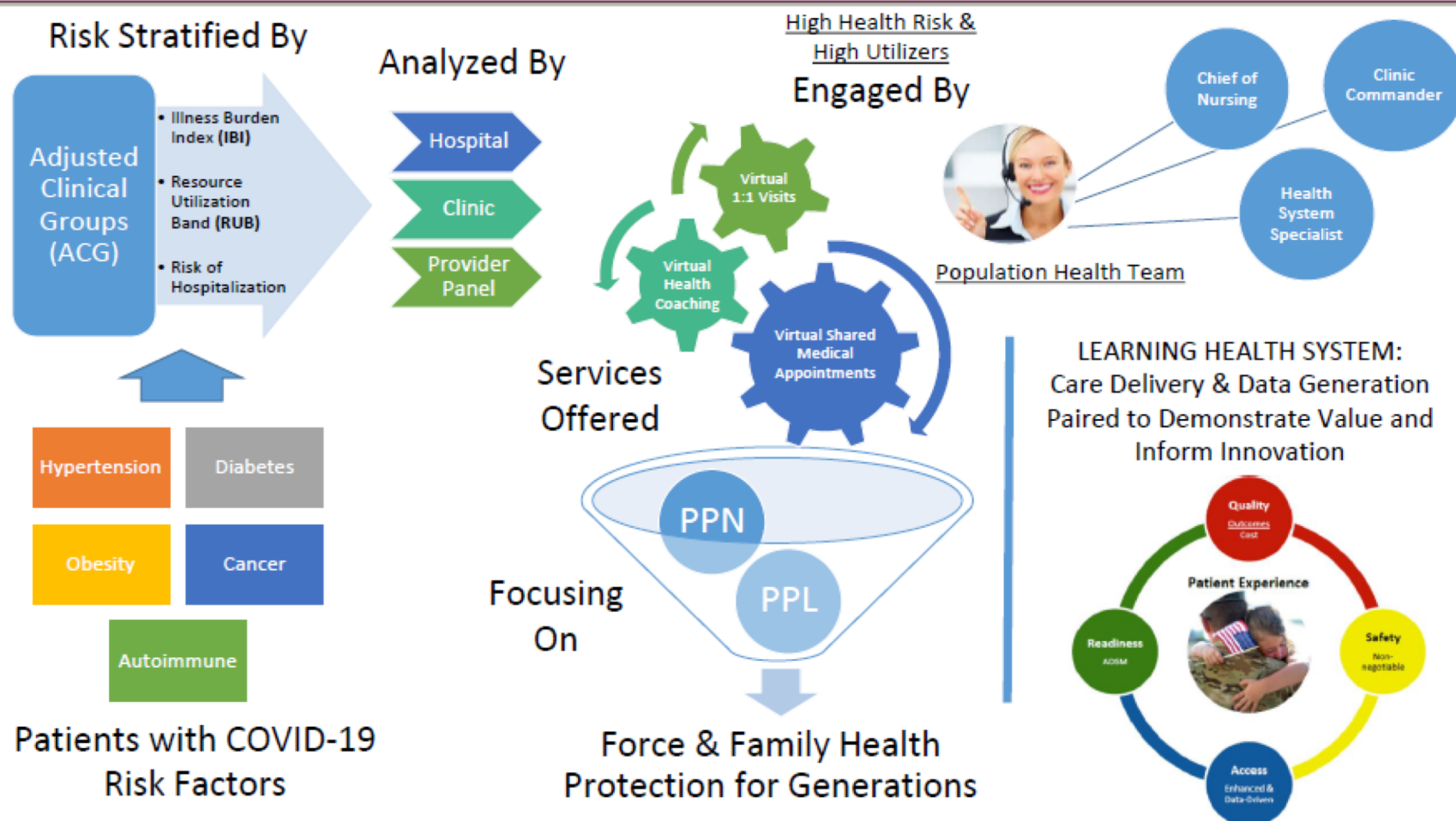
- ☐ Practice self-regulation and emotional intelligence (STOP = Stop, take a breath, observe, proceed)
- ☐ Know your stress burden: heart rate variability (HRV) can indirectly measure total stress burden
- ☐ Reflect and express gratitude: journaling, meditating, and praying
- ☐ Volunteer, serve, and perform simple acts of kindness
- ☐ Prioritize and plan for activities that bring you joy
- ☐ Build relationships and communicate openly to create a climate of trust, cooperation, feedback, and mentorship

- ☐ Do 30 min of at least moderate intensity activity (can't sing during activity) 5-7 days weekly
- ☐ Include strength training at least 2 days weekly
- ☐ Cardiovascular (CV) Exercise boosts immune function and antioxidant activity while providing brain health and hormone balancing benefits
- ☐ Avoid overtraining: track daily resting heart rate (RHR) and heart rate variability (HRV) as biomarker to help decide what to do today

Created by Task Force Resilience members:
Dr. Bryan Stepanenko (CPT USA)
Dr. Regan Stiegmann (Maj, USAF)
Dr. Mylene Huynh (Col (ret) USAF)

V1
JUN 2020

Virtual System of Care delivering PPN & PPL



“Medically Ready Force...Ready Medical Force”

Review Article

Individual risk management strategy and potential therapeutic options for the COVID-19 pandemic

Amin Gasmi ^a, Sadaf Noor ^b, Torsak Tippairote ^{c, d}, Maryam Dadar ^e, Alain Menzel ^a, Geir Bjørklund ^f 



 Show more

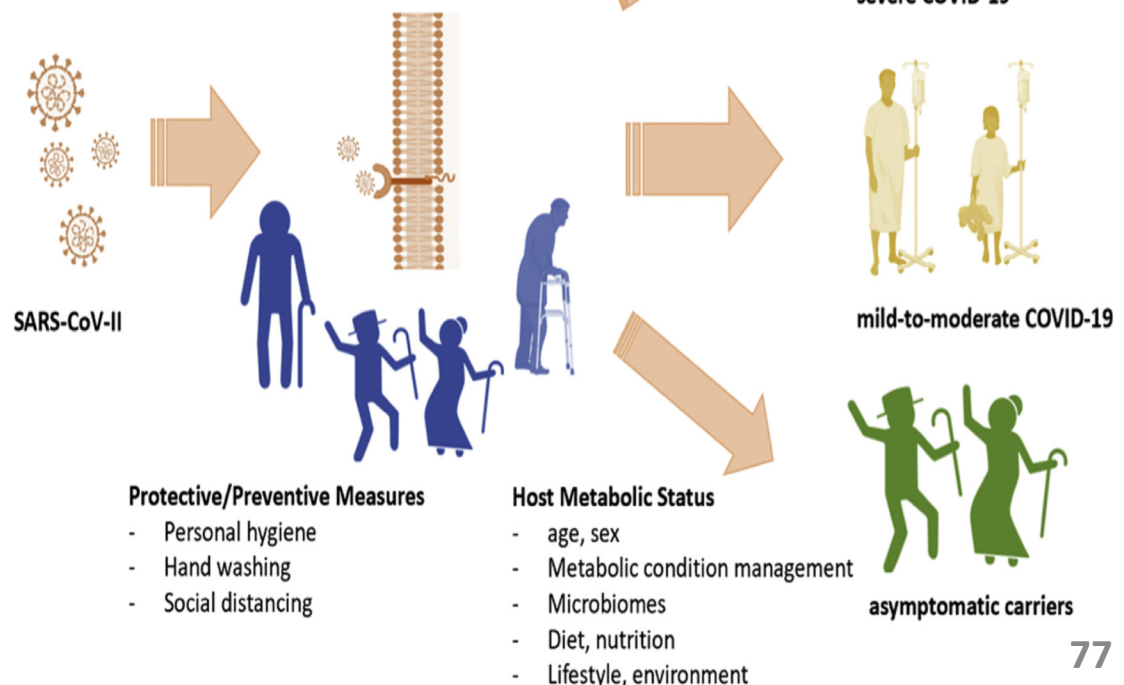
<https://doi.org/10.1016/j.clim.2020.108409>

[Get rights and content](#)

Putting It All Together: Prevention + Human Factors

Key points:

- Metabolic status determines clinical severity
- Diet, microbiome, lifestyle factors shapes immune response
- Human factor = PPN + PPL = immune resilience



Prevention & Containment

Cough Etiquette

Wash Your Hands

Physical Distancing

Avoid Touching Your Eyes, Nose, Mouth

Eat Healthy

Be Mindful

Work-life Balance

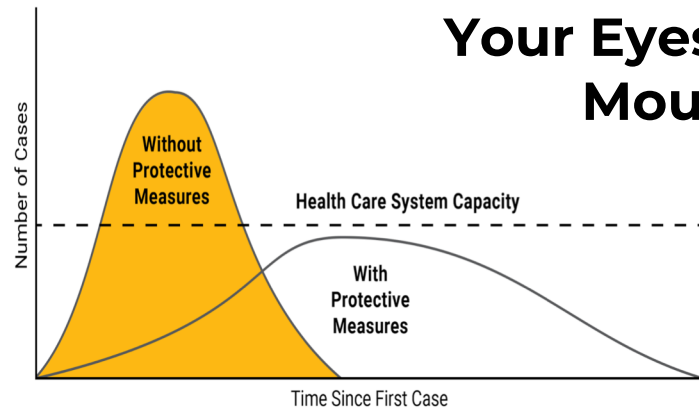
Meaningful Connection

Exercise

Sleep 7-9 Hours

Resilience & Readiness

“Flatten the curve”
– Protective Measures –



Adapted from the Centers for Disease Control and Prevention

Key Takeaways



- PPN & PPL is critical to address the human factor: Build immune and metabolic resilience
- PPN: Anti-inflammatory, antioxidant, and diverse microbiome foods & nutrients
 - ❑ Whole food plant-based w/ high quality protein & fiber
 - ❑ COVID-specific: Vit D, Vit C, Zinc, Zinc ionophores (Quercetin, Epigallocatechin Gallate (EGCG))
- PPL: Sleep, stress management, exercise, meaningful connection, time in nature, resilient mindset

DoD PPN & PPL Resources: Apps



PRESCRIPTION FOR CONNECTED HEALTH MOBILE RESOURCES

- | | | | |
|---|---|--|---|
| <input type="checkbox"/> ACT Coach* | <input type="checkbox"/> CPT Coach* | <input type="checkbox"/> Moving Forward* | <input type="checkbox"/> Stay Quit Coach* |
| <input type="checkbox"/> AIMS* | <input type="checkbox"/> DHA Opioid Safety | <input type="checkbox"/> Parenting2Go* | <input type="checkbox"/> T2 Mood Tracker |
| <input type="checkbox"/> Breathe2Relax | <input type="checkbox"/> Dream EZ | <input type="checkbox"/> PE Coach 2* | <input type="checkbox"/> Tactical Breather |
| <input type="checkbox"/> Breathe, Think, Do | <input type="checkbox"/> LifeArmor | <input type="checkbox"/> Positive Activity Jackpot | <input type="checkbox"/> The Big Moving Adventure |
| <input type="checkbox"/> CBT-i Coach* | <input type="checkbox"/> Mindfulness Coach* | <input type="checkbox"/> PTSD Coach* | <input type="checkbox"/> VetChange* |
| <input type="checkbox"/> Concussion Coach* | <input type="checkbox"/> Mood Coach* | <input type="checkbox"/> STAIR Coach* | <input type="checkbox"/> Virtual Hope Box |

INSTRUCTIONS



DOWNLOAD THESE FREE MOBILE APPS FROM THE APP STORE AND GOOGLE PLAY.

*THESE APPS WERE DEVELOPED BY, OR IN PARTNERSHIP WITH, THE U.S. DEPARTMENT OF VETERANS AFFAIRS.



PRODUCT ID # CH-0032

“Medically Ready Force...Ready Medical Force”

DoD PPN + PPL Resources: Health Coaching



A screenshot of the Military OneSource website. The header includes the "MILITARY ONESOURCE" logo on the left, the phone number "800-342-9647" and contact options "Call Us OCONUS" and "Call Us TTY/TDD" in the center, and icons for chat, search, and a menu on the right. Below the header, a breadcrumb trail reads "Home > Confidential Help > Specialty Consultations". The main heading is "HEALTH & WELLNESS COACHING" in large, bold, blue letters. Below this is a horizontal navigation bar with several categories: "Adoption", "Building Healthy Relationships", "Education", "Elder Care", "Health & Wellness Coaching" (which is underlined with a red line), and "New MilParent". Below this bar is another row of categories: "Peer-to-Peer", "Special Needs", "Spouse Relocation & Transition", "Transitioning Veterans", and "Wounded Warrior". The background of the page features a faint, grayscale image of a person's silhouette.

Free health coaching for AD, Reserve and Family Members

<https://www.militaryonesource.mil>

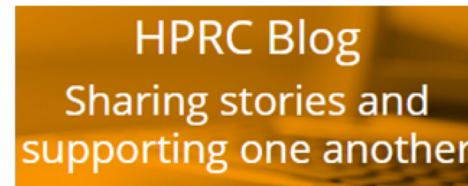
“Medically Ready Force...Ready Medical Force”

DoD PPN + PPL Resources: Human Performance Resources by CHAMP



HPRC-online.org

The screenshot shows the homepage of the Human Performance Resources by CHAMP (HPRC) website. At the top, there is a navigation bar with the text "Human Performance Resources by CHAMP" and "Operation Supplement Safety". Below this is a header section with the CHAMP logo (a stylized "H" with "CHAMP" and "Human Performance Resources" text) and a search bar. The main content area features a large banner with the text "TOTAL FORCE FITNESS" in large, bold, white letters. Above this text is a collage of five images: a soldier on a tank, a naval ship, a fighter jet, soldiers in a field, and a helicopter. Below the banner, there is a welcome message: "Welcome to HPRC, your source for military-specific evidence-based Total Force Fitness information".



Sign up for newsletter/email updates!
"Medically Ready Force...Ready Medical Force"

Summary/Call to Action



- Pandemic = SARS-COV-2 + obesity + chronic disease
- Human Factor: Promote PPN & PPL as foundation
- Implement strategies to address immune resilience
 - Front-line, HCWs, caregivers, household contacts
 - Patients at risk for severe COVID complications

Resilience = PPE + PPN + PPL = Readiness

References



Adams, Mary L., et al. "Population-Based Estimates of Chronic Conditions Affecting Risk for Complications from Coronavirus Disease, United States." *Emerging Infectious Diseases*, vol. 26, no. 8, 2020, <https://doi.org/10.3201/eid2608.200679>

Canada's Food Guide. *Canada's Food Guide*, 13 Jan. 2020, www.food-guide.canada.ca/en

Carlsen, Monica H, et al. "The Total Antioxidant Content of More than 3100 Foods, Beverages, Spices, Herbs and Supplements Used Worldwide." *Nutrition Journal*, U.S. National Library of Medicine, www.ncbi.nlm.nih.gov/pmc/articles/PMC20096093/

Centers for Disease Control and Prevention. "People Who Are at Increased Risk for Severe Illness." *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 25 June 2020, www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-at-increased-risk.html

References



Department of Defense Health of the Force Report. (2019).

Gasmi, Amin, et al. "Individual Risk Management Strategy and Potential Therapeutic Options for the COVID-19 Pandemic." *Clinical Immunology*, vol. 215, 2020, p. 108409.,
<https://doi.org/10.1016/j.clim.2020.108409>

Green, Shawn J. "Covid-19 Accelerates Endothelial Dysfunction and Nitric Oxide Deficiency." *Microbes and Infection*, vol. 22, no. 4-5, 2020, pp. 149–150.,
<https://doi.org/10.1016/j.micinf.2020.05.006>

"Healthy Eating Plate." *The Nutrition Source*, 22 Nov. 2019,
www.hsph.harvard.edu/nutritionsource/healthy-eating-plate/

References



“Healthy Food Choices.” *Canada's Food Guide*, 17 Dec. 2019, www.food-guide.canada.ca/en/healthy-food-choices

Isidori, Alessandro, et al. “Immunosenescence and Immunotherapy in Elderly Acute Myeloid Leukemia Patients: Time for a Biology-Driven Approach.” *Cancers*, vol. 10, no. 7, 2018, p. 211., <https://doi.org/10.3390/cancers10070211>

Krebs-Smith, Susan M., et al. “Americans Do Not Meet Federal Dietary Recommendations.” *The Journal of Nutrition*, vol. 140, no. 10, 2010, pp. 1832–1838., <https://doi.org/10.3945/jn.110.124826>

References



- Martino, Jessica, et al. "The Connection Prescription: Using the Power of Social Interactions and the Deep Desire for Connectedness to Empower Health and Wellness." *American Journal of Lifestyle Medicine*, vol. 11, no. 6, 2015, pp. 466–475., <https://doi.org/10.1177/1559827615608788>
- Müller-Ladner, Ulf, and Elena Neumann. "Faculty Opinions Recommendation of Western Diet Triggers NLRP3-Dependent Innate Immune Reprogramming." *Faculty Opinions – Post-Publication Peer Review of the Biomedical Literature*, 2018, <https://doi.org/10.3410/f.732444493.793552842>
- National Academy of Sciences Engineering and Medicine. *Americans Have Worse Health Than People in Other High-Income Countries; Health Disadvantage Is Pervasive Across Age and Socio-Economic Groups*, www.nationalacademies.org/

References



NHANES - National Health and Nutrition Examination Survey Homepage. *Centers for Disease Control and Prevention*, Centers for Disease Control and Prevention, 30 June 2020,

www.cdc.gov/nchs/nhanes/index.htm

Omics-Gut-Brain Axis. *Lifetime Omics*, lifetimeomics.com/the-omics-gut-brain-axis-2/.

Reiter, Russel J., et al. "Melatonin as an Antioxidant: under Promises but over Delivers." *Journal of Pineal Research*, vol. 61, no. 3, 2016, pp. 253–278., <https://doi.org/10.1111/jpi.12360>

Shaw, Jonathan. "Raw and Red-Hot." *Harvard Magazine*, 16 Apr. 2019, www.harvardmagazine.com/2019/05/inflammation-disease-diet

References



Singh, Rasnik K, et al. "Influence of Diet on the Gut Microbiome and Implications for Human Health." *Journal of Translational Medicine*, BioMed Central, 8 Apr. 2017,

www.ncbi.nlm.nih.gov/pubmed/28388917

Smith, Dana G. "Coronavirus May Be a Blood Vessel Disease, Which Explains Everything." *Medium*, Elemental, 30 June 2020, [www.elemental.medium.com/coronavirus-may-be-a-blood-vessel-](https://www.elemental.medium.com/coronavirus-may-be-a-blood-vessel-disease-which-explains-everything-2c4032481ab2)

[disease-which-explains-everything-2c4032481ab2](https://www.elemental.medium.com/coronavirus-may-be-a-blood-vessel-disease-which-explains-everything-2c4032481ab2)

"Smoldering Inflammation in Cardio-Immune-Metabolic Diseases." *Frontiers*, [www.frontiersin.org/research-](https://www.frontiersin.org/research-topics/9855/smoldering-inflammation-in-cardio-immune-metabolic-diseases)
[topics/9855/smoldering-inflammation-in-cardio-immune-metabolic-diseases](https://www.frontiersin.org/research-topics/9855/smoldering-inflammation-in-cardio-immune-metabolic-diseases)

References



- Stenvers, Dirk Jan, et al. "Circadian Clocks and Insulin Resistance." *Nature Reviews Endocrinology*, vol. 15, no. 2, 2018, pp. 75–89., <https://doi.org/10.1038/s41574-018-0122-1>
- Tersalvi, Gregorio, et al. "Elevated Troponin in Patients With Coronavirus Disease 2019: Possible Mechanisms." *Journal of Cardiac Failure*, vol. 26, no. 6, 2020, pp. 470–475., <https://doi.org/10.1016/j.cardfail.2020.04.009>
- Varga, Zsuzsanna, et al. "Endothelial Cell Infection and Endotheliitis in COVID-19." *The Lancet*, vol. 395, no. 10234, 2020, pp. 1417–1418., [https://doi.org/10.1016/s0140-6736\(20\)30937-5](https://doi.org/10.1016/s0140-6736(20)30937-5)
- Webber, Bryant J., et al. "Weight Gain of Service Members After Basic Military Training." *American Journal of Preventive Medicine*, vol. 58, no. 1, 2020, pp. 117–121., <https://doi.org/10.1016/j.amepre.2019.08.022>

References



Weyh, Christopher, et al. "Physical Activity and Diet Shape the Immune System during Aging." *Nutrients*, vol. 12, no. 3, 2020, p. 622., <https://doi.org/10.3390/nu12030622>

Yan, Zhen, and Hannah R. Spaulding. "Extracellular Superoxide Dismutase, a Molecular Transducer of Health Benefits of Exercise." *Redox Biology*, vol. 32, 2020, p. 101508., <https://doi.org/10.1016/j.redox.2020.101508>

How to Obtain CE/CME Credit



To receive CE/CME credit, you must register by 0745 ET on 24 July 2020 to qualify for the receipt of CE/CME credit or certificate of attendance. You must complete the program posttest and evaluation before collecting your certificate. The posttest and evaluation will be available through 6 August 2020 at 2359 ET. Please complete the following steps to obtain CE/CME credit:

1. Go to URL: <https://www.dhaj7-cepo.com/content/clinical-communities-speaker-series-health-innovations-and-promising-practices-jul-2020>
2. Click on the REGISTER/TAKE COURSE tab.
 - a. If you have previously used the CEPO CMS, click login.
 - b. If you have not previously used the CEPO CMS click register to create a new account.
3. Follow the onscreen prompts to complete the post-activity assessments:
 - a. Read the Accreditation Statement
 - b. Complete the Evaluation
 - c. Take the Posttest
4. After completing the posttest at 80% or above, your certificate will be available for print or download.
5. You can return to the site at any time in the future to print your certificate and transcripts at <https://www.dhaj7-cepo.com/>
6. If you require further support, please contact us at dha.ncr.j7.mbx.cepo-cms-support@mail.mil