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MEDICAL HISTORY:

Food as Medicine Spans Millennia

- Ancient Greece: Hippocrates – food and dietetics for healing
- TCM (Traditional Chinese Medicine): 3,000-4,000 year history
 - Oldest texts on herbal medicine
- Indian Ayurveda: ancient texts known as Vedas
 - Concept of Doshic balance
 - First forms of treatment are often dietary changes
- Japanese Kampo: since 5th century AD / natural based medicine
 - Covered by national health insurance since 1967

HISTORICAL CONTEXT IN WESTERN MEDICINE

- Native American Culture
- Modern Era Western Medicine:
 - 1970's increased cultural exchange with China: interest in TCM grew
 - 1980's US medical community confronted with AIDS epidemic
 - No cure and few available treatments
 - Medical community discovered patients nutritional status affected survival



**FOOD AS
MEDICINE**



POPULARIZATION OF FOOD AS MEDICINE


Modern Day Perspective

- Concept of “Food as Medicine” applied in patient care settings:
 - Short term conditions/illnesses
 - Chronic conditions
- Countless media sources highlight its use and application for health and longevity
- Fits within growing field of Integrative / Holistic and Functional Medicine

DEFINITION:

a medical approach that focuses on identifying the root cause of disease.

- Root cause analysis can include an individual's:
 - Genes
 - Environment /Epigenetics
 - Lifestyle factors: nutritional status, stress, allergens, toxins



INTEGRATIVE & FUNCTIONAL MEDICINE



FOOD AS FUNCTIONAL MEDICINE

CURRENT EXAMPLES

- The Nigerian Paradox:
 - ◆ APOE4 gene
 - ◆ Dietary/lifestyle/epigenetic link
 - ◆ Decreased Alzheimer's compared to other communities

- Mediterranean Diet
 - ◆ decreases inflammation
 - ◆ extraordinarily well-studied

- Keto Diet
 - ◆ down regulates inflammatory triggers
 - ◆ can support neuronal growth

- Restricted/Fast-Mimicking Diets:
 - ◆ improve insulin sensitivity

A dark, atmospheric photograph of a traditional tea ceremony. A teapot is pouring water into a cup filled with tea leaves. The scene is set on a wooden table with various tea-related items like a brush and a small container. The overall mood is serene and focused.

THE RAPID GROWTH OF FUNCTIONAL MEDICINE

THE RAPID GROWTH OF FUNCTIONAL MEDICINE

STATISTICS

- Chronic diseases: Heart Dss, CA, Diabetes
- Account for 86% of health care costs in the US
- Rise in functional medicine stems from evidence-based research confirming: dss risk reduction, prevention – and in some cases reversibility – through nutrition and lifestyle changes.
- Increased recognition by employers and insurance companies to cover these treatments
- Global CAM market expected to exceed \$400B by 2028



MORE STATISTICS: POPULARIZATION OF FOOD AS MEDICINE WITHIN FUNCTIONAL MEDICINE

How has Covid affected these trends?

- Herbal Supplement Use 2020: Increased by 17.3% in the US
- First double digit growth in this industry in two decades
- Herbal supplement sales exceeded \$11.2B (a record) in the US

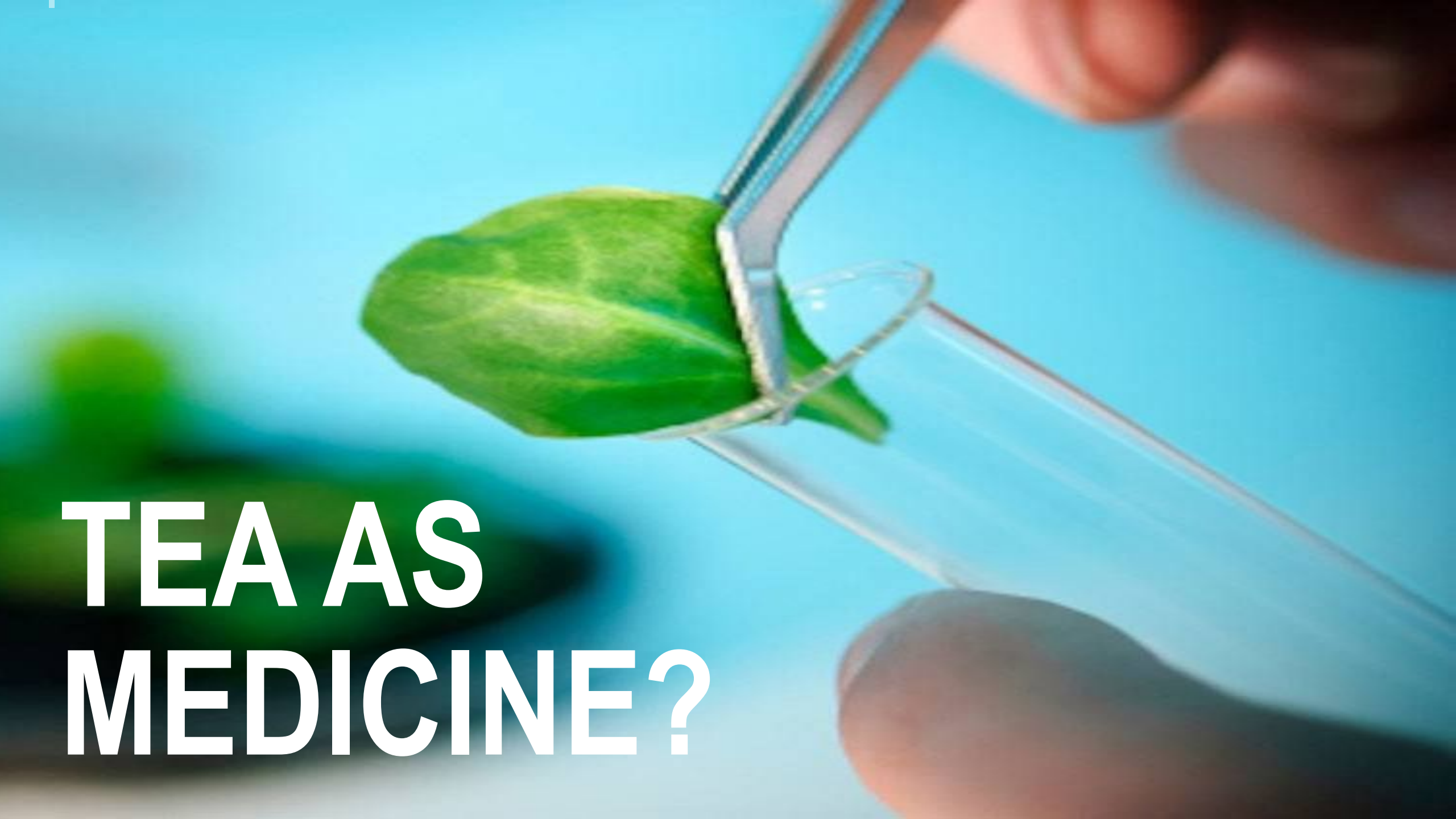




TOP SELLING HERBS IN 2020

A Few Examples | Food As Medicine

- Ashwagandha
- Apple Cider Vinegar
- Elderberry
- Ginger
- Echinacea



TEA AS MEDICINE?

EARLY BEGINNINGS: TEA TIMELINE



CRITERIA FOR SCIENTIFIC ACCEPTANCE

Physiologic effect

Risk assessment/toxicity

Pilot studies:
Assess potential benefit

RCT's: Assess efficacy

Outcome studies

A close-up photograph of a person wearing a white lab coat and blue nitrile gloves. They are holding a white pipette and dispensing liquid into a small glass vial. In the background, a microscope is visible on a lab bench. The overall scene is brightly lit with a blue and white color palette.

**SCIENTIFIC
ACCEPTANCE
OF INTEGRATIVE
TREATMENTS**

TEA AS MEDICINE AND FUNCTIONAL FOOD

200 BC: CHINA / HAN DYNASTY

MODERN MEDICINE:

1950's: Japan

1970's: Linus Pauling / Concept of Antioxidants

1990's-Present: Biochemistry of Nutrition

Evidenced-Based

Chemical analysis

Medical Genetics

Epigenetics

Functional Compounds



A close-up photograph of a hand holding a tea leaf bud. The bud consists of a small, unopened leaf at the top, with three larger, fully developed leaves extending downwards and outwards. The leaves are a vibrant green color with visible veins. The hand is positioned at the bottom left, with the thumb and index finger gripping the base of the bud. The background is a dark, out-of-focus green, suggesting a tea plantation.

Camellia sinensis

Botano-Medical Perspective



**WHAT FUNCTIONAL
INGREDIENTS
ARE WE DRINKING?**



HEALTH COMPOUNDS IN TEA

FUNCTIONAL INGREDIENTS:

Antioxidants:

Flavonoids

Catechins

EGCG



TEA AND ANTIOXIDANTS

CLASSIC ANTIOXIDANT:

“quench reactive oxidant species”

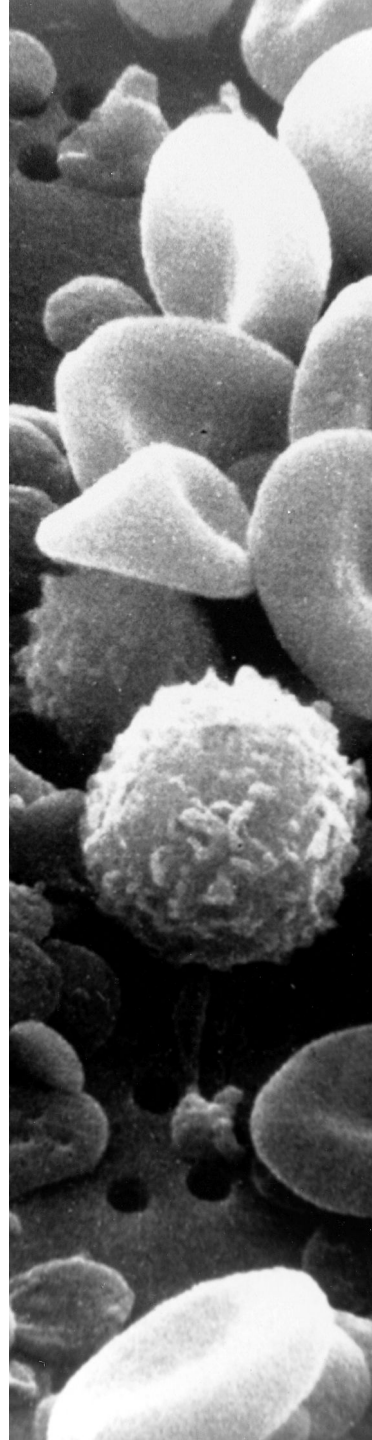
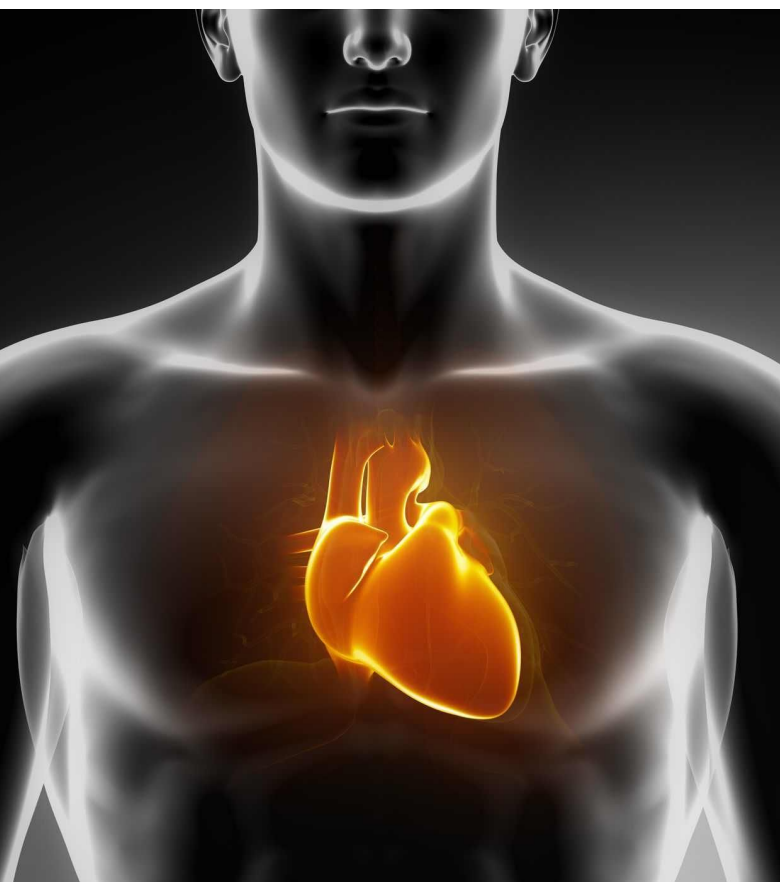
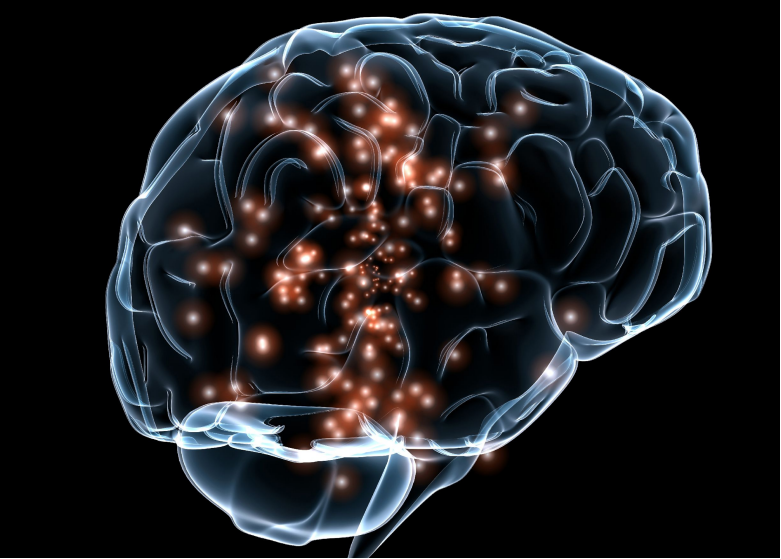
CURRENT TEA RESEARCH

Based on over 100 articles

Acts on biomarkers of
inflammation

Modulates signal transduction
pathways

Can up-regulate antioxidant
enzymes and
“antioxidant defenses”



CURRENT TEA AND HEALTH RESEARCH

IN VITRO / ANIMAL / HUMAN STUDIES

ORGAN SYSTEM / PATHOLOGY

Brain/Cognitive

Oral Health

Cardiovascular Support

Bone Health

Cancer Prevention

Weight Management



**VAST SUB-SECTION OF
INTEGRATIVE AND
FUNCTIONAL MEDICINE**

Herbs, supplements, spices, dietary intake....

**Highlight Two Areas:
Herbs: Adaptogens
Tea (*Camellia Sinensis*)**

HERB CLASS - ADAPTOGENS



Current science for healthy aging focuses on two main areas:

- **STRESS:** physiologic response to chronic exposure
- **INFLAMMATION** (gut, brain, heart, thyroid...)



Definition / Common Characteristics: ADAPTOGENS

- Constitutionally normalizing effect on the body
- Non-specific stress defense response
- Antioxidant activity
- Non-toxic

- ↑ Bld-Glc metab
- ↑ Energy and stamina
- ↑ Focus
- ↑ Immune resistance
- ↓ Anxiety



Adaptogens

Target

**TWO Main
Conditions**

1. STRESS

Stabilize the Neuroendocrine
and HPA Axis

2. INFLAMMATION

“Inflamm-aging”

STRESS



TYPES OF STRESS & STRESS BIOLOGY

Diet

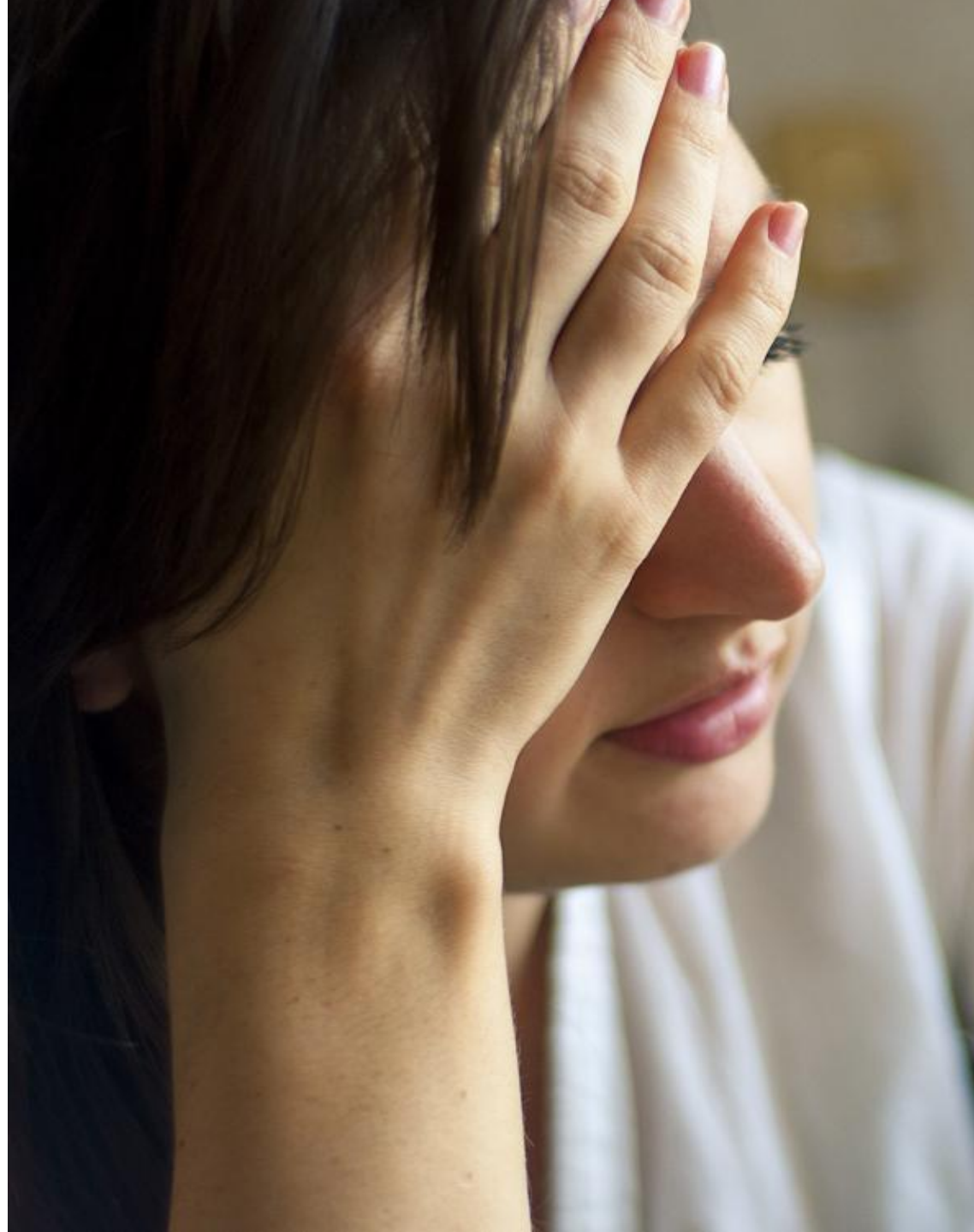
Environmental

Illness/Infection

Normal aging/basic biological processes

Psychological

Physical





CHRONIC ANXIETY/STRESS RESPONSE

↑: Cortisol, epi, insulin, bld glucose, BP, CHOL
↓: Sleep, immunity, GH, HDL, thyroid horm fxn
Harmful to brain cells: cortisol/hippocampus

ANESTHESIOLOGY 2003

Increased and consistent stress reduces white blood cell count = lower immune response, and leads to physical disease and emotional problems.

ABNORMAL STRESS



SLEEP DEPRIVATION & ELEVATED CORTISOL

Chronic Sleep Deprivation

- ↑ P.M. cortisol
- ↑ Insulin and bld glc
- ↑ Sympathetic tone
- ↑ Inflammatory cytokines
- ↑ BP

Sleep deprivation as a neurobiologic and physiologic stressor: Allostasis and allostatic load. *Metabolism*. 2006 Oct;55(10:2):S20-3.

Stress accelerates cellular aging—measured by length of specialized genetic segments called telomeres—by as *much as ten years*

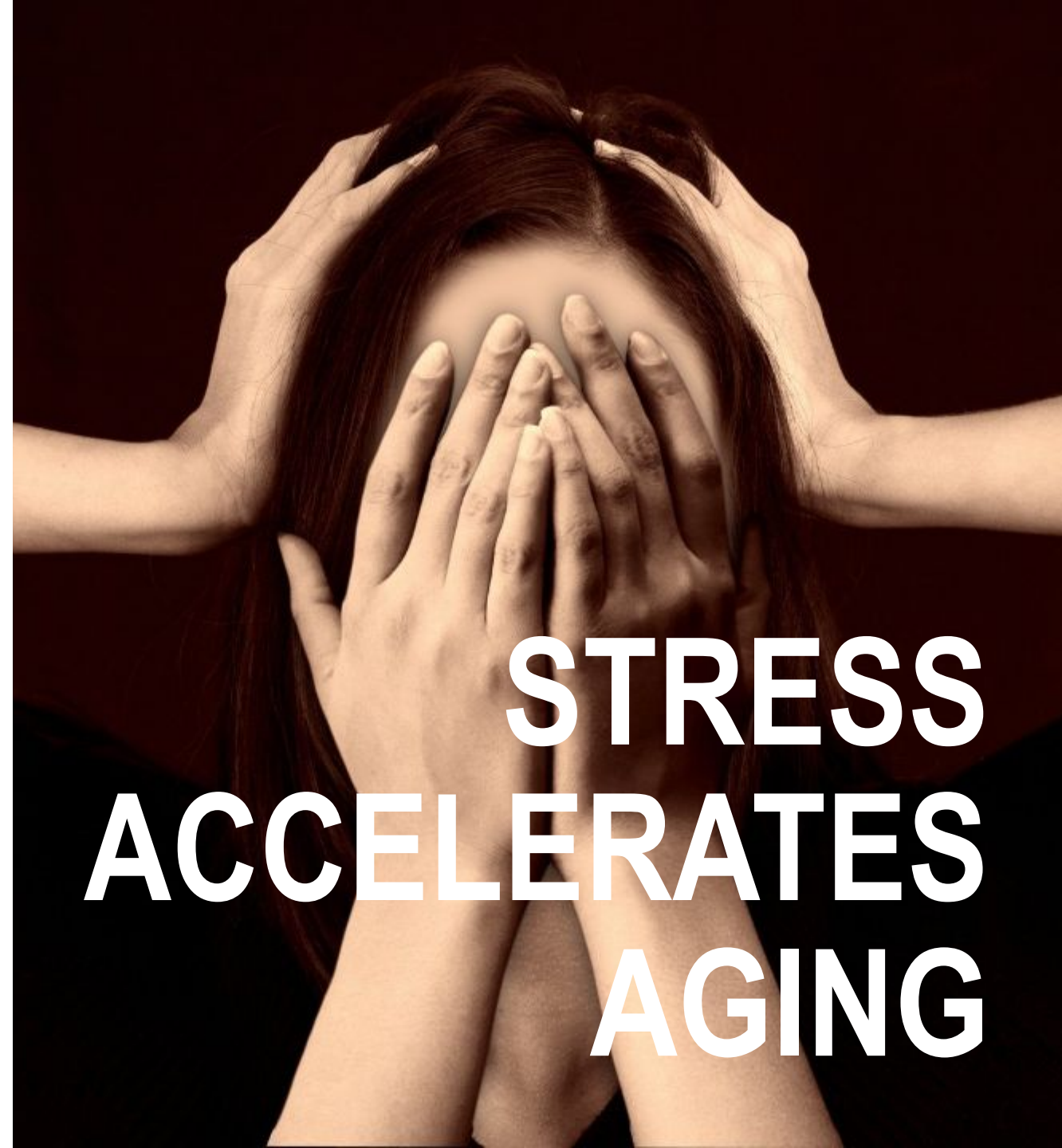
Strong connection between **chronic stress** and **heart disease**

Job stress → significantly increased risk of **coronary heart disease**

High stress patients more likely to suffer HBP—along with ↑ angiotensin lvls and aortic stiffness (frequently accompany HTN)

Epel E, Blackburn E, Lin J, et al., Accelerated telomere shortening in response to life stress, Proc Natl Acad Sci USA 2004 Dec 7; 101(49): 17312-17315

Chida Y, Steptoe A, Greater cardiovascular responses to laboratory mental stress are associated with poor subsequent cardiovascular risk status, Hypertension 2010, 55: 1026-1032



**STRESS
ACCELERATES
AGING**

TELOMERES





ASHWAGANDHA

BOTANICAL NAME:
WITHANIA SOMNIFERA

Calming herb

↓ Chol

↓ Bld-Glc

Modulates immune system

Normalize cortisol

Dose: 300-1000mg/day



ASIAN GINSENG

BOTANICAL NAME:
PANAX GINSENG

↑ Mental fxn/work performance
and quality

Enhance immune fxn

Likely most stimulating
adaptogen

Caution: can ↑ BP

Dose: 100-400mg/day



RHODIOLA

BOTANICAL NAME:

RHODIOLA ROSEA

Improves attention/focus

Improves memory

↓ Fatigue

↑ Mood

Dose: 100-250mg/day



SIBERIAN GINSENG

BOTANICAL NAME:

*ELEUTHEROCOCCUS
SENTICOSUS*

↑ Endurance

↑ Post-stress/exercise recovery

↑ Mental alertness/
cognitive fxn

Dose: 500-1000mg/day



SEVERAL COMMON ADAPTOGENS

American Ginseng, Amla,
Ashwagandha, Asian Ginseng

Astralagus, Cordyceps, Dang Shen,
Eleuthero, Guduchi, He Shou Wu

Holy Basil, Jiaogulan, Licorice
Lycium, Prince Seng, Reishi

Rhaponticum, Rhodiola, Schisandra,
Shatavarti, Shijalit

CONCLUSION



- **Functional Foods Can Alter Cellular Function**
- **Health Compounds In Tea Have Functional Capacity To Support Health**
- **Tea / Herb Blends: Synergistic and Additive Health Benefits**
- **Functional Foods and Herbal Industry: Unprecedented Projected Growth**



THANK YOU!