UltraWellness:
The Science of Staying Healthy

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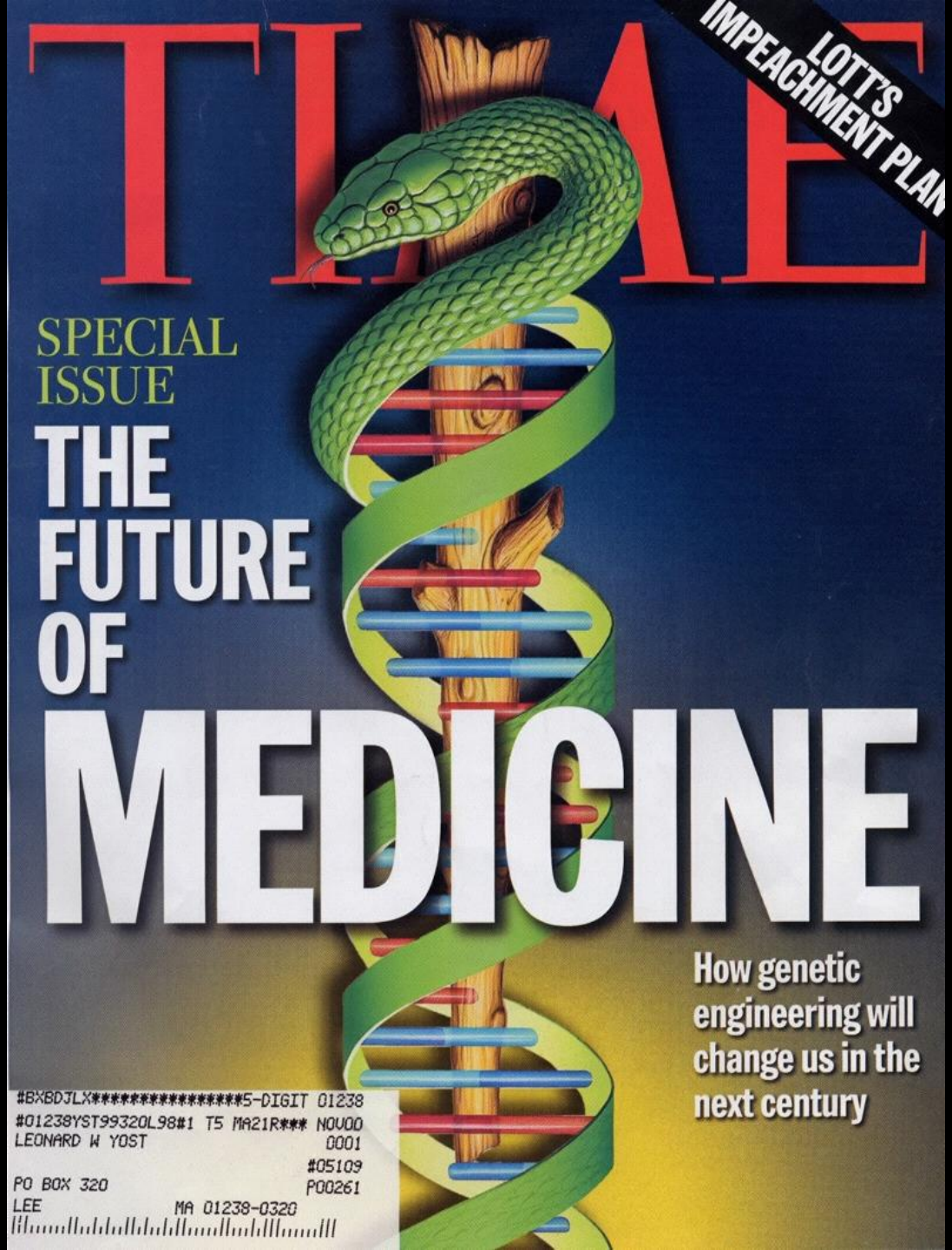
"The ancient sages did not treat those who were already ill; they instructed those who were not ill."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What is Wrong with this Picture?

TSUNAMI: THE POLITICS OF RELIEF

Newsweek

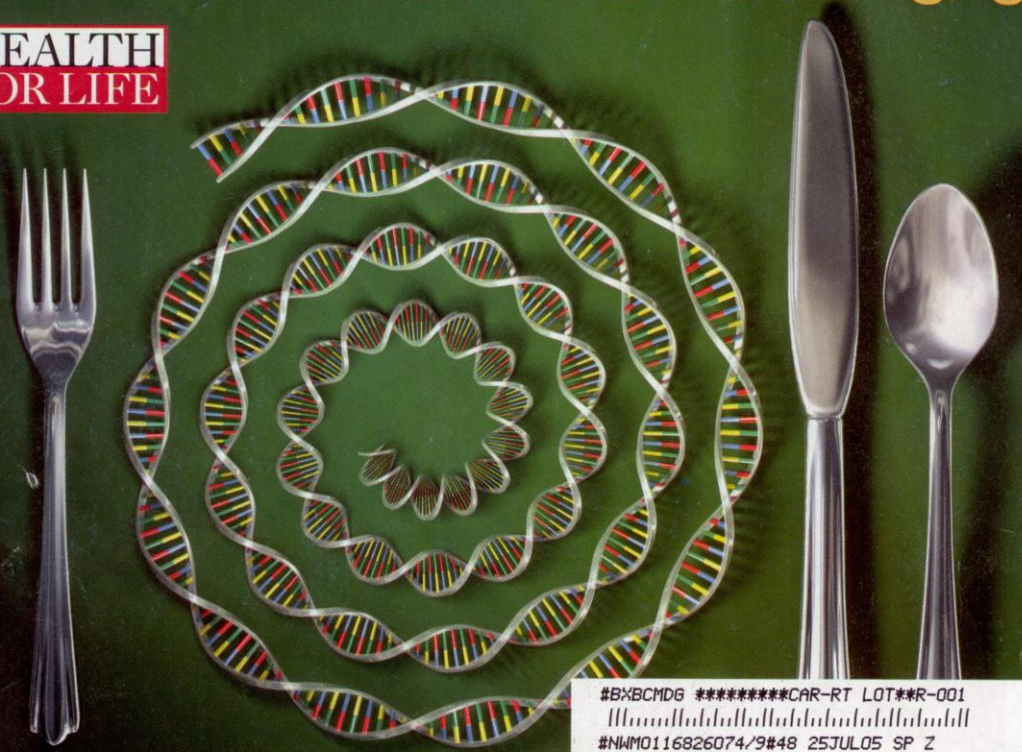
January 17, 2005 : $3.95 US

newsweek.msnbc.com

Diet & Genes

The New Science of Nutrition and Aging

HEALTH FOR LIFE



With Harvard Medical School

Nutrigenomics

Personalized Medicine

Food is Information

My Story

A Study in Healing

What We Will Discuss Today

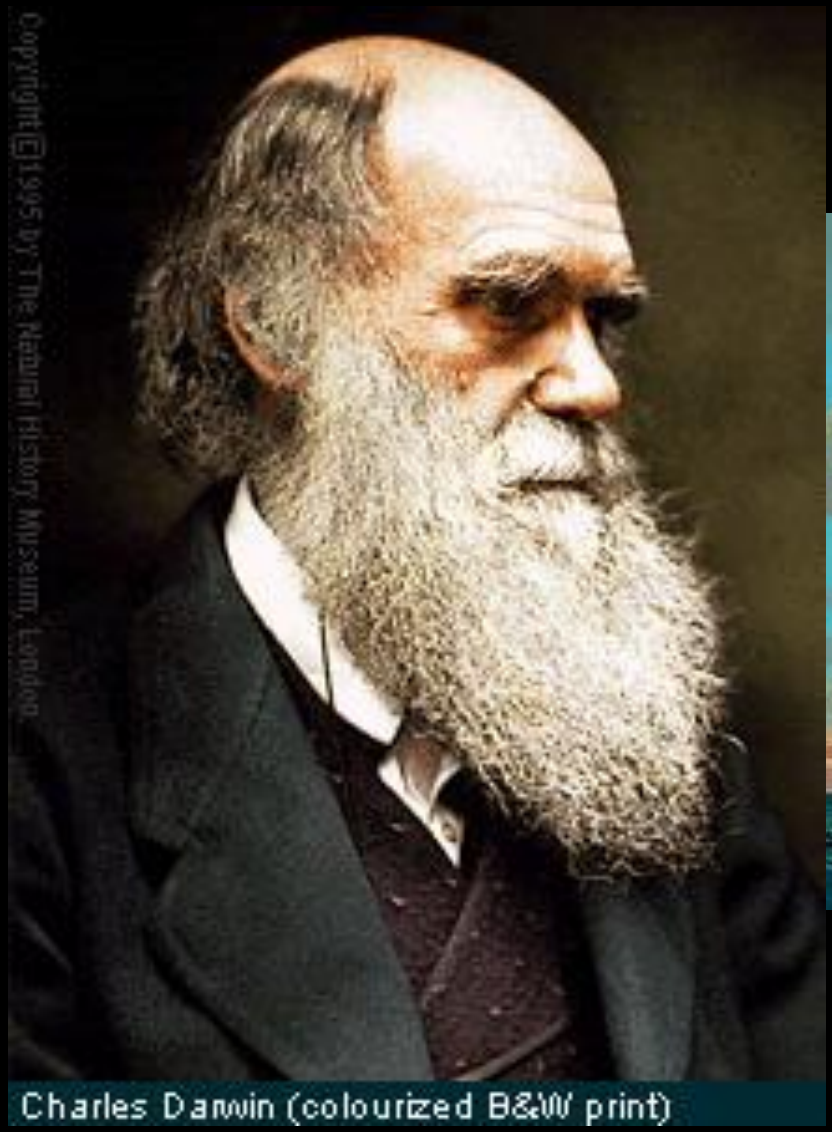
- ✓ The Unaddressed Epidemic of Chronic Disease
- ✓ The New Paradigm: Personalized Medicine/Systems and Functional Medicine
- ✓ The Myths that Keep us Sick
- ✓ Your Body's Owner's Manual - The Forces of Illness/Wellness including UltraMetabolism
- ✓ Ten Clinical Pearls - Getting Started
- ✓ Resources

Our Health Care Crisis: The Quality Question

- ✓ $1.5 trillion or 15% of our gross national product spent on health care (1/3 to hospitals, 1/3 to clinicians and 1/3 to other costs and administration of the insurance industry)
- ✓ Harm from our healthcare system (>700K deaths, >$200B)
- ✓ The startling lack of measures of health care quality and outcomes
- ✓ Lack of universal access with 45 million uninsured

Health Care Crisis

- The insurance morass and their controls of health care spending
- The disenchantment and disempowerment of physicians
- The frustration of patients and health care consumer
- The lack of incentives for practitioners or insurers to foster prevention and health promotion



Charles Darwin (colourized B&W print)


ROC

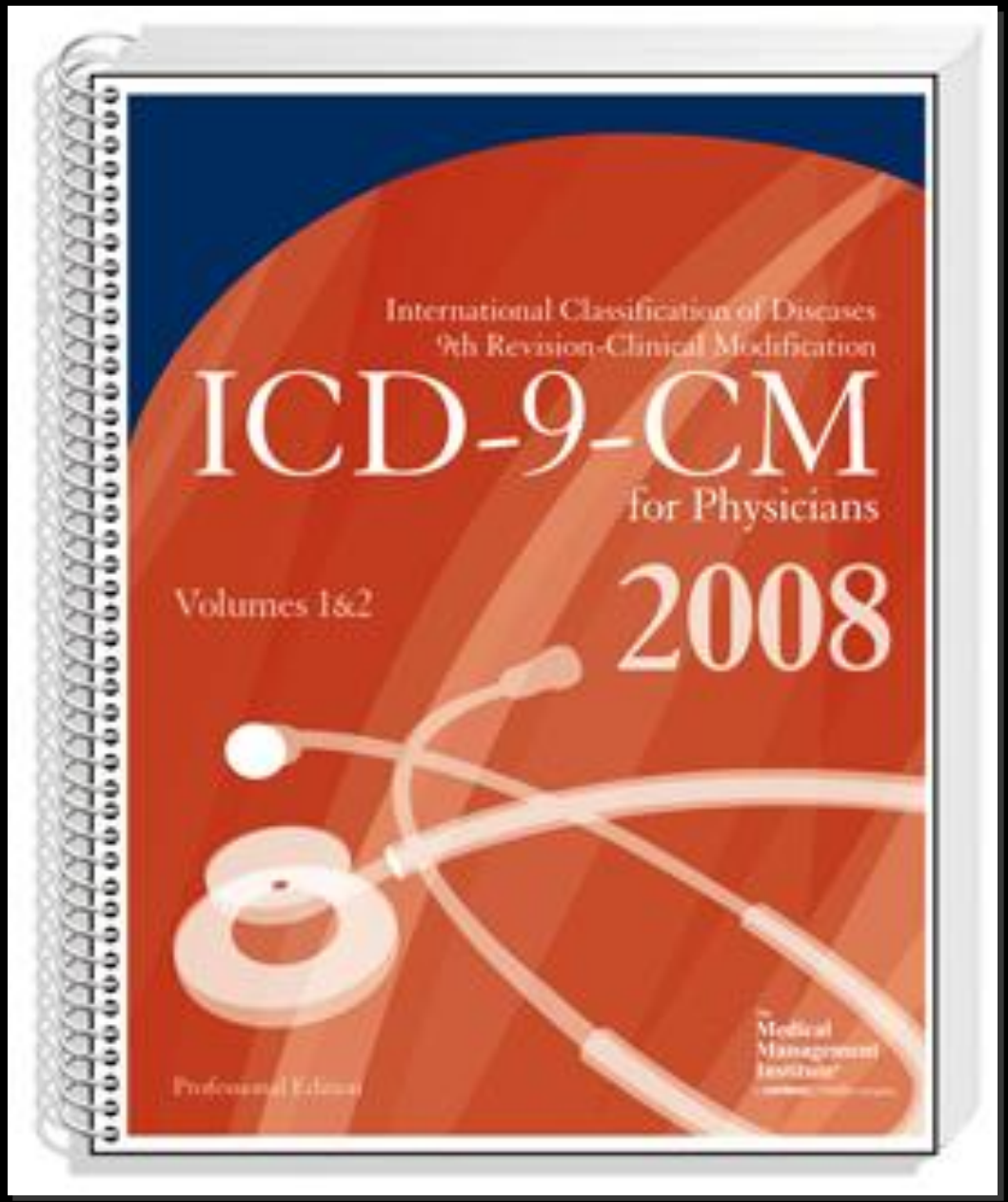
The Origin of Diseases

“How extremely stupid not to have thought of that.”

T.H. Huxley's reaction to the reading of The Origin of Species

The Spontaneous Creation of Diseases?

The Fixity of Diseases?


International Classification of Diseases
9th Revision-Clinical Modification
ICD-9-CM
for Physicians
Volumes 1&2
2008
Professional Edition
Medical Management Institute

The Wrong Map for the Territory

How can we find our way to health if we are using the wrong roadmap?

together of knowledge and information across disciplines to create a unified framework of understanding. The converse of consilience is reductionism.

Concinnity: *The internal harmony or fitness in the adaptation of parts to a whole*

Systems Biology
Functional Medicine

The Basic Laws of Nature

Unified Theory of Biology

Consilience

Two Simple Questions

- ✓ Does this person need to be rid of something toxic, allergic or infectious, a poor diet or stress? (The 5 causes of illness)

- ✓ Does this person have some unmet individual need? (What do you need to thrive?)

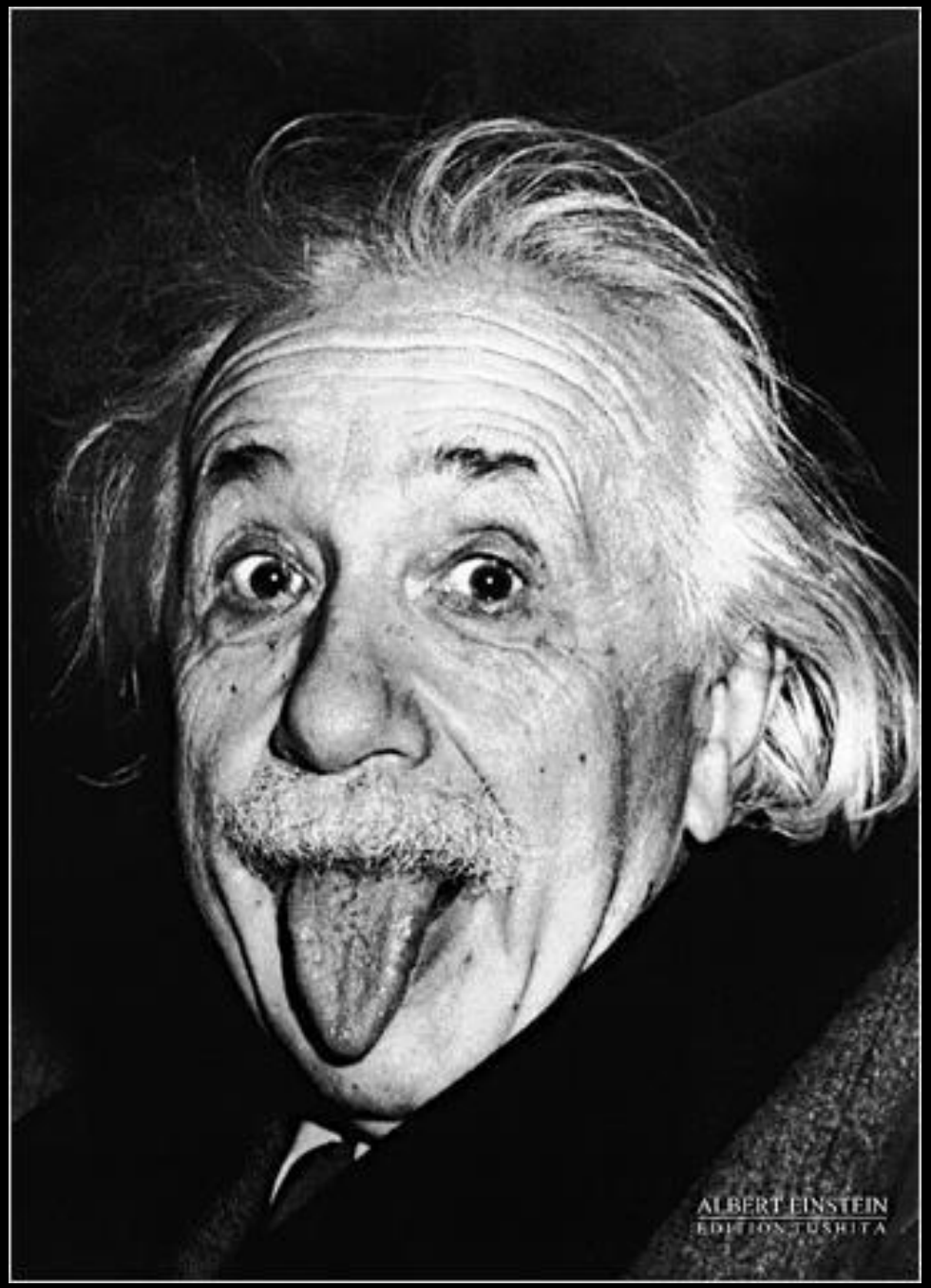
What do you need to get rid of?

- ✓ Toxins (biologic, elemental and synthetic)
- ✓ Allergens (food, mold, dust, animal products, pollens, chemicals)
- ✓ Microbes (bacteria, yeast, parasites, prions, etc.)
- ✓ Poor diet/lifestyle
- ✓ Stress

What do you need to get?

- ✓ Foods (protein, fats, carbohydrates, fiber)
- ✓ Vitamins, minerals, accessory or conditionally essential nutrients, hormones
- ✓ Light, water and air
- ✓ Love Community
- ✓ Rhythm
- ✓ Meaning and Purpose

The Future of Health Care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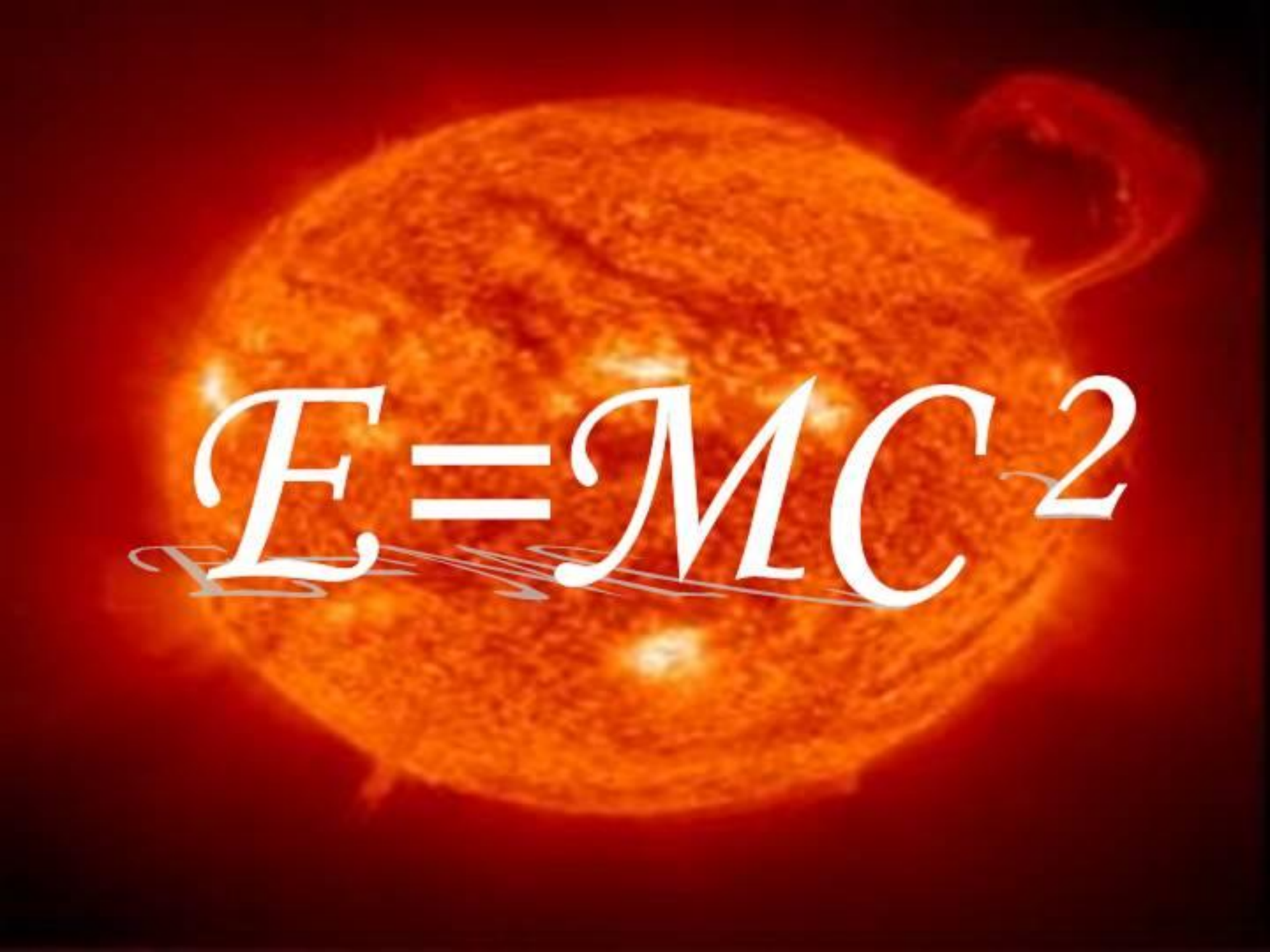

$E=MC^2$

MEDICINE

The NIH Roadmap

Elias Zerhouni

The National Institutes of Health (NIH) is at a critical moment in its prestigious history. As the 21st century unfolds, discovery in the life sciences is accelerating at an unprecedented rate. Although the sequencing of the human genome presents vast opportunities for researchers, it also creates a series of challenges that will redefine the ways that medical research is conducted and, ultimately, how research leads to improvements in health.

The 5-year doubling of the NIH budget, completed in FY 2003, both picked up the pace of discovery and heightened public expectations. As I assumed the directorship of NIH, early discussions with legislators, administration officials, and institute directors, as well as public, patient advocacy, and scientific leaders convinced me that NIH needed to examine its portfolio with an eye to identifying critical scientific gaps.

The NIH earned its reputation for success because of the vitality of its institutes, centers, and offices and because of the diverse ways in which it funds and conducts research—all fostered by decentralization inherent to its organization and funding streams. This characteristic serves the agency well and should be preserved. However, as science grows more complex, it is also converging on a set of unifying principles that link apparently disparate diseases through common biological pathways and therapeutic approaches. Today, NIH research needs to reflect this new reality.

Over the past year, NIH and its leadership have been engaged in a process dubbed the "NIH Roadmap." This process was designed to ask the kind of probing questions that a complex research organization should periodically pose, especially when in transition. The roadmap was purposefully focused on efforts that no single or small group of institutes or centers could or should conduct on its own, but that NIH as a whole must address to ensure both efficient and effective discovery. This was not a reexamination of the strategic plans of each institute or the development of a wholly new comprehensive plan for the sake of being responsive to every interest and constituency. This would have led to a reasoned, but impractical, plan. Rather, the goal was to define a compelling, limited set of priorities that can be acted on and are essential to accelerate progress across the spectrum of the institute missions.

Our consultations began first with the scientific community and public constituencies, representing over 300 of the nation's biomedical leaders from academia, government, and the private sector. We asked participants to address three key questions: What are today's most pressing scientific challenges? What are the roadblocks to progress and what must be done to overcome them? Which efforts were beyond the mandate of one or a few institutes, but were the responsibility of NIH as a whole?

Through these consultations, three major themes emerged—New Pathways to Discovery, Research Teams of the Future, and Reengineering the Clinical Research Enterprise. These ideas were examined by 15 working groups, each led by institute directors, with input from the NIH Council of Public Representatives and the Advisory Committee to the Director.

In June, the NIH leadership met to make final selections of key initiatives to be launched in FY 2004 based on the following criteria: Is the initiative truly transforming—will it dramatically change the content or the process of medical research in the next decade? Would outcomes from the initiative be used by, and synergize the work of, many institutes? Can the NIH afford not to do it? Will the initiative be compelling to NIH stakeholders, especially the public? Does the initiative position the NIH to do something that no other entity can or will do?

At this juncture, working groups with thematically related initiatives were combined and reorganized into nine implementation groups (see the table) responsible for developing the proposals into tangible activities to be launched in FY 2004. The initiatives are complex, so their implementation will be gradual and tailored to specific short- and long-term goals. Some efforts will reach fruition rapidly; others will require longer incubation periods before being fully realized.

NIH ROADMAP—THEMES, IMPLEMENTATION GROUPS, AND INITIATIVES*

New Pathways to Discovery

Building Blocks, Pathways, and Networks Implementation Group
- National Technology Centers for Networks and Pathways
- Metabolomics Technology Development
- Standards for Proteomics and Metabolomics/Assessment of Critical Reagents for Proteomics

Molecular Libraries and Imaging Implementation Group
- Creation of NIH Bioactive Small-Molecule Library and Screening Centers
- Cheminformatics
- Technology Development
- Development of High-Specificity/High-Sensitivity Probes to Improve Detection
- Comprehensive Trans-NIH Imaging Probe Database
- Core Synthesis Facility to Produce Imaging Probes

Structural Biology Implementation Group
- Membrane Protein Production Facilities

Bioinformatics and Computational Biology Implementation Group
- National Centers for Biomedical Computing

Nanomedicine Implementation Group
- Planning for Nanomedicine Centers

Research Teams of the Future

High-Risk Research Implementation Group
- NIH Director's Innovator Awards

Interdisciplinary Research Implementation Group
- Interdisciplinary Research (IR) Centers
- Interdisciplinary Research Training Initiative
- Innovations in Interdisciplinary Technology and Methods (Meetings)
- Removing Structural Barriers to Interdisciplinary Research
- NIH Intramural Program as a Model for Interdisciplinary Research
- Interagency Conference on the Interface of Life Sciences and Physical Sciences

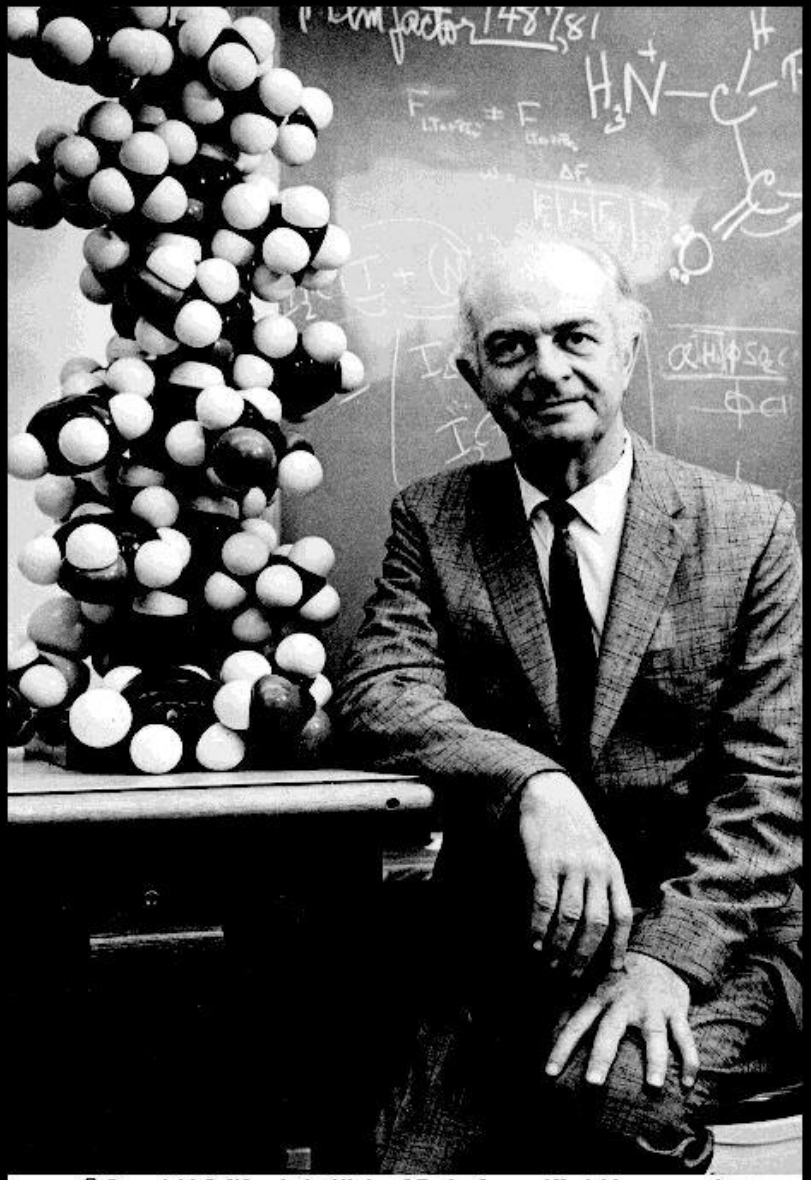
Public-Private Partnerships Implementation Group
- Designation of a Public-Private Sector Liaison
- High-Level Science-Driven Partnership Meetings

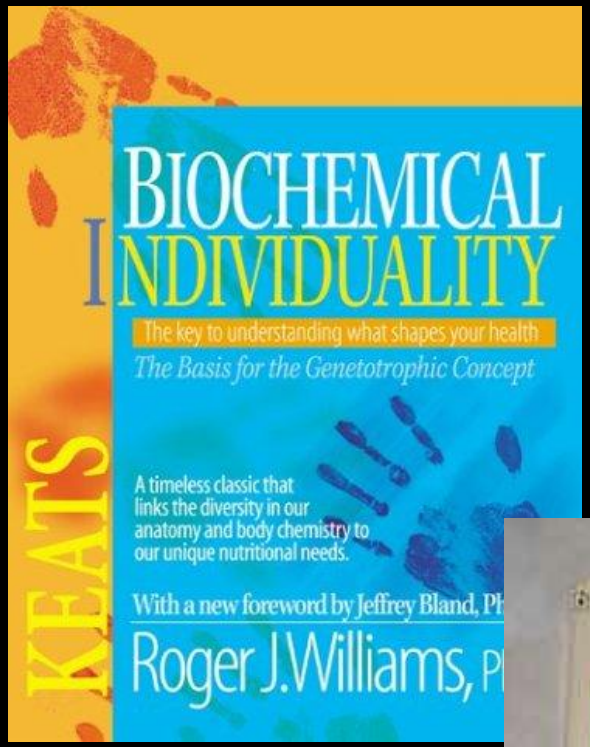
Reengineering the Clinical Research Enterprise

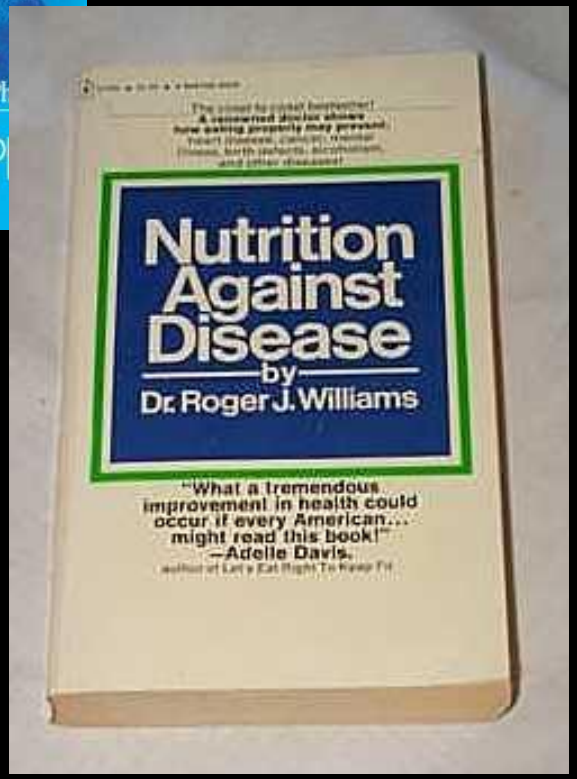
Clinical Research Implementation Group
- Harmonization of Clinical Research Regulatory Requirements
- Integration of Clinical Research Networks
- Enhance Clinical Research Workforce Training
- Clinical Research Informatics: National Electronic Clinical Trials and Research (NECTAR) Network
- Translational Research Core Services
- Regional Translational Research Centers
- Enabling Technologies for Improved Assessment of Clinical Outcomes

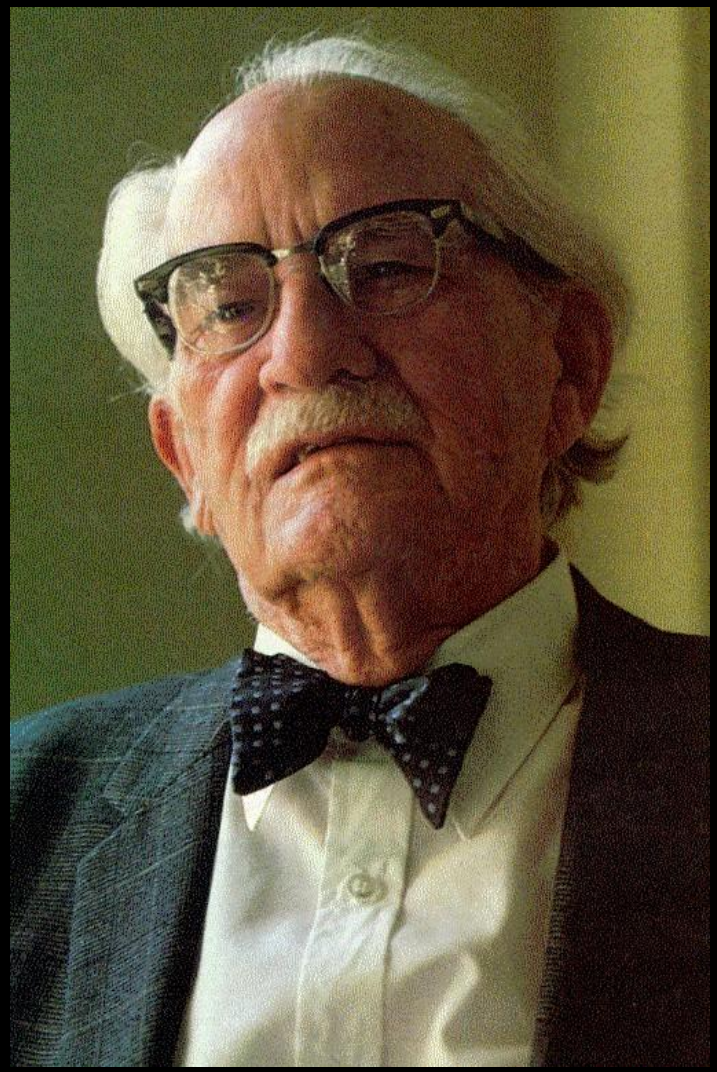
The author is the director of the National Institutes of Health, Bethesda, MD 20892, USA.

* For further description see www.sciencemag.org/cgi/content/full/302/5642/63/DC1




BIOCHEMICAL
INDIVIDUALITY
The key to understanding what shapes your health
The Basis for the Genetotrophic Concept
A timeless classic that links the diversity in our anatomy and body chemistry to our unique nutritional needs.
With a new foreword by Jeffrey Bland, Ph
Roger J. Williams, Ph
KEATS


Nutrition Against Disease
by
Dr. Roger J. Williams
"What a tremendous improvement in health could occur if every American... might read this book!"
—Adelle Davis,



Steps to an Ecology of Mind

Gregory Bateson

With a new Foreword by
Mary
Catherine
Bateson

"One of the great books of the 20th century."— Charles Keil

Special Lecture

The Metabolic Tune-Up: Metabolic Harmony and Disease Prevention[1,2]

Bruce N. Ames[3]

University of California, Berkeley and Children's Hospital and Research Center at Oakland, Oakland, CA 94609

ABSTRACT An optimum intake of micronutrients and metabolites, which varies with age and genetic constitution, would tune up metabolism and give a marked increase in health, particularly for the poor and elderly, at little cost. *1) DNA damage.* Inadequate intake of folic acid causes millions of uracils to be incorporated into the DNA of each cell with associated chromosome breaks, essentially producing a radiation mimic. Deficiencies of the metabolically connected vitamins B-6 and B-12, which are also widespread, also cause uracil incorporation and chromosome breaks. Inadequate iron intake (2 billion women in the world; 25% of U.S. menstruating women) causes oxidants to leak from mitochondria and damages mitochondria and mitochondrial DNA. Inadequate zinc intake (~10% in the U.S.) causes oxidation and DNA damage in human cells. *2) The K_m concept.* Approximately 50 different human genetic diseases that are due to a poorer binding affinity (K_m) of the mutant enzyme for its coenzyme can be remedied by feeding high-dose B vitamins, which raise levels of the corresponding coenzyme. Many polymorphisms also result in a lowered affinity of enzyme for coenzyme. *3) Mitochondrial oxidative decay with age.* This decay, which is a major contributor to aging, can be ameliorated by feeding old rats the normal mitochondrial metabolites acetyl carnitine and lipoic acid at high levels. They restore the K_m for acetyl carnitine transferase and the velocity of the reaction as well as mitochondrial function; reduce levels of oxidants, neuron RNA oxidation and mutagenic aldehydes; and increase old-rat ambulatory activity and cognition. J. Nutr. 133: 1544S–1548S, 2003.

KEY WORDS: • *essential vitamins and minerals* • *DNA damage* • *aging* • *cancer*

Metabolic harmony

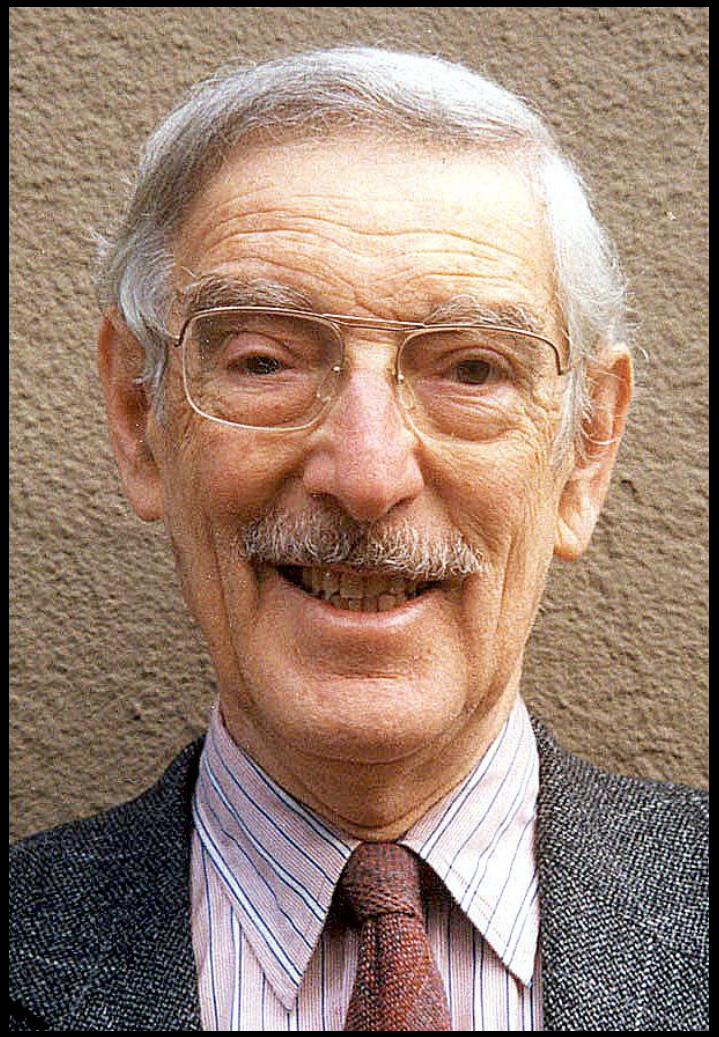
Maximum health and life span require metabolic harmony. It is commonly thought that American's intake of the >40 essential micronutrients (vitamins, minerals and other biochemicals that humans require) is adequate. Classic deficiency diseases such as scurvy, beriberi, pernicious anemia and rickets are rare. We think the evidence suggests that much metabolic damage occurs at levels between the level that causes acute micronutrient deficiency disease and the recommended dietary allowances (RDA).[4] However, the prevention of more subtle metabolic damage is not addressed by current RDA. When one input in the metabolic network is inadequate, repercussions are felt on a large number of systems and can lead to degenerative disease. This may, for example, result in an increase in DNA damage (and possibly cancer), or neuron decay (and possibly cognitive dysfunction) or mitochondrial decay (and possibly accelerated aging and degenerative diseases). The optimum amount of folic acid or zinc that is truly "required" is the amount that minimizes DNA damage and maximizes a healthy life span, which is higher than the amount needed to prevent acute disease. The requirements of the old for vitamins and metabolites are likely to be different from those of the young, but this issue has not been seriously examined. An optimal intake of micronutrients and metabolites also varies with genetic constitution. A tune-up of micronutrient metabolism should give a marked increase in health at little cost. It is inexcusable that anyone in the world should have an inadequate intake of a vitamin or mineral, at great cost to that person's health, when a year's supply of a daily multivitamin/mineral pill as insurance against deficiencies costs less than a few packs of cigarettes. The poor, in general, eat the worst diets and have the most to gain from multivitamin/mineral supplementation and improvement in diet. As Hip-

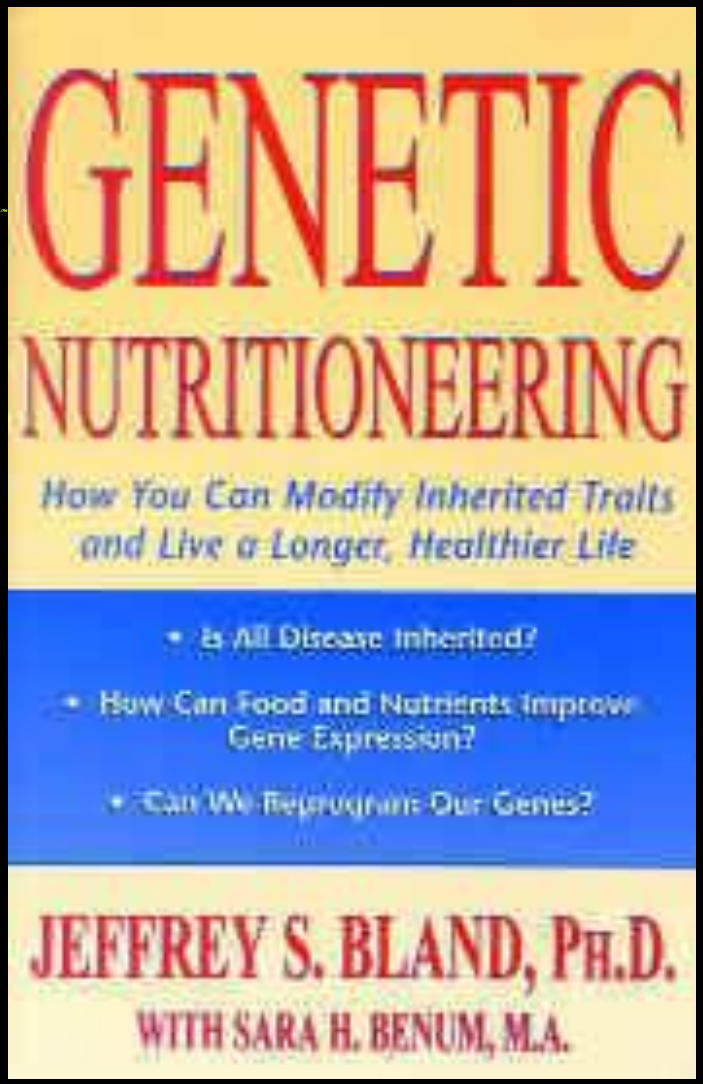
[1] Published in a supplement to *The Journal of Nutrition*. Presented as part of the 11th meeting of the international organization, "Trace Elements in Man and Animals (TEMA)," in Berkeley, California, June 2–6, 2002. This meeting was supported by grants from the National Institutes of Health and the U.S. Department of Agriculture and by donations from Akzo Nobel Chemicals, Singapore; California Dried Plum Board, California; Cattlemen's Beef Board and National Cattlemen's Beef Association, Colorado; GlaxoSmithKline, New Jersey; International Atomic Energy Agency, Austria; International Copper Association, New York; International Life Sciences Institute Research Foundation, Washington, D.C.; International Zinc Association, Belgium; Mead Johnson Nutritionals, Indiana; Minute Maid Company, Texas; Perrier Vittel Water Institute, France; U.S. Borax, Inc., California; USDA/ARS Western Human Nutrition Research Center, California and Wyeth-Ayerst Global Pharmaceuticals, Pennsylvania. Guest editors for the supplement publication were Janet C. King, USDA/ARS WHNRC and the University of California at Davis; Lindsay H. Allen, University of California at Davis; James R. Coughlin, Coughlin & Associates, Newport Coast, California; K. Michael Hambidge, University of Colorado, Denver; Carl L. Keen, University of California at Davis; Bo L. Lönnerdal, University of California at Davis and Robert B. Rucker, University of California at Davis.

[2] This study was supported by National Foundation for Cancer Research Grant 00-CHORI, Ellison Medical Foundation Grant SS-0422-99, The Wheeler Foundation Fund of the University of California, National Institute on Aging Grant AG17140 and National Institute of Environmental Health Sciences Center Grant P30-ES01896.

[3] To whom correspondence should be addressed. E-mail: bames@chori.org.

[4] Abbreviations used: ALCAR, acetyl carnitine; LA, lipoic acid; RDA, recommended dietary allowance.




GENETIC
NUTRITIONEERING
How You Can Modify Inherited Traits and Live a Longer, Healthier Life
• Is All Disease Inherited?
• How Can Food and Nutrients Improve Gene Expression?
• Can We Reprogram Our Genes?
JEFFREY S. BLAND, PH.D.
WITH SARA H. BENUM, M.A.


The McGraw-Hill Companies
BusinessWeek
SEPTEMBER 3, 2001
www.businessweek.com
DRUGS GET SMART
How new medicines will more effectively target what ails you
—and help prevent another Vioxx

TSUNAMI: THE POLITICS OF RELIEF

Newsweek

January 17, 2005 : $3.95 US

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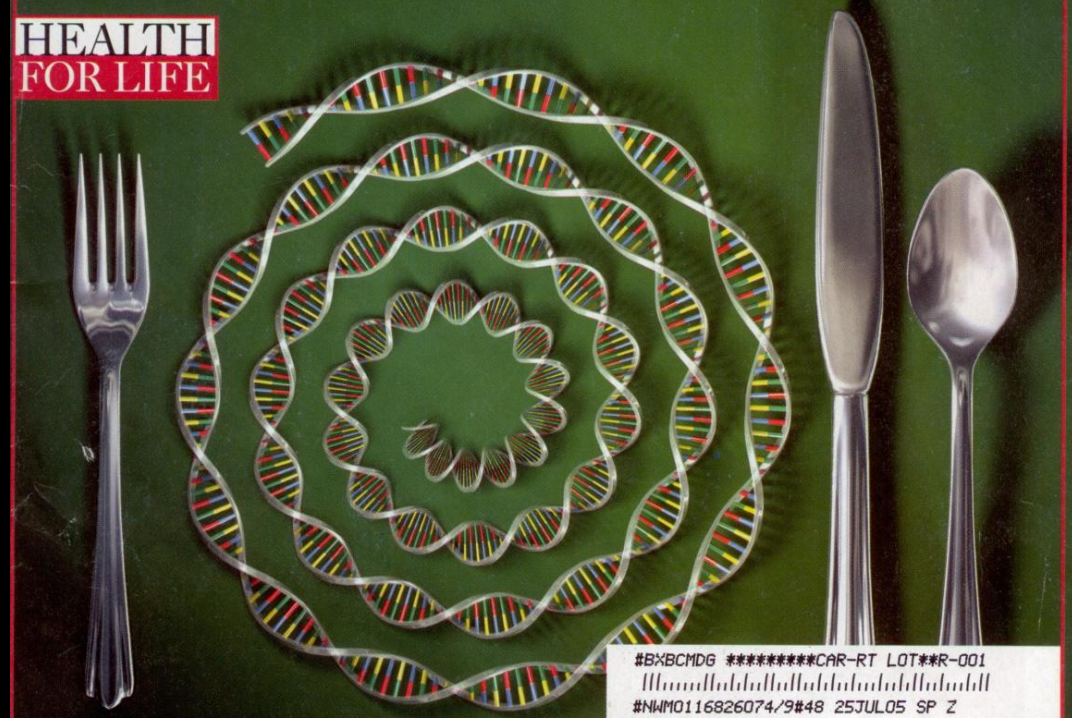
Diet & Genes

The New Science of Nutrition and Aging

HEALTH FOR LIFE



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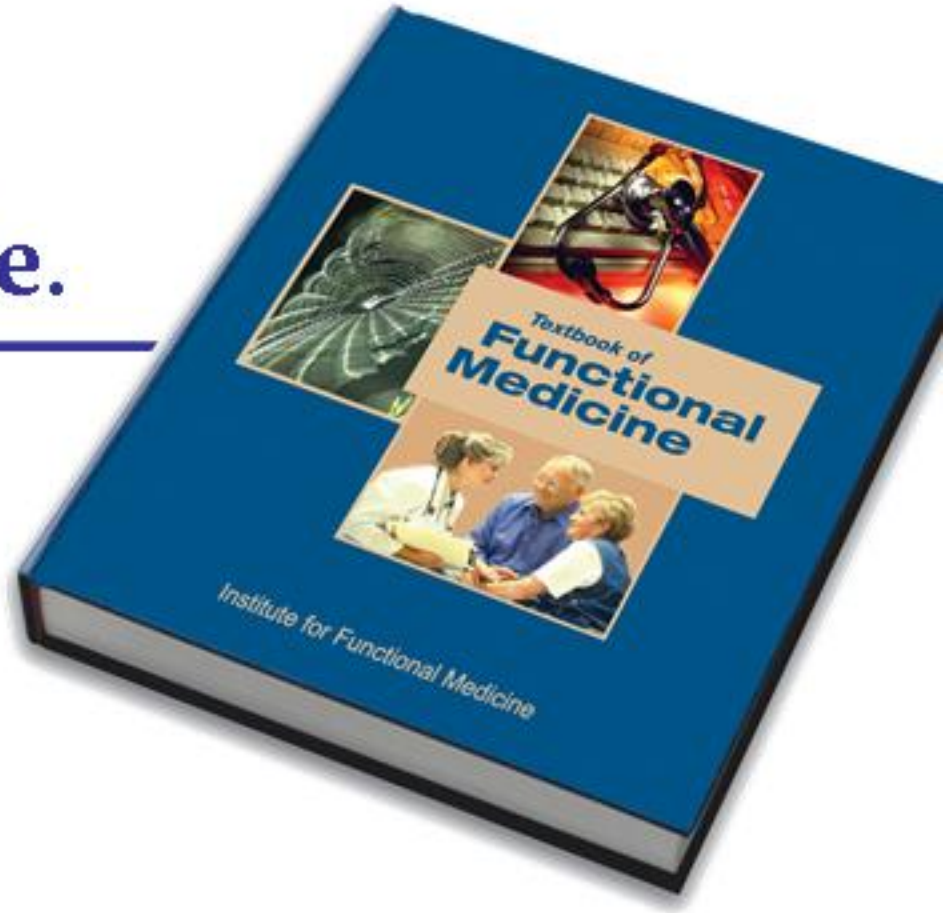

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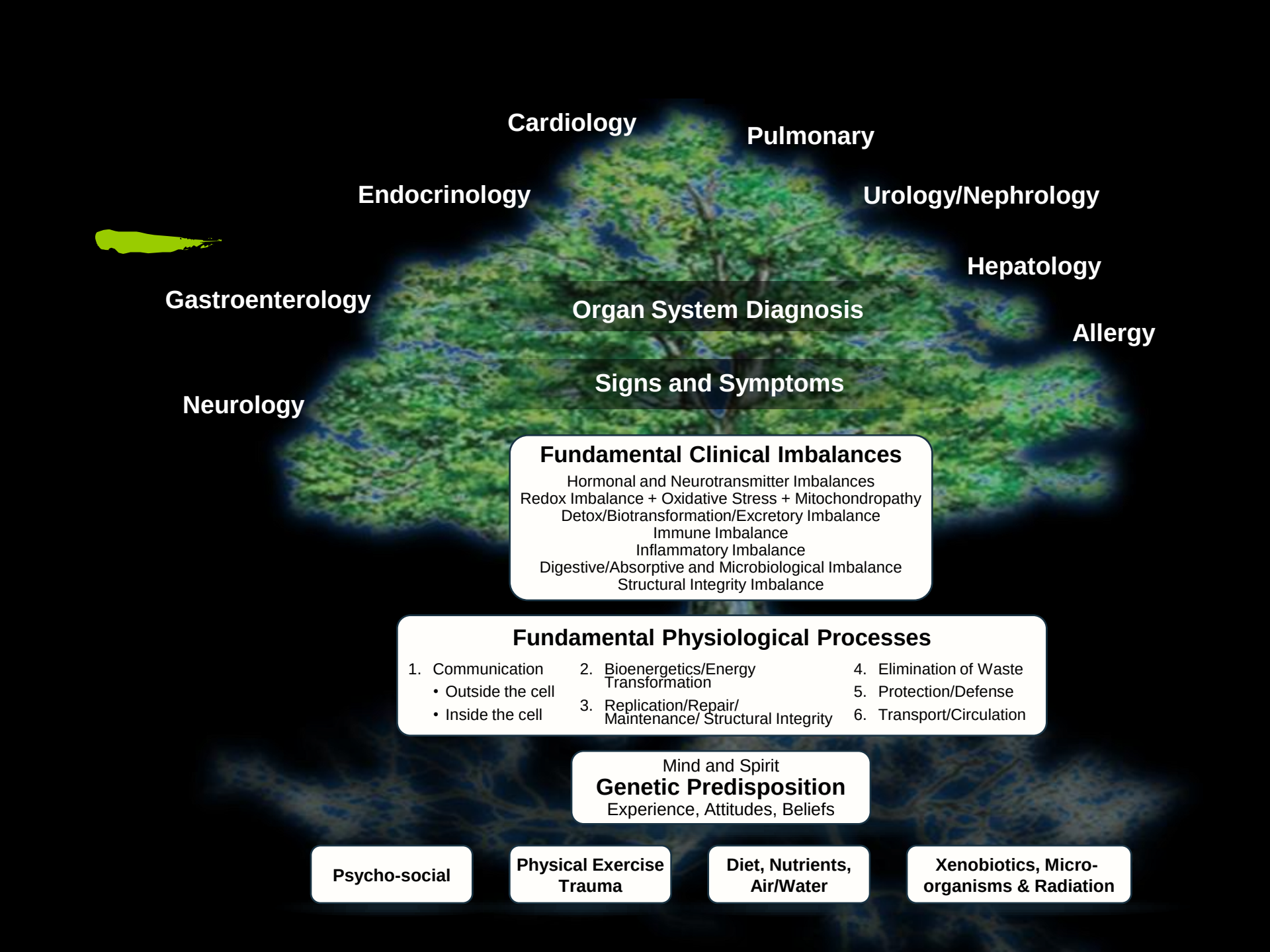
Principles

- ✓ Biochemical Individuality - enhanced gene expression
- ✓ Patient Centered v.s. Disease centered
- ✓ Dynamic balance between external and internal factors
- ✓ Web-like interconnectedness
- ✓ Health as positive vitality
- ✓ Enhancement of organ reserve


Cardiology
Pulmonary
Endocrinology
Urology/Nephrology
Hepatology
Gastroenterology
Organ System Diagnosis
Allergy
Signs and Symptoms
Neurology
Fundamental Clinical Imbalances
Hormonal and Neurotransmitter Imbalances
Redox Imbalance + Oxidative Stress + Mitochondropathy
Detox/Biotransformation/Excretory Imbalance
Immune Imbalance
Inflammatory Imbalance
Digestive/Absorptive and Microbiological Imbalance
Structural Integrity Imbalance
Fundamental Physiological Processes
1. Communication
• Outside the cell
• Inside the cell
2. Bioenergetics/Energy Transformation
3. Replication/Repair/ Maintenance/ Structural Integrity
4. Elimination of Waste
5. Protection/Defense
6. Transport/Circulation
Mind and Spirit
Genetic Predisposition
Experience, Attitudes, Beliefs
Psycho-social
Physical Exercise Trauma
Diet, Nutrients, Air/Water
Xenobiotics, Micro-organisms & Radiation

The Core Imbalances

- ✓ Environmental Inputs
- ✓ Hormone and Neurotransmitter Balance
- ✓ Immune/Inflammatory Balance
- ✓ Digestive/Gut Balances
- ✓ Detoxification
- ✓ Energy – Mitochondrial and Redox Balance
- ✓ Mind Body Balance
- ✓ Structural Integrity and Balance


Counseling
Meditation
Exercise
Phytonutrients
Detoxification and Biotransformation
Inflammatory Process
Structural Integrity
Vitamins
Minerals
Nutrient excess
Excessive exercise
Infectious micro-organisms
Dysbiosis
Spiritual angst
Nutrient insufficiency
Situational stress – fear, anxiety, worry
Xenobiotics
Immune Surveillance
Structural or physical damage
Adiposity
Psychological and Spiritual Equilibrium
Drug side effects
Hypoglycemia
Disrupted light cycles – circadian dysrhythmias
The functional medicine model recognizes and prioritizes the patient's full, unique story and uses fundamental clinical imbalances as a key to treating complex, chronic illness.
Diet
Toxic metals
Hyperglycemia
Drugs
Excessive noise
Radiation
Digestion, Absorption, and Barrier Integrity
Genetic pre-disposition (SNPs)
Emotional trauma
Food toxicants (allergens, stimulants etc,)
Aging
Oxidative Reductive Homeodynamics
Yoga
Hormone and Neurotransmitter Regulation
Surgery
Manipulative Therapies
Acupuncture

Attention Deficit Hyperactivity Disorder

A Holographic Model
for Chronic Disease

An Plague on Our Children

- ADHD affects 8.7% of children between the ages of 8 and 15.
- Over 8 million, or 1 in 10, children now take stimulant medications
- From 1987 to 1996 the use of these medications increased 400%, and from 1996 to 2007 use has increased over 1000%.

12 Million Children with Mental Illness

- Autism rates have increased from 3 in 10,000 children to 1 in 166 children and has increased 11-fold over the last decade.
- Learning disabilities affect between 5% and 10% of school-age children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WHAT IS GOING ON?????


TIME
Should Kids Hunt?
Corporate Welfare: The Pigs
THE LATEST ON
RITALIN
Scientists last week said it works. But how do you know if it's right for your kids?

Clinical Neuropsychiatry (2005) 2, 6, 354-379

AUTISM: A BRAIN DISORDER, OR A DISORDER THAT AFFECTS THE BRAIN?

Martha R. Herbert

Summary

Autism is defined behaviorally, as a syndrome of abnormalities involving language, social reciprocity and hyperfocus or reduced behavioral flexibility. It is clearly heterogeneous, and it can be accompanied by unusual talents as well as by impairments, but its underlying biological and genetic basis is unknown. Autism has been modeled as a brain-based, strongly genetic disorder, but emerging findings and hypotheses support a broader model of the condition as genetically influenced and systemic. These include imaging, neuropathology and psychological evidence of pervasive (and not just specific) brain and phenotypic features; postnatal evolution and chronic persistence of brain, behavior, and tissue changes (e.g. inflammation) and physical illness symptomatology (e.g. gastrointestinal, immune, recurrent infection); overlap with other disorders; and reports of rate increases and improvement or recovery that support a role for modulation of the condition by environmental factors (e.g. exacerbation or triggering by toxins, infectious agents, or other stressors, or improvement by treatment). Modeling autism more broadly encompasses previous work, but also encourages the expansion of research and treatment to include intermediary domains of molecular and cellular mechanisms, as well as chronic tissue, metabolic and somatic changes previously addressed only to a limited degree. The heterogeneous biologies underlying autism may conceivably converge onto the autism profile via multiple mechanisms that all somehow perturb brain connectivity. Studying the interplay between the biology of intermediary mechanisms on the one hand and processing and connectivity abnormalities on the other may illuminate relevant final common pathways and contribute to focusing the search for treatment targets in this biologically and etiologically heterogeneous behavioral syndrome.

Key Words: Autism – Brain – Complex systems – Connectivity – Gene-environment interaction

Autism: A Brain Disorder or a Disorder that Affects the Brain?

Martha Herbert, MD

Clinical Neuropsychiatry (2005) 2,6, 354-379

tive vantage points within the autism community's multiplicity of perspectives. These will be characterized here as the "strongly genetic, brain-based" model and the "genetically influenced, systemic" model. The focus here will be upon the impact of underlying assumptions upon how one constructs and investigates the relationship between the phenotypic profile of atypical language, social reciprocity and hyperfocused or repetitive behaviors that define the autism behavioral syndrome (American Psychiatric Association 1994) and the underlying biology. The argument will be made that

only behaviorally, the definition neither implies nor excludes any particular underlying etiology or disease course. Given the multiple known diseases associated with autism (e.g. tuberous sclerosis, fragile X, *in utero* rubella etc.) that do not share the same biology, and the presumed multiple other not yet identified biological underpinnings in the vast majority whose autism is now classified as "idiopathic," we are faced with the challenge of how to sort out the subgroups and multiple pathways to autism. Within this overall challenge there are two particularly important questions: a) what adap-

Received July 2005, accepted October 2005

Metabolic Encephalopathy

- Genes load the gun.
  - SNPs – GST, MTHFR, MS, COMT
- Environment pulls the trigger.
  - Nutrient poor diet
  - Food additives and chemicals
  - Toxins, infections, immune and gut dysfunction
  - Mitochondrial dysfunction and oxidative stress
  - Impaired methylation and sulfation (Jill James)

Martha Herbert, MD, PhD
Harvard Medical School

- ✓ Autism and ASD and ADHD is a hologram
- ✓ Encompasses
  - ✓ Epidemiology
  - ✓ Toxicology
  - ✓ Philosophy of science
  - ✓ Biochemistry and genetics
  - ✓ Systems theory
  - ✓ The collapse of the medical system
  - ✓ And the failure of medical care
- ✓ The end of medicine as we know it!

One Boy's Story

- ✓ 12 year old boy
- ✓ ADHD on Ritalin for years
- ✓ Behavior problems, poor school performance
- ✓ Severe dysgraphia (poor handwriting)

His Story

- ✓ Asthma, allergies, hives, stomach aches, headaches, insomnia, muscle cramps, and anxiety
- ✓ History antibiotics and frequent infections
- ✓ On 7 medications for allergies, asthma, pain, ADHD
- ✓ Junk food and high sugar diet

Old Paradigm

- A "team" of doctors
  - Psychiatrist, lung specialist, allergist, neurologist and gastroenterologist.
- No one asked - How is everything connected?
- Their job: match the pill to the ill!
- Did he just have bad luck to have so many different problems at 12 years old?
- We are asking the wrong questions.

His Real Problems: Core Imbalances

- Nutritional Deficiencies
  - Zinc, magnesium, B6, omega 3 fats
- Hormonal and Neurotransmitter Problems
  - Sleep problems, behavior, attention and hand writing problems

The Real Core Imbalances

- Inflammation
  - Food allergies and yeast
- Digestive Imbalances
  - Overuse of antibiotics, nausea, anal itching (yeast)
- Toxin Overload
  - Lead, food additives, sugar

A New Model for Treatment
Restoring Balance

- Take away the bad stuff
  - Processed food, food allergies, yeast overgrowth, toxic metals
- Add the good stuff
  - Whole real food
  - Nutrients: B6, Magnesium, omega 3 fats, zinc, vitamin D
  - Healthy gut bacteria - probiotics

Name

Chapter 7 Lesson 2 Notes

New Taxes for the Colonists

Sugar Act

Tax

What bothered the colonists the most was

- loyalists - tories
- mercy otis warren and james otis

The Stamp Act

Stamp Act

Representation

- Treason - working against or
- Public opinion or what people
- more people
- Less

People Protest in Different Ways

Petitions

Two groups that had their boats taken were

Liberty

- boycotters refuse to buy.

King ignored the colonists

Clayton Lamper 136

1. I wrote this sentence.
2. I have several radios.
3. Since when do you have an x box?
4. I am thinking of something.
5. I am better at math than my sister.
6. Though the cat was old, it was still very playful.
7. We're all in this together.
8. The water was calm until the alligator attacked.
9. Usually it is quiet in my room.
10. I am very happy most of the time.
11. While you were at school, I went skiing.
12. You ate the whole cake!!!
13. I went on a cruise on the English canal.
14. I am good at mathematics.
15. I listen to music alot.
16. My Dad took a physical.
17. I have an education.
18. The old man was not very

UltraWellness: Applying Functional Medicine

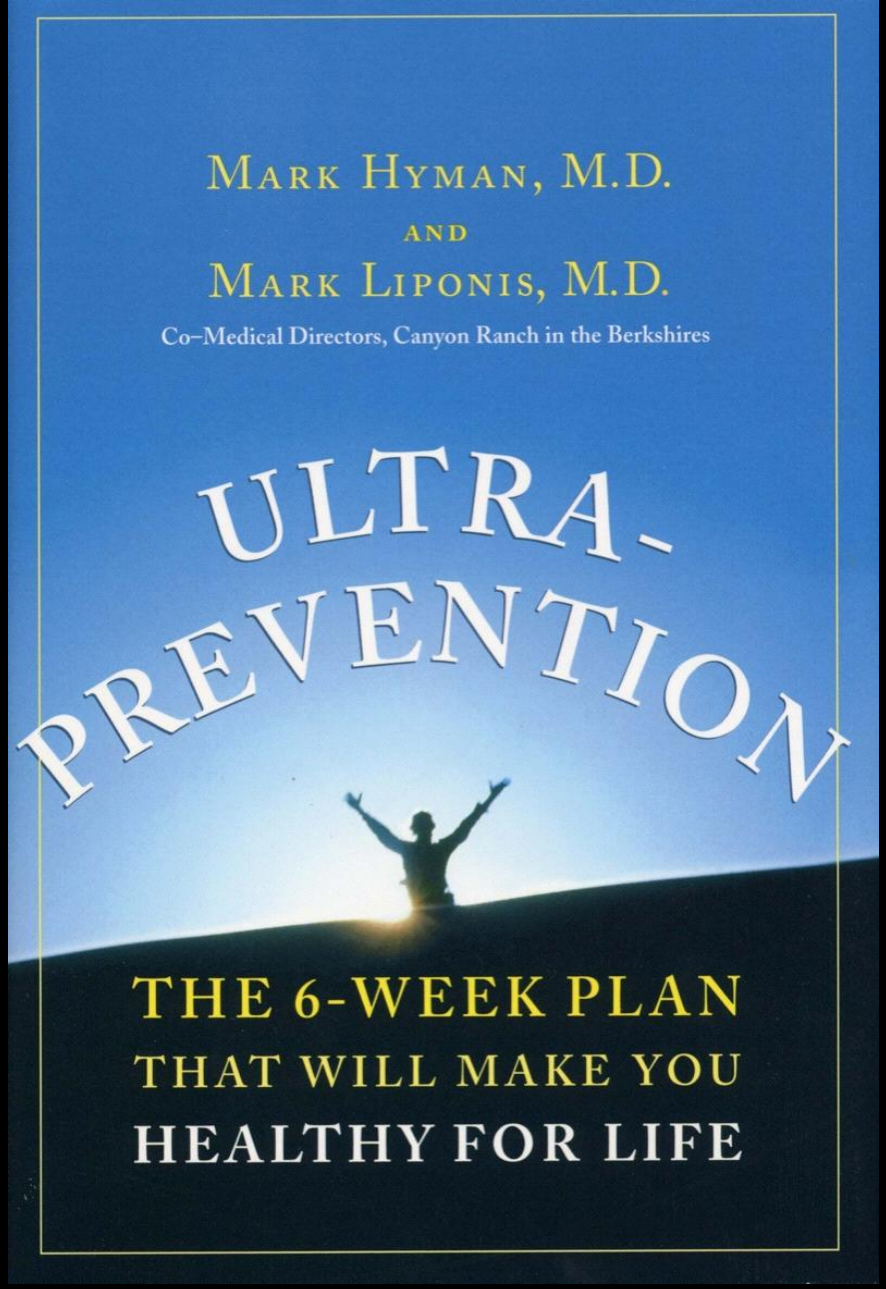
The Myths of Modern Medicine

The Forces of Illness/Wellness

Testing

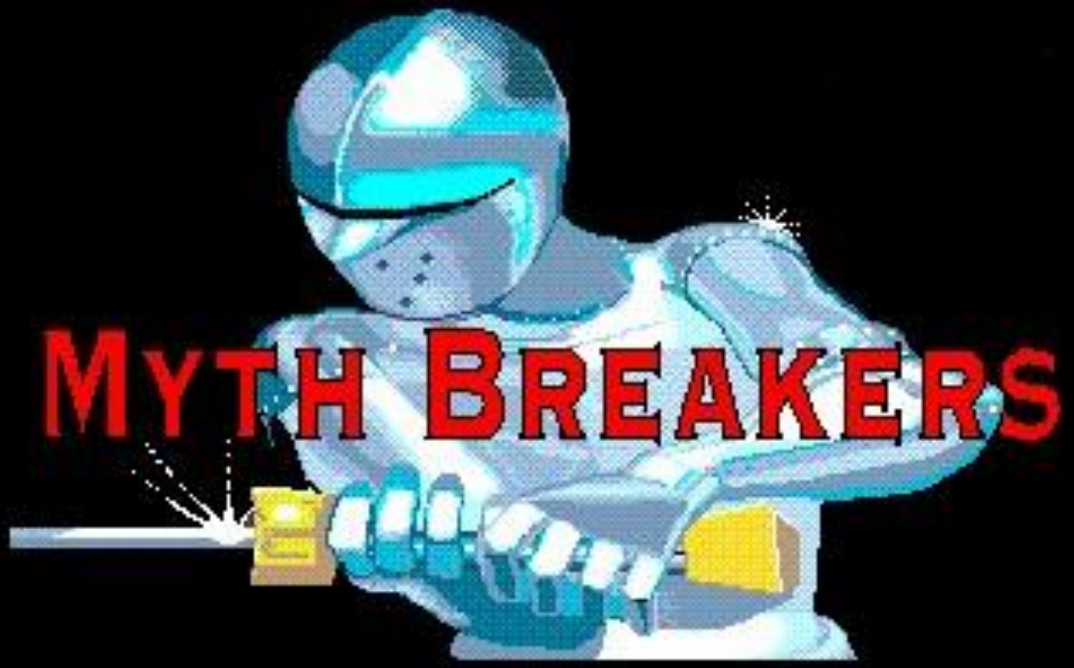
Correcting Imbalances

Activating the Forces of Wellness



www.ultrawellness.com

The Myths of Modern Medicine



Your Doctor Knows Best

Myth # 1

113,597 DOCTORS FROM COAST TO COAST WERE ASKED!

According to this recent Nationwide survey:

MORE DOCTORS SMOKE CAMELS THAN ANY OTHER CIGARETTE!

This is no casual claim. It's an actual fact. Based on the statements of doctors themselves to three nationally known independent research organizations.

THE QUESTION was very simple. One that you...any smoker... might ask a doctor: "What cigarette do you smoke, Doctor?"

After all, doctors are **human** too. Like you, they **smoke** for pleasure. Their taste, like yours, enjoys the **pleasing** flavor of costlier tobaccos. Their throats too **appreciate** a cool mildness.

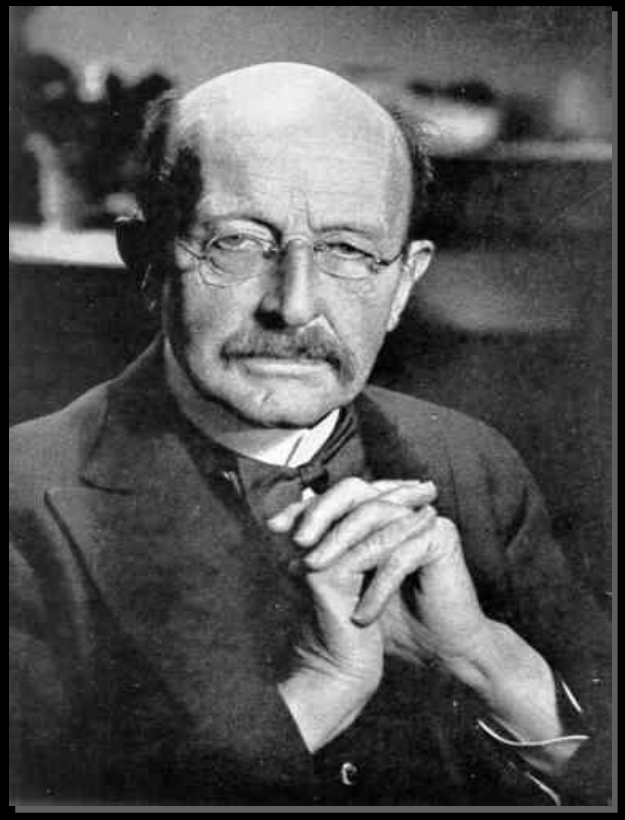
And more doctors **named Camels** than any other cigarette!

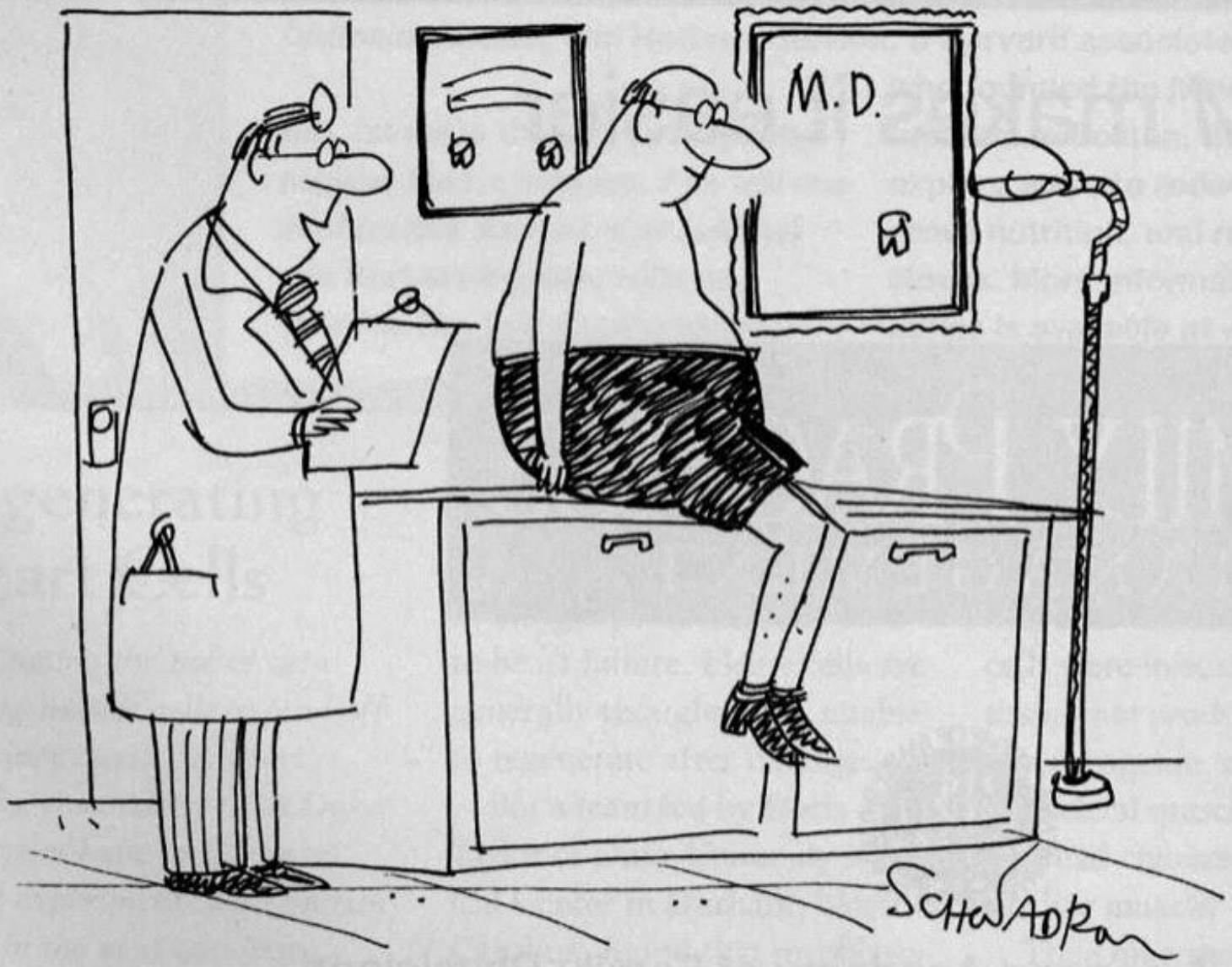
If you are a Camel **smoker**, this preference for **Camels** among **physicians** and **surgeons** will not surprise you. But if you are not now smoking Camels, by all means try them. Compare them critically in your "T-Zone" (see right).

CAMEL—COSTLIER TOBACCOS

How Medicine Evolves: Max Planck

"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because it opponents eventually die, and a new generation grows up that is familiar with it"





"Good news, Mr. Dewlap. While your cholesterol has remained the same, the research findings have changed."

The Mis-education of Doctors

- ✓ Zetia – lowers cholesterol but increases heart disease
- ✓ Aggressive blood sugar control increases heart disease and deaths (ACCORD study)
- ✓ Anti-depressants don't work (NEJM review)

Is US Health Really the Best in the World?

Barbara Starfield, MD, MPH

INFORMATION CONCERNING THE DEFICIENCIES OF US MEDICAL care has been accumulating. The fact that more than 40 million people have no health insurance is well known. The high cost of the health care system is considered to be a deficit, but seems to be tolerated under the assumption that better health results from more expensive care, despite evidence from a few studies indicating that as many as 20% to 30% of patients receive contraindicated care.[1] In addition, with the release of the Institute of Medicine (IOM) report "To Err Is Human,"[2] millions of Americans learned, for the first time, that an estimated 44 000 to 98 000 among them die each year as a result of medical errors.

The fact is that the US population does not have anywhere near the best health in the world. Of 13 countries in a recent comparison,[3] the United St… 12th (second from the bottom) for… dicators. Countries in order of their… health indicators (with the first be… Sweden, Canada, France, Australia, S… erlands, the United Kingdom, Denm… States, and Germany. Rankings of t… separate indicators[3] are:

- 13th (last) for low-birth-weight percentages
- 13th for neonatal mortality and infant mortality overall
- 11th for postneonatal mortality
- 13th for years of potential life lost (excluding external causes)
- 11th for life expectancy at 1 year for females, 12th for males
- 10th for life expectancy at 15 years for females, 12th for males
- 10th for life expectancy at 40 years for females, 9th for males
- 7th for life expectancy at 65 years for females, 7th for males
- 3rd for life expectancy at 80 years for females, 3rd for males
- 10th for age-adjusted mortality

The poor performance of the United States was recently confirmed by the World Health Organization, which used different indicators. Using data on disability-adjusted life expectancy, child survival to age 5 years, experiences with the health care system, disparities across social groups in experiences with the health care system, and equality of family out-of-pocket expenditures for health care (regardless of need for services), this report ranked the United States as 15th among 25 industrialized countries.[4] Thus, the figures regarding the poor position of the United States in health measures used. Common explanations for this poor performance fail to implicate the health system. The perception is that the American public "behaves badly" by smoking, drinking, and perpetrating violence. The data show otherwise, at least relatively. The proportion of females who smoke ranges from 14% in Japan to 41% in Denmark; in the United States, it is 24% (fifth best). For males, the range is from 26% in Sweden to 61% in Japan; it is 28% in the United States (third best).

The data for alcoholic beverage consumption are similar: the United States ranks fifth best. Thus, although tobacco use and alcohol use in excess are clearly harmful to health, they do not account for the relatively poor position of the United States on these health indicators. The data on years of potential life lost exclude external causes associated with deaths due to motor vehicle collisions and violence, and it is still the … 13 countries.[3] Dietary differences have been … be related to differences in mortality across … the United States has relatively low consump… fats (fifth lowest in men aged 55-64 years in … countries) and the third lowest mean cho… rations among men aged 50 to 70 years among … countries.[6]

… nation for relatively poor health in the United States is undoubtedly complex and multifactorial. From a health system viewpoint, it is possible that the historic failure to build a strong primary care infrastructure could play some role. A wealth of evidence[3] documents the benefits of characteristics associated with primary care performance. Of the 7 countries in the top of the average health ranking, 5 have strong primary care infrastructures. Although better access to care, including universal health insurance, is widely considered to be the solution, there is evidence that the major benefit of access accrues only when it facilitates receipt of primary care.[3,7] The health care system also may contribute to poor health through its adverse effects. For example, US estimates[8-10] of the combined effect of errors and adverse effects that occur because of iatrogenic damage not associated with recognizable error include:

- 12 000 deaths/year from unnecessary surgery
- 7000 deaths/year from medication errors in hospitals
- 20 000 deaths/year from other errors in hospitals

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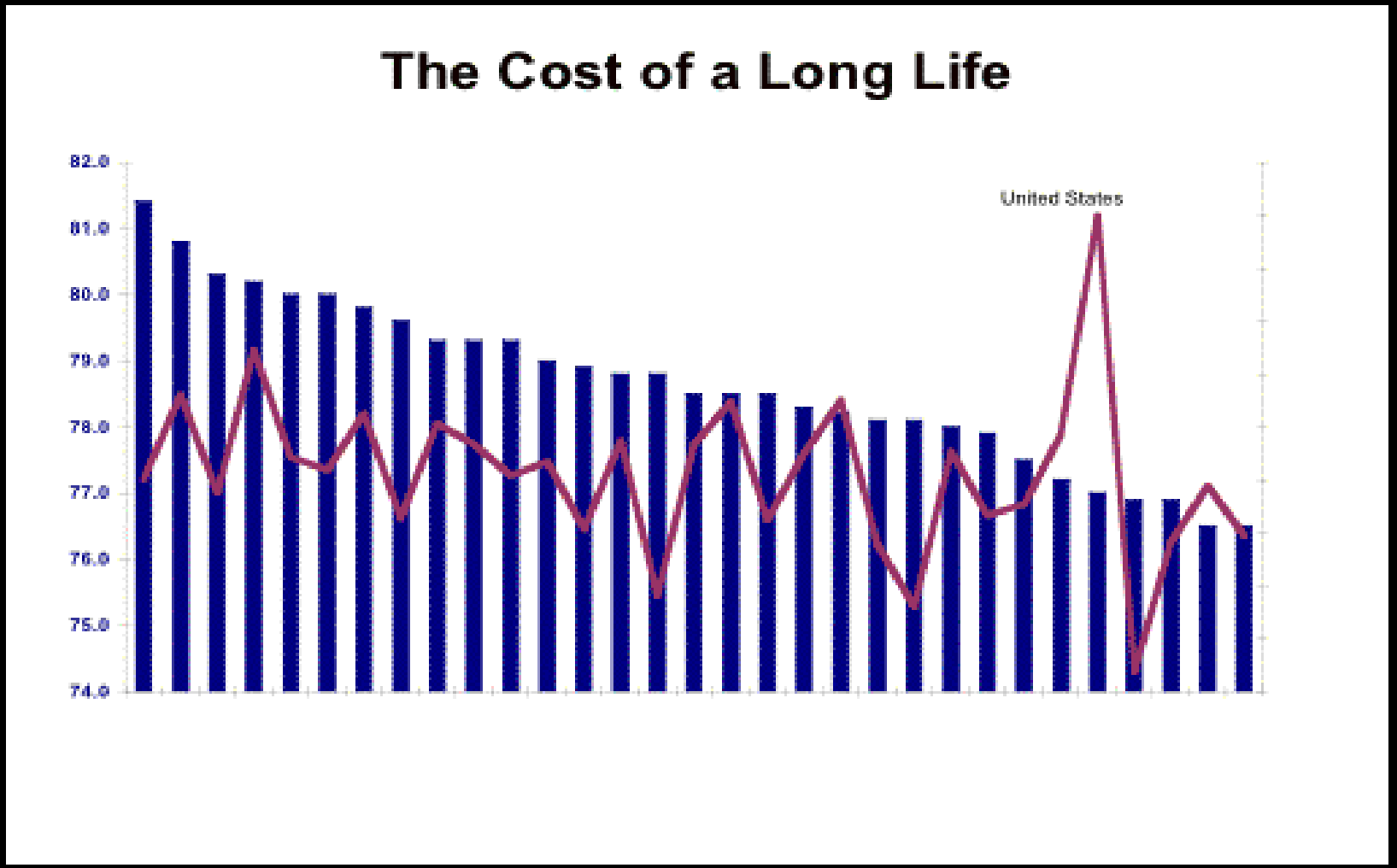
NO!

Health Care Expenditures

- 16% of Gross National Product
- 1.6 trillion dollars a year
- $7000 per person per year

Annual Physical and Economic Cost of Medical Intervention

CONDITION	DEATHS	COSTS	AUTHOR
Hospital ADR	106,000	$12 Billion	Lazarou
Medical Error	98,000	$2 Billion	IOMIO
Bedsores	115,000	$55 Billion	Xakelis
Infection	88,000	$ 5 Billion	Weinstein
Malnutrition	108,000		Nurses Coalition
Outpatient ADR	199,000	$77 Billion	Starfield
Unnecessary Procedures	37,136	$122 Billion	HCUP
Surgery Related	32,000	$9 Billion	HARQ
TOTAL	783,936	$282 Billion	



Life Expectancy v.s.
Health Care Expenditures

SPECIAL COMMUNICATION

Actual Causes of Death in the United States, 2000

Ali H. Mokdad, PhD
James S. Marks, MD, MPH
Donna F. Stroup, PhD, MSc
Julie L. Gerberding, MD, MPH

Context Modifiable behavioral risk factors are leading causes of mortality in the United States. Quantifying these will provide insight into the effects of recent trends and the implications of missed prevention opportunities.

Objectives To identify and quantify the leading causes of mortality in the United States.

Actual Causes of Death

Smoking 450,000

Obesity 400,000

JAMA 2004;291:1238-1245

IN A SEMINAL 1993 ... McGinnis and Foege[1] des... major external (nongene... fiable factors that cont... death in the United States a... them the "actual causes of de... ing the 1990s, substantial lif... tern changes may have led to... in actual causes of death. Mor... from heart disease, stroke, a... have declined.[2] At the same ti... ioral changes have led to an... prevalence of obesity and dia...

Most diseases and injuries ... tiple potential causes and s... tors and conditions may co... a single death. Therefore, it ... lenge to estimate the contr... each factor to mortality. I... ticle, we used published caus... reported to the Centers for Di... trol and Prevention (CDC) ... relative risks (RRs), and prev... timates from published lite... governmental reports to up... causes of death in the United ... method similar to that used by McGinnis and Foege.

METHODS

Our literature review used a MEDLINE database search of English-language articles that identified epidemiological, clinical, and laboratory studies linking risk behaviors and mortality. Our search criteria were to include all ar-

arms, sexual behavior, illicit drug use. Our search allowed for words with similar meaning to be included (ie, exercise as well as physical activity). The search was initially restricted to articles published during or after 1990, but we later included relevant articles published in 1980 to December 31, 2002 (search strategies are available from the authors on request). For each risk factor, we used the prevalence and RR identified by the literature search. To identify the causes and number of

culate attributable fractions for each disease: $[(P_0+\Sigma P_i\ (RR_i))-1]/[P_0+\Sigma P_i\ (RR_i)]$, in which P_0 is the percentage of individuals in the United States not engaging in the risk behavior, P_i is the per-

For editorial comment see p 1263.

Author Affiliations: Division of Adult and Community Health (Dr Mokdad), Office of the Director (Drs Marks and Stroup), National Center for Chronic Disease Prevention and Health Promotion and Office of the Director (Dr Gerberding), Centers for Disease Control and Prevention, Atlanta, Ga.
Corresponding Author: Ali H. Mokdad, PhD, Division of Adult and Community Health, 4770 Buford Hwy, NE, Mailstop K66, Atlanta, GA 30341 (amokdad@cdc.gov).

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

The Quality of Health Care Delivered to Adults in the United States

Elizabeth A. McGlynn, Ph.D., Steven M. Asch, M.D., M.P.H., John Adams, Ph.D., Joan Keesey, B.A., Jennifer Hicks, M.P.H., Ph.D., Alison DeCristofaro, M.P.H., and Eve A. Kerr, M.D., M.P.H.

439 Indicators of Quality of Care
30 Chronic Conditions
Only 54.9% received recommended care

BACK
We ha
volvec

METH
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State
conse
infor
chronic conditions as well as preventive care. We then constructed aggregate scores.

RESULTS

Participants received 54.9 percent (95 percent confidence interval, 54.3 to 55.5) of recommended care. We found little difference among the proportion of recommended preventive care provided (54.9 percent), the proportion of recommended acute care pro-

Michigan, Ann Arbor (E.A.K.). Address reprint requests to Dr. McGlynn at RAND, 1700 Main St., P.O. Box 2138, Santa Monica, CA 90407, or at beth_mcglynn@rand.org.

N Engl J Med 2003;348:2635-45.

The NEW ENGLAND JOURNAL of MEDICINE

EDITORIAL

Medical Care — Is More Always Better?

Elliott S. Fisher, M.D., M.P.H.

Manhattan - $10,550
Portland, OR - $4,823

High intensity practice pattern is associated with a lower quality of care and worse outcomes than a more conservative practice pattern.

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

SHATTUCK LECTURE

Clinical Research to Clinical Practice — Lost in Translation?

Claude Lenfant, M.D.

40% of patients do not get aspirin after myocardial infarction

Confessio Medici
hen Paget, 1909

VAS MADE IN IM-
icans. The average
en 1900 and 2000.
y, we still managed

Much of our continued success in extending life expectancy over the past several decades is almost certainly due to research supported by the National Institutes of Health (NIH) and generously funded by the American public. NIH-supported research has not only made possible the development of new and improved treatments for a wide range of human diseases; it has also provided the knowledge of disease risk factors needed to formulate effective approaches to prevent them. For example, research supported by the National Heart, Lung, and Blood Institute has identified important cardiovascular risk factors, has established the effectiveness of approaches to prevent or control them, and has assessed the effectiveness of treatment interventions for established disease.

As director of the National Heart, Lung, and Blood Institute, I am especially gratified

From the National Heart, Lung, and
Institute, National Institutes of H
Bethesda, Md., and the Departm
Health and Human Services, Washi
D.C. Address reprint requests to D
fant at the National Heart, Lung
Blood Institute, National Institu
Health, 9000 Rockville Pike, Bldg. 31, Room
5A52, Bethesda, MD 20892.

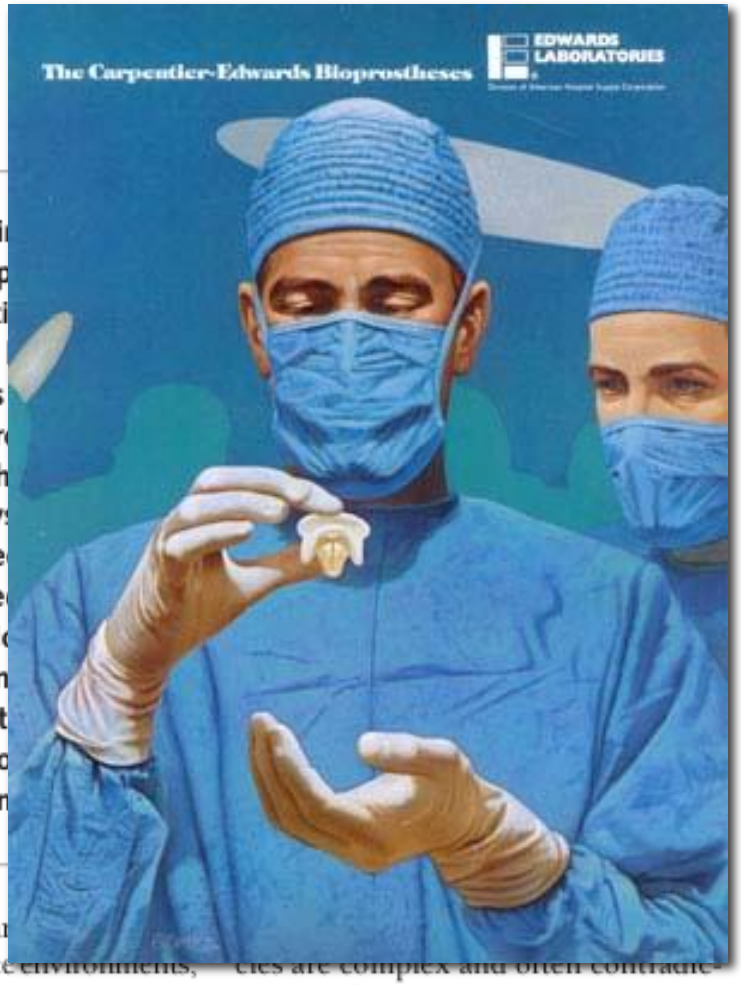
N Engl J Med 2003;349:868-74.

Physician Discontent
Challenges and Opportunities

David Mechanic, PhD

Most physicians conti
public and patient exp
contribute to percepti
tonomy. Increasingly,
the media, as well as
specialty societies, pr
front physicians with
mands. Although phys
earlier periods they fe
sures include increase
adoption of informati
reduce errors and to in
design. Use of such st
of direction, can empo
edge and expert syster

JAMA. 2003;290:941-946



DESPITE THE SUBSTANTIAL grumbling apparent among physicians, 8 of 10 physicians in national surveys report being satisfied overall with their careers in medicine.[1,2] A closer look at changes in physician career satisfaction over the past 3 or 4 decades indicates more physicians qualifying their reports of satisfaction and a larger minority expressing some dissatisfaction than in earlier decades, but the magnitude of change hardly explains the anguish commonly expressed.[3,4]

No comparable national data are available on other relevant professions because surveys use different questions and response categories, which can alter distributions. Surveys suggest, however, that nurses, dentists, and lawyers are no more satis-

gate summaries hide var
graphic markets, practice environments,
and specialty. An analysis of the pro-

cies are complex and often contradic-
tory, and financial, legal, organizational

If You Have a Diagnosis
You Know What's Wrong With You

Myth # 2

The End of Diagnostic Medicine

- ✓ Paradigm Shift: Finding the Right Medicine
- ✓ Understanding and Treating Causes, Dysfunction and Imbalances versus Treating Symptoms or Diseases
- ✓ The Science of Health
- ✓ A Fundamental Change in Our Thinking
- ✓ A new GPS system

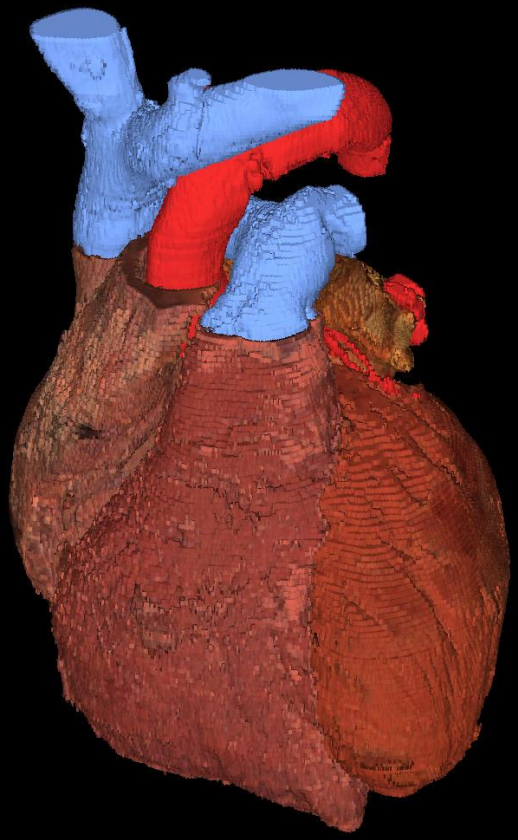
Avicenna (973-1037)
The Prince of Physicians

The knowledge of anything, since all things have causes, is not acquired or complete unless it is know by causes. Therefore in medicine we ought to know the causes of sickness and health.

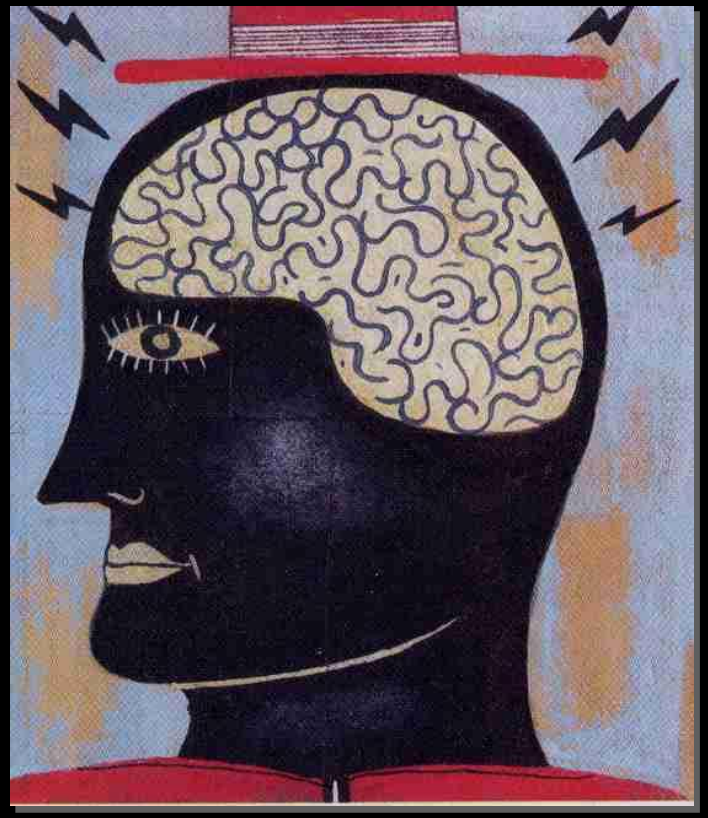
TABLE 1. THE SPECTRUM OF CLINICAL PRESENTATIONS OF CELIAC SPRUE.

COMMON FEATURES	LESS COMMON FEATURES	ASSOCIATED CONDITIONS	COMPLICATIONS
Adults	General features	Definite associations	Refractory sprue
Iron-deficiency anemia	Short stature	Dermatitis herpetiformis	Enteropathy-associated T-cell lymphoma
Diarrhea	Delayed puberty	IgA deficiency	Carcinoma of the oropharynx, esophagus, and small bowel
Children	Gastrointestinal features	Type 1 diabetes	Ulcerative jejunoileitis
Diarrhea	Recurrent aphthous stomatitis	Autoimmune thyroid disease	Collagenous sprue
Failure to thrive	Recurrent abdominal pain	Sjögren's syndrome	
Abdominal distention	Steatorrhea	Microscopic colitis	
	Extraintestinal features	Rheumatoid arthritis	
	Folate-deficiency anemia	Down's syndrome	
	Osteopenia or osteoporosis	IgA nephropathy	
	Dental-enamel hypoplasia	Possible associations	
	Vitamin K deficiency	Congenital heart disease	
	Hypertransaminasemia	Recurrent pericarditis	
	Thrombocytosis (hyposplenism)	Sarcoidosis	
	Arthralgia or arthropathy	Cystic fibrosis	
	Polyneuropathy	Fibrosing alveolitis	
	Ataxia	Lung cavities	
	Epilepsy (with or without cerebral calcification)	Pulmonary hemosiderosis	
	Infertility	Inflammatory bowel disease	
	Recurrent abortions	Autoimmune hepatitis	
	Anxiety and depression	Primary biliary cirrhosis	
	Follicular keratosis	Addison's disease	
	Alopecia	Systemic lupus erythematosus	
		Vasculitis	
		Polymyositis	
		Myasthenia gravis	
		Schizophrenia	

Is Heart Disease a Disease of the Heart?

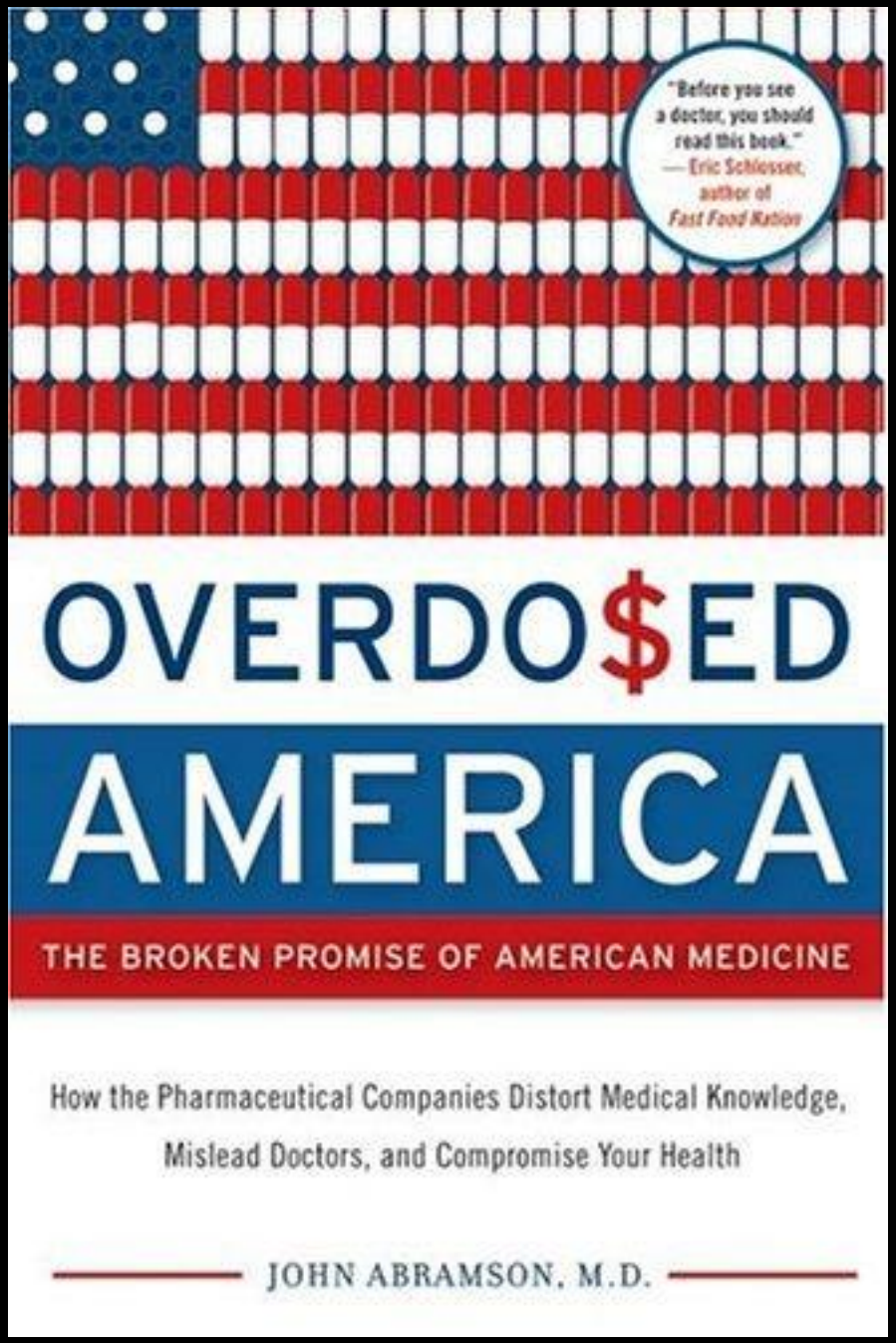


Are Migraines a Neurologic Disease?



Drugs Cure Disease

Myth # 3


"Before you see a doctor, you should read this book."
— Eric Schlosser, author of Fast Food Nation
OVERDO$ED
AMERICA
THE BROKEN PROMISE OF AMERICAN MEDICINE
How the Pharmaceutical Companies Distort Medical Knowledge, Mislead Doctors, and Compromise Your Health
JOHN ABRAMSON, M.D.

Hippocrates

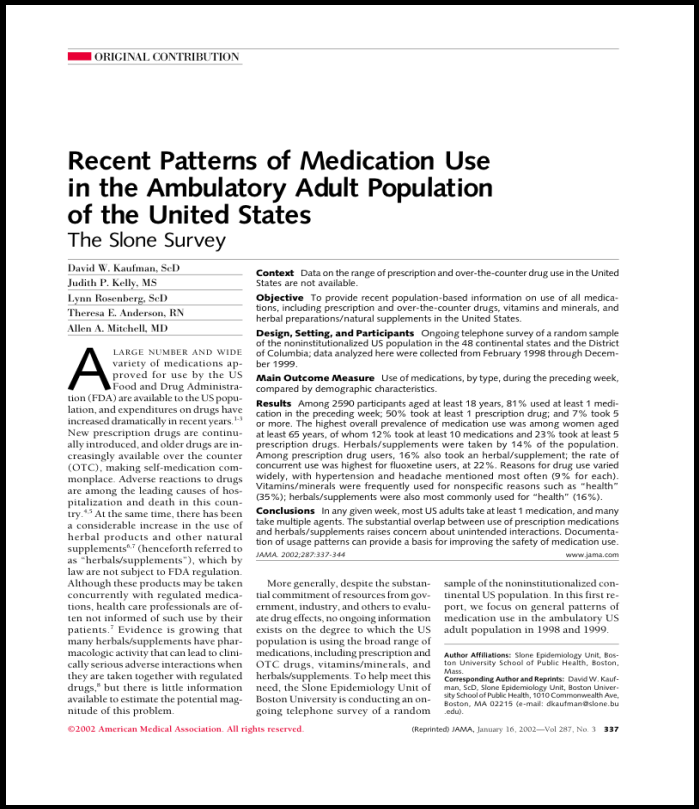
Leave your potions in the chemist's crucible if you can heal your patient with food.

Our Drug Problem

- ✓ $216 Billion in 2004 (2% GNP and 11.5% increase)
- ✓ 3.4 billion Rx written – 12 for each American
- ✓ $25 billion on marketing, $3.2 billion DTC ads

Overdosed America

- 81% took 1 medication in last week
- >65 years old
- 12% took 10 medications
- 23% took at least 5 medications



ORIGINAL CONTRIBUTION

Recent Patterns of Medication Use in the Ambulatory Adult Population of the United States

The Slone Survey

David W. Kaufman, ScD
Judith P. Kelly, MS
Lynn Rosenberg, ScD
Theresa E. Anderson, RN
Allen A. Mitchell, MD

Context Data on the range of prescription and over-the-counter drug use in the United States are not available.

Objective To provide recent population-based information on use of all medications, including prescription and over-the-counter drugs, vitamins and minerals, and herbal preparations/natural supplements in the United States.

Design, Setting, and Participants Ongoing telephone survey of a random sample of the noninstitutionalized US population in the 48 continental states and the District of Columbia; data analyzed here were collected from February 1998 through December 1999.

Main Outcome Measure Use of medications, by type, during the preceding week, compared by demographic characteristics.

Results Among 2590 participants aged at least 18 years, 81% used at least 1 medication in the preceding week; 50% took at least 1 prescription drug; and 7% took 5 or more. The highest overall prevalence of medication use was among women aged at least 65 years, of whom 12% took at least 10 medications and 23% took at least 5 prescription drugs. Herbals/supplements were taken by 14% of the population. Among prescription drug users, 16% also took an herbal/supplement; the rate of concurrent use was highest for fluoxetine users, at 22%. Reasons for drug use varied widely, with hypertension and headache mentioned most often (9% for each). Vitamins/minerals were frequently used for nonspecific reasons such as "health" (35%); herbals/supplements were also most commonly used for "health" (16%).

Conclusions In any given week, most US adults take at least 1 medication, and many take multiple agents. The substantial overlap between use of prescription medications and herbals/supplements raises concern about unintended interactions. Documentation of usage patterns can provide a basis for improving the safety of medication use.

JAMA. 2002;287:337-344 www.jama.com

A LARGE NUMBER AND WIDE variety of medications approved for use by the US Food and Drug Administration (FDA) are available to the US population, and expenditures on drugs have increased dramatically in recent years.[1-3] New prescription drugs are continually introduced, and older drugs are increasingly available over the counter (OTC), making self-medication commonplace. Adverse reactions to drugs are among the leading causes of hospitalization and death in this country.[4,5] At the same time, there has been a considerable increase in the use of herbal products and other natural supplements[6,7] (henceforth referred to as "herbals/supplements"), which by law are not subject to FDA regulation. Although these products may be taken concurrently with regulated medications, health care professionals are often not informed of such use by their patients.[7] Evidence is growing that many herbals/supplements have pharmacologic activity that can lead to clinically serious adverse interactions when they are taken together with regulated drugs,[8] but there is little information available to estimate the potential magnitude of this problem.

More generally, despite the substantial commitment of resources from government, industry, and others to evaluate drug effects, no ongoing information exists on the degree to which the US population is using the broad range of medications, including prescription and OTC drugs, vitamins/minerals, and herbals/supplements. To help meet this need, the Slone Epidemiology Unit of Boston University is conducting an ongoing telephone survey of a random sample of the noninstitutionalized continental US population. In this first report, we focus on general patterns of medication use in the ambulatory US adult population in 1998 and 1999.

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Overdosed America

- Top sellers: lifestyle medications
  - Statins
  - Acid blockers
  - Anti-depressants
  - Hypertension medications

Recent Warning Signs

- ✓ Hormone therapy - cancer, heart disease, stroke and dementia
- ✓ COX 2 inhibitors - Vioxx, et. al
- ✓ SSRI - Prozac and teenage suicides
- ✓ The Untold Statin Story - CoQ10 and Aging
- ✓ Zetia and cholesterol – increasing CAD
- ✓ Diabetes and blood sugar – wrong problem?

Pro-drugs v.s. Anti-drugs

Enhancing or interfering with the body's healing system?

INTERHEART STUDY

- ✓ 15,000 cases, 15,000 controls
- ✓ 8 of 9 risk factors for heart disease are all influenced by diet
- ✓ Dietary factors account for over 90% of all heart disease

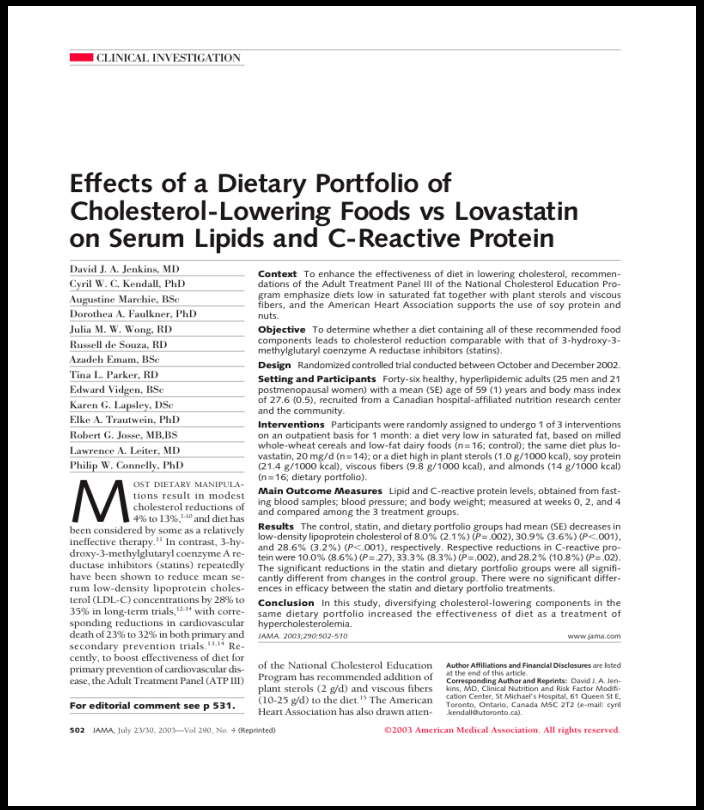
Abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, psychosocial factors, consumption of fruits, vegetables, and alcohol, and regular physical activity account for most of the risk of myocardial infarction worldwide in both sexes and at all ages in all regions. This finding suggests that approaches to prevention can be based on similar principles worldwide and have the potential to prevent most premature cases of myocardial infarction.

Lancet 2004; 364: 937–52

Cholesterol

Diet = Statins

Low fat diet and
statin
OR
Plant sterols, soy
proteins,
viscous fibers,
almonds
JAMA



CLINICAL INVESTIGATION

Effects of a Dietary Portfolio of Cholesterol-Lowering Foods vs Lovastatin on Serum Lipids and C-Reactive Protein

David J. A. Jenkins, MD
Cyril W. C. Kendall, PhD
Augustine Marchie, BSc
Dorothea A. Faulkner, PhD
Julia M. W. Wong, RD
Russell de Souza, RD
Azadeh Emam, BSc
Tina L. Parker, RD
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Philip W. Connelly, PhD

Context To enhance the effectiveness of diet in lowering cholesterol, recommendations of the Adult Treatment Panel III of the National Cholesterol Education Program emphasize diets low in saturated fat together with plant sterols and viscous fibers, and the American Heart Association supports the use of soy protein and nuts.

Objective To determine whether a diet containing all of these recommended food components leads to cholesterol reduction comparable with that of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors (statins).

Design Randomized controlled trial conducted between October and December 2002.

Setting and Participants Forty-six healthy, hyperlipidemic adults (25 men and 21 postmenopausal women) with a mean (SE) age of 59 (1) years and body mass index of 27.6 (0.9), recruited from a Canadian hospital-affiliated nutrition research center and the community.

Interventions Participants were randomly assigned to undergo 1 of 3 interventions on an outpatient basis for 1 month: a diet very low in saturated fat, based on milled whole-wheat cereals and low-fat dairy foods (n=16; control); the same diet plus lovastatin, 20 mg/d (n=14); or a diet high in plant sterols (1.0 g/1000 kcal), soy protein (21.4 g/1000 kcal), viscous fibers (9.8 g/1000 kcal), and almonds (14 g/1000 kcal) (n=16; dietary portfolio).

Main Outcome Measures Lipid and C-reactive protein levels, obtained from fasting blood samples; blood pressure; and body weight; measured at weeks 0, 2, and 4 and compared among the 3 treatment groups.

Results The control, statin, and dietary portfolio groups had mean (SE) decreases in low-density lipoprotein cholesterol of 8.0% (2.1%) ($P=.002$), 30.9% (3.6%) ($P<.001$), and 28.6% (3.2%) ($P<.001$), respectively. Respective reductions in C-reactive protein were 10.0% (8.6%) ($P=.27$), 33.3% (8.3%) ($P=.002$), and 28.2% (10.8%) ($P=.02$). The significant reductions in the statin and dietary portfolio groups were all significantly different from changes in the control group. There were no significant differences in efficacy between the statin and dietary portfolio treatments.

Conclusion In this study, diversifying cholesterol-lowering components in the same dietary portfolio increased the effectiveness of diet as a treatment of hypercholesterolemia.

JAMA. 2003;290:502-510 www.jama.com

Most dietary manipulations result in modest cholesterol reductions of 4% to 13%,[1-10] and diet has been considered by some as a relatively ineffective therapy.[11] In contrast, 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors (statins) repeatedly have been shown to reduce mean serum low-density lipoprotein cholesterol (LDL-C) concentrations by 28% to 35% in long-term trials,[12-14] with corresponding reductions in cardiovascular death of 23% to 32% in both primary and secondary prevention trials.[13,14] Recently, to boost effectiveness of diet for primary prevention of cardiovascular disease, the Adult Treatment Panel (ATP III) of the National Cholesterol Education Program has recommended addition of plant sterols (2 g/d) and viscous fibers (10-25 g/d) to the diet.[15] The American Heart Association has also drawn atten-

For editorial comment see p 531.

Author Affiliations and Financial Disclosures are listed at the end of this article.
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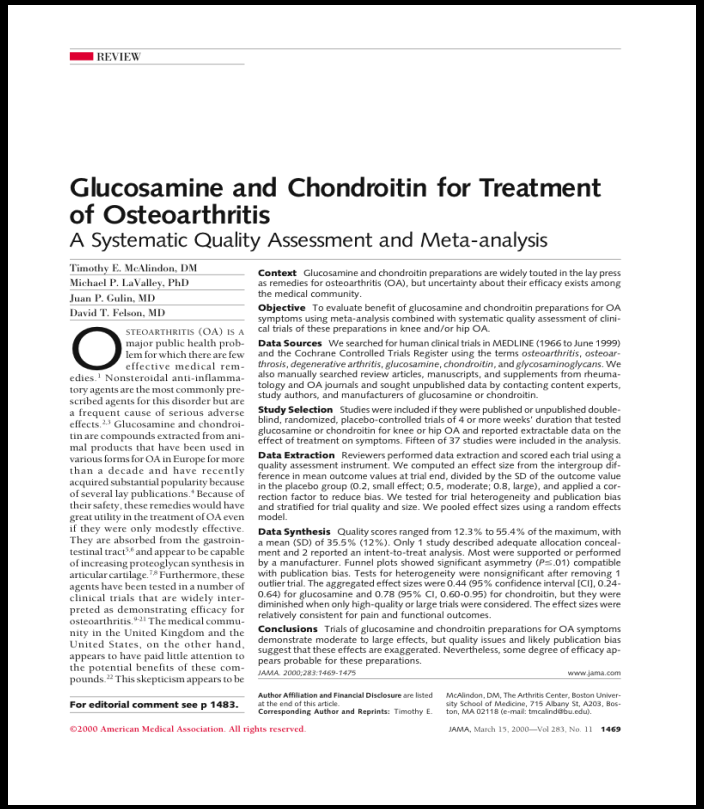
Vioxx or Glucosamine

Trials of glucosamine and chondroitin preparations for osteoarthritis symptoms demonstrate moderate to large effects.

JAMA



REVIEW

Glucosamine and Chondroitin for Treatment of Osteoarthritis

A Systematic Quality Assessment and Meta-analysis

Timothy E. McAlindon, DM
Michael P. LaValley, PhD
Juan P. Gulin, MD
David T. Felson, MD

OSTEOARTHRITIS (OA) IS A major public health problem for which there are few effective medical remedies.[1] Nonsteroidal anti-inflammatory agents are the most commonly prescribed agents for this disorder but are a frequent cause of serious adverse effects.[2,3] Glucosamine and chondroitin are compounds extracted from animal products that have been used in various forms for OA in Europe for more than a decade and have recently acquired substantial popularity because of several lay publications.[4] Because of their safety, these remedies would have great utility in the treatment of OA even if they were only modestly effective. They are absorbed from the gastrointestinal tract[5,6] and appear to be capable of increasing proteoglycan synthesis in articular cartilage.[7,8] Furthermore, these agents have been tested in a number of clinical trials that are widely interpreted as demonstrating efficacy for osteoarthritis.[9-21] The medical community in the United Kingdom and the United States, on the other hand, appears to have paid little attention to the potential benefits of these compounds.[22] This skepticism appears to be

For editorial comment see p 1483.

Context Glucosamine and chondroitin preparations are widely touted in the lay press as remedies for osteoarthritis (OA), but uncertainty about their efficacy exists among the medical community.

Objective To evaluate benefit of glucosamine and chondroitin preparations for OA symptoms using meta-analysis combined with systematic quality assessment of clinical trials of these preparations in knee and/or hip OA.

Data Sources We searched for human clinical trials in MEDLINE (1966 to June 1999) and the Cochrane Controlled Trials Register using the terms *osteoarthritis*, *osteoarthrosis*, *degenerative arthritis*, *glucosamine*, *chondroitin*, and *glycosaminoglycans*. We also manually searched review articles, manuscripts, and supplements from rheumatology and OA journals and sought unpublished data by contacting content experts, study authors, and manufacturers of glucosamine or chondroitin.

Study Selection Studies were included if they were published or unpublished double-blind, randomized, placebo-controlled trials of 4 or more weeks' duration that tested glucosamine or chondroitin for knee or hip OA and reported extractable data on the effect of treatment on symptoms. Fifteen of 37 studies were included in the analysis.

Data Extraction Reviewers performed data extraction and scored each trial using a quality assessment instrument. We computed an effect size from the intergroup difference in mean outcome values at trial end, divided by the SD of the outcome value in the placebo group (0.2, small effect; 0.5, moderate; 0.8, large), and applied a correction factor to reduce bias. We tested for trial heterogeneity and publication bias and stratified for trial quality and size. We pooled effect sizes using a random effects model.

Data Synthesis Quality scores ranged from 12.3% to 55.4% of the maximum, with a mean (SD) of 35.5% (12%). Only 1 study described adequate allocation concealment and 2 reported an intent-to-treat analysis. Most were supported or performed by a manufacturer. Funnel plots showed significant asymmetry ($P \leq .01$) compatible with publication bias. Tests for heterogeneity were nonsignificant after removing 1 outlier trial. The aggregated effect sizes were 0.44 (95% confidence interval [CI], 0.24-0.64) for glucosamine and 0.78 (95% CI, 0.60-0.95) for chondroitin, but they were diminished when only high-quality or large trials were considered. The effect sizes were relatively consistent for pain and functional outcomes.

Conclusions Trials of glucosamine and chondroitin preparations for OA symptoms demonstrate moderate to large effects, but quality issues and likely publication bias suggest that these effects are exaggerated. Nevertheless, some degree of efficacy appears probable for these preparations.

JAMA. 2000;283:1469-1475 www.jama.com

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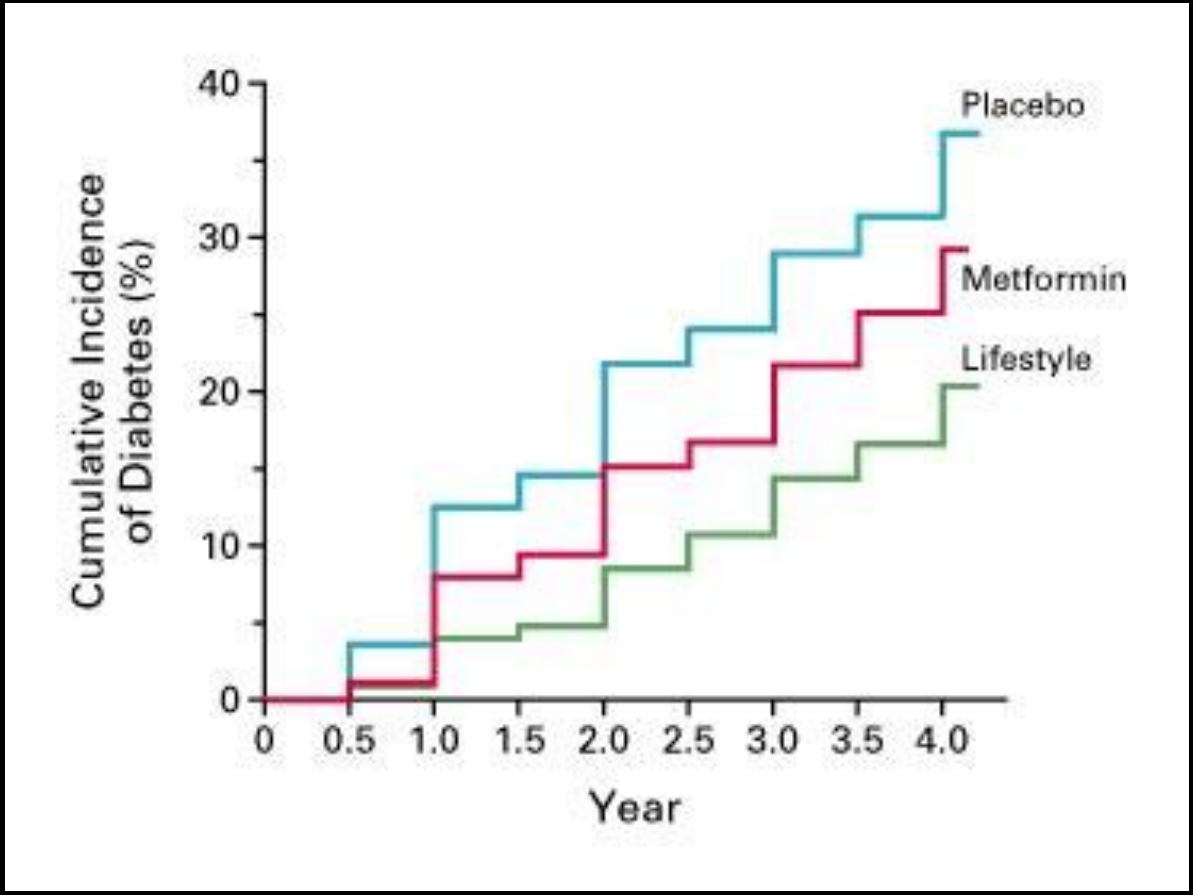
Lifestyle vs. Drugs & Diabetes



Diabetes: Fiber or Medication

The New England Journal of Medicine

BENEFICIAL EFFECTS OF HIGH DIETARY FIBER INTAKE IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

Manisha Chandalia, M.D., Abhimanyu Garg, M.D., Dieter Lutjohann, Ph.D., Klaus von Bergmann, M.D., Scott M. Grundy, M.D., Ph.D., and Linda J. Brinkley, R.D.

Abstract

Background The effect of increasing the intake of dietary fiber on glycemic control in patients with type 2 diabetes mellitus is controversial.

Methods In a randomized, crossover study, we assigned 13 patients with type 2 diabetes mellitus to follow two diets, each for six weeks: a diet containing moderate amounts of fiber (total, 24 g; 8 g of soluble fiber and 16 g of insoluble fiber), as recommended by the American Diabetes Association (ADA), and a high-fiber diet (total, 50 g; 25 g of soluble fiber and 25 g of insoluble fiber) containing foods not fortified with fiber (unfortified foods). Both diets, prepared in a research kitchen, had the same macronutrient and energy content. We compared the effects of the two diets on glycemic control and plasma lipid concentrations.

Results Compliance with the diets was excellent. During the sixth week of the high-fiber diet, as compared with the sixth week of the ADA diet, mean daily preprandial plasma glucose concentrations were 13 mg per deciliter (0.7 mmol per liter) lower (95 percent confidence interval, 1 to 24 mg per deciliter [0.1 to 1.3 mmol per liter]; P=0.04) and mean daily urinary glucose excretion was 1.3 g lower (median difference, 0.23 g; 95 percent confidence interval, 0.03 to 1.83; P=0.008). The high-fiber diet also lowered the area under the curve for 24-hour plasma glucose and insulin concentrations, which were measured every two hours, by 10 percent (P=0.02) and 12 percent (P=0.05), respectively. The high-fiber diet reduced plasma total cholesterol concentrations by 6.7 percent (P=0.02), triglyceride concentrations by 10.2 percent (P=0.02), and very-low-density lipoprotein cholesterol concentrations by 12.5 percent (P=0.01).

Conclusions A high intake of dietary fiber, particularly of the soluble type, above the level recommended by the ADA, improves glycemic control, decreases hyperinsulinemia, and lowers plasma lipid concentrations in patients with type 2 diabetes. (N Engl J Med 2000;342:1392-8.)

DIETARY guidelines for patients with diabetes mellitus were revised by the American Diabetes Association (ADA) earlier this year.[1] The ADA recommends that the composition of the diet be individualized on the basis of a nutritional assessment and the outcomes desired. Consistent with the previous recommendations of the ADA,[2] the new guidelines advise replacing saturated fat with carbohydrates. However, on the basis of previous studies,[3-10] an alternative approach of replacing saturated fat with cis monounsaturated fat was also included in the recommendations.[1] This new approach is further supported by epidemiologic studies that have shown the healthful effects of diets rich in cis monounsaturated fat in Mediterranean countries.[11,12]

Another, less strongly emphasized aspect of Mediterranean diets is the high intake of fruits, vegetables, and grains that are rich sources of dietary fiber.[13,14] The ADA recommended a moderate increase in the intake of dietary fiber to 20 to 35 g per day because of the cholesterol-lowering effects of soluble fiber. However, the effects of dietary fiber on glycemic control were considered inconsequential.[1] Furthermore, the expert panel of the ADA considered it difficult to achieve a high dietary intake of soluble fiber without consuming foods or supplements fortified with fiber.[1] We therefore designed the present study to determine the effects on glycemic control and plasma lipid concentrations of increasing the intake of dietary fiber in patients with type 2 diabetes exclusively through the consumption of foods not fortified with fiber (unfortified foods) to a level beyond that recommended by the ADA. In addition, we studied the effects of such an intervention on the intestinal absorption of cholesterol and the fecal excretion of sterols in an attempt to uncover the mechanisms by which a high-fiber diet lowers plasma cholesterol.

METHODS

Patients

We studied 12 men and 1 woman (9 non-Hispanic whites and 4 blacks) with type 2 diabetes at the general clinical research center of the University of Texas Southwestern Medical Center at Dallas. The protocol for the study was approved by the institutional review board of the medical center, and each patient gave written informed consent. In all patients the onset of diabetes was insidious; the disease developed in most of the patients after 40 years of age. Their mean (±SD) age was 61±9 years (range, 45 to 70). Their mean body weight was 93.5±12.7 kg, and the mean body-mass index (the weight in kilograms divided by the square of the height in meters) was 32.8±3.9. Three patients were treated with diet alone, and the other 10 patients were treated with 2.5 to 20

From the Department of Internal Medicine (M.C., A.G., S.M.G., L.J.B.) and the Center for Human Nutrition (A.G., S.M.G.), University of Texas Southwestern Medical Center, Dallas; the Department of Veterans Affairs Medical Center, Dallas (M.C., A.G., S.M.G.); and the Department of Clinical Pharmacology, Rheinische Friedrich-Wilhelms-Universität, Bonn, Germany (D.L., K.B.). Address reprint requests to Dr. Garg at the Center for Human Nutrition, University of Texas Southwestern Medical Center, 5323 Harry Hines Blvd., Dallas, TX 75390.

ORIGINAL CONTRIBUTION

Effect of a Mediterranean-Style Diet on Endothelial Dysfunction and Markers of Vascular Inflammation in the Met

A Randomized

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Carmen Di Palo, MD
Francesco Giugliano, MD
Giovanni Giugliano, MD
Massimo D'Armiento, MD
Francesco D'Andrea, MD
Dario Giugliano, MD, PhD

THE METABOLIC SYNDR
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2 diabetes. Recent estimate
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prevalent in the United State
estimated 24% of the adult p
affected.[1] Its clinical identif
based on measures of abdon
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evated blood pressure, an
intolerance.[2] The etiology o
drome is largely unknown bu
ably represents a complex i
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ronmental factors including
eral recent studies also sugg
proinflammatory state is on
nent of the metabolic syn
Moreover, evidence has acc
indicating that low-grade i
tion is associated with endot
function.[9,10]

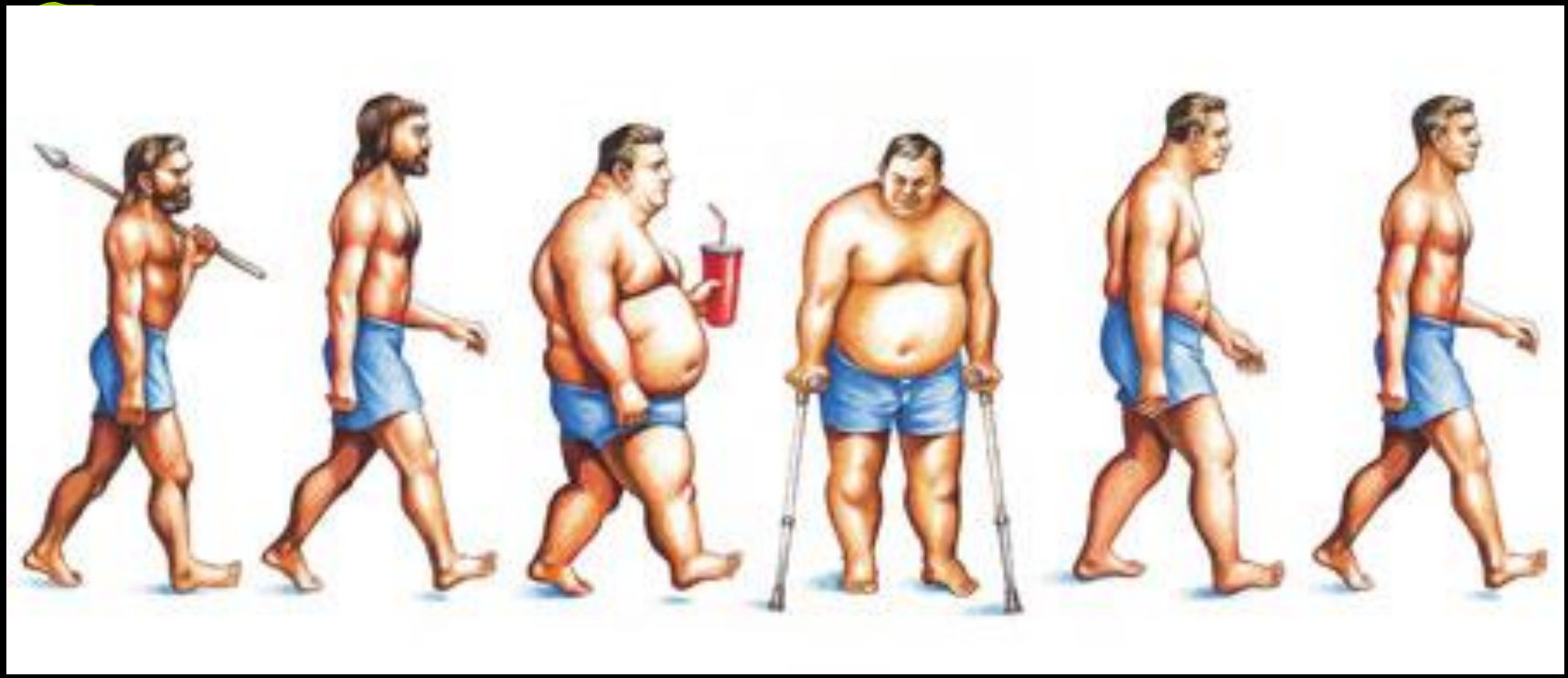
See also pp 1433 and 149

Patients in the intervention group has significantly reduced hs-CRP, IL-7, IL-18, as well as decreased insulin resistance and improved endothelial function. A Mediterranean-style diet might be effective in reducing the prevalence of the metabolic syndrome and its associated cardiovascular risk.

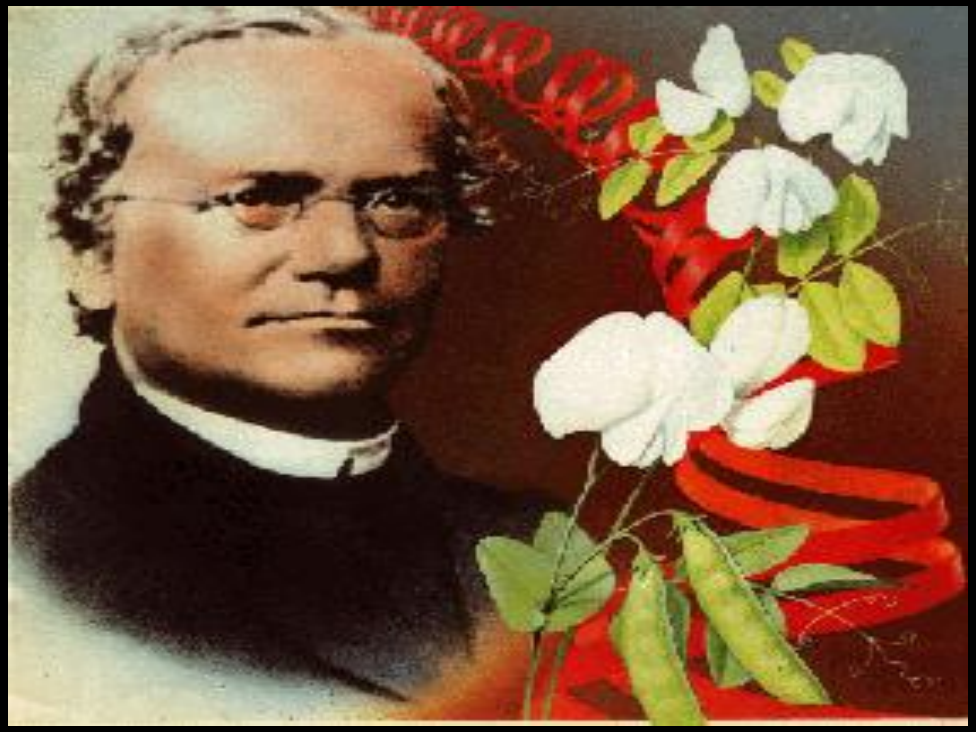
JAMA 2004;292:1440-1446

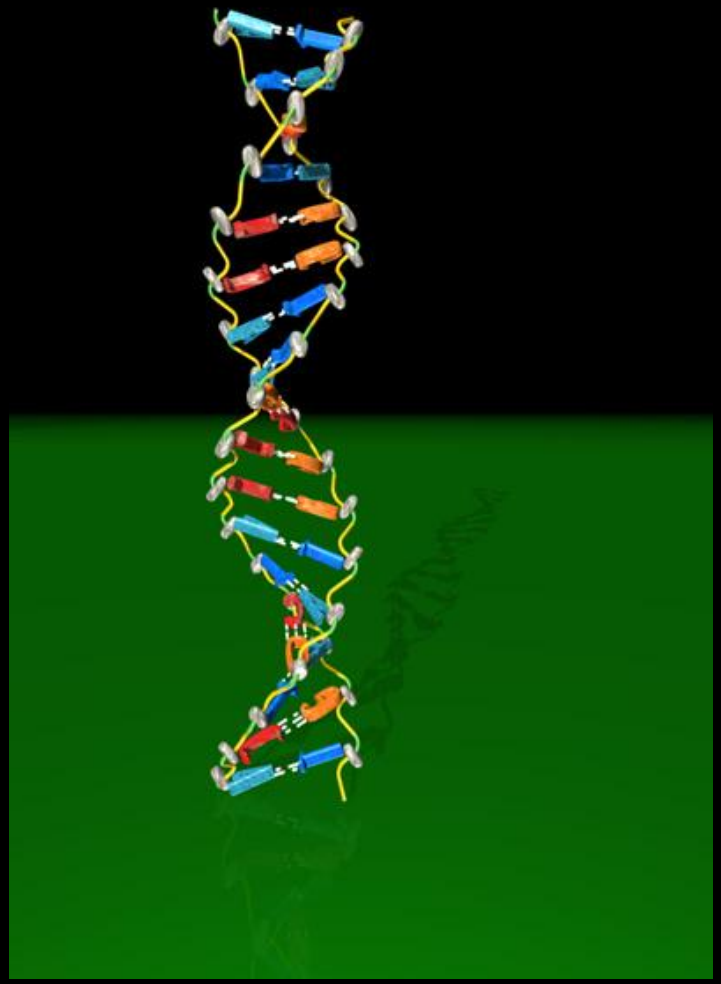
Your Genes Determine Your Fate

Myth # 4



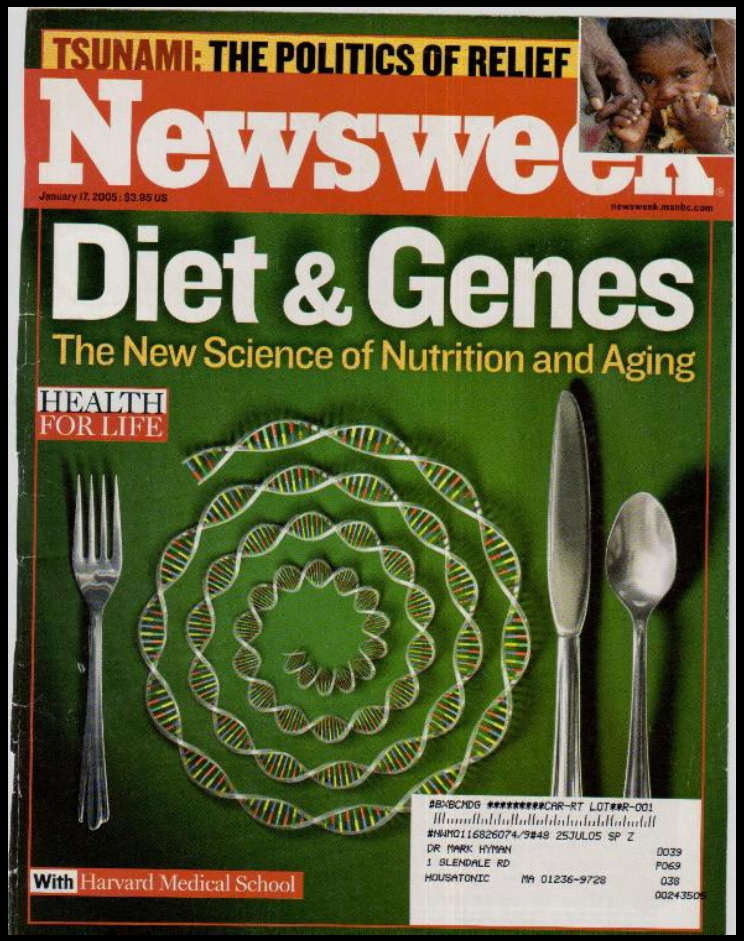
Gregor Mendel and Genetic Determinism





Genomics: Predisposition and Gene Expression

Nutrigenomics: Food as Information Fitting into Your Genes



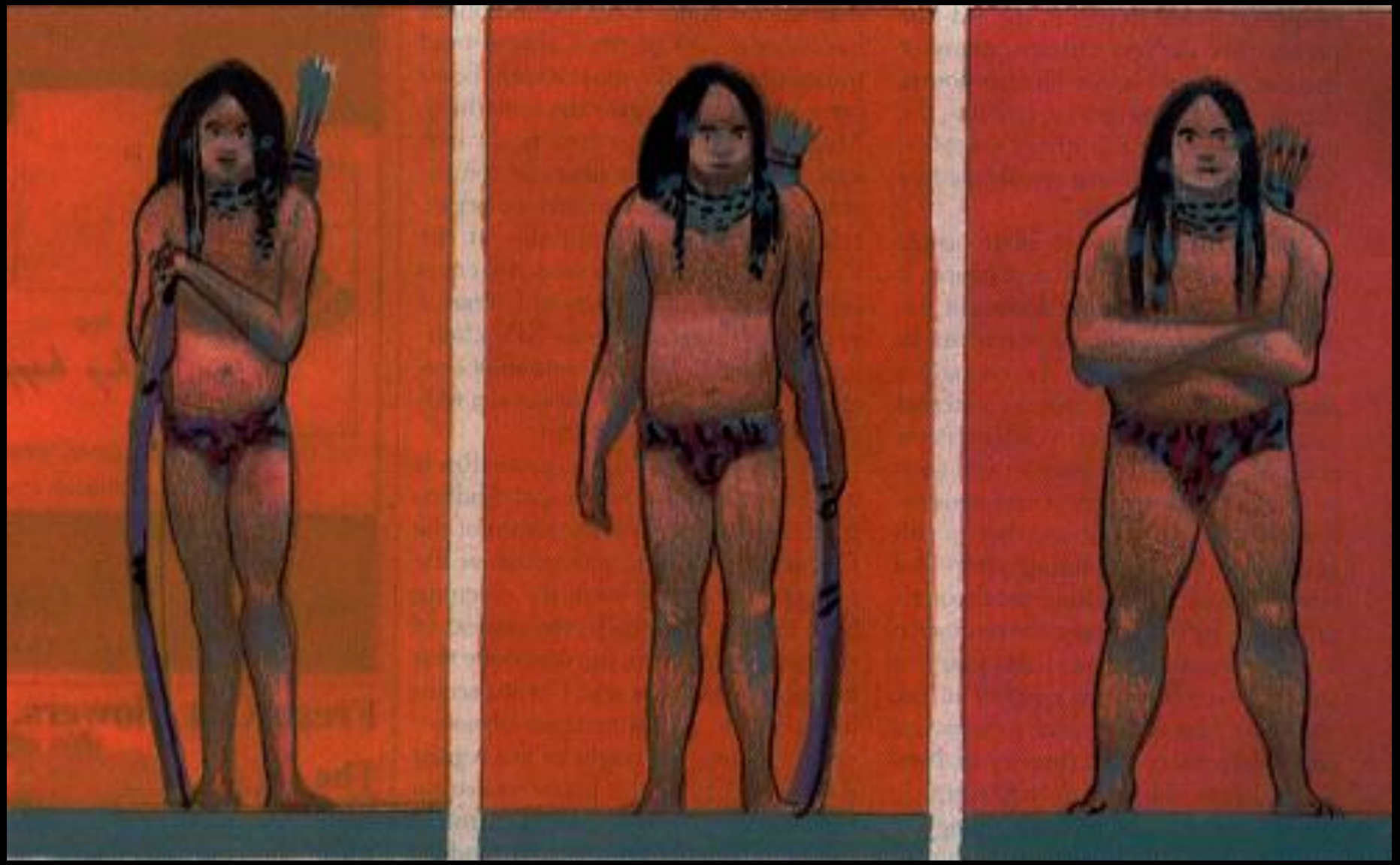
A PATH TO HEALTH FROM DIABETES, HEART DISEASE, OBESITY, OR ANY CHRONIC CONDITION

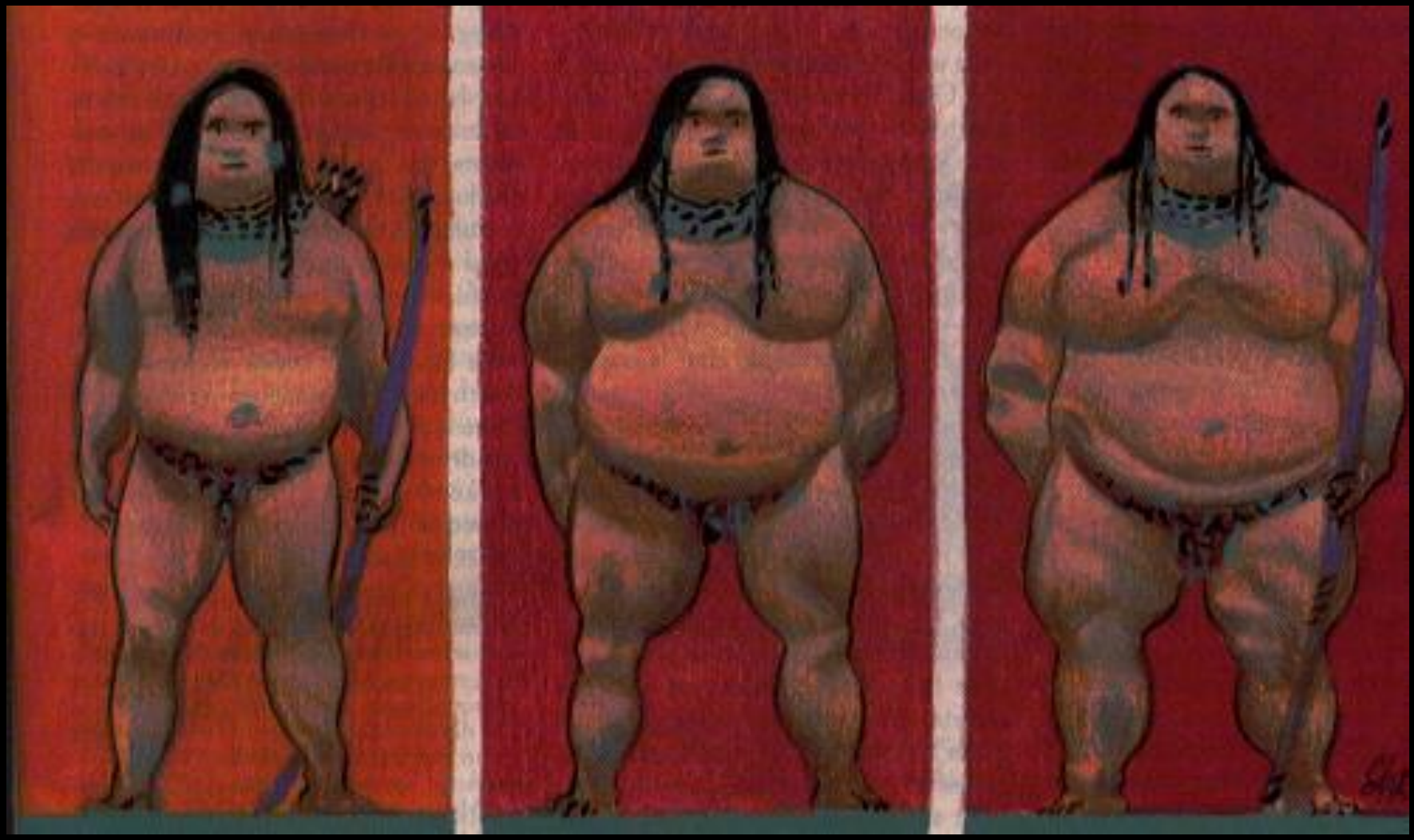
DR. MARK HYMAN'S NUTRIGENOMICS

HOW FOOD "TALKS" TO YOUR GENES TO SEND MESSAGES OF HEALTH OR DISEASE

Nutrients Get Smart

What is Wrong with this Picture?






7 26 '10

Getting Older Means Aging

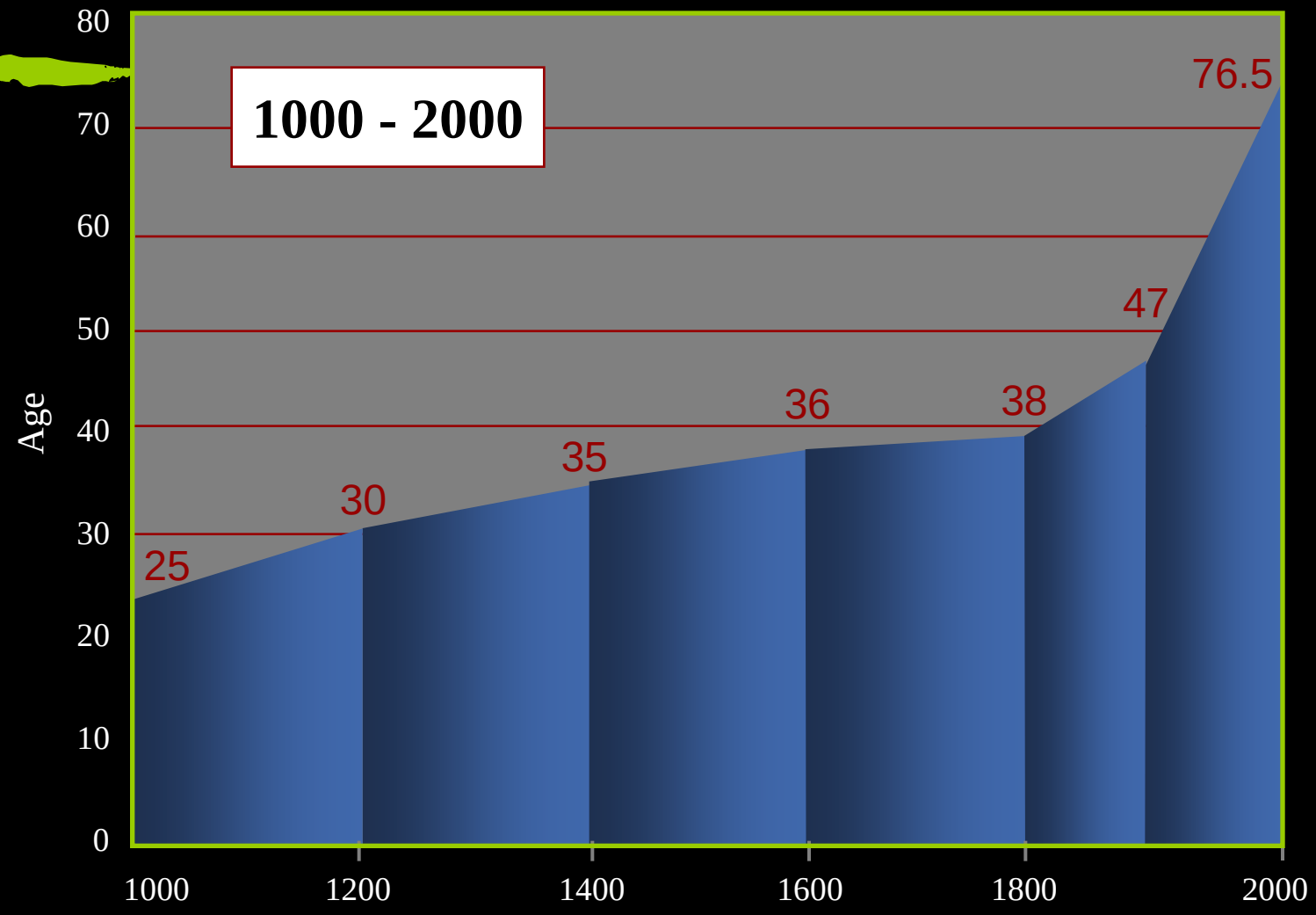
Myth # 5

Six Generations

Life at Age 100 is Surprisingly Healthy

Source: New York Times, 2001

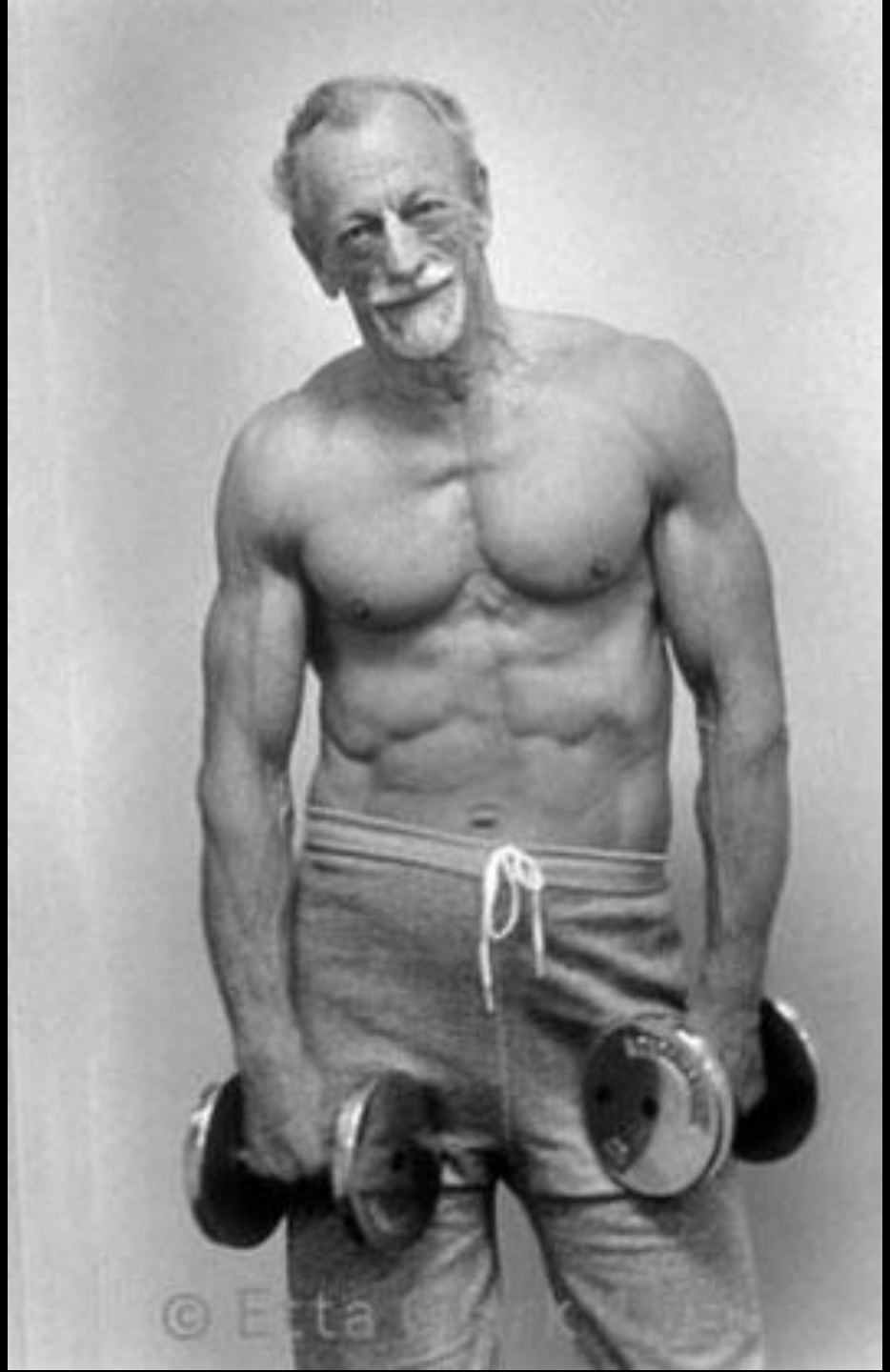
Life Expectancy at Birth



Source: Census Bureau, 2000


LIFE
CAN WE STOP AGING?
There are scientists who believe we can and will—but would we really want to?

FITNESS?



ORIGINAL CONTRIBUTION

Mediterranean Diet, Lifestyle Factors, and 10-Year Mortality in Elderly European Men and Women

The HALE Project

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Daan Kromhout, PhD
Anne-Elisabeth
Olga Moreiras-V
Alessandro Men
Wija A. van Stav

Context Dietary patterns and lifestyle factors are associated with mortality from all causes, coronary heart disease, cardiovascular diseases, and cancer, but few studies have investigated these factors in combination.

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than the age of
diovascular dise

Regardless of
diet and lifestyl
and mortality during the course of life.[2] Because of the cumulative effect of adverse factors throughout life, it is particularly important for older persons to adopt diet and lifestyle practices that minimize their risk of death from morbidity and maximize their prospects for healthful aging.[2]

Dietary patterns and other modifiable lifestyle factors are associated with mortality from all causes, coronary heart disease (CHD), cardiovascular diseases (CVD), and cancer.[3-8] As yet, few studies have investigated the combined effect of diet and other lifestyle factors.[7,8]

In the current study, we investigated the association of individual and combined dietary patterns and lifestyle factors (alcohol use, smoking sta-

See also pp 1440 and 1490.

Conclusion Among individuals aged 70 to 90 years, adherence to a Mediterranean diet and healthful lifestyle is associated with a more than 50% lower rate of all-causes and cause-specific mortality.

JAMA. 2004;292:1433-1439 www.jama.com

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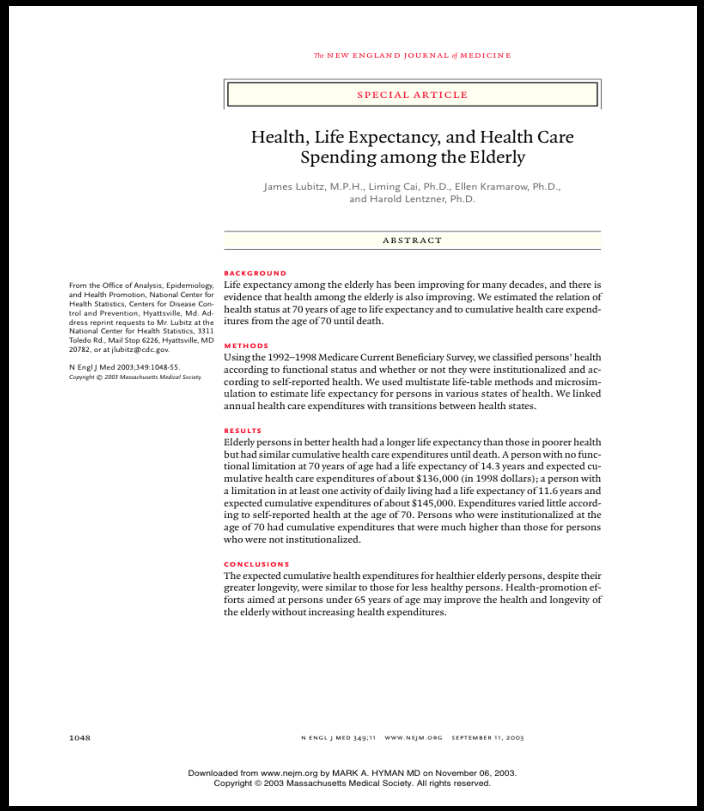
Among individuals aged 70 to 90 years, adherence to a Mediterranean diet and healthful lifestyle is associated with a more than 50% lower rate of all-causes and cause-specific mortality.
JAMA. 2004;292:1433-1439

Compression of Morbidity

Rectangularization of Survival Curve

"Add life to years, not just years to life!"



The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

Health, Life Expectancy, and Health Care Spending among the Elderly

James Lubitz, M.P.H., Liming Cai, Ph.D., Ellen Kramarow, Ph.D., and Harold Lentzner, Ph.D.

ABSTRACT

BACKGROUND

Life expectancy among the elderly has been improving for many decades, and there is evidence that health among the elderly is also improving. We estimated the relation of health status at 70 years of age to life expectancy and to cumulative health care expenditures from the age of 70 until death.

METHODS

Using the 1992–1998 Medicare Current Beneficiary Survey, we classified persons' health according to functional status and whether or not they were institutionalized and according to self-reported health. We used multistate life-table methods and microsimulation to estimate life expectancy for persons in various states of health. We linked annual health care expenditures with transitions between health states.

RESULTS

Elderly persons in better health had a longer life expectancy than those in poorer health but had similar cumulative health care expenditures until death. A person with no functional limitation at 70 years of age had a life expectancy of 14.3 years and expected cumulative health care expenditures of about $136,000 (in 1998 dollars); a person with a limitation in at least one activity of daily living had a life expectancy of 11.6 years and expected cumulative expenditures of about $145,000. Expenditures varied little according to self-reported health at the age of 70. Persons who were institutionalized at the age of 70 had cumulative expenditures that were much higher than those for persons who were not institutionalized.

CONCLUSIONS

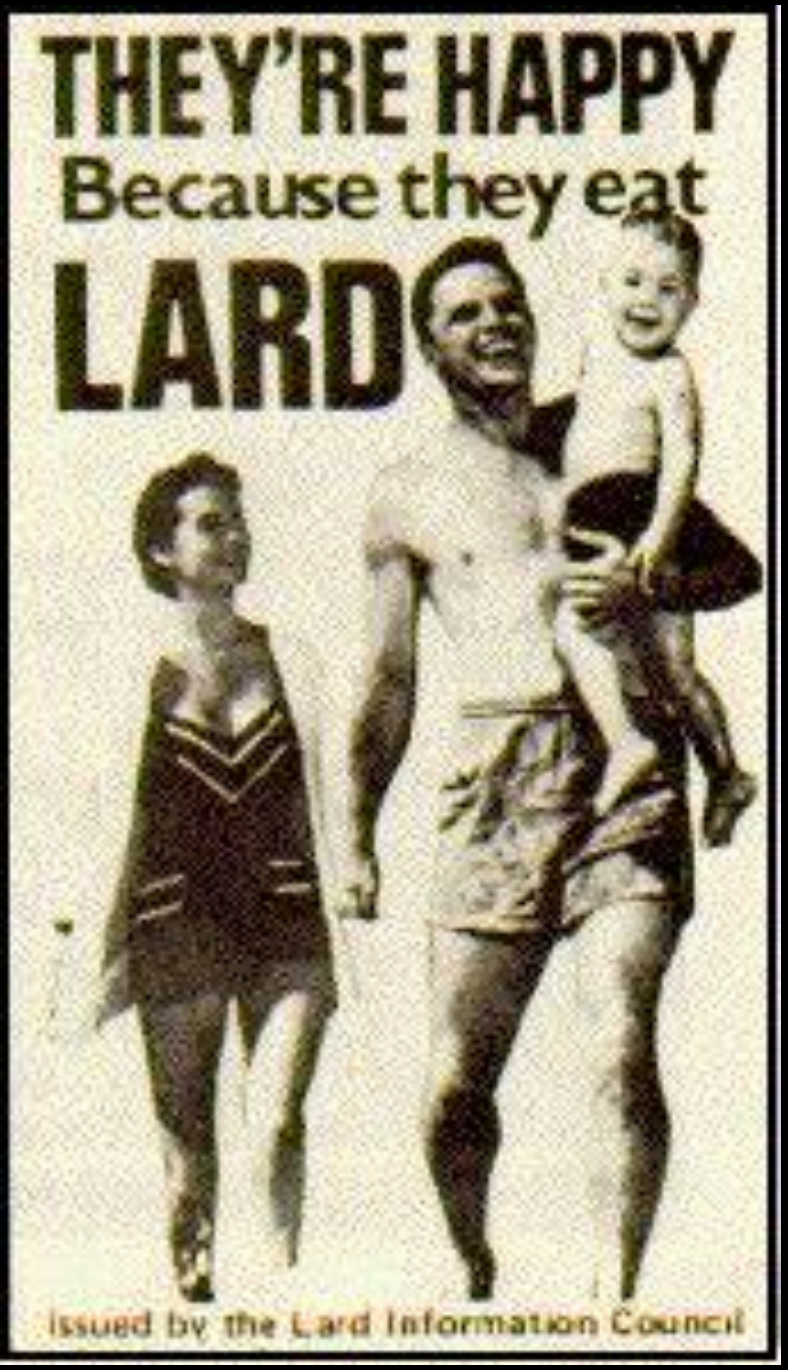
The expected cumulative health expenditures for healthier elderly persons, despite their greater longevity, were similar to those for less healthy persons. Health-promotion efforts aimed at persons under 65 years of age may improve the health and longevity of the elderly without increasing health expenditures.

From the Office of Analysis, Epidemiology, and Health Promotion, National Center for Health Statistics, Centers for Disease Control and Prevention, Hyattsville, Md. Address reprint requests to Mr. Lubitz at the National Center for Health Statistics, 3311 Toledo Rd., Mail Stop 6226, Hyattsville, MD 20782, or at jlubitz@cdc.gov.

N Engl J Med 2003;349:1048-55.

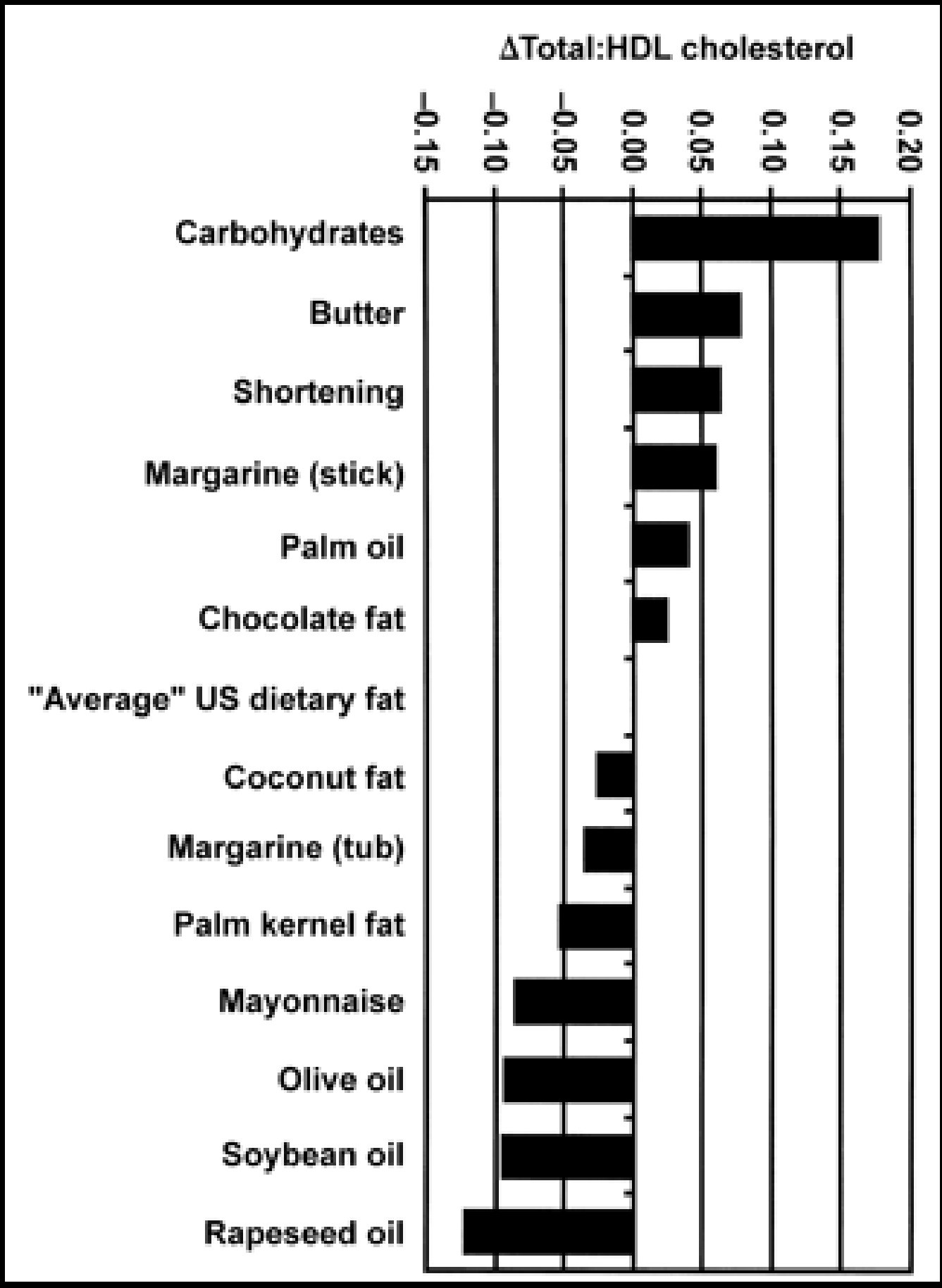
Fat is a Four Letter Word

Myth # 6


THEY'RE HAPPY
Because they eat
LARD
Issued by the Lard Information Council

Epidemic of Fat Deficiency

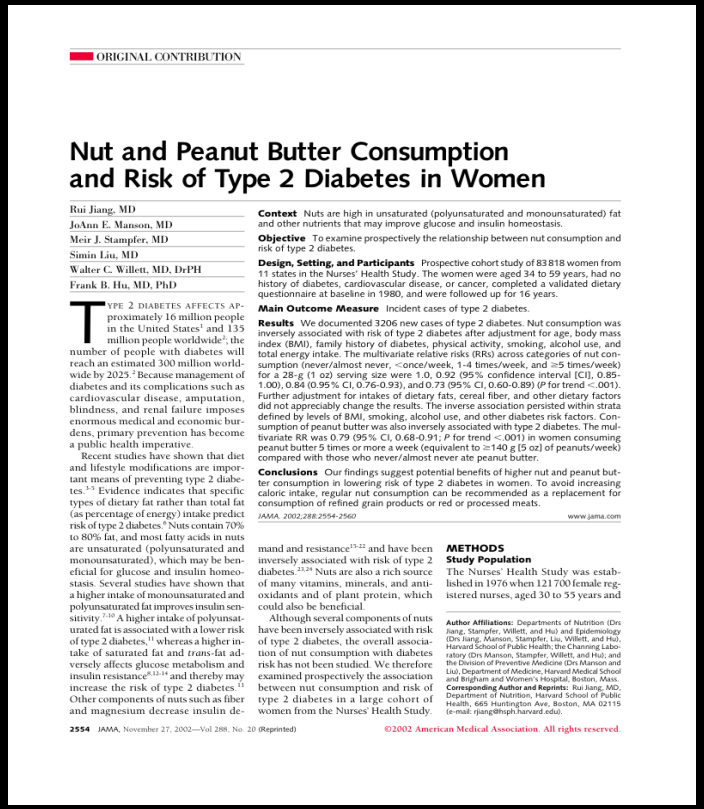
- ✓ 90% of Americans are deficient in the omega 3 fatty acids - the essential fats
- ✓ Sugar causes high cholesterol NOT fat


ΔTotal:HDL cholesterol
−0.15
−0.10
−0.05
0.00
0.05
0.10
0.15
0.20
Carbohydrates
Butter
Shortening
Margarine (stick)
Palm oil
Chocolate fat
"Average" US dietary fat
Coconut fat
Margarine (tub)
Palm kernel fat
Mayonnaise
Olive oil
Soybean oil
Rapeseed oil

Eat Nuts

- Nut consumption is inversely associated with the risk of type 2 diabetes
- Nuts increase weight loss

JAMA



ORIGINAL CONTRIBUTION

Nut and Peanut Butter Consumption and Risk of Type 2 Diabetes in Women

Rui Jiang, MD
JoAnn E. Manson, MD
Meir J. Stampfer, MD
Simin Liu, MD
Walter C. Willett, MD, DrPH
Frank B. Hu, MD, PhD

Context Nuts are high in unsaturated (polyunsaturated and monounsaturated) fat and other nutrients that may improve glucose and insulin homeostasis.

Objective To examine prospectively the relationship between nut consumption and risk of type 2 diabetes.

Design, Setting, and Participants Prospective cohort study of 83 818 women from 11 states in the Nurses' Health Study. The women were aged 34 to 59 years, had no history of diabetes, cardiovascular disease, or cancer, completed a validated dietary questionnaire at baseline in 1980, and were followed up for 16 years.

Main Outcome Measure Incident cases of type 2 diabetes.

Results We documented 3206 new cases of type 2 diabetes. Nut consumption was inversely associated with risk of type 2 diabetes after adjustment for age, body mass index (BMI), family history of diabetes, physical activity, smoking, alcohol use, and total energy intake. The multivariate relative risks (RRs) across categories of nut consumption (never/almost never, <once/week, 1-4 times/week, and ≥5 times/week) for a 28-g (1 oz) serving size were 1.0, 0.92 (95% confidence interval [CI], 0.85-1.00), 0.84 (0.95% CI, 0.76-0.93), and 0.73 (95% CI, 0.60-0.89) (*P* for trend <.001). Further adjustment for intakes of dietary fats, cereal fiber, and other dietary factors did not appreciably change the results. The inverse association persisted within strata defined by levels of BMI, smoking, alcohol use, and other diabetes risk factors. Consumption of peanut butter was also inversely associated with type 2 diabetes. The multivariate RR was 0.79 (95% CI, 0.68-0.91; *P* for trend <.001) in women consuming peanut butter 5 times or more a week (equivalent to ≥140 g [5 oz] of peanuts/week) compared with those who never/almost never ate peanut butter.

Conclusions Our findings suggest potential benefits of higher nut and peanut butter consumption in lowering risk of type 2 diabetes in women. To avoid increasing caloric intake, regular nut consumption can be recommended as a replacement for consumption of refined grain products or red or processed meats.

JAMA. 2002;288:2554-2560 www.jama.com

TYPE 2 DIABETES AFFECTS APPROXIMATELY 16 million people in the United States[1] and 135 million people worldwide[2]; the number of people with diabetes will reach an estimated 300 million worldwide by 2025.[2] Because management of diabetes and its complications such as cardiovascular disease, amputation, blindness, and renal failure imposes enormous medical and economic burdens, primary prevention has become a public health imperative.

Recent studies have shown that diet and lifestyle modifications are important means of preventing type 2 diabetes.[3-5] Evidence indicates that specific types of dietary fat rather than total fat (as percentage of energy) intake predict risk of type 2 diabetes.[6] Nuts contain 70% to 80% fat, and most fatty acids in nuts are unsaturated (polyunsaturated and monounsaturated), which may be beneficial for glucose and insulin homeostasis. Several studies have shown that a higher intake of monounsaturated and polyunsaturated fat improves insulin sensitivity.[7-10] A higher intake of polyunsaturated fat is associated with a lower risk of type 2 diabetes,[11] whereas a higher intake of saturated fat and *trans*-fat adversely affects glucose metabolism and insulin resistance[8,12-14] and thereby may increase the risk of type 2 diabetes.[11] Other components of nuts such as fiber and magnesium decrease insulin demand and resistance[15-22] and have been inversely associated with risk of type 2 diabetes.[21,24] Nuts are also a rich source of many vitamins, minerals, and antioxidants and of plant protein, which could also be beneficial.

Although several components of nuts have been inversely associated with risk of type 2 diabetes, the overall association of nut consumption with diabetes risk has not been studied. We therefore examined prospectively the association between nut consumption and risk of type 2 diabetes in a large cohort of women from the Nurses' Health Study.

METHODS

Study Population

The Nurses' Health Study was established in 1976 when 121 700 female registered nurses, aged 30 to 55 years and

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Dietary Fat Is Not a Major Determinant of Body Fat

Walter C. Willett, MD, DrPH, Rudolph L. Leibel, MD

The percentage of energy from fat in diets has been thought to be an important determinant of body fat, and several mechanisms have been proposed. Comparisons of diets and the prevalence of obesity between affluent and poor countries have been used to support this relationship, but these contrasts are seriously confounded by differences in physical activity and food availability. Within areas of similar economic development, regional intake of fat and prevalence of obesity have not been positively correlated. Randomized trials are the preferable method to evaluate the effect of dietary fat on adiposity and are feasible because the number of subjects needed is not large. In short-term trials, a modest red body weight is typically seen in individuals ized to diets with a lower percentage of calo fat. However, compensatory mechanisms a operate, because in randomized trials la year, fat consumption within the range o 40% of energy appears to have little if any body fatness. The weighted mean differe −0.25 kg overall and +1.8 kg (i.e., less weigh the low-fat diets) for trials with a control g received a comparable intensity interventio over, within the United States, a substantia in the percentage of energy from fat during 2 decades has corresponded with a ma crease in the prevalence of obesity. Diet fat do not appear to be the primary caus high prevalence of excess body fat in our and reductions in fat will not be a solution. *Am J Med.* 2002;113(9B):47S–59S. © 2002 by Excerpta Medica, Inc.

Dietary Fat is Not a Major Determinant of Body Fat

Am J Med 2002:113(98) 475-595

Excess body fat is the largest nutritionally related problem in the United States and many other affluent countries. Excess adiposity can account for approximately 30% to 40% of coronary heart disease,[1,2] many cancers of several types,[3] most cases of adult onset diabetes,[4] and a substantial proportion of disabling osteoarthritis.[5] Whereas genetic factors influence which individuals within a population will develop excessive adiposity, diet and lifestyle factors clearly make critical contributions to the present high rates of excessive body fat in our population. Evidence for this is provided by the dramatic changes in prevalence of overweight in migrants

ergy available per fat calorie for deposit in the organism; a tendency to partition fat calories preferentially to storage in adipose tissue without affecting net energy expenditure; hedonic effects related to greater palatability of high-fat foods; a higher caloric density of high-fat foods, which could lead to greater caloric intake if food intake is regulated by volume or weight (as opposed to calories per se).

In this review, we will first consider possible mechanisms by which diet composition might influence body fatness and will then examine empirical evidence, updated from an earlier overview,[8] for an effect of dietary fat composition on adiposity.

BIOCHEMICAL AND PHYSIOLOGIC CONSIDERATIONS

The potential effects of diet composition on body fat can be reduced to several biochemical/physiological considerations. First, because of differences in the energy costs

From the Departments of Epidemiology and Nutrition, Harvard School of Public Health, Boston, Massachusetts, USA; and the Division of Molecular Genetics and Naomi Berrie Diabetes Center, Columbia University College of Physicians and Surgeons, New York, New York, USA.

This study was supported by Grant No. DK30583 from the National Institutes of Health (RLL).

Requests for reprints should be addressed to Walter C. Willett, MD, Dr PH, Department of Nutrition, Harvard School of Public Health, 665 Huntington Avenue, Boston, Massachusetts 02115.

Eat the Right Fats

- ✓ Replacing saturated and trans fats with monounsaturated and polyunsaturated fats is more effective in preventing heart disease than reducing overall fat intake

NEJM

DIETARY FAT INTAKE AND THE RISK OF CORONARY HEART DISEASE IN WOMEN

FRANK B. HU, M.D., MEIR J. STAMPFER, M.D., JOANN E. MANSON, M.D., ERIC RIMM, SC.D., GRAHAM A. COLDITZ, M.D., BERNARD A. ROSNER, PH.D., CHARLES H. HENNEKENS, M.D., AND WALTER C. WILLETT, M.D.

ABSTRACT

Background The relation between dietary intake of specific types of fat, particularly trans unsaturated fat, and the risk of coronary disease remains unclear. We therefore studied this relation in women enrolled in the Nurses' Health Study.

Methods We prospectively studied 80,082 women who were 34 to 59 years of age and had no known coronary disease, stroke, cancer, hypercholesterolemia, or diabetes in 1980. Information on diet was obtained at base line and updated during follow-up by means of validated questionnaires. During 14 years of follow-up, we documented 939 cases of nonfatal myocardial infarction or death from coronary heart disease. Multivariate analyses included age, smoking status, total energy intake, dietary cholesterol intake, percentages of energy obtained from protein and specific types of fat, and other risk factors.

Results Each increase of 5 percent of energy intake from saturated fat, as compared with equivalent energy intake from carbohydrates, was associated with a 17 percent increase in the risk of coronary disease (relative risk, 1.17; 95 percent confidence interval, 0.97 to 1.41; $P=0.10$). As compared with equivalent energy from carbohydrates, the relative risk for a 2 percent increment in energy intake from trans unsaturated fat was 1.93 (95 percent confidence interval, 1.43 to 2.61; $P<0.001$); that for a 5 percent increment in energy from monounsaturated fat was 0.81 (95 percent confidence interval, 0.65 to 1.00; $P=0.05$); and that for a 5 percent increment in energy from polyunsaturated fat was 0.62 (95 percent confidence interval, 0.46 to 0.85; $P=0.003$). Total fat intake was not significantly related to the risk of coronary disease (for a 5 percent increase in energy from fat, the relative risk was 1.02; 95 percent confidence interval, 0.97 to 1.07; $P=0.55$). We estimated that the replacement of 5 percent of energy from saturated fat with energy from unsaturated fats would reduce risk by 42 percent (95 percent confidence interval, 23 to 56; $P<0.001$) and that the replacement of 2 percent of energy from trans fat with energy from unhydrogenated, unsaturated fats would reduce risk by 53 percent (95 percent confidence interval, 34 to 67; $P<0.001$).

Conclusions Our findings suggest that replacing saturated and trans unsaturated fats with unhydrogenated monounsaturated and polyunsaturated fats is more effective in preventing coronary heart disease in women than reducing overall fat intake. (N Engl J Med 1997;337:1491-9.)

LOW-FAT, high-carbohydrate diets have been widely recommended as a way to reduce the risk of coronary heart disease because populations with low intakes of saturated and total fat tend to be at low risk and because saturated fat increases low-density lipoprotein (LDL) cholesterol levels.[1] However, low-fat, high-carbohydrate diets also reduce high-density lipoprotein (HDL) cholesterol levels and raise fasting levels of triglycerides.[2] Because low levels of HDL cholesterol and high levels of triglycerides independently increase risk, the value of replacing fat in general with carbohydrates has been questioned.[2] Replacing saturated fat and trans unsaturated fat with unhydrogenated unsaturated fats has clear beneficial effects on blood lipids[2] and thus provides an alternative strategy for reducing the risk of coronary heart disease.

The results of prospective epidemiologic investigations of dietary fat and coronary disease have been inconsistent. A significant positive association between saturated fat and disease was found in two studies,[4,5] but not in others.[6-11] A significant inverse association between polyunsaturated fat intake and the risk of disease was found in only one study.[9] The interpretation of these findings is complicated by the small size of the studies, inadequate dietary assessment, incomplete adjustment for energy intake, failure to account for trans isomers of unsaturated fats, and lack of control for other types of fat.[12] Repeated measurements of dietary components were rarely obtained during follow-up. Moreover, previous research on the relation of dietary fat to the risk of coronary disease has focused primarily on men.[4,11,13-15]

We previously reported on the relation of dietary intake of trans unsaturated fat to the incidence of coronary disease among women in the Nurses' Health Study over an eight-year period.[16] The present analyses extend those findings to a total of 14 years of follow-up to examine the effect of total dietary fat and specific major types of fat and to estimate the effects of substituting carbohydrates or unsaturated fat for saturated fat and trans unsaturated fat.

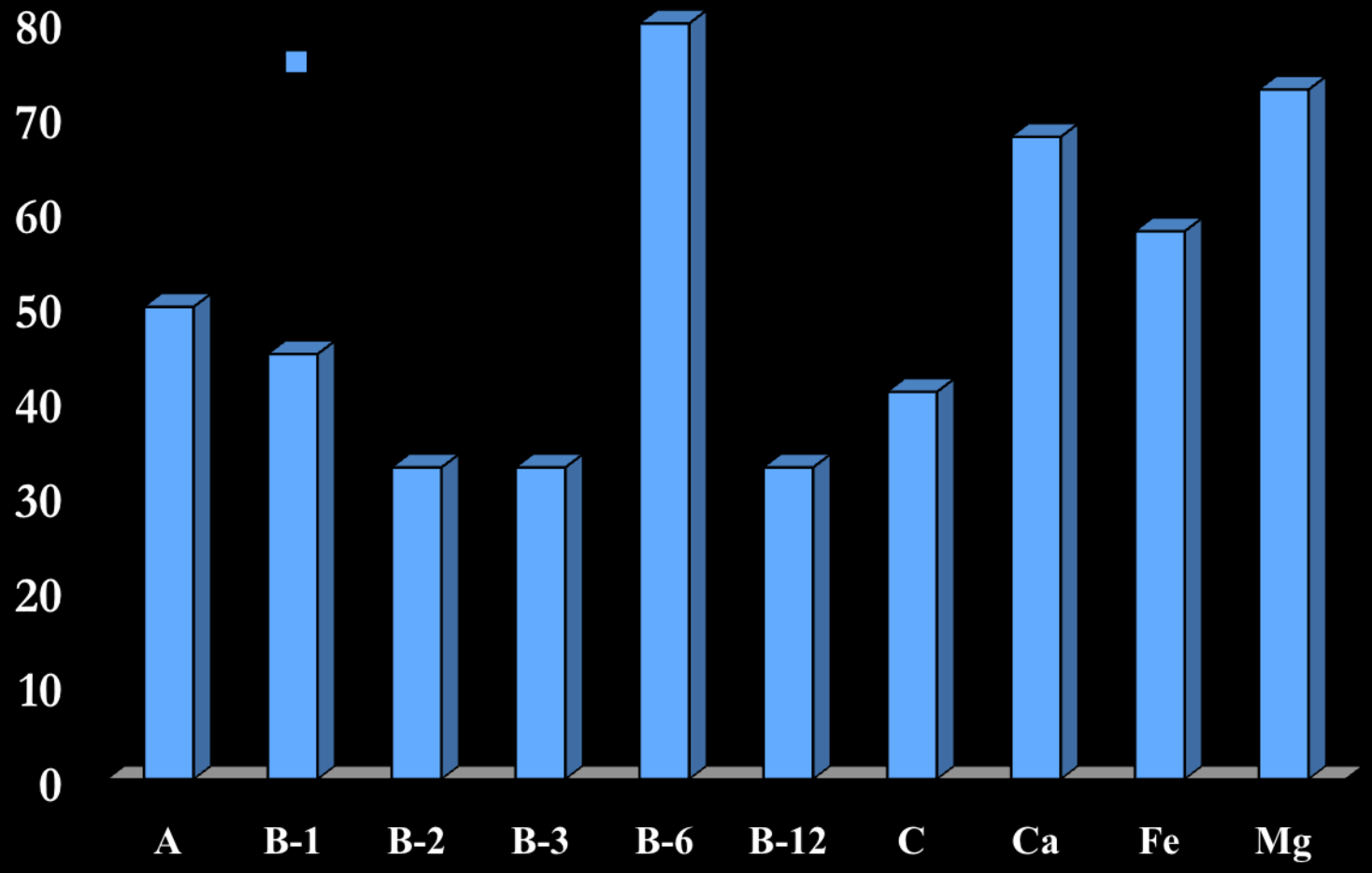
From the Departments of Nutrition (F.B.H., M.J.S., E.R., W.C.W.), Epidemiology (M.J.S., J.E.M., E.R., B.A.R., W.C.W.), and Biostatistics (B.A.R.), Harvard School of Public Health; and the Channing Laboratory (M.J.S., J.E.M., E.R., G.A.C., B.A.R., C.H.H., W.C.W.) and the Division of Preventive Medicine (J.E.M., C.H.H.), Department of Medicine, Brigham and Women's Hospital and Harvard Medical School — all in Boston. Address reprint requests to Dr. Hu at the Department of Nutrition, Harvard School of Public Health, 665 Huntington Ave., Boston, MA 02115.

You Can Get All the Vitamins You Need from Food

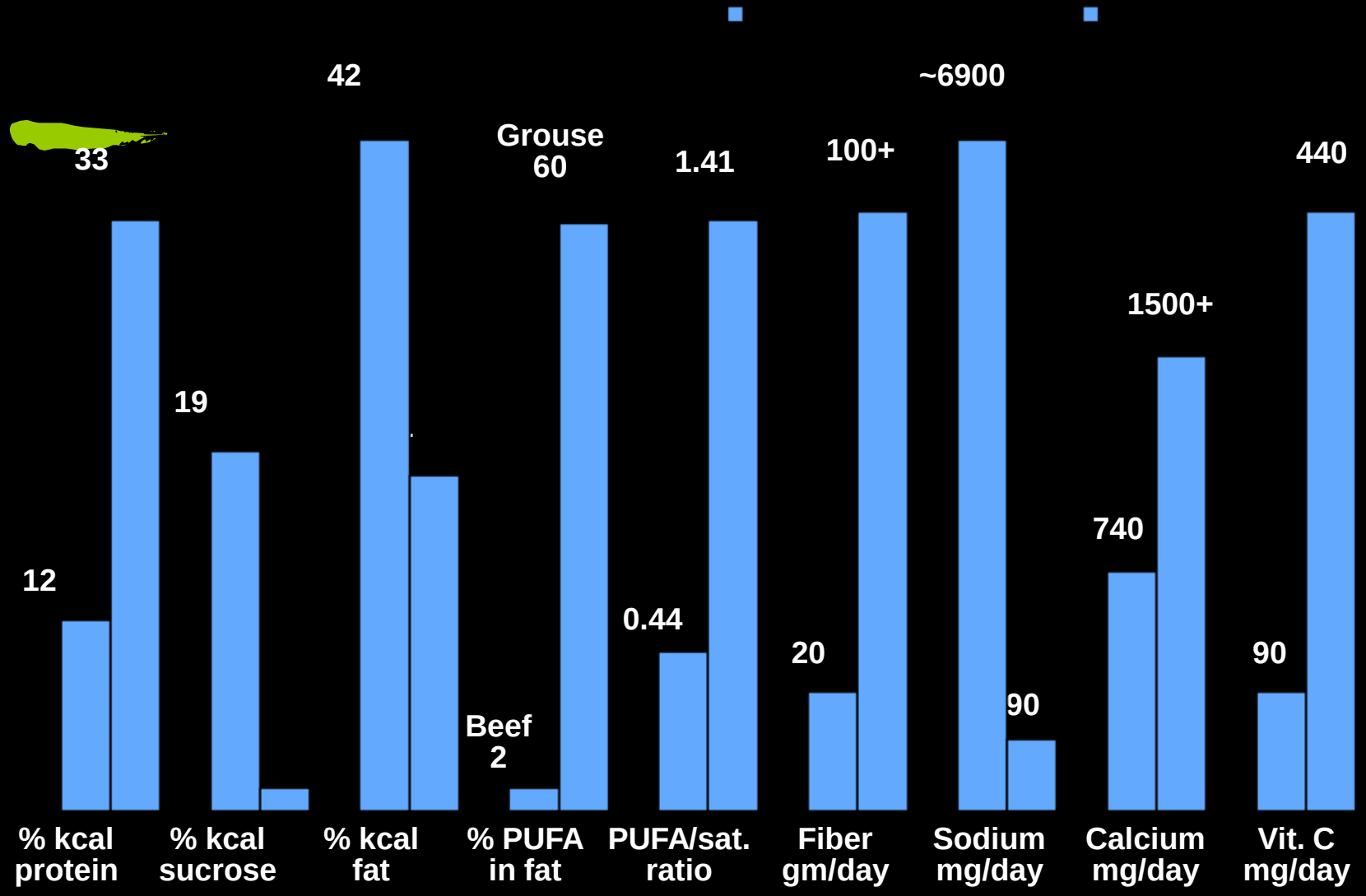
Myth # 7

% OF AMERICANS NOT EATING THE RDA

Recommended Dietary Allowance=92%



Paleolithic vs. Modern Diet



Source: Paleolithic Prescription by Eaton, Shostak, Konner, Harper & Row, 1988

Vitamins for Chronic Disease Prevention in Adults

Scientific Review

Kathleen M. Fairfield, MD, DrPH
Robert H. Fletcher, MD, MSc

Context Although vitamin deficiency is encountered infrequently in developed countries, inadequate intake of several vitamins is associated with chronic disease.

Inadequate intake of several vitamins has been linked to chronic diseases, including coronary heart disease, cancer and osteoporosis.

JAMA 2002;287:3116-3126

See also p 3127 and Patient Page.

Care, and Department of Epidemiology, Harvard School of Public Health (Dr Fletcher), Boston, Mass.
Corresponding Author and Reprints: Kathleen M. Fairfield, MD, DrPH, Division of General Medicine and

entific Review and Clinical Applications." Please contact Wendy Levinson, MD, Contributing Editor, *JAMA*; phone: 312-464-5204; fax: 312-464-5824; e-mail: wendy.levinson@utoronto.ca.

Long-latency defi
and vitamin D[1–4]

Robert P Heaney

ABSTRACT

Nutrient intake recommendations
have focused primarily on preveni
diseases. Most nutrient intake rec
on prevention of the index disea
intakes of many nutrients are now
several of the major chronic diseas
the industrialized nations. Often
themselves, these disease outcome
latency deficiency diseases. Some
same pathophysiologic mechanisr
ease, but sometimes the mechan
Well-documented examples of bo
ciency states involving calcium
briefly. Then, the insights derived
tively applied to folic acid. Discer
long-latency, multifactorial disor
challenge facing nutritional scienc
this challenge is to recognize that
nutrients may produce more than
eases by more than one mechanism
for the consequent morbidity to
clinically recognizable as "disease
to prevent many of the long-latency
required to prevent the respective
tions based solely on preventing t
biologically defensible. *Am J*

KEY WORDS Long-latency
tency deficiency disease, index di
acid, nutrient intakes, scientific an

INTRODUCTION

At its birth roughly a century
overcome the prevailing view t
external invaders, either bacteri
eating something could make on
owe much to pioneers like EV
vinced, and ultimately convinc
communities, that foods contai
needed for health and that not g
explicit disease. Unfortunately,
proach to nutrition is still stro
external invader model. Some o

912

…because the current recommendations are based on the prevention of the index disease only, they can no longer be said to be biologically defensible. The pre-agricultural human diet … may well be a better starting point for policy. The burden of proof should fall on those who say that these more natural conditions are not needed and that lower intakes are safe.

Am J Clin Nutr 2003;78:912–9

High-dose vitamin therapy stimulates variant enzymes with decreased coenzyme binding affinity (increased K_m): relevance to genetic disease and polymorphisms[1–3]

Bruce N Ames, Ilan Elson-Schwab, and Eli A Silver

ABSTRACT As many as one-third of mutations in a gene result in the corresponding enzyme having an increased Michaelis

the primary defect and remediates the disease. We show in this review that ≈50 human genetic diseases involving defective

About 50 human genetic diseases due to defective enzymes can be remediated or ameliorated by the administration of high doses of the vitamin component of the corresponding co-enyzme.

Am J Clin Nutr 2002;75:616-58

Am J Clin Nutr 2002;75:616–58. Printed in USA.

The Potential: Supplements

- ✓ "Suboptimal intake of some vitamins, above levels causing classic vitamin deficiency, is a risk factor for chronic diseases and common in the general population, especially in the elderly."
- ✓ "….. It appears prudent for all adults to take vitamin supplements."

Robert H. Fletcher, MD, MSc Harvard School of Public Health, JAMA. 2002;287:3127-3129

Conceptual Framework for the Study

Does the supplement produce a physiological effect as shown by a change in biological markers?

Does the physiological effect create a change in health status?

Effect on Biological Markers → **Clinical Effects from Change in Biological Markers** → **Cost Effects from Reduced Health Care Utilization**

Is the change in health status associated with a decrease in health care expenditures?

Key Study Findings: > $24 billion savings

- ✓ Folic acid: $1.4 billion in savings from NTD prevention
- ✓ Calcium with D: $16.1 billion osteoporosis and hip fracture prevention
- ✓ Omega 3 fats: $3.2 billion from CHD prevention
- ✓ Lutein & Zeaxanthin: $3.6 billion from macular degeneration prevention

Special Lecture

The Metabolic Tune-Up: Metabolic Harmony and Disease Prevention[1,2]

Bruce N. Ames[3]

University of California, Berkeley and Children's Hospital and Research Center at Oakland, Oakland, CA 94609

An optimum intake of micronutrients and metabolites, which varies with age and genetic constitution would tune up metabolism and give a marked increased in health, particularly for the poor and elderly, at little cost.

J. Nutr. 133:1544-1548S, 2003

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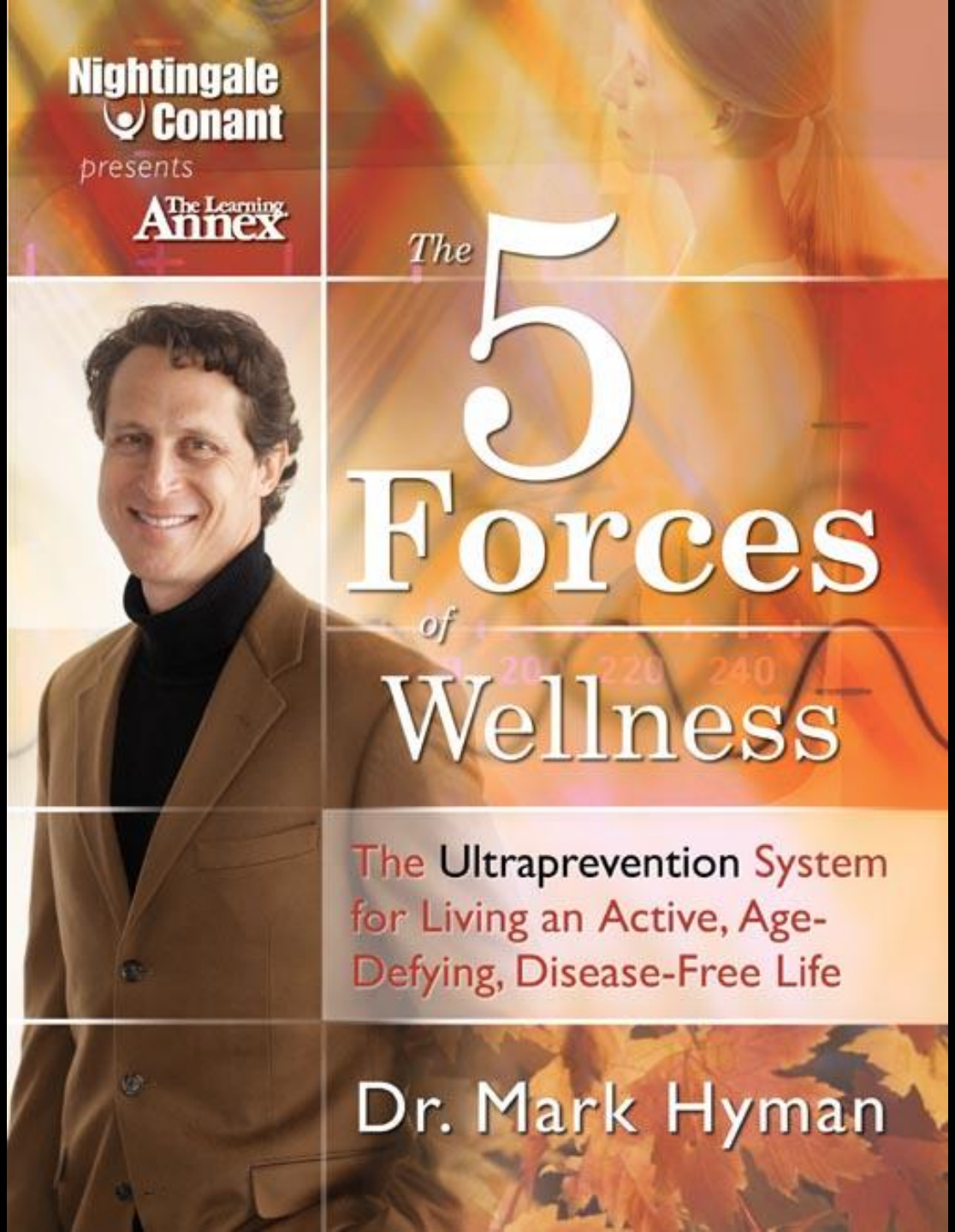

Nightingale Conant
presents
The Learning Annex
The 5 Forces of Wellness
The Ultraprevention System for Living an Active, Age-Defying, Disease-Free Life
Dr. Mark Hyman

UltraWellness - Finding the Balance

1. Environmental Inputs: Diet, Exercise, Toxins, Trauma
2. Inflammation/Immune Balance
3. Impaired Metabolism/Hormonal Imbalance
4. Digestive Function/Gut Imbalances
5. Impaired Detoxification
6. Energy Metabolism and Oxidative Stress
7. Mind Body/Body Mind Balance

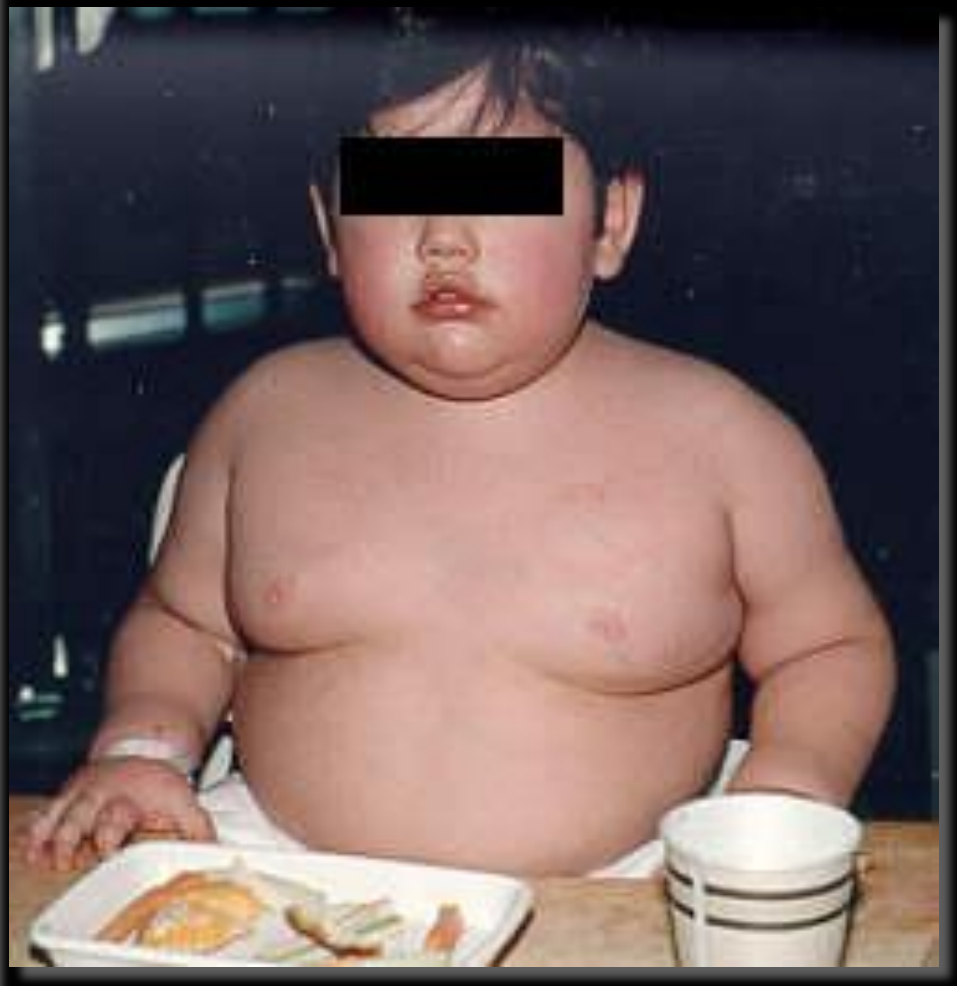
Ten Pearls: Short Cuts to Success

- ✓ Address IgG food sensitivities
- ✓ Diagnosis and treat gluten problems
- ✓ Treat small bowel bacterial overgrowth
- ✓ Diagnose and treat insulin resistance
- ✓ Address thyroid problems
- ✓ Treat adrenal dysfunction

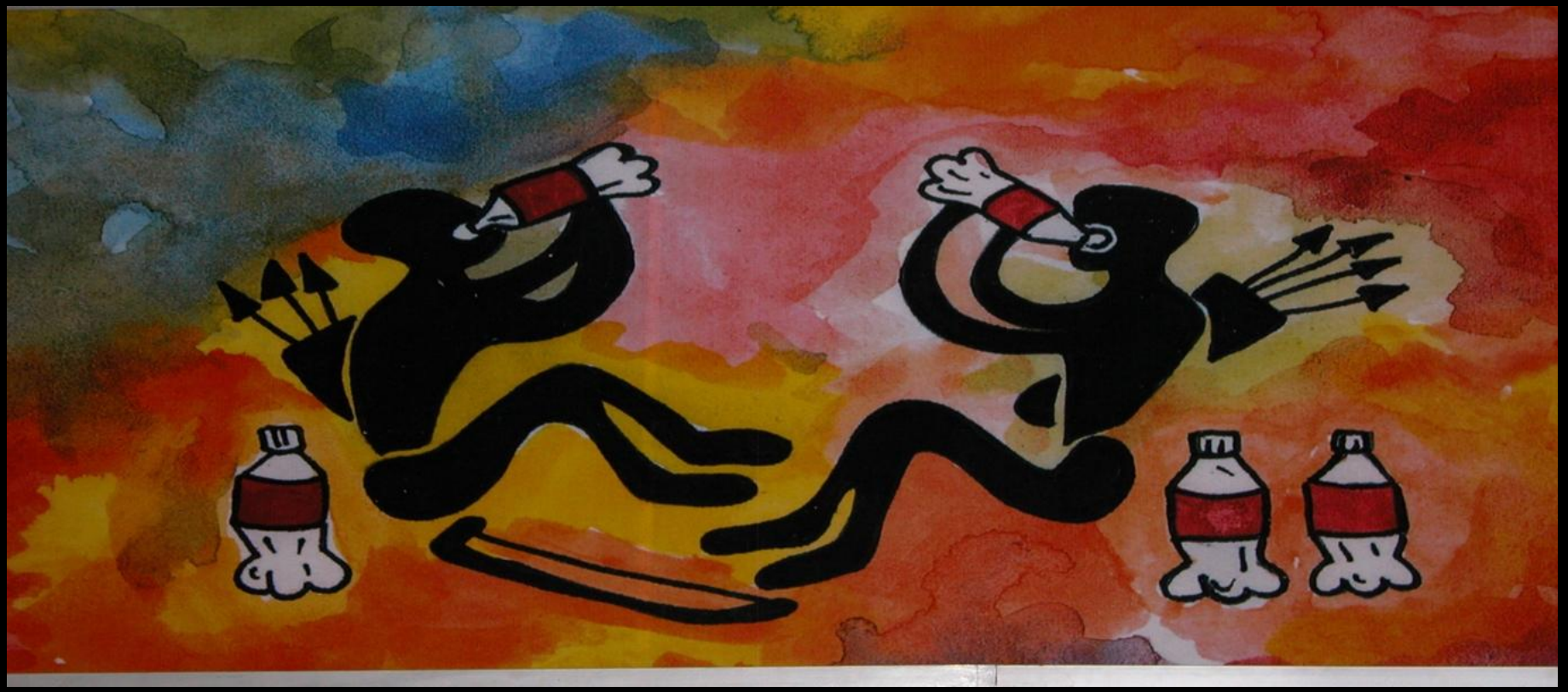
Ten Pearls: Short Cuts to Success

- ✓ Address detoxify heavy metals (mercury)
- ✓ Support methylation and sulfation
- ✓ Treat vitamin D deficiency
- ✓ Treat magnesium deficiency

Environmental Inputs: Malnutrition



Who is Malnourished?



$30 billion in fast food/junk food advertising each year

10,000 junk food commercials seen by children each year

UDSA Top 9 Foods

- ✓ Whole Milk
- ✓ 2% Milk
- ✓ Processed American Cheese
- ✓ White Bread
- ✓ White Flour
- ✓ White Rolls
- ✓ Refined Sugars
- ✓ Colas
- ✓ Ground Beef

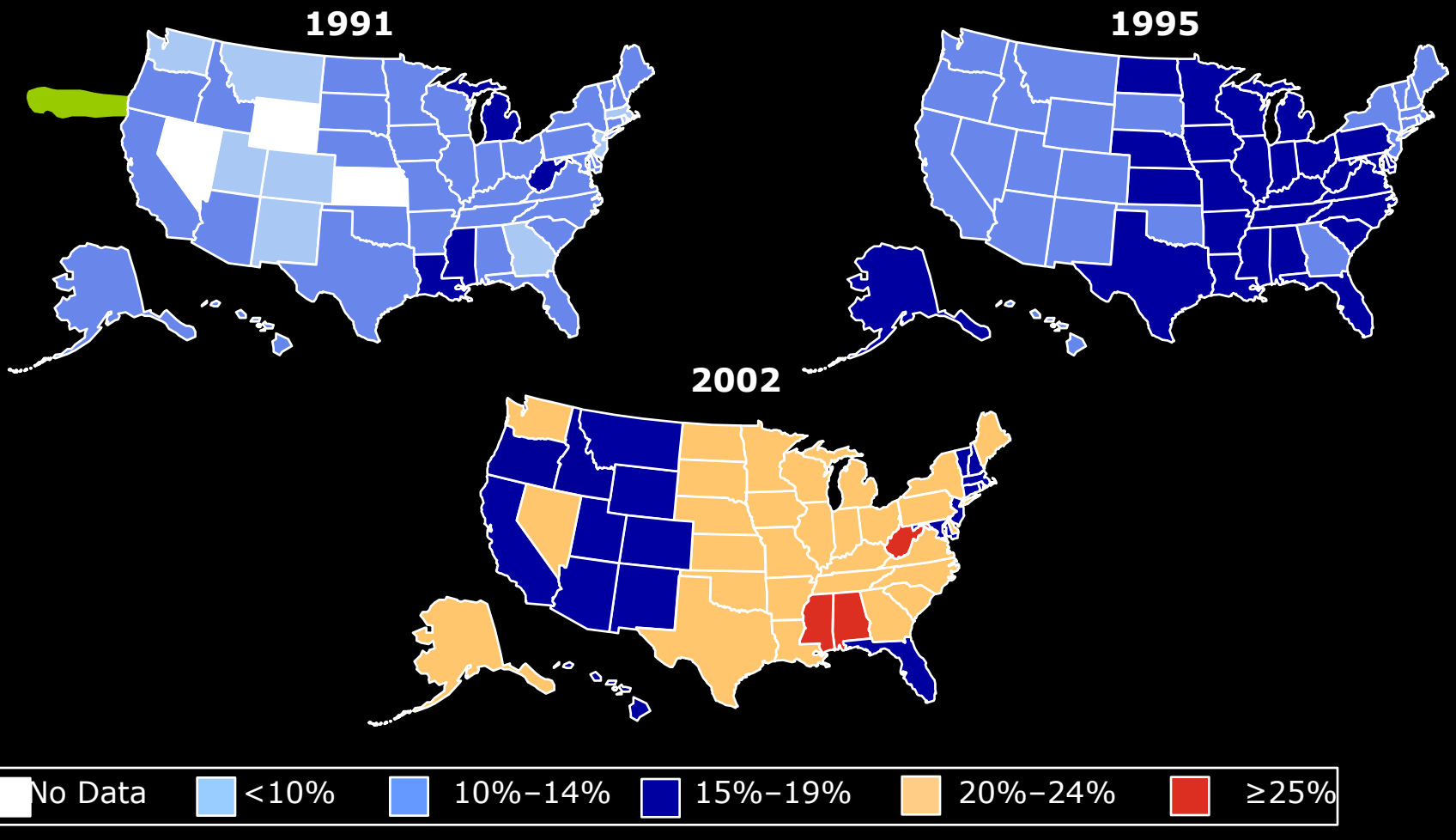
Most Popular Grocery Items

- ✓ Marlboro Cigarettes
- ✓ Coke Classic
- ✓ Pepsi Cola
- ✓ Kraft processed cheese
- ✓ Campbell's soup
- ✓ Budweiser beer
- ✓ Tide detergent
- ✓ Folger's coffee
- ✓ Winston Cigarettes

Obesity Trends* Among U.S. Adults

BRFSS, 1991-2002

(*BMI ≥30, or ~ 30 lbs overweight for 5’ 4” woman)



Origins of Modern Disease

The evolutionary collision of our ancient genome with the nutritional qualities of recently introduced foods may underlie many of the chronic diseases of Western civilization.

Am J Clin Nutr 2005;81:341–54.

Commentary

Origins and evolution of the Western diet: health implications for the 21st century[1,2]

Loren Cordain, S Boyd Eaton, Anthony Sebastian, Neil Mann, Staffan Lindeberg, Bruce A Watkins, James H O'Keefe, and Janette Brand-Miller

ABSTRACT

There is growing awareness that the profound changes in the environment (eg, in diet and other lifestyle conditions) that began with the introduction of agriculture and animal husbandry ≈10 000 y ago occurred too recently on an evolutionary time scale for the human genome to adjust. In conjunction with this discordance between our ancient, genetically determined biology and the nutritional, cultural, and activity patterns of contemporary Western populations, many of the so-called diseases of civilization have emerged. In particular, food staples and food-processing procedures introduced during the Neolithic and Industrial Periods have fundamentally altered 7 crucial nutritional characteristics of ancestral hominin diets: *1*) glycemic load, *2*) fatty acid composition, 3) macronutrient composition, *4*) micronutrient density, *5*) acid-base balance, 6) sodium-potassium ratio, and *7*) fiber content. The evolutionary collision of our ancient genome with the nutritional qualities of recently introduced foods may underlie many of the chronic diseases of Western civilization. *Am J Clin Nutr* 2005;81:341–54.

KEY WORDS Westernized diets, chronic disease, processed foods, genetic discordance, hunter-gatherers, human evolution

EVOLUTIONARY DISCORDANCE

Evolution acting through natural selection represents an ongoing interaction between a species' genome and its environment over the course of multiple generations. Genetic traits may be positively or negatively selected relative to their concordance or discordance with environmental selective pressures (1). When the environment remains relatively constant, stabilizing selection tends to maintain genetic traits that represent the optimal average for a population (2). When environmental conditions permanently change, evolutionary discordance arises between a species' genome and its environment, and stabilizing selection is replaced by directional selection, moving the average population genome to a new set point (1, 2). Initially, when permanent environmental changes occur in a population, individuals bearing the previous average status quo genome experience evolutionary discordance (2, 3). In the affected genotype, this evolutionary discordance manifests itself phenotypically as disease, increased morbidity and mortality, and reduced reproductive success (1–3).

Similar to all species, contemporary humans are genetically adapted to the environment of their ancestors—that is, to the environment that their ancestors survived in and that consequently conditioned their genetic makeup (1–3). There is growing awareness that the profound environmental changes (eg, in diet and other lifestyle conditions) that began with the introduction of agriculture and animal husbandry ≈10 000 y ago occurred too recently on an evolutionary time scale for the human genome to adapt (2–5). In conjunction with this discordance between our ancient, genetically determined biology and the nutritional, cultural, and activity patterns in contemporary Western populations, many of the so-called diseases of civilization have emerged (2–12).

CHRONIC DISEASE INCIDENCE

In the United States, chronic illnesses and health problems either wholly or partially attributable to diet represent by far the most serious threat to public health. Sixty-five percent of adults aged ≥20 y in the United States are either overweight or obese (13), and the estimated number of deaths ascribable to obesity is 280 184 per year (14). More than 64 million Americans have one or more types of cardiovascular disease (CVD), which represents the leading cause of mortality (38.5% of all deaths) in the United States (15). Fifty million Americans are hypertensive; 11 million have type 2 diabetes, and 37 million adults maintain high-risk total cholesterol concentrations (>240 mg/dL) (15). In postmenopausal women aged ≥50 y, 7.2% have osteoporosis and 39.6% have osteopenia (16). Osteoporotic hip fractures are associated with a 20% excess mortality in the year after fracture

[1] From the Department of Health and Exercise Science, Colorado State University, Fort Collins (LC); the Departments of Radiology and Anthropology, Emory University, Atlanta (SBE); the Department of Medicine and UCSF/Moffitt General Clinical Research Center, University of California, San Francisco (AS); the Department of Food Science, RMIT University, Melbourne, Australia (NM); the Department of Medicine, Lund University, Sweden (SL); the Department of Food Science, Lipid Chemistry and Molecular Biology Laboratory, Purdue University, West Lafayette, IN (BAW); the Mid America Heart Institute, Cardiovascular Consultants, Kansas City, MO (JHO); and the Human Nutrition Unit, Department of Biochemistry, University of Sydney, Australia (JB-M).

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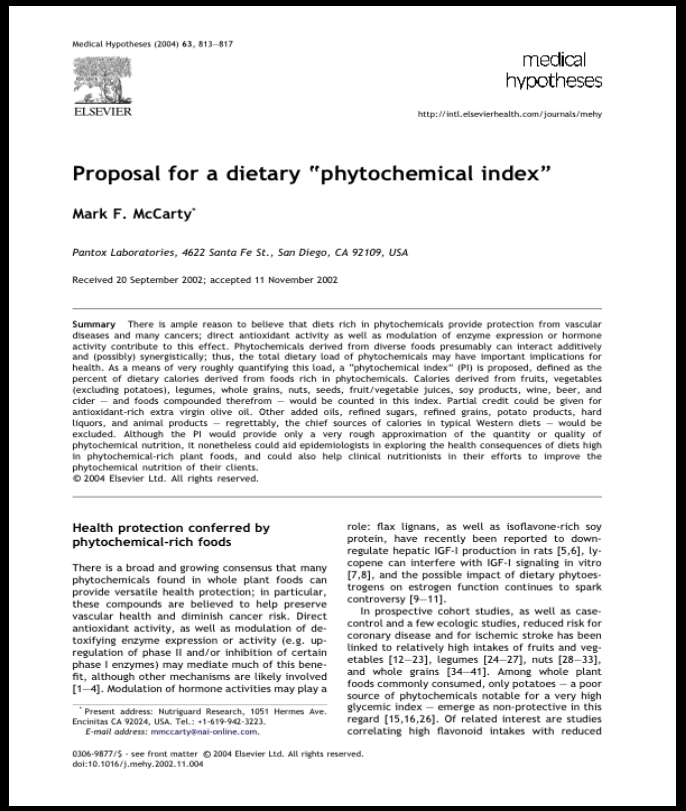
Accepted for publication August 24, 2004.

7 Crucial Nutritional Characteristics of Ancestral Hominin Diets

1) Glycemic load
2) Fatty acid composition
3) Macronutrient composition
4) Micronutrient density
5) Acid-base balance
6) Sodium-potassium ratio
7) Fiber content

Phytonutrient Index

- ✓ The key to prevention, health and longevity
- ✓ The real food, whole food diet



Medical Hypotheses (2004) 63, 813–817

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Proposal for a dietary "phytochemical index"

Mark F. McCarty*

Pantox Laboratories, 4622 Santa Fe St., San Diego, CA 92109, USA

Received 20 September 2002; accepted 11 November 2002

Summary There is ample reason to believe that diets rich in phytochemicals provide protection from vascular diseases and many cancers; direct antioxidant activity as well as modulation of enzyme expression or hormone activity contribute to this effect. Phytochemicals derived from diverse foods presumably can interact additively and (possibly) synergistically; thus, the total dietary load of phytochemicals may have important implications for health. As a means of very roughly quantifying this load, a "phytochemical index" (PI) is proposed, defined as the percent of dietary calories derived from foods rich in phytochemicals. Calories derived from fruits, vegetables (excluding potatoes), legumes, whole grains, nuts, seeds, fruit/vegetable juices, soy products, wine, beer, and cider — and foods compounded therefrom — would be counted in this index. Partial credit could be given for antioxidant-rich extra virgin olive oil. Other added oils, refined sugars, refined grains, potato products, hard liquors, and animal products — regrettably, the chief sources of calories in typical Western diets — would be excluded. Although the PI would provide only a very rough approximation of the quantity or quality of phytochemical nutrition, it nonetheless could aid epidemiologists in exploring the health consequences of diets high in phytochemical-rich plant foods, and could also help clinical nutritionists in their efforts to improve the phytochemical nutrition of their clients.

Health protection conferred by phytochemical-rich foods

There is a broad and growing consensus that many phytochemicals found in whole plant foods can provide versatile health protection; in particular, these compounds are believed to help preserve vascular health and diminish cancer risk. Direct antioxidant activity, as well as modulation of detoxifying enzyme expression or activity (e.g. up-regulation of phase II and/or inhibition of certain phase I enzymes) may mediate much of this benefit, although other mechanisms are likely involved [1–4]. Modulation of hormone activities may play a role: flax lignans, as well as isoflavone-rich soy protein, have recently been reported to down-regulate hepatic IGF-I production in rats [5,6], lycopene can interfere with IGF-I signaling in vitro [7,8], and the possible impact of dietary phytoestrogens on estrogen function continues to spark controversy [9–11].

In prospective cohort studies, as well as case-control and a few ecologic studies, reduced risk for coronary disease and for ischemic stroke has been linked to relatively high intakes of fruits and vegetables [12–23], legumes [24–27], nuts [28–33], and whole grains [34–41]. Among whole plant foods commonly consumed, only potatoes — a poor source of phytochemicals notable for a very high glycemic index — emerge as non-protective in this regard [15,16,26]. Of related interest are studies correlating high flavonoid intakes with reduced

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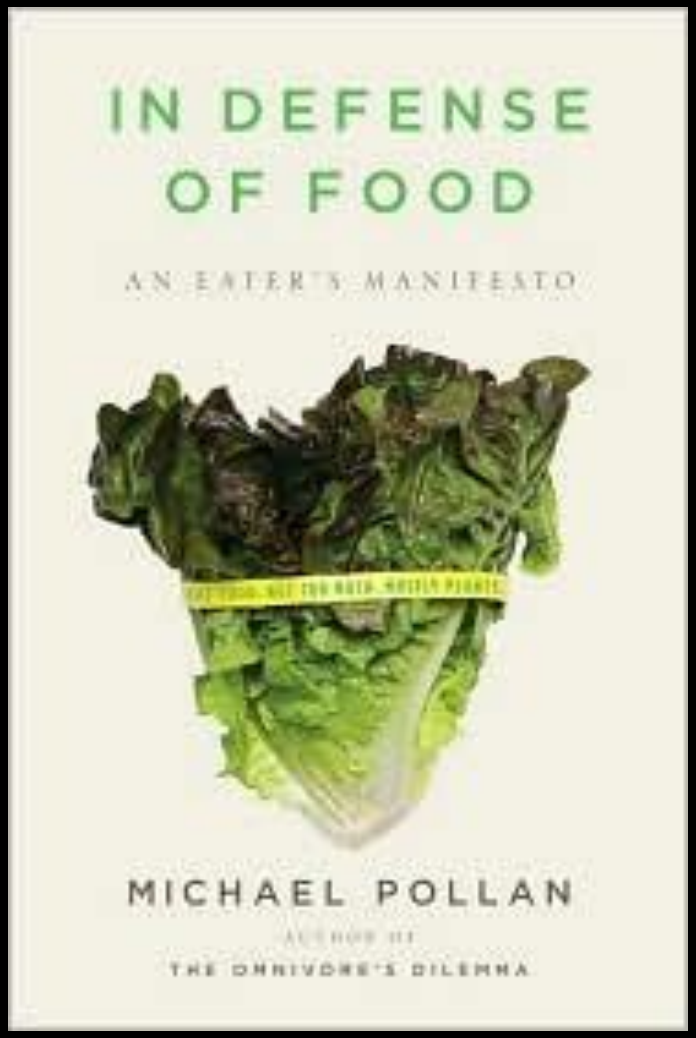
E-mail address: mmccarty@mai-online.com.

0306-9877/$ - see front matter
doi:10.1016/j.mehy.2002.11.004

Eat food. Not too much. Mostly Plants.



The Dangers of Trans Fats

- ✓ High cholesterol
- ✓ Weight gain
- ✓ Diabetes
- ✓ Cancer
- ✓ Dementia
- ✓ Inflammation
- ✓ READ LABELS
- ✓ "HYDROGENATED"

The New England Journal of Medicine

VOLUME 340 JUNE 24, 1999 NUMBER 25

EFFECTS OF DIFFERENT FORMS OF DIETARY HYDROGENATED FATS ON SERUM LIPOPROTEIN CHOLESTEROL LEVELS

ALICE H. LICHTENSTEIN, D.Sc., LYNNE M. AUSMAN, D.Sc., SUSAN M. JALBERT, M.L.T., AND ERNST J. SCHAEFER, M.D.

ABSTRACT

Background Metabolic studies suggest that fatty acids containing at least one double bond in the trans configuration, which are found in hydrogenated fat, have a detrimental effect on serum lipoprotein cholesterol levels as compared with unsaturated fatty acids containing double bonds only in the cis configuration. We compared the effects of diets with a broad range of trans fatty acids on serum lipoprotein cholesterol levels.

Methods Eighteen women and 18 men consumed each of six diets in random order for 35-day periods. The foods were identical in each diet, and each diet provided 30 percent of calories as fat, with two thirds of the fat contributed as soybean oil (<0.5 g of trans fatty acid per 100 g of fat), semiliquid margarine (<0.5 g per 100 g), soft margarine (7.4 g per 100 g), shortening (9.9 g per 100 g), or stick margarine (20.1 g per 100 g). The effects of those diets on serum lipoprotein cholesterol, triglyceride, and apolipoprotein levels were compared with those of a diet enriched with butter, which has a high content of saturated fat.

Results The mean (±SD) serum low-density lipoprotein (LDL) cholesterol level was 177±32 mg per deciliter (4.58±0.85 mmol per liter) and the mean high-density lipoprotein (HDL) cholesterol level was 45±10 mg per deciliter (1.2±0.26 mmol per liter) after subjects consumed the butter-enriched diet. The LDL cholesterol level was reduced on average by 12 percent, 11 percent, 9 percent, 7 percent, and 5 percent, respectively, after subjects consumed the diets enriched with soybean oil, semiliquid margarine, soft margarine, shortening, and stick margarine; the HDL cholesterol level was reduced by 3 percent, 4 percent, 4 percent, 4 percent, and 6 percent, respectively. Ratios of total cholesterol to HDL cholesterol were lowest after the consumption of the soybean-oil diet and semiliquid-margarine diet and highest after the stick-margarine diet.

Conclusions Our findings indicate that the consumption of products that are low in trans fatty acids and saturated fat has beneficial effects on serum lipoprotein cholesterol levels. (N Engl J Med 1999;340: 1933-40.)

THE results of controlled metabolic studies have suggested that dietary fatty acids containing at least one double bond in the trans configuration (trans fatty acids) have a detrimental effect on serum lipid levels relative to fatty acids containing only double bonds in the cis configuration or, in some cases, saturated fatty acids.[1,2] Adverse effects of dietary trans fatty acids on the risk of the development of cardiovascular disease have also been reported in some studies of large cohorts.[3,4] Trans fatty acids are naturally present at low levels in meat and dairy products as a result of bacterial fermentation in ruminant animals. They are also formed in varying amounts during the hydrogenation of oil, a process used to transform oil from a liquid to a semisolid or solid state. In addition to forming trans double bonds, hydrogenation also results in the saturation of some double bonds and the migration of others along the acyl chain. Hydrogenated fat is used in the manufacture of margarines and vegetable shortening and is therefore in foods prepared with the use of these products.

Unresolved issues relating to the physiologic effects of dietary trans fatty acids in humans include the actual magnitude of the unfavorable effect relative to saturated or other unsaturated fatty acids on individual serum lipoprotein and apolipoprotein levels. Although recent studies consistently demonstrate a positive relation between the level of intake of trans fatty acids and low-density lipoprotein (LDL) cholesterol levels, data on the effect of trans fatty acids on high-density lipoprotein (HDL) cholesterol levels have proved less conclusive.[1,2,5,6] Similarly, trans

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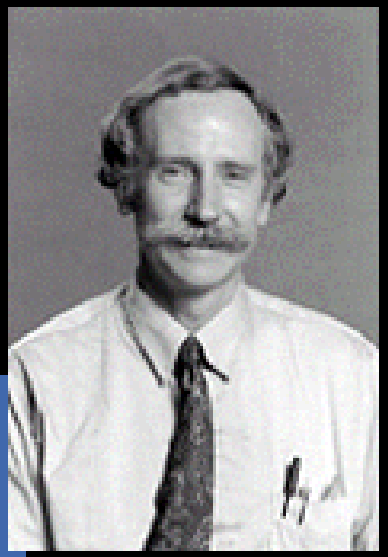
CLINICAL CARDIOLOGY

Optimal Diets for Prevention of Coronary Heart Disease

Frank B. Hu, MD, PhD

Context Coronary heart disease (CHD) remains the leading cause of mortality in in-



Substantial evidence indicates that using non-hydrogenated unsaturated fats, whole grains, an abundance of fruits and vegetables and adequate omega 3 fats can offer significant protection against CHD.

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