

A serene forest scene featuring a wooden boardwalk that leads from the foreground into the distance. Sunlight filters through the dense canopy of tall, slender trees, creating a warm, golden glow. The ground is covered in fallen leaves and moss, and the overall atmosphere is peaceful and natural.

# What is the Healthiest Diet: A Scientific Answer for the Culture

Scott Stoll, MD FABPMR  
Co-Founder, The  
Plantrician Project

# Overview

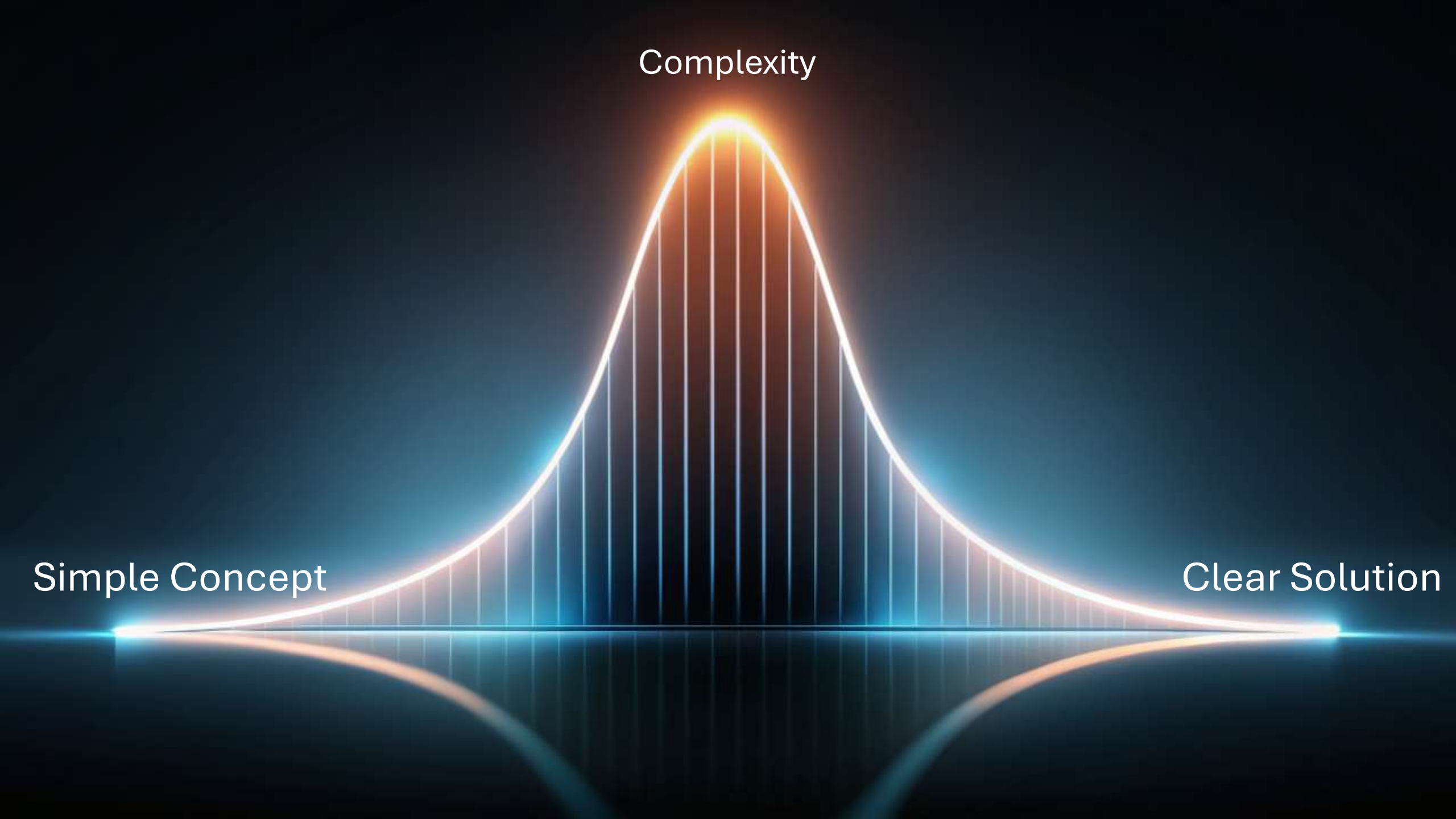
1. Historical Perspectives
2. Dietary Research
3. GLP-1 Overview
4. Modern LCD Challenges
5. Sustainability/Adherence
6. Protein Facts
7. First Principles/ System Optimization
8. Keys to Transformative Change
9. Intersections: People/Plate/Planet



Complexity

Simple Concept

Clear Solution



# How did we arrive here?

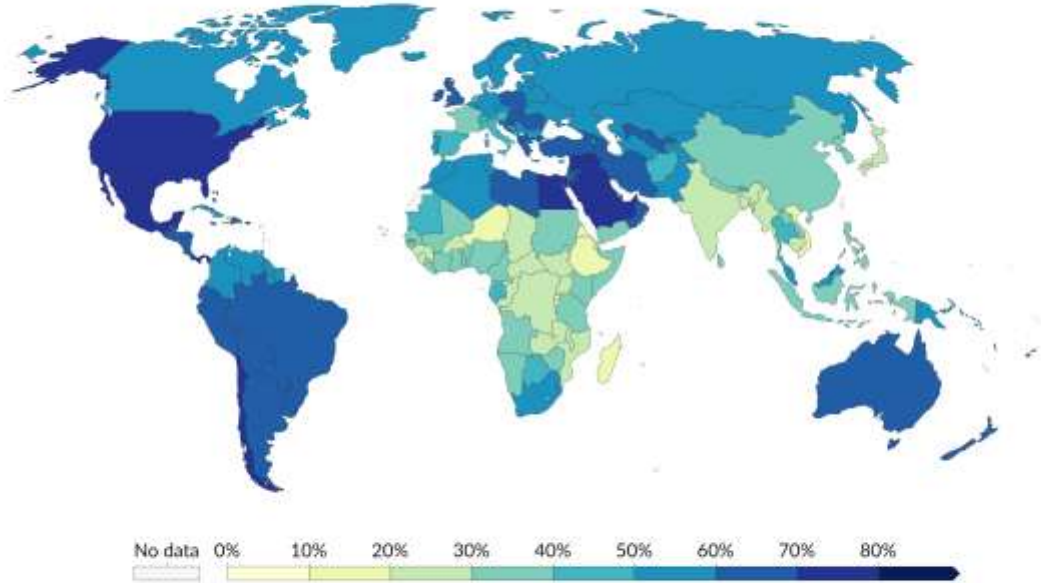


# Why are we having this conversation?

## Share of adults who are overweight or obese, 2022

"Overweight" is defined here as a body mass index (BMI) above 25. BMI is a person's weight in kilograms divided by their height in meters squared.

Our World  
In Data



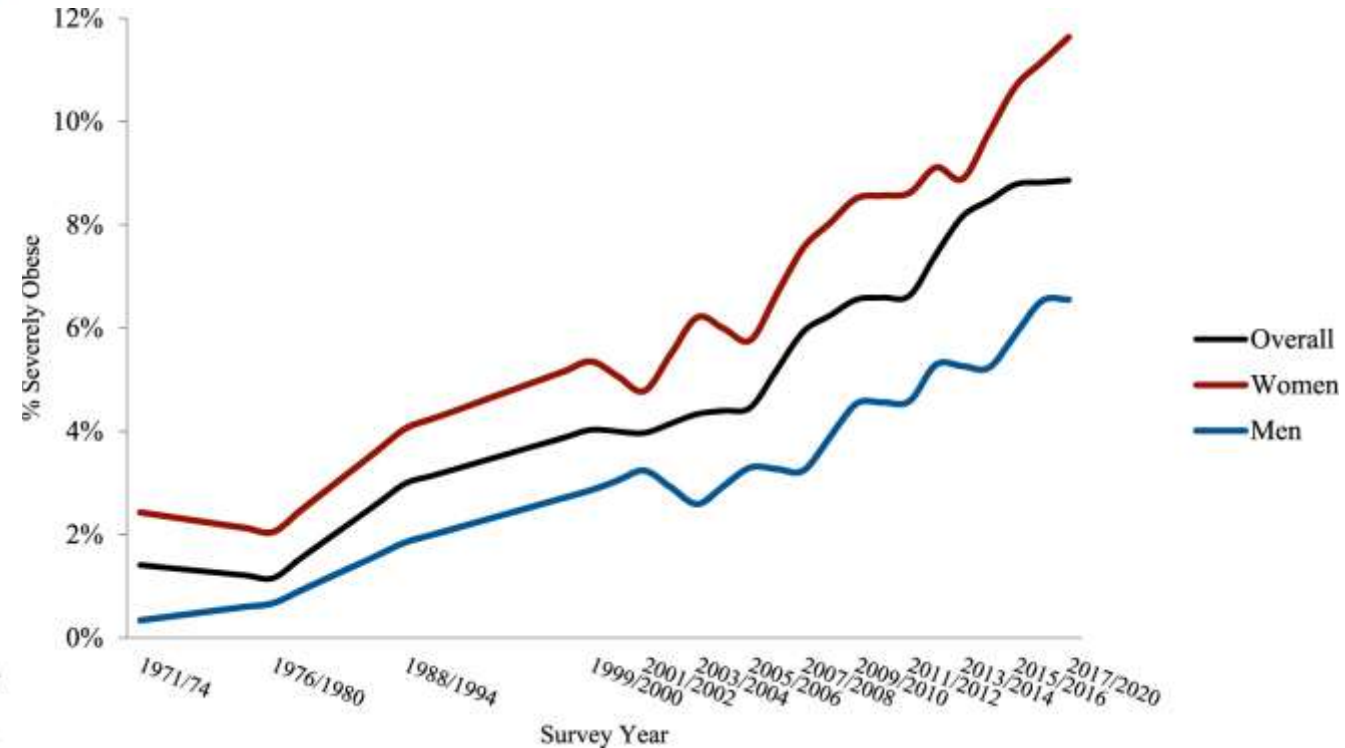
Data source: World Health Organization - Global Health Observatory (2025)

OurWorldInData.org/obesity | CC BY

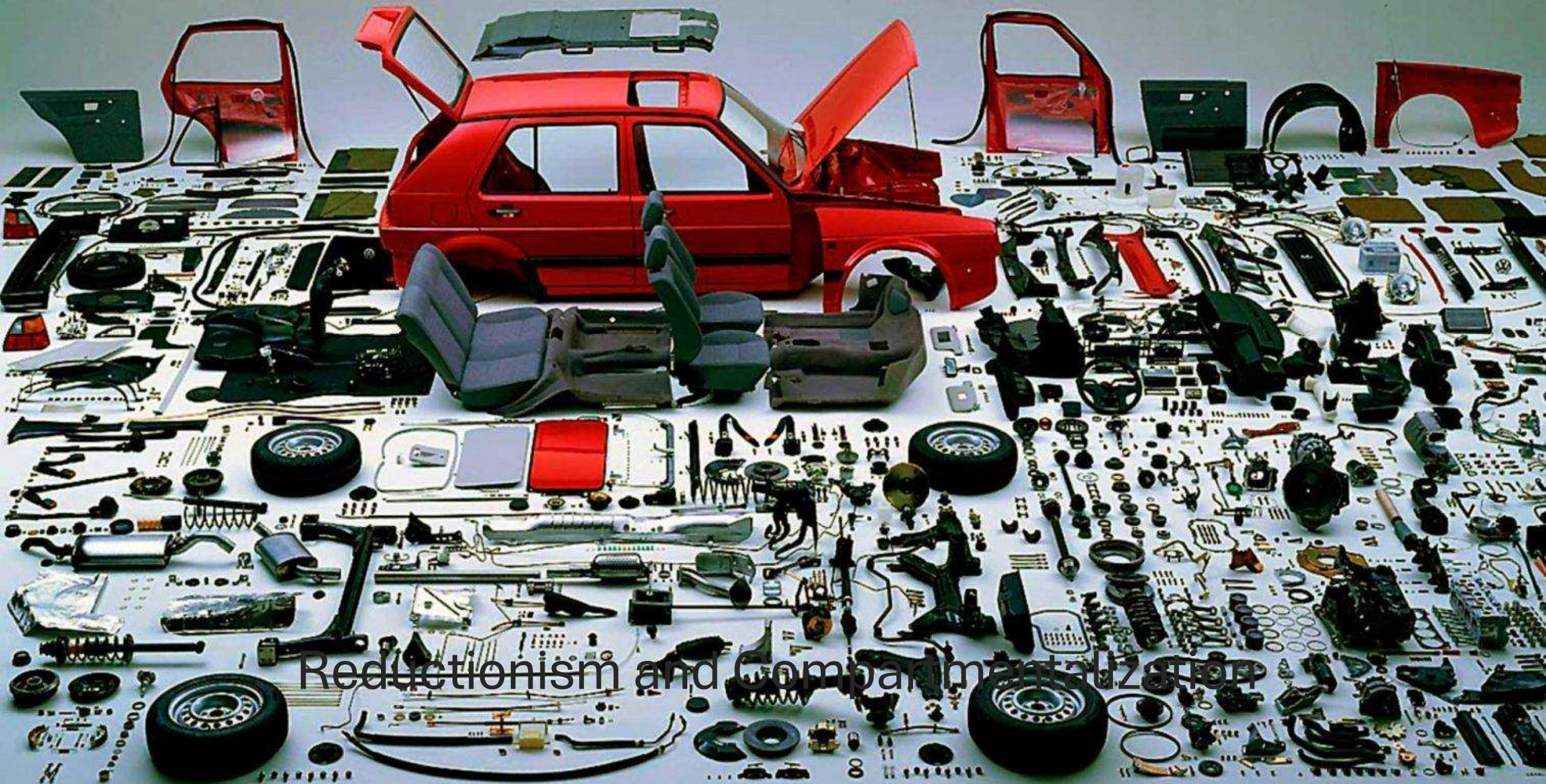
Note: To allow for comparisons between countries and over time, this metric is age-standardized<sup>1</sup>.

1. Age standardization Age standardization is an adjustment that makes it possible to compare populations with different age structures, by standardizing them to a common reference population.

[Read more: How does age standardization make health metrics comparable?](#)



Response to a food system gone wrong Looking for ways to lose weight, comfortably



Reductionism and Compartmentalization

# Balanced Approach

## Wholism

- Whole
- Connected/Synergistic
- Ecosystem
- Dynamic
- Intuitive
- Curious Open Mind
- Complexity
- Root Cause-Systems
- Complex Adaptive Systems



## Reductionism

- Parts
- Separate
- Individual
- Static
- Rational
- Hard Evidence
- Simplify
- Cause and Effect
- Simple Mechanistic Systems

The beginning...



# Historical Dietary Patterns

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- Early ancestral diets were overwhelmingly plant-based, with some insects and very small amounts of animal flesh.
- Reliance on meat increased in later ancestral diets as hunting skills improved.
- “... much proof points to continued significant (if not predominant) dependence on plant foods”.

Invited Review

## Paleolithic Nutrition

Twenty-Five Years Later

Melvin Konner, MD, PhD<sup>1</sup>; and S. Boyd Eaton, MD<sup>2</sup>

Nutrition in Clinical Practice  
Volume 25 Number 6  
December 2010 594-602  
© 2010 American Society for  
Parenteral and Enteral Nutrition  
10.1177/0884533610385702  
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# Philosophical Shift

## **Modern Western thought emphasized:**

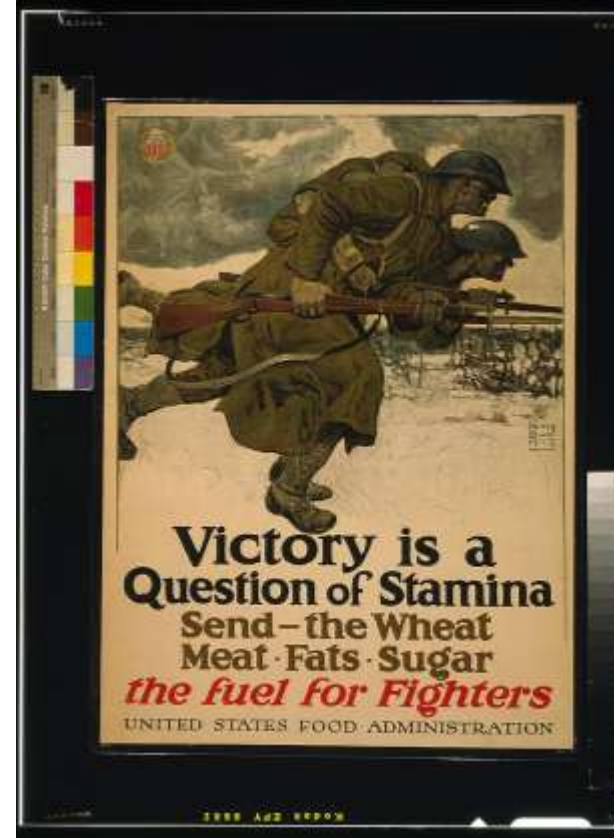
- Human dominance over nature
  - Linear over Circular
  - Efficiency over harmony
  - Extraction over stewardship
  - Individual parts over interconnected, synergistic systems
  - Worldview shaped agriculture and medicine
- 
- By contrast, many indigenous and traditional systems understood food as:
  - Relationship
  - Life
  - Ecology
  - Community
  - Reciprocity
  - Stewardship

# A Brief History

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- Calorie-dense foods were largely a privilege of the elite, symbolizing wealth and status
- Industrial Revolution-1800-1900
- New transportation-railway system
- Meat and milk could be transported long distances
- Refrigeration
- Farming Conglomerates, Food Corporations
- 1870 large canning facilities
- Pasteurization
- Early processed food
- Marketing of Food
- World Wars
- Green Revolution/ Subsidies
- Wall Street, quarterly earnings





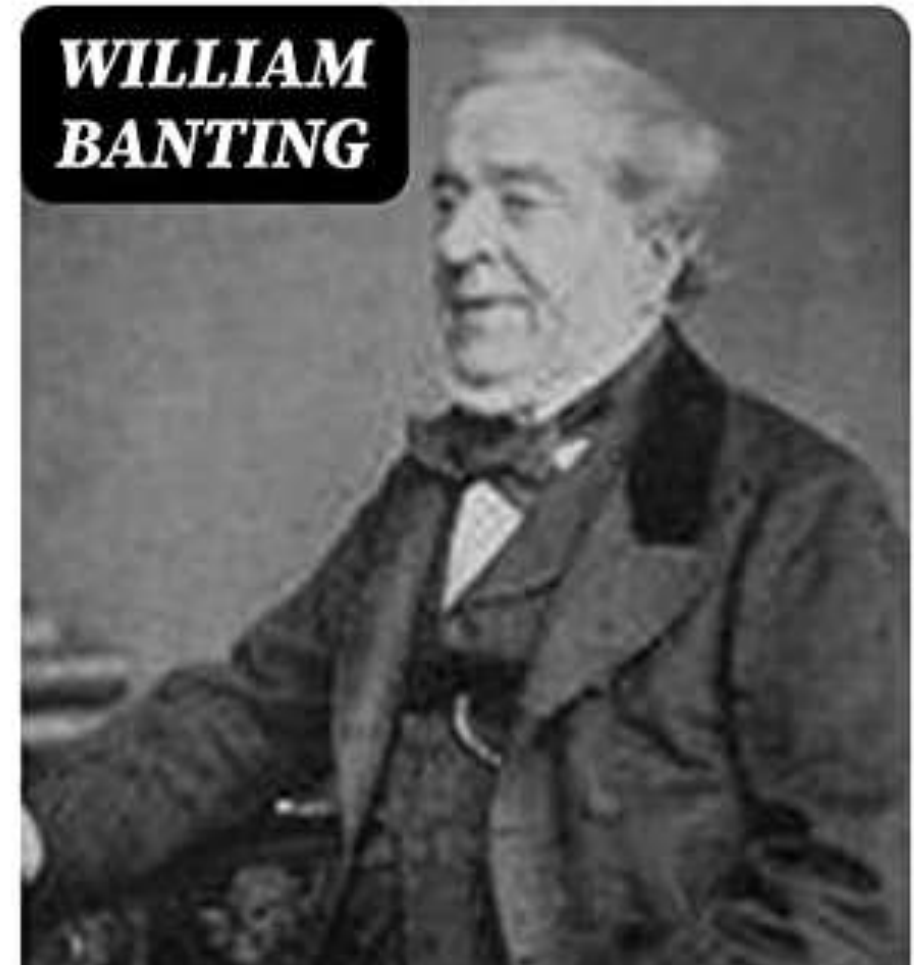
## Impact of the World Wars

- Royal typewriter advertisement 'WHAT THIS WAR IS ALL ABOUT . . . [is the right to] once more walk into any store in the land and buy anything you want.'

# A Brief History

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- 1864 William Banting- “Letter on Corpulence”
- 1918 Lulu Hunt Peters “Diet and Health, with a key to the Calories”  
100 calorie unit
- 1925 Lucky strike cigarette diet
- 1928 Inuit meat and fat diet
- 1960 Weight Watchers
- 1961 Calories Don’t Count Diet
- 1964 Drinking Man’s Diet
- 1972 Atkins Diet Revolution published



**EAT! EAT! EAT!**  
**& ALWAYS STAY THIN!**



NO DIET • NO BATHS  
NO EXERCISE!

**NO  
DANGER**  
GUARANTEED  
HARMLESS

# FAT

the ENEMY that is shortening Your Life  
**BANISHED!**



No Ill  
Effects!

HOW?  
with  
SANITIZED

## TAPE WORMS

Jar Packed

"FRIENDS FOR A  
FAIR FORM"

Easy To  
Swallow!

Prepared By  
W. T.  
BRIDGE, Chemist  
New York

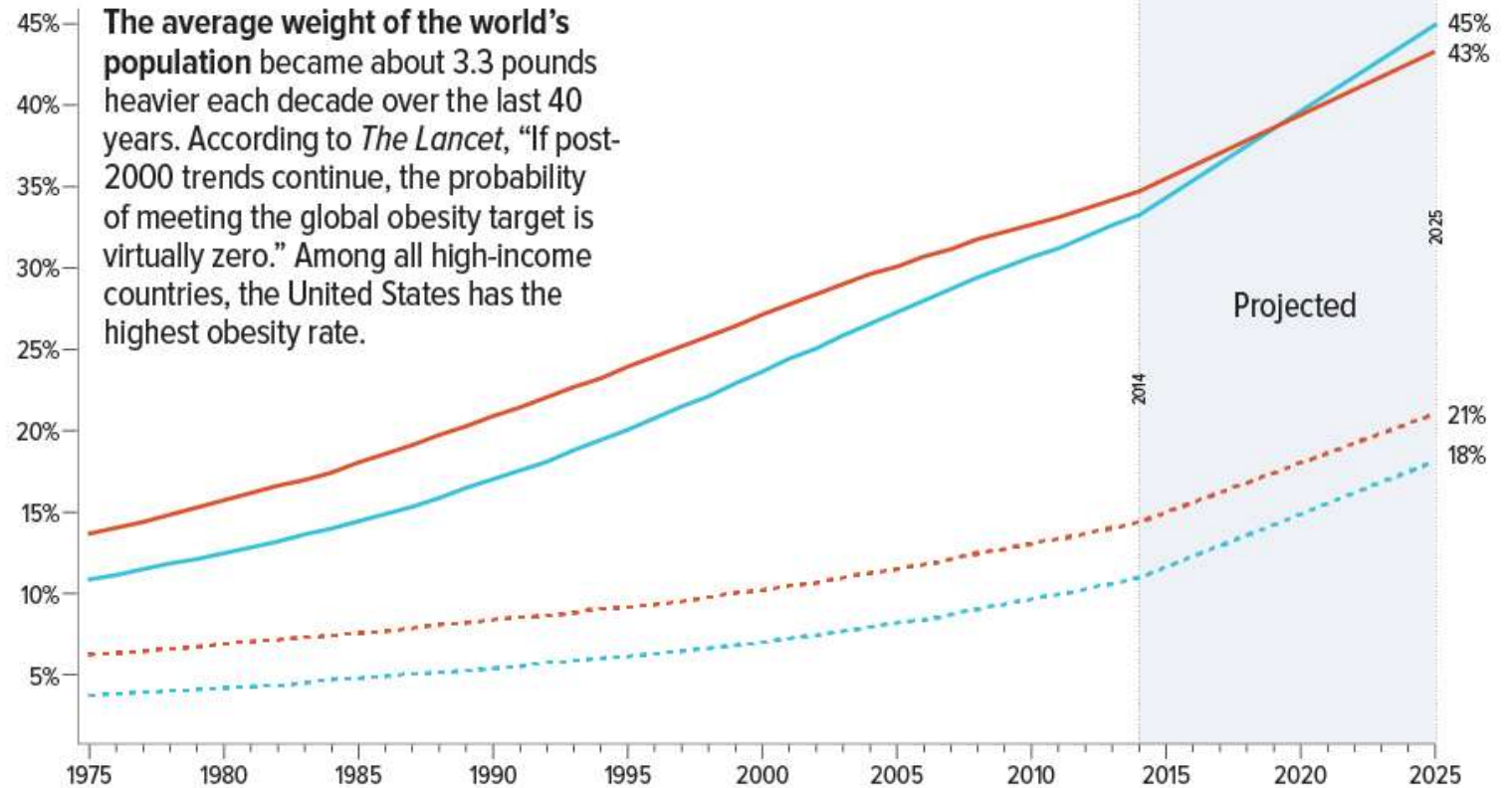
SEND NO  
MONEY  
PARTICULARS  
MAILED  
**FREE**

# Despite more than a century of diets...

## The world is getting heavier, and America leads the way

1975–2014 (% of population); Body mass index  $\geq 30$ ; Age-standardized

— Global men (95% CI) — Global women (95% CI) — U.S. men (95% CI) — U.S. women (95% CI)



NCD Risk Factor Collaboration (NCD-RisC); Projections: *The Lancet* 2016; 387:1377-96

# Key

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- BMJ 2020 meta-analysis of 121 RCTs found that at **12 months, the benefits for cardiovascular risk factors of all interventions — except the Mediterranean diet — essentially disappeared** as weight was regained.
- Sustained weight loss is a primary determinant of long-term biomarker improvement.



# What's going on here?

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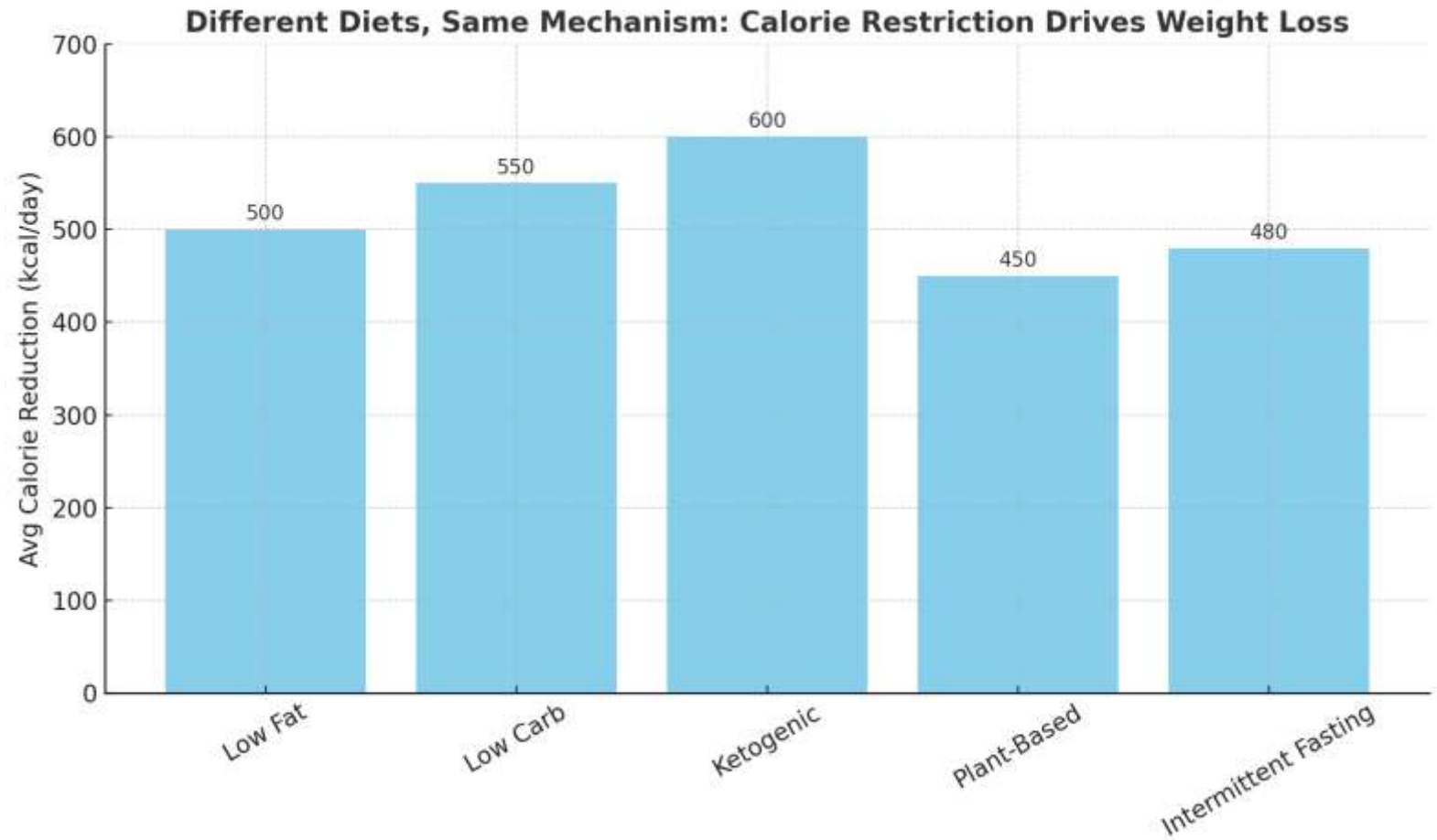
- Short term fixes focused on metabolism, driven by weight loss, juxtaposed against long term data highlighting risks
- Short term outcomes misconstrued as long-term health benefits
- Biohacking vs. System Optimization-philosophy
- Story telling to fill in gaps in research and explain away the risks
  - Cholesterol and fat
- Potent SM influence
- Culturally acceptable, easily adopted, and plays on ideals of meat=Strength-imagery



# Simple Truth

- “Regardless of the macronutrient composition, reduced energy intake is the key determinant of weight loss.”

— Kevin D. Hall, PhD, National Institutes of Health (NIH), Obesity Reviews, 2017





# Caloric Deficit – The Universal Mechanism of Weight Loss

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- All diets that produce weight loss share one physiological truth:
  - **calorie intake < calorie expenditure**
- Different strategies, same effect:
  - Keto: Reduces appetite and limits food choices → lower intake
  - Plant-based: Low-calorie density/high nutrient density → fullness with fewer calories
  - Intermittent fasting: Time-restricted eating → fewer opportunities to eat
- **Diet success ≠ Superiority**
  - Key: Sustainability, Nourishment, System Support, Long term disease prevention
- **Best diet** = consistent, long-term sustainability with health, system optimization, satiety, and interconnected system benefits.

# Summary of Clinical Evidence for All Diets

| Biomarker Category               | Specific Markers Conclusively Improved           | Threshold for Benefit      | Level of Evidence               | Refs    |
|----------------------------------|--------------------------------------------------|----------------------------|---------------------------------|---------|
| Glycemic control                 | Fasting glucose, fasting insulin, HOMA-IR, HbA1c | ≥5% weight loss            | High (multiple large RCTs/MAs)  | [1-3]   |
| Lipid profile                    | Triglycerides ↓, LDL-C ↓, HDL-C ↑                | Per-kg linear relationship | High (73 RCTs, N=32,496)        | [4-5]   |
| Blood pressure                   | Systolic BP ↓, Diastolic BP ↓                    | ~4 kg weight loss          | High (Cochrane SR + network MA) | [5-6]   |
| Inflammation                     | hsCRP ↓, IL-6 ↓ (with >5% WL)                    | ≥5% weight loss for IL-6   | Moderate-High                   | [7-9]   |
| Adipokines                       | Leptin ↓, Adiponectin ↑                          | Any caloric restriction    | Moderate-High                   | [10-12] |
| Hepatic markers                  | ALT ↓, GGT ↓, liver steatosis ↓                  | Weight loss per se         | High (JAMA IM MA, 22 RCTs)      | [13-14] |
| Uric acid                        | Serum urate ↓                                    | Weight loss per se         | Moderate (single large RCT)     | [15]    |
| Body composition                 | VAT ↓, waist circumference ↓, intrahepatic fat ↓ | ≥5% weight loss            | High (40 RCTs)                  | [16-17] |
| <b>NOT conclusively improved</b> | TNF-α, histologic liver fibrosis                 | —                          | Negative evidence               | [9, 13] |

# Failed Dieting

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- Dieting doesn't work-faulty foundation
- Single focus of weight as primary outcome
- Willpower is not enough-it is a finite resource that will get depleted
- Restriction and deprivation ultimately lead to rebellion
- Doesn't account for culture adequately
- Diets produce negative self talk based on the concept of weight-inner critic
- Produces a flawed identity and mindset
  - Resigned that something is wrong with the diet or you



# Failed Strategy



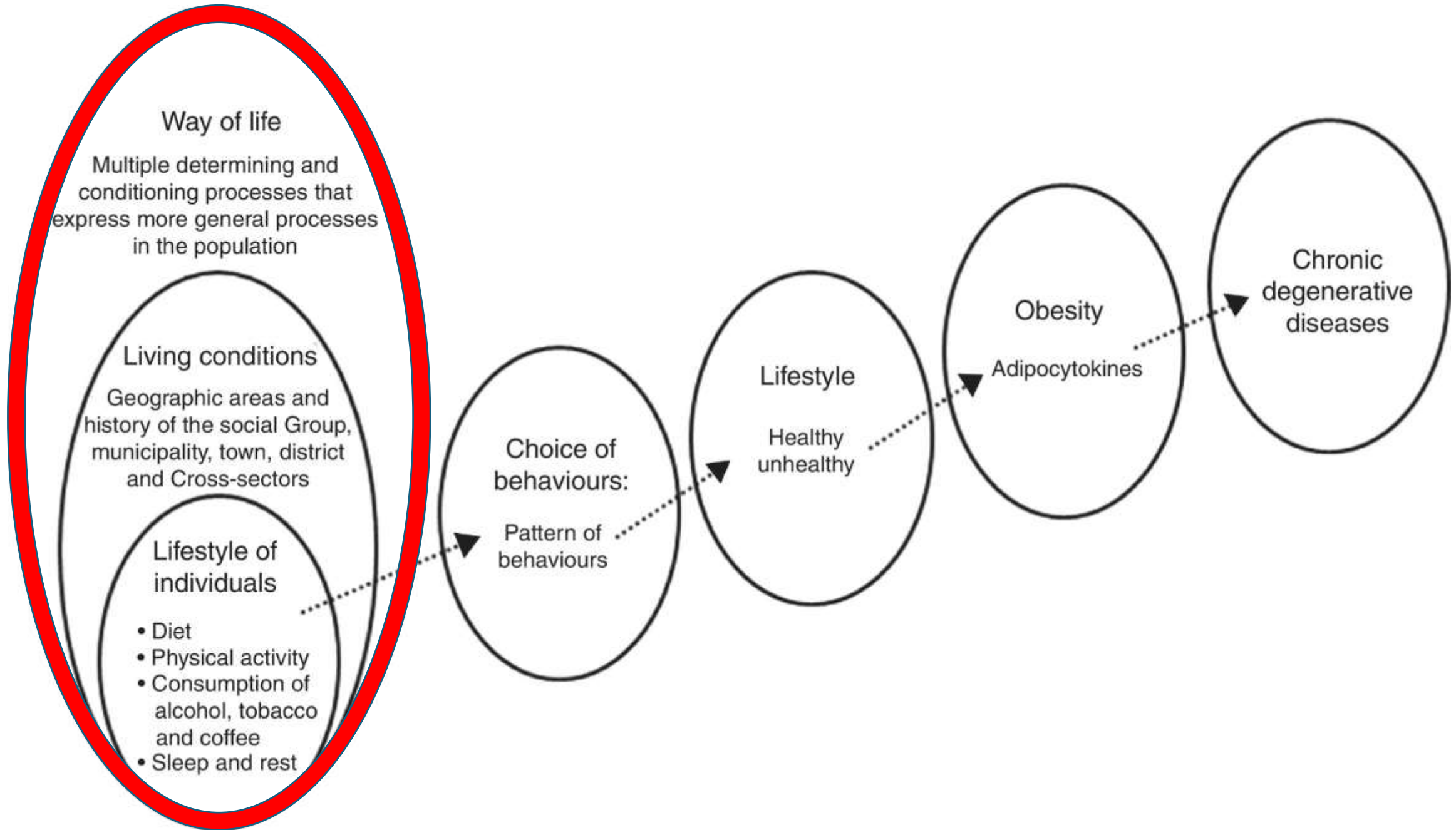
## Weight Regain After Dieting

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- 80% regain most or all weight lost by 12 months
- 1/3 to 2/3 regain more weight than lost
- ~50% maintain partial weight loss at 3 years
- 80% regain all weight lost by 5 years
- 85% regain lost weight within 3-5 years

### Sources:

- Anderson, J. W. et al. (2001) *The American Journal of Clinical Nutrition*
- Mann, T, et al. (2007), *American Psychologist*
- Franz, M. J. et al. (2007), *Journal of the Americann Dietetic Association*
- Dulloo, A. G., et al, (2015) *Dbesity Reviews*
- Nordmo, M.. et al. (2020) *Obesity Reviews*
- Wadden, T.A., et al. (2011) *The Americann Journal of Medicine*





# Calorie Density

| Food                           | Calories per pound |
|--------------------------------|--------------------|
| Vegetables                     | 60-100             |
| Fruit                          | 100-425            |
| Potatoes/Yams                  | 300-600            |
| Whole Grains                   | 325-625            |
| Lentils/Beans/Peas             | 500-700            |
|                                |                    |
| Avocado                        | 750                |
| Dried Fruit                    | 1000               |
| Bread, Bagels, Muffins         | 900-1300           |
| Animal Protein/Dairy/Ice Cream | 1200               |
| Cheese/Sugar/Soft Drinks       | 1600-1800          |
| Fried Foods and Snacks         | 2000-2400          |
| Chocolate                      | 2500               |
| Nuts and Seeds                 | 2800               |
| Butter                         | 3500               |
| Oil                            | 4000               |



# Common Foods, Calories and Exercise Time

| Food Type      | Calories | Walk  | Run  |
|----------------|----------|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| Soda           | 140      | 26 min                                                                                   | 13 min                                                                                  |
| Butter         | 102      | 22 min                                                                                   | 10 min                                                                                  |
| French Fries   | 375      | 79 min                                                                                   | 37 min                                                                                  |
| Chocolate bar  | 230      | 42 min                                                                                   | 22 min                                                                                  |
| Pizza 2 slices | 570      | 1 hour 35 min                                                                            | 43 min                                                                                  |
| Mocha-Medium   | 290      | 53 min                                                                                   | 28 min                                                                                  |
| Protein Bar    | 170      | 37 min                                                                                   | 17 min                                                                                  |

# Diet vs. Lifestyle

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If you pursue excellent health, your weight will follow naturally

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Diets often employ dishonest servants-deprivation, starvation, restriction, condemnation, elimination, empty plates, deadlines, celebration with all the unhealthy foods you avoided

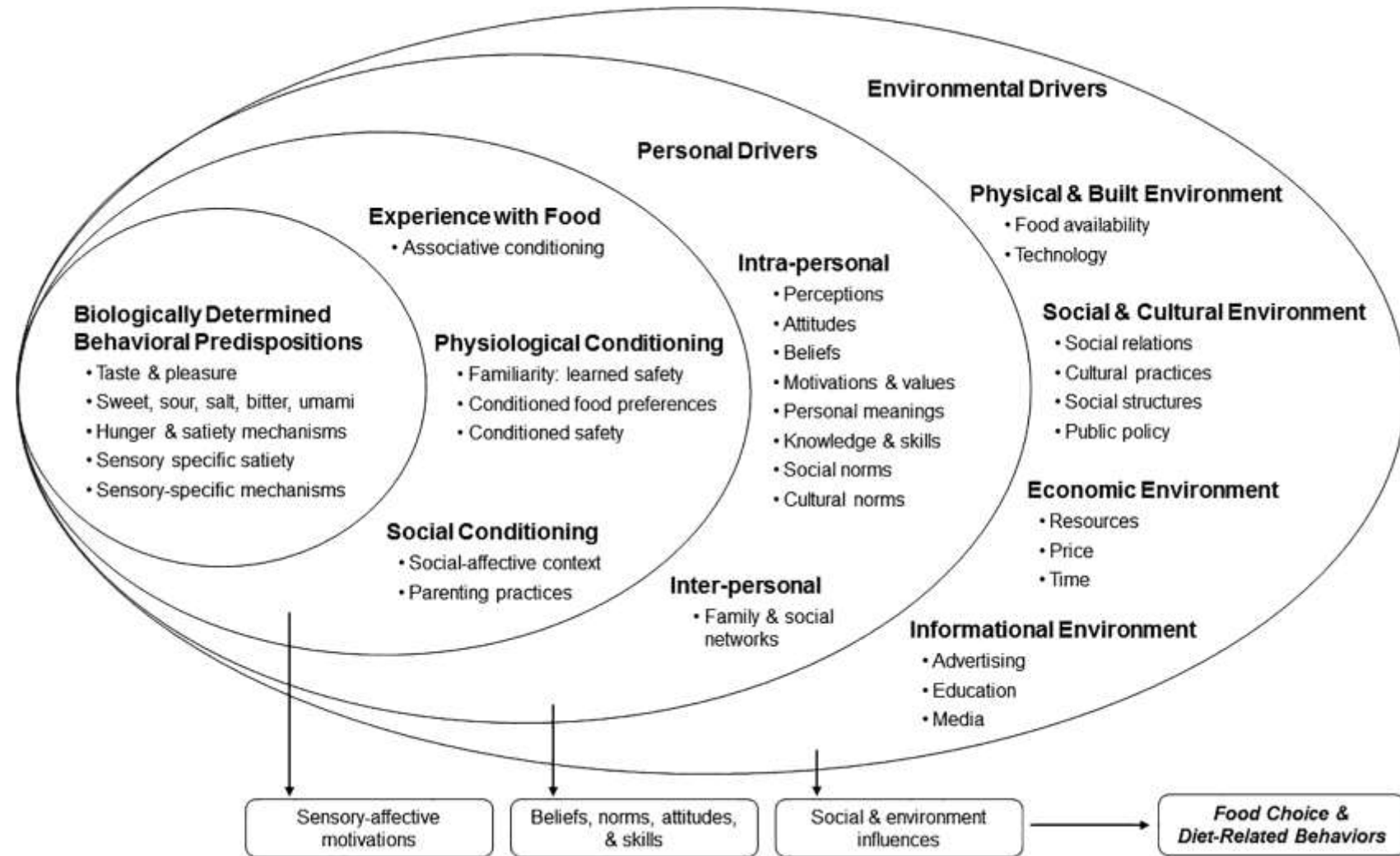
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Lifestyle employs freedom, balance, abundance, whole health, future vision, joy, mindfulness, grateful choices, community, connection, and longevity.

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Lifestyle produces a positive renewed self identity, cultivates community, and seeds an empowering future vision

# Determinants of Food Choice



- Monterrosa, Eva C., et al. "Sociocultural influences on food choices and implications for sustainable healthy diets." *Food and Nutrition Bulletin* 41.2\_suppl (2020): 59S-73S.



# "Survival Hardware" in a Modern Toxic Environment of Excess

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- **The Law of Least Effort (Energy Conservation):**

- **Physiology:** Designed to prioritize calorie-dense foods-minimizing physical exertion to survive periods of scarcity. We like efficiency and ease.
- **Exploitation:** Industry provides easy access and convenient ultra-processed, "pre-digested" calories that require minimal effort to acquire or consume, fulfilling an ancient biological drive to conserve energy.

- **The Scarcity Brain (Storage vs. Utilization):**

- **Physiology:** Body is designed to store excess energy as fat in preparation for scarcity.
- **Exploitation:** In an environment of perpetual "feasts," the biological "off-switch" is bypassed by constant access and affordability.

- **The Bliss Point (Sensory-Specific Satiety):**

- **Physiology:** Wired to seek variety and carbohydrates to ensure a broad range of micronutrients and energy.
- **Exploitation:** Sensory-specific satiety is overridden by the "Bliss Point"— precise optimization of sugar, salt, and fat that maximizes dopamine release without ever triggering a "full" signal. Buffet Effect

# Your Body's Natural “Operating System”

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- **Your body is not broken—it's perfectly designed for survival**
- **Your Body is wired to survive in scarcity- not to navigate modern abundance/indulgence**
- **Hunger is a neurobiological signal, not a lack of discipline or willpower**
- Your brain and body are designed to:
  - Seek food aggressively in scarcity
  - Store energy efficiently
  - Pursue calorie density
  - Conserve calories whenever possible
- Your body prefers:
  - Carbohydrates
  - Fat storage (energy reserve)
  - Reduced energy expenditure when food is scarce
- Built-in “thrifty system”:
  - Eat more when food is available—Buffet Effect!
  - Burn less when it's not



Drug

GLP-1

Rybelsus

Wegovy

Semaglutide

weight loss

Diabetes

# Multimodal Mechanism of Action



**Pancreatic Regulation** Enhances glucose-dependent insulin secretion and suppresses inappropriate glucagon release.



**Gastric Slowing** Delays gastric emptying, smoothing the postprandial glucose spike and increasing fullness.

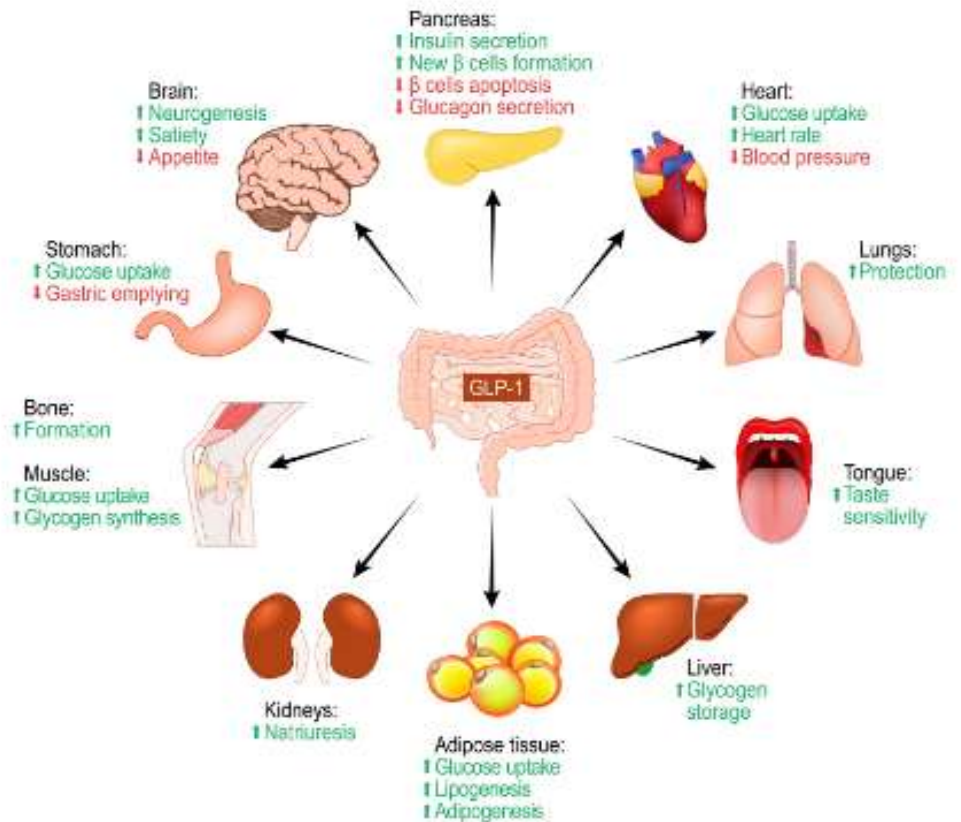


**CNS Satiety Signaling** Targets the hypothalamus and hindbrain to reduce appetite and lower caloric preference.



**Cardiometabolic Protection** Provides systemic benefits including reduced inflammation and major adverse cardiac events (MACE).

## Functions of Glucagon-like peptide-1



## Clinical Adverse Events

- **Gastrointestinal Distress:** Reported in up to 80% of patients; including nausea, vomiting, and chronic constipation.
- **Severe Gastric Complications:** Emerging data (2023) links usage to **gastroparesis** (stomach paralysis) and intestinal obstruction (ileus).
- **Sarcopenic Risk:** Evidence from the STEP 1 trial indicates up to **40% of weight lost** may be lean muscle mass rather than adipose tissue.
- **Gallbladder Disease:** Increased risk of cholelithiasis and acute pancreatitis.

## The Persistence Paradox

- **The Weight Rebound:** In the STEP 1 trial extension, patients **regained two-thirds** of their lost weight within one year of treatment cessation.
- **"Food Noise" Return:** Post-drug metabolic signaling often results in hyper-responsiveness to hunger cues, leading to rapid caloric surplus.
- **Economic Attrition:** High monthly costs and lack of insurance coverage drive discontinuation rates of >50% within the first year.
- **Metabolic Mismatch:** Drugs do not address the underlying neuro-behavioral drivers of food addiction or dependency.

Weight Tracking Post-Cessation (Conceptual)



# Dark Side of GLP-1

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- **Clinical:** Studies suggest **60-90% of weight is regained within one year** of discontinuation, with glycemic, blood pressure, and lipid parameters returning to baseline within approximately 12 months.
- **Lancet Review (2026):** Approximately **50% of lean body mass loss is muscle mass**. Concerns exist that this could lead to functional impairments, particularly in older adults with pre-existing sarcopenia.



# Harnessing Natural GLP-1 Through Lifestyle

- **Key Points:**
- **GLP-1 is released naturally after meals**, throughout the intestines, especially the distal colon
- After eating, GLP-1 rises via two pathways:
  - **Neuroendocrine pathway**: onset 10–15 minutes after eating
  - **Nutrient-specific G-protein coupled receptors**: onset 30–60 minutes after eating
- Endogenous GLP-1 has a **half-life of only 1-2 minutes** yet exerts powerful metabolic effects
- GLP-1 acts on:
  - **Pancreatic beta cells** → enhanced insulin secretion
  - **Brain** → homeostatic (energy-focused) AND hedonic (reward-focused) regulation of food intake
- GLP-1 modulates **vagal afferent neurons**, which may have potent metabolic effects even at lower concentrations than pharmacologic levels



# Foods that Activate GLP-1

| Nutrient/Food                           | Mechanism                           | Receptor/Pathway                        |
|-----------------------------------------|-------------------------------------|-----------------------------------------|
| <b>Fiber Resistant Starch</b>           | Fermented by gut bacteria → SCFAs   | Free fatty acid receptors 2 3 (FFAR2/3) |
| <b>Mono/Polyunsaturated Fats</b>        | Direct L-cell stimulation           | Free fatty acid receptors 1 4 (FFAR1/4) |
| <b>Monosaccharides</b>                  | Bind L-cell glucose transporters    | SGLT1, GLUT2                            |
| <b>Protein/Amino Acids</b>              | Peptide sensing (poorly understood) | CaSR, GPRC6A                            |
| <b>Polyphenols</b> (fruits, vegetables) | Bioactive stimulation               | Multiple pathways                       |
| <b>Green Tea Catechins</b>              | Bioactive stimulation               | Multiple pathways                       |
| <b>Curcumin</b> (turmeric)              | Bioactive stimulation               | Multiple pathways                       |
| <b>Capsaicin</b> (chili peppers)        | Bioactive stimulation               | TRPV1                                   |
| <b>Omega-3 Fatty Acids</b>              | Long-chain fatty acid sensing       | FFAR1/4                                 |
| <b>Cinnamon Ginger</b>                  | Bioactive stimulation               | Multiple pathways                       |



# Microbiome and GLP-1 Release

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- **Key Research Findings:**
- **Circadian GLP-1 secretion is microbiome-dependent:**
- **Western diet (high-fat/high-sucrose)** markedly increases but makes GLP-1 secretion **irregular** over 24 hours
- **Prebiotics + probiotics together** may be more impactful for GLP-1 release than either alone
- **Clinical Implications:**
- Plant-based diets rich in fiber **feed SCFA-producing bacteria**
- This creates a **sustained, physiologic GLP-1 response** throughout the day
- **Supports both metabolic homeostasis and appetite regulation**

# Exercise and GLP-1

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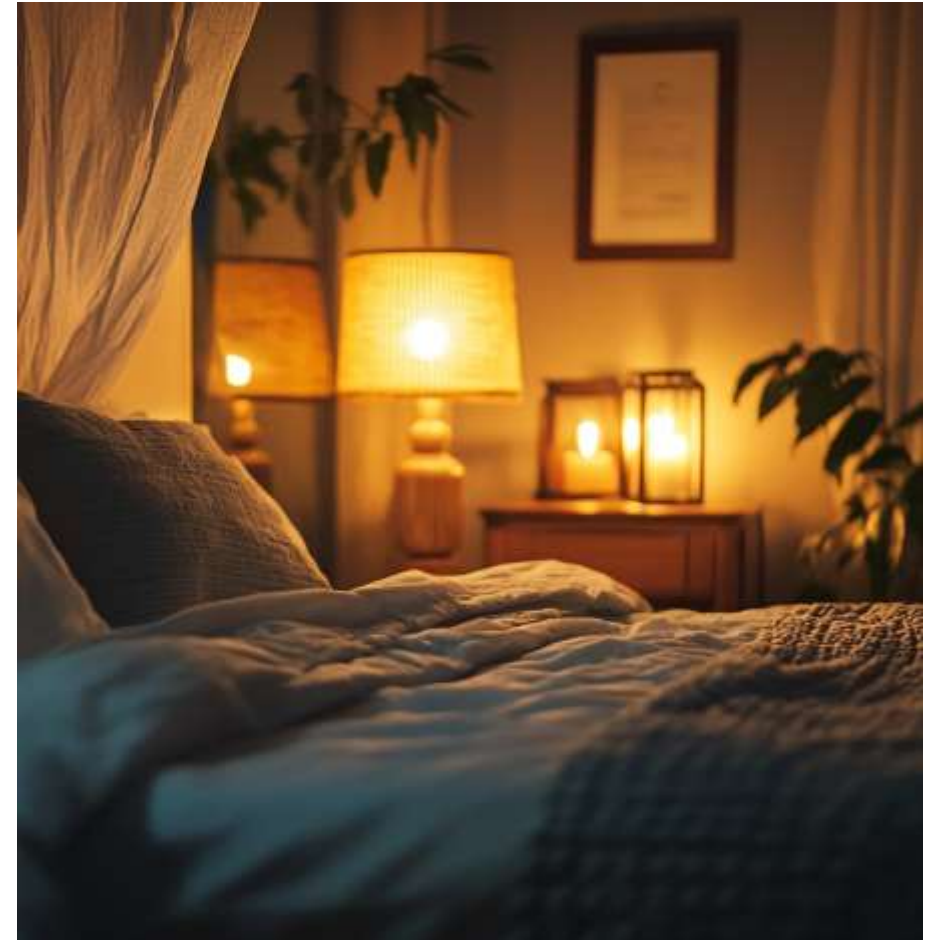
- **Landmark RCT (2025):** After diet-induced weight loss, 52 weeks of moderate-to-vigorous exercise increased late-phase postprandial GLP-1 response by **37%— 25% greater than usual activity controls**
- **Mechanism:** Exercise-induced IL-6 release from contracting skeletal muscle **directly stimulates GLP-1 secretion**
- Both **acute exercise and short-term endurance training** significantly increase GLP-1 secretion
- **2 weeks of exercise training** (independent of intensity) increased early-phase GLP-1 secretion in adults with prediabetes



# Sleep and GLP-1 Circadian Rhythm

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- **GLP-1 exhibits a circadian rhythm**, with highest release at the onset of the feeding period
- **Sleep deprivation with nocturnal light exposure:**
  - Disrupts melatonin and cortisol profiles
  - Increases insulin resistance
  - Induces profound derangements in GLP-1 and insulin responses
  - Markedly elevates postprandial GLP-1/insulin but **abolishes normal diurnal variation**
- **Dark conditions during sleep deprivation prevented metabolic abnormalities** — indicating a **direct effect of light** on glucoregulatory pathways
- **Core clock gene Bmal1** is essential for circadian GLP-1 secretion



# Acute sleep deprivation:

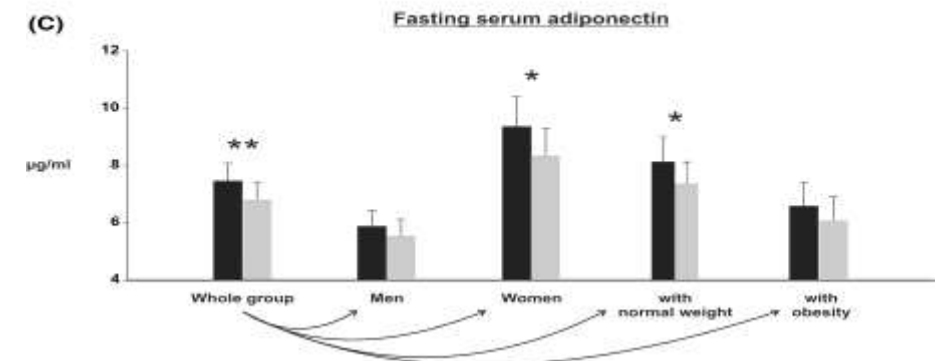
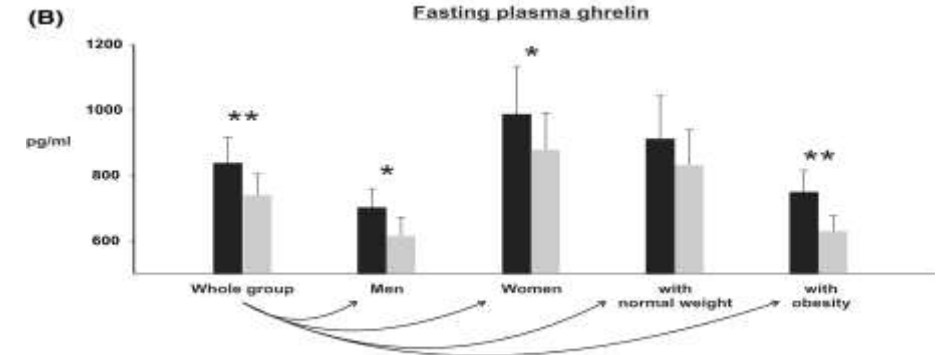
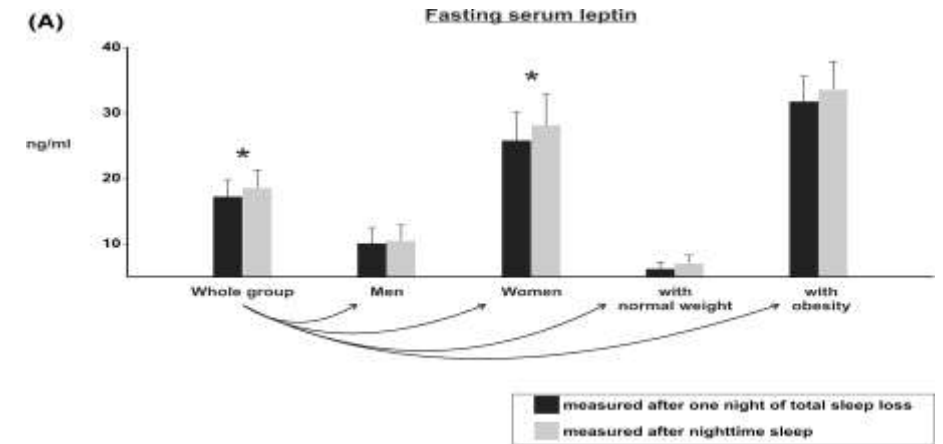
Elicits more robust brain reward responses to food cues

Stimulates food purchases

Increases daily food intake

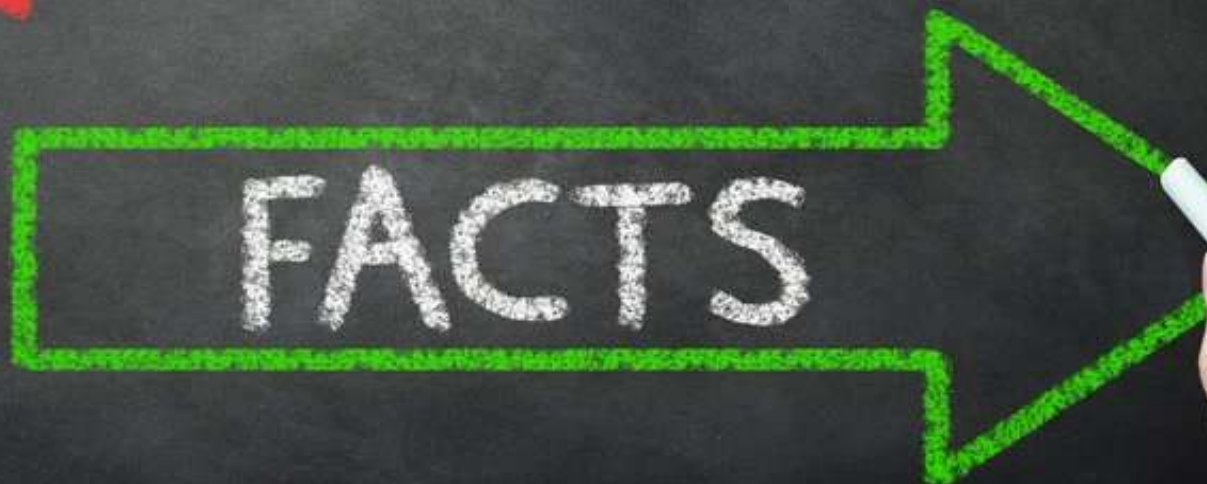


## Increase ghrelin and disrupts adiponectin & leptin



A large red arrow pointing to the left, drawn with a thick red line. The word "MYTHS" is written in white, uppercase, sans-serif letters inside the arrow.

MYTHS

A large green arrow pointing to the right, drawn with a thick green line. The word "FACTS" is written in white, uppercase, sans-serif letters inside the arrow. A hand is visible on the right side, holding a white chalk piece and finishing the green outline of the arrow.

FACTS



# Current Statistics: Keto/Carnivore Diet Globally

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- **20% of American adults** (representing 51.7 million individuals) reported following some form of low-carbohydrate dietary pattern, in the previous year. (JACC Journals, 2024)

## Ketogenic (Keto) Diet

- **Dominance in Weight Loss:**
  - The keto diet ranked first among "Best Fast Weight-Loss Diets" in a U.S. News & World Report's 2024 comparison,
  - Research Trend: Increase of more than 200 studies per year since 2019,

# What are the Ketogenic and Carnivore Diets

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## **Ketogenic Diet (Keto):**

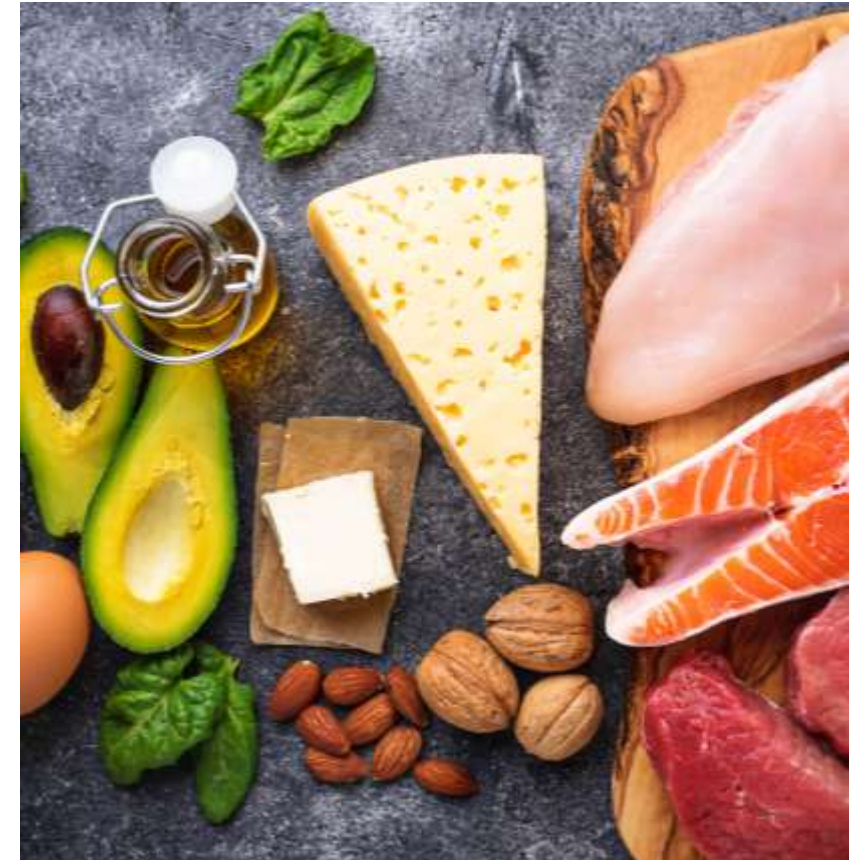
A high-fat, very low-carb diet-- ketosis- fat as primary fuel source

- ~70-80% fat, 10-20% protein, 5-10% carbs—Often 4:1 ratio
- Emphasizes foods like dairy, avocados, meats, eggs, oils, nuts, and leafy greens
- Limits grains, sugar, fruits, and most starchy vegetables

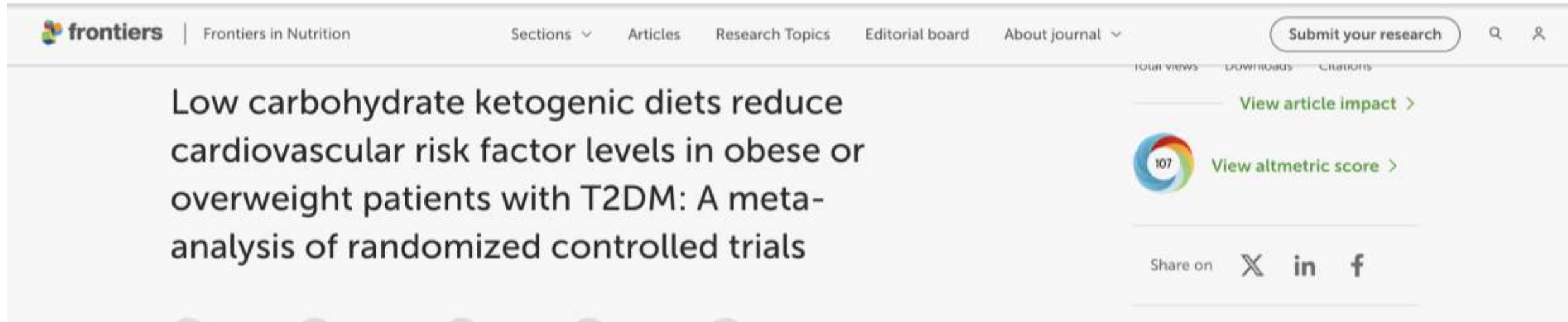
## **Carnivore Diet:**

Focuses exclusively on animal products.

- 100% meat, fish, eggs, animal fats, and sometimes dairy
- No fruits, vegetables, grains, or legumes
- Extreme form of low-carb eating with zero fiber intake



# Why is this tricky?



The screenshot shows the top portion of a research article page from Frontiers in Nutrition. The header includes the Frontiers logo, the journal name, and navigation links for Sections, Articles, Research Topics, Editorial board, and About journal. A 'Submit your research' button is on the right. The article title is 'Low carbohydrate ketogenic diets reduce cardiovascular risk factor levels in obese or overweight patients with T2DM: A meta-analysis of randomized controlled trials'. To the right of the title, there are links for 'View article impact >' and 'View altmetric score >'. Below these links is a circular altmetric icon with the number 107. At the bottom of the article preview, there are social media sharing icons for X, LinkedIn, and Facebook.

frontiers | Frontiers in Nutrition

Sections ▾ Articles Research Topics Editorial board About journal ▾

Submit your research

Low carbohydrate ketogenic diets reduce cardiovascular risk factor levels in obese or overweight patients with T2DM: A meta-analysis of randomized controlled trials

View article impact >

107 View altmetric score >

Share on X in f

**Conclusions:** Low-carbohydrate ketogenic diets effectively improved cardiovascular risk factors (blood glucose, weight, and lipids) in obese/ overweight patients, especially those with T2DM when compared with non-ketogenic diets.



#### Meta-analyses

Effects of ketogenic and low-carbohydrate diets on the body composition of adults with overweight or obesity: A systematic review and meta-analysis of randomised controlled trials



- “Thirty-three RCTs involving 2821 individuals were included. Overall meta-analysis results indicated that KD/LCD significantly reduced BW, BMI, and BFP, but not FM, in individuals with a carbohydrate of  $\leq 100$  g/d. Subgroup analyses revealed significant improvements in BW, BMI, and FM in individuals on KD/LCD for  $\geq 1$  month and in all parameters for those with a carbohydrate intake of  $\leq 50$  g/d.”...Adults with overweight or obesity should consume KD/LCD for  $\geq 1$  month and limit carbohydrate intake to  $\leq 50$  g/d.

# But...What do the studies show?

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- Respondents aged 50–65 reporting high protein intake had a 75% increase in overall mortality and a 4-fold increase in cancer death risk during the following 18 years. These associations were either abolished or attenuated if the proteins were plant derived. Levine, Morgan E., et al. 2014 Cell Metabolism
- Harvard- highest levels of animal protein intake had the highest mortality risk, cancer and cardiovascular risk. Song, Mingyang, et al. 2016 JAMA Int Medicine
- A dose-response analysis showed a significant inverse dose-response association between intake of plant protein and all cause mortality ( $P=0.05$  for non-linearity). An additional 3% energy from plant proteins a day was associated with a 5% lower risk of death from all causes. Naghshi, Sina, et al. 2020 BMJ

# How LCD stacks up: Short and Long Term

- "Other meta-analyses based on longer-term randomized weight loss trials that compare LCD with traditional calorie-restricted (low-fat) diets show that although LCDs associate with greater weight loss in the short-term, this advantage of the LCD either disappears or diminishes after 1 year"-Feinman, RD et al.
- "fasting insulin sensitivity improves over the short-term in response to the LCD, but the effect of the LCD on fasting insulin sensitivity diminishes over the longer-term, in tandem with the diminished longer-term effects on body weight loss"-Accurso, A et al.
- "In a systematic review and meta-analysis of RCTs on the efficacy of the LCD versus a normal or high-carbohydrate diet in patients with T2D from 9 studies and >700 individuals, there was a significant reduction in HbA1C of 0.44% for the LCD group. The LCD group also had a significant reduction in plasma triglyceride level of 0.33 mmol/L but no significant change in total or LDL cholesterol. Furthermore, although the LCD had an initial reducing effect on body weight, over the longer term (as with outcomes from the general obese cohorts outlined above), there was no significant effect of the LCD on body weight" Meng, Y et al.



# Comparison

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## Claim by Keto/Carnivore Advocates

Carbs are harmful

Meat has all nutrients

LDL-C not harmful

Keto cures all

Plants are toxic

Carnivore diet is ideal

## Scientific Counter-Evidence

Fiber-rich carbs improve health & longevity

Lacks fiber, vitamins, antioxidants---  
microbiome diversity

ApoB and LDL-C are **causally linked** to CVD

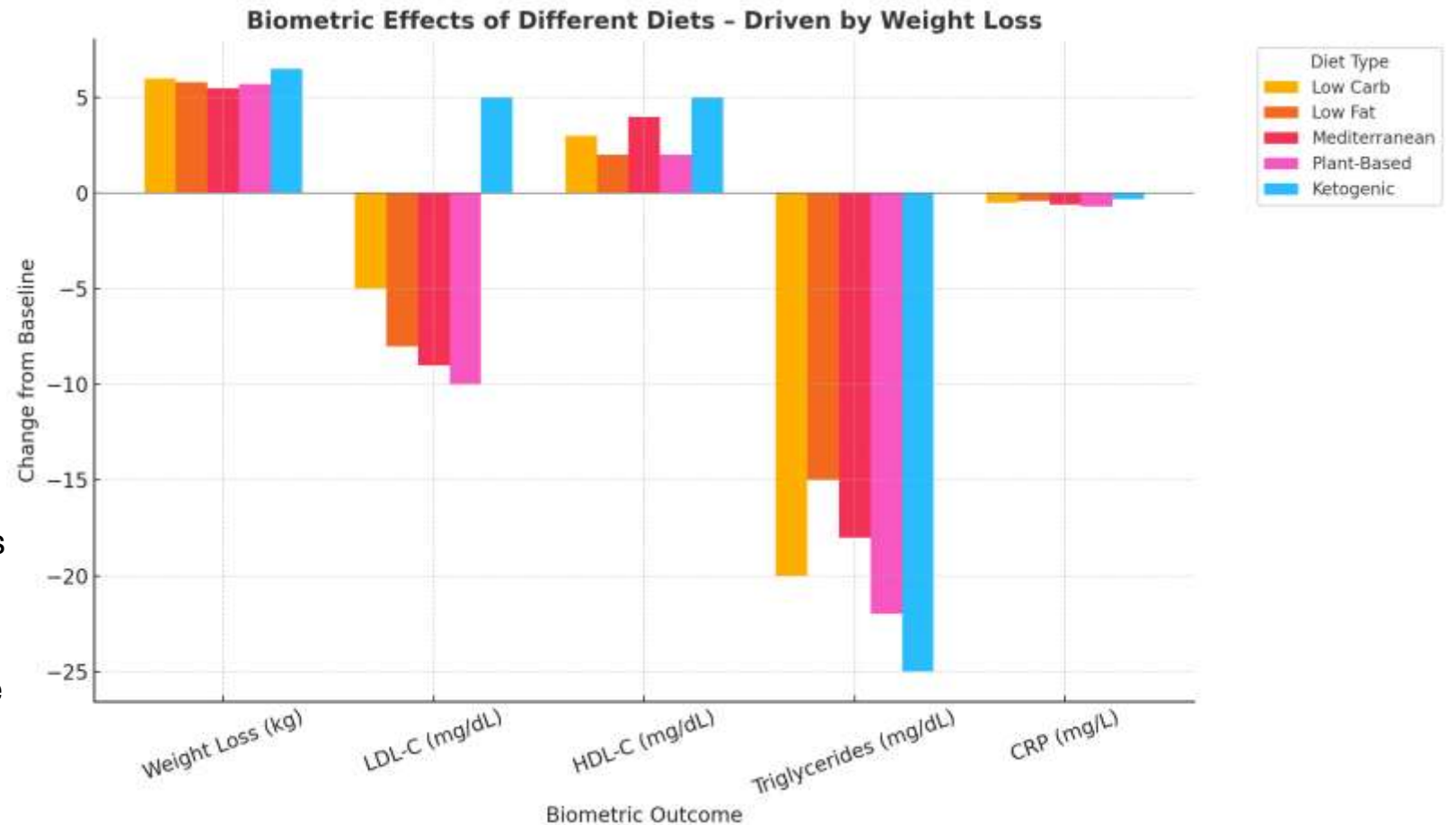
Short-term benefits, long-term risks

Anti-nutrients mostly **non-harmful or  
beneficial**

No long-term safety data; lacks evidence

# Lipid Summary

- ▼ **LDL-C** tends to decrease in most diets, except ketogenic (which often raises LDL-C)
- ▲ **HDL-C** and ▼ **triglycerides** improve across the board
- ▼ **CRP (inflammation marker)** declines with weight loss, regardless of diet type
- These findings align with NIH-funded research and Kevin Hall's studies: **it's the calorie deficit and resulting weight loss—not the diet's macronutrient composition—that drives improvements in most biomarkers.**



**CLINICAL INVESTIGATIONS**

# **Consumption of a defined, plant-based diet reduces lipoprotein(a), inflammation, and other atherogenic lipoproteins and particles within 4 weeks**

Rami S. Najjar<sup>1</sup>  | Carolyn E. Moore<sup>2</sup> | Baxter D. Montgomery<sup>3,4</sup>

<sup>1</sup>Department of Nutrition, Georgia State

## Conclusions

- A defined, plant-based diet has a favorable impact on Lp(a), inflammatory indicators, and other atherogenic lipoproteins and particles. Lp(a) concentration was previously thought to be only minimally altered by dietary interventions. In this protocol however, a defined plant-based diet was shown to substantially reduce this biomarker. Further investigation is required to elucidate the specific mechanisms that contribute to the reductions in Lp(a) concentrations, which may include alterations in gene expression.

# Long Term Follow-up

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- “Accompanying meta-analysis of 9 prospective studies, including 462 934 participants who were followed for 16.1 years, also showed that the use of an LCD was associated with a higher risk of all-cause, cardiovascular, and cancer mortality ” Mazidi, Mohsen, et al. 2019 Eur.Heart J
- 23 year follow up: LCD significantly higher risks for total and cause specific mortality, healthy LFD 18% reduction in risk
  - isocaloric replacement of 3% energy from saturated fat with other macronutrient subtypes was associated with significantly lower total and cause-specific mortality. Zhao, Yimin, et al. 2023 J. Int Med



ESC

European Society  
of Cardiology

European Heart Journal (2019) 40, 2870–2879  
doi:10.1093/eurheartj/ehz174

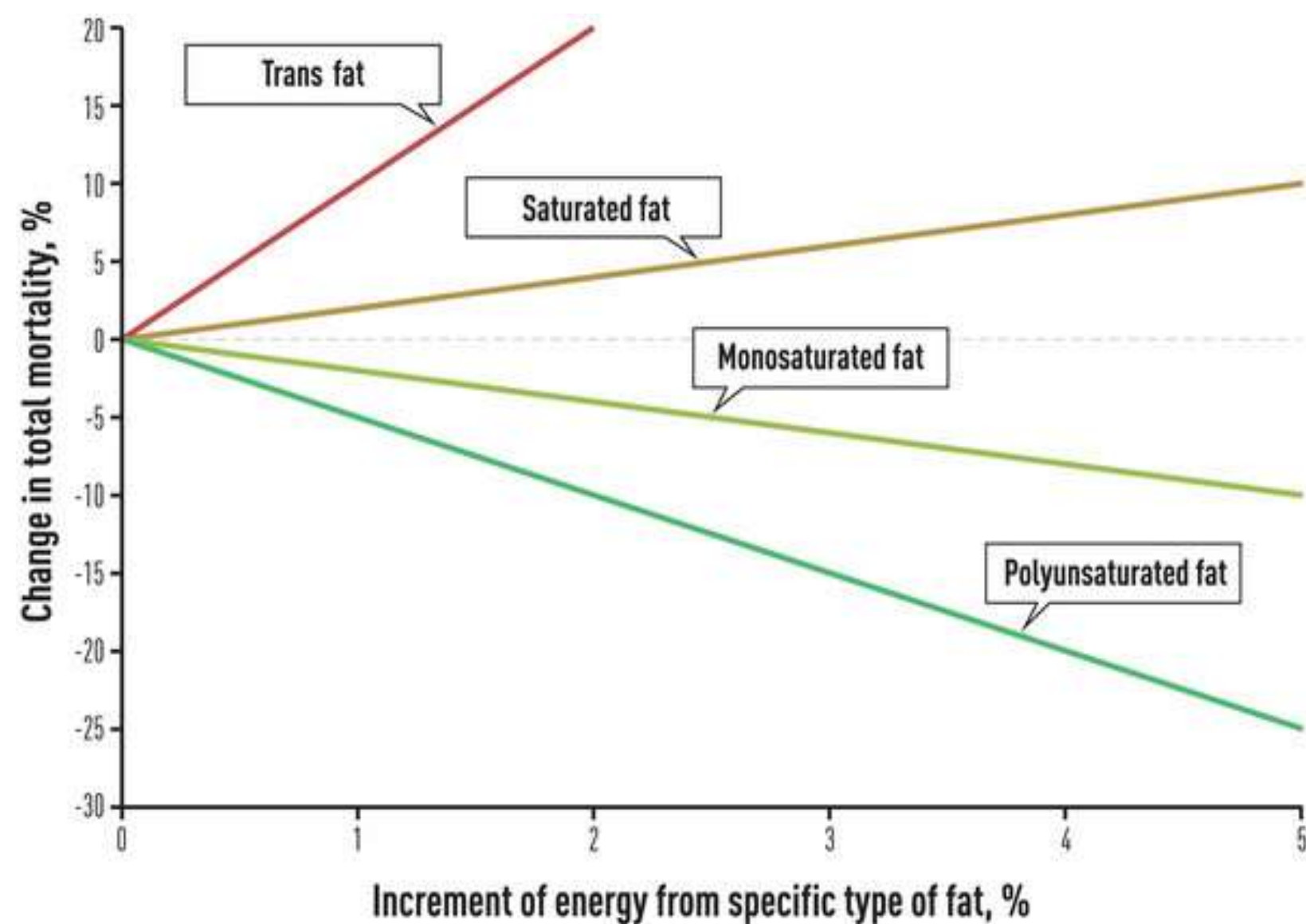
CLINICAL RESEARCH

Prevention and epidemiology

## Lower carbohydrate diets and all-cause and cause-specific mortality: a population-based cohort study and pooling of prospective studies

- “Overall, 24 825 participants from NHANES study were included (mean follow-up 6.4 years). After adjustment, participants with the lowest carbohydrates intake (quartile 4 of LCD) had the highest risk of overall (32%), cardiovascular disease (CVD) (50%), cerebrovascular (51%), and cancer (36%) mortality.”
- “Nevertheless, further studies are needed to extend these important findings, which if confirmed, may suggest a need to rethink recommendations for LCD in clinical practice.”

Diet strategies for promoting healthy aging and longevity: An epidemiological perspective





CLINICAL TRACK

**Dietary Fats in Relation to Total and Cause-Specific Mortality in a Prospective Cohort of 521 120 Individuals With 16 Years of Follow-Up**

In This Issue, see p 663

Meet the First Author, see p 664

Pan Zhuang, Yu Zhang, Wei He, Xiaoqian Chen, Jingnan Chen, Lilin He, Lei Mao, Fei Wu, and Jingjing Jiao

- Zhuang *et al.* - saturated fatty acid consumption was significantly associated with all-cause mortality (increasing the risk by up to 52%), and every increase in energy from SFAs by 1 SD was associated with a 7% increase in the risk of cardiovascular mortality
- “Isocalorically replacing 5% of the energy from SFAs with plant MUFAs was associated with 15%, 10%, 11%, and 30% lower total mortality, CVD, cancer, and respiratory disease mortality”

# Cancer Risk

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- Umbrella Review: 72 meta-analyses with 20 unique outcomes for red meat and 19 unique outcomes for processed meat.
- “Dose-response analyses revealed that 100 g/d increment of red meat and 50 g/d increment of processed meat consumption were associated with 11%-51% and 8%-72% higher risk of multiple cancer outcomes, respectively, and seemed to be not correlated with any benefit”





## Association between red and processed meat consumption and colorectal cancer risk: a comprehensive meta-analysis of prospective studies

Zoltan Ungvari · Mónika Fekete · Péter Varga · Andrea Lehoczki · Gyöngyi Munkácsy · János Tibor Fekete · Giampaolo Bianchini · Alberto Ocana · Annamaria Buda · Anna Ungvari  · Balázs Györffy

Received: 11 February 2025 / Accepted: 1 April 2025 / Published online: 10 April 2025  
© The Author(s) 2025

- “This meta-analysis provides robust evidence that high consumption of red and processed meats is significantly associated with an increased risk of colorectal, colon, and rectal cancers. These findings reinforce current dietary recommendations advocating for the limitation of red and processed meat intake as part of cancer prevention strategies.”

# Peer-Reviewed Articles on Long-Term Adherence Issues

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1. **Brinkworth, G. D., et al. (2009)** *Long-term effects of a very low-carbohydrate diet and a low-fat diet on mood and cognitive function*

- 1-year RCT: Initial adherence was good, but long-term adherence declined. Participants on the VLCD reported **reduced adherence, dietary dissatisfaction, and negative mood changes**.

2. **Gardner, C. D., et al. (2007)** *Comparison of the Atkins, Zone, Ornish, and LEARN diets for change in weight and related risk factors among overweight premenopausal women*

- 1-year study: Participants assigned to Atkins (a ketogenic diet) had **the lowest long-term adherence rates** of the four diets tested. Adherence correlated strongly with outcomes.

3. **Johnston, B. C., et al. (2014)** *Comparison of weight loss among named diet programs in overweight and obese adults: A meta-analysis*

- Meta-analysis of 48 trials: **Weight loss was similar across diets** at 6 and 12 months, but **adherence sharply declined over time**, especially in **low-carb and extreme diets**.

# Plant Based Diets and Ketogenic Diets As Diverging Paths to Address Cancer

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**Conclusions and Relevance** The results of this review suggest that the collective evidence supports plant-enriched diets vs KD for the reduction of cancer risk and the improvement of metabolic disorders in survivors. Shah, Urvi A et al. JAMA Onc 2022

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Plant-based dietary patterns are associated with lowered levels of oxidative stress and inflammation and may provide valid means for chronic disease prevention.

# LYON Heart Trial –RCT Mediterranean Diet

## Major Results and Findings

The trial was stopped prematurely after only 27 months due to the significant difference in outcomes between the two groups, confirming the powerful effect of the intervention. Protective effect remained 4 years in follow up study

| Outcome                    | Control Group<br>(Prudent Diet) | Intervention Group<br>(Mediterranean-Style) | Key Difference                                                            |
|----------------------------|---------------------------------|---------------------------------------------|---------------------------------------------------------------------------|
| Recurrence of Heart Attack | Significantly higher            | Substantially lower                         | ~70% Reduction                                                            |
| All-Cause Mortality        | Significantly higher            | Substantially lower                         | ~70% Reduction                                                            |
| Total Major Cardiac Events | 30 events                       | 8 events                                    | Highly significant reduction in cardiac death and non-fatal heart attack. |

# Ecological/Planetary

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- Ecological and ethical implications of promoting and adopting the LCD for many patients:
- Environmental effects of dairy/ meat production
- Deforestation and consequent effects on climate change.
- Socio-economic implications of the LCD include the increased financial expense of the LCD compared with other diets that may preclude the feasibility and affordability of the LCD for lower socio-economic groups within society (who are also most likely to benefit from lifestyle and dietary changes).



# Adherence and Sustainability



# General Adherence

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- Medication adherence rates 50-60% and 50% continue their prescribed at medication at 1 year
- 2025 comprehensive review synthesized 20 years of evidence and identified a three-stage nonadherence cascade
- **Non-initiation:** ~**20% of patients never fill** or start their prescribed medication
- **Poor implementation:** Of those who initiate, **30–50% do not take medications as prescribed**
- **Early discontinuation:** Over long follow-up periods, **80–100% of patients discontinue** treatment in chronic conditions
- **Take away:** The pattern of nonadherence — not just the percentage — is a key determinant of outcomes

# State of the Clinic Today



## National data:

**Only 21.5% of office visits with obese patients include weight reduction advice**

**24.5% include exercise counseling,**

**12.2% include all three** (weight, exercise, and diet). Rubens M et al. J Gen Intern Med 2026

## A survey of Canadian primary care physicians:

**76.3% cited insufficient time as the primary barrier**

**76.3% believed patients are not truthful about diet**

**46.8% believed patients would not follow their advice**

# Diet and Lifestyle Adherence

The Cochrane systematic review of interventions to enhance dietary adherence (38 RCTs) found that **non-adherence rates for chronic disease lifestyle changes range from 50–80%.**

The Dansinger RCT comparing Atkins, Zone, Weight Watchers, and Ornish diets found that level of adherence, not type of diet, was the key determinant of weight loss and CVD risk factor reduction

**Takeaway:** The evidence is unequivocal — **prescribing a diet without a support system is a strategy with a >50% failure rate.** The first 6 months represent a critical window where early success predicts long-term outcomes.

# Beyond Prescribing

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- Can we prescribe our way out of the current problem?
- Produce Prescriptions
- Lifestyle Prescriptions
  
- Live by example
- Create Microcultures

# What is a micro-culture?

“An identifiable group of people who share a set of values, beliefs, and behaviors and possess a common history and a verbal and nonverbal symbol system that is similar to but systematically varies from the larger, often dominant cultural milieu”

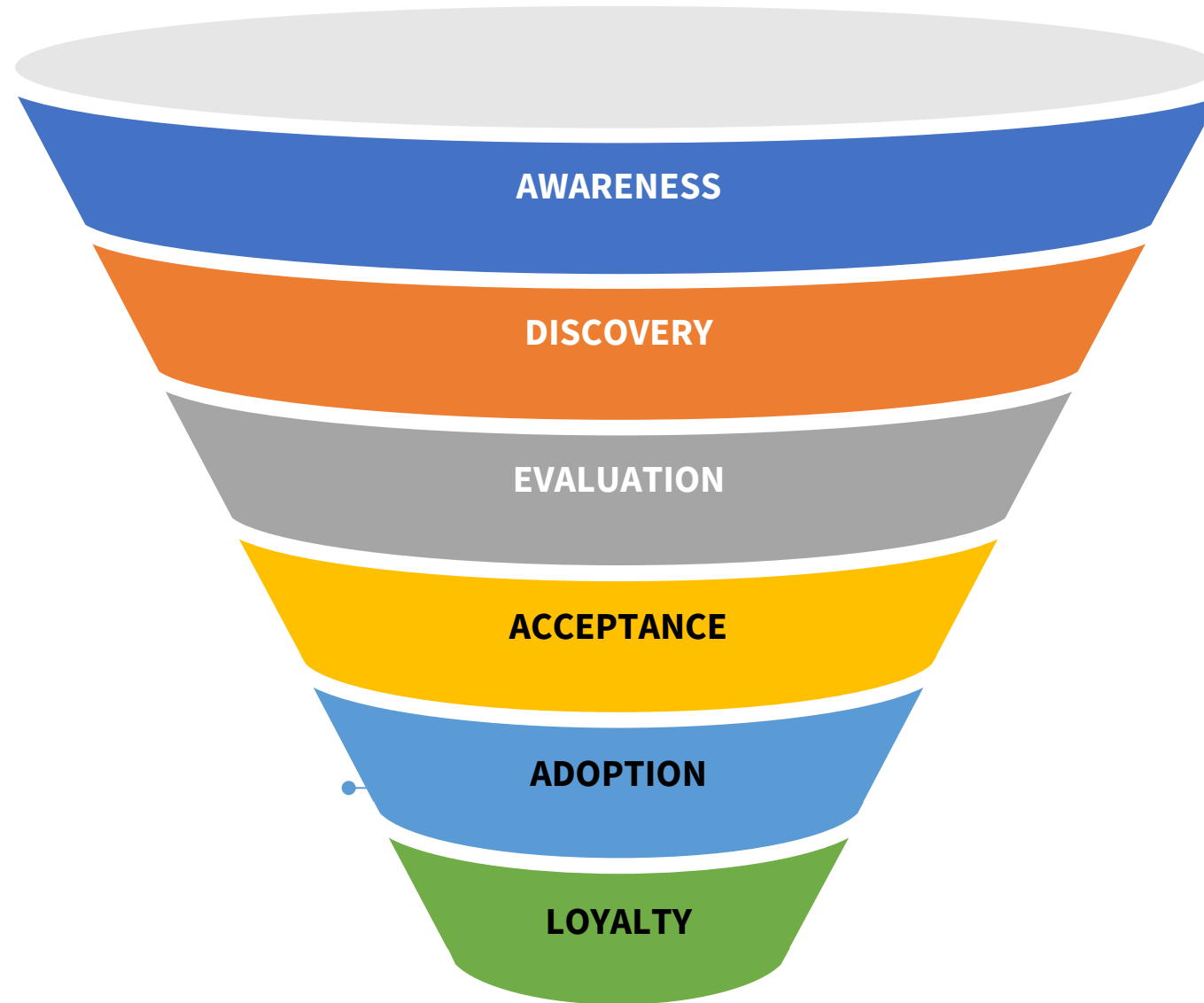
# *Groundswell*

A black and white photograph of a coastal landscape. In the foreground, there are waves breaking on a sandy beach. In the middle ground, there are rolling hills or dunes covered in vegetation. In the background, a range of mountains is visible under a hazy sky. The overall tone is serene and natural.

Micro cultures can produce a  
groundswell movement

Result: Pockets of people with a  
tribal identity, highly energized  
and engaged create sustained  
impact.

# MICROCULTURE FUNNEL



# Adherence Interventions (medications)

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- A 2025 ADA state-of-the-science overview of healthcare provider interventions found that HCP-delivered adherence interventions key features:
- Move beyond education (education-only interventions consistently fail)
- Multiple behavior change strategies simultaneously
- Tailor interventions to individual determinants of nonadherence
- Incorporating pharmacists and nurses as intervention deliverers
- Providing ongoing support rather than one-time counseling
- Addressing health system-level barriers and inequities

# Physician's Role

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- **The ADA 2026 Standards of Care and AHA Scientific Statements converge on a multicomponent model:**
- **Assess** → Use a validated rapid diet screener (AHA recommends integration into EMR) and lifestyle tools with motivational interviewing
- **Advise** → Brief, personalized dietary counseling (even 15 minutes by a GP improves diet quality — Italian RCT, N=3,179)
- **Connect** → Refer to group-based lifestyle programs, shared medical appointments, or community WFPB programs with peer support

# Physician's Role

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- **Coach** → Employ motivational interviewing and Brief Action Planning (BAP): collaborative SMART goals, confidence scaling, barrier problem-solving, and follow-up accountability
- **Sustain** → Prioritize the first 6 months (the DIRECT critical window), schedule monthly touchpoints (potlucks), and leverage digital tools and peer mentors for long-term maintenance. Utilize teams to assist patients
- **Key Takeaway: The physician's most powerful role is not as a diet prescriber but a catalyst who connects patients to sustained support systems**
  - coaching, group visits, and community programs — using brief motivational techniques to ignite and maintain the behavior change process

# Cost Concerns

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A crossover trial cost analysis found that the **WFPB diet cost \$9.78/day** as consumed — significantly less than both the DASH diet (\$12.74/day) and the typical baseline diet of T2DM patients (\$15.72/day). Campbell EK Am J C Nutrition 2024



A Belgian/UK modeling study estimated that plant-based dietary patterns (soy-containing and Mediterranean) would generate **€1.6–2.1 million in societal savings per 1,000 individuals** over 20 years, along with 100–202 QALYs gained. Schepers J, Annemans L. Nutrition 2018



**Protein**

Where do you get  
your protein?





# Why is Protein an intensely debated topic?

## Cultural and Historical Beliefs

## Aggressive marketing by food and supplement industry

- Market protein as “silver bullet”
- Perception diets are deficient and more is better
- Industry fortifies foods, normalizing the belief more is needed and better

## Dietary Fads and Trends

- Popularity of LCD and Ketogenic
- Rise of WFPB, Vegan/Vegetarian

## Confusion and Misinformation

- Industry sponsored research
- Social Media-lack context and nuance
- Marketing

# Why is Protein an intensely debated topic?

## Optimal vs. Deficiency

- Performance and muscle growth
- Weight management and satiety
- Healthy Aging-avoiding sarcopenia
- Recovery from illness/injury
- Cultural and Industry bias

## Source- Animal vs. Plant

- Complete vs Incomplete
- Performance
- Environmental impact and animal welfare

How is  
your  
protein  
packaged?

**CHART 11.2. NUTRIENT COMPOSITION OF PLANT AND ANIMAL-BASED FOODS (PER 500 CALORIES OF ENERGY)**

| <b>Nutrient</b>     | <b>Plant-Based Foods*</b> | <b>Animal-Based Foods**</b> |
|---------------------|---------------------------|-----------------------------|
| Cholesterol (mg)    | —                         | 137                         |
| Fat (g)             | 4                         | 36                          |
| Protein (g)         | 33                        | 34                          |
| Beta-carotene (mcg) | 29,919                    | 17                          |
| Dietary Fiber (g)   | 31                        | —                           |
| Vitamin C (mg)      | 293                       | 4                           |
| Folate (mcg)        | 1168                      | 19                          |
| Vitamin E (mg_ATE)  | 11                        | 0.5                         |
| Iron (mg)           | 20                        | 2                           |
| Magnesium (mg)      | 548                       | 51                          |
| Calcium (mg)        | 545                       | 252                         |

\* Equal parts of tomatoes, spinach, lima beans, peas, potatoes

\*\* Equal parts of beef, pork, chicken, whole milk

# When Dietary Protein Is Adequate, Utilization Scores Matter Less

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**2023 meta-analysis (Van Vliet et al., Annual Review of Nutrition):**

**“When energy needs and protein quantity are met, the protein quality becomes far less impactful on outcomes such as muscle mass, metabolic function, and longevity.”**

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**If total protein intake meets or exceeds RDA and includes a variety of sources, the precise utilization rate is not clinically significant in healthy individuals.**

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**DIAAS or “high UR” marketing is more relevant in populations with low protein intake, malnutrition, or restrictive diets.**



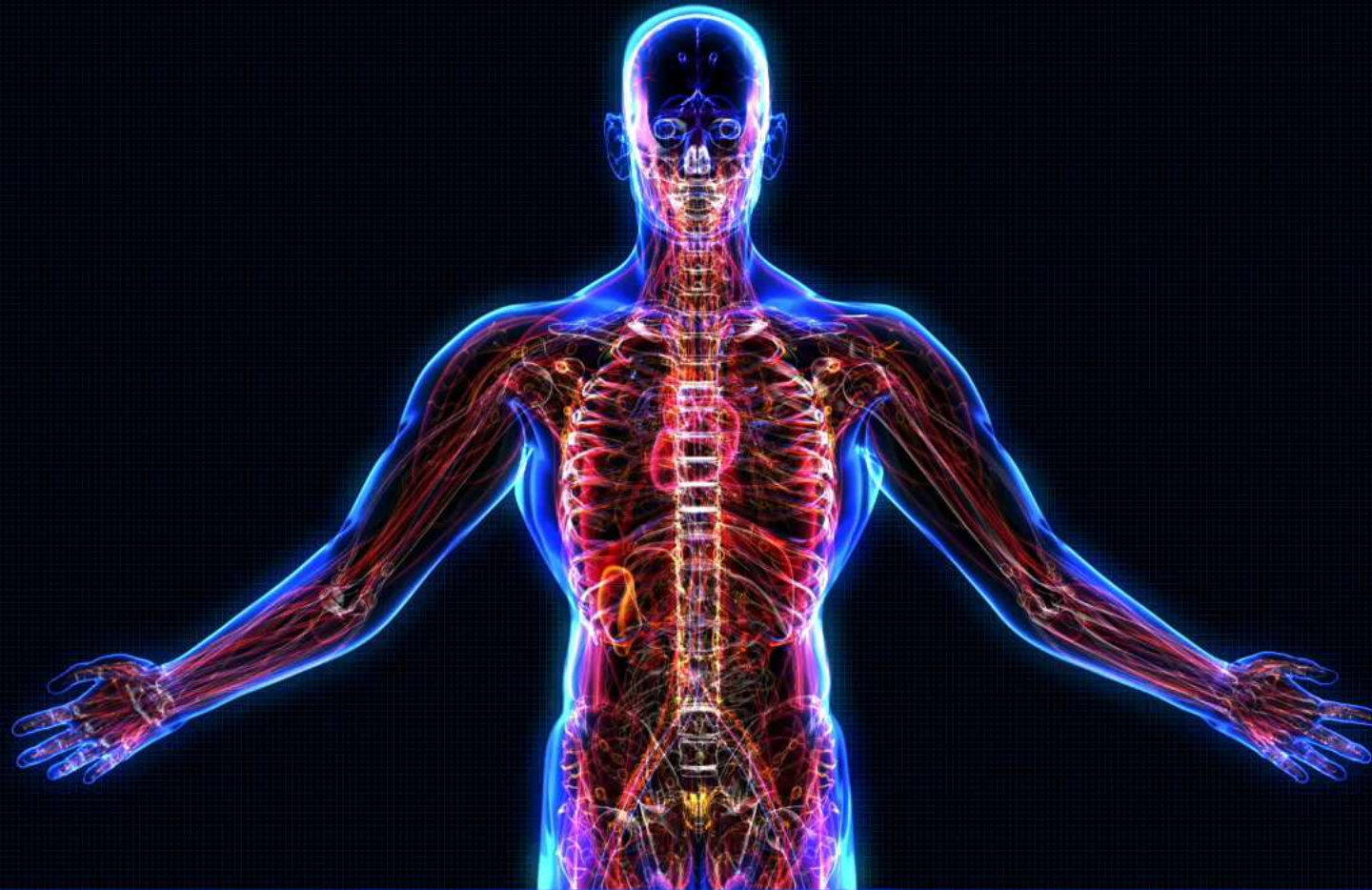
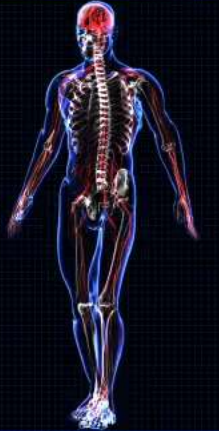
# Is High Utilization Rate (UR) Mostly Marketing?

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Yes!

- **Animal protein advocates** often tout high BV/DIAAS (e.g., whey, eggs = 100+), implying plant proteins are inferior.
- **All Plants are Complete Proteins**
- But real-world outcomes (muscle retention, disease prevention) **do not correlate directly** with utilization metrics when overall protein is adequate.
- **Packaging Matters-Whole plant foods--fiber, phytonutrients, and lower inflammatory load**

# First Principles and Biologic Systems



**What does  
the  
body *actually*  
*need* at the  
cellular and  
systemic  
level?**

- **First principles approach in science-** breaks complex problems down to their fundamental truths and builds from the ground up—**the best food for the human body is whole, minimally processed plant-based foods.** This conclusion arises when we analyze human biology, cellular biochemistry, evolutionary adaptations, and disease outcomes from foundational principles.

# Fundamental Cellular Needs

---

- **Raw materials** → For building and repairing tissues: amino acids, essential fats, vitamins, minerals—Total of 90 nutrients
- **Energy (ATP)** → Primarily from **glucose** (carbohydrates), alternative pathways
- **Signal molecules** → To regulate inflammation, immunity, growth, coordination, modulation, and metabolism
- **Minimal toxic load** → To reduce oxidative damage, inflammation, and DNA mutation
- Whole plant foods provide all of these—without the biological cost of excess saturated fat, cholesterol, hormones, endotoxins, or persistent pollutants.

# System Design

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Human dentition, saliva (amylase), GI tract length, and microbiota composition suggest adaptation for **fiber-rich, carbohydrate-dense diets**.



Hunter-gatherer diets were diverse but **predominantly plant-based** in most regions (>70–90% plants by volume).



Our microbiome is linked with a soil microbiome and a plant-rich diet

High meat diets drives dysbiosis, TMAO and LPS production, reduced SCFA and increased risk

# Biochemical Pathways

- **Glycolysis and Oxidative Phosphorylation:**

Glucose (from complex carbs) is the most efficient and preferred fuel for ATP production.

- **Fiber fermentation** in the colon → short-chain fatty acids (butyrate, acetate, propionate) → signaling anti-inflammatory effects and gut barrier support
- **Antioxidant systems:** Plant-derived phytonutrients upregulate protective pathways (e.g., NRF2 activation) and inhibit potentially injurious pathways (e.g., NF- $\kappa$ B inflammation)
- Plant-based foods enhance mitochondrial efficiency, reduce inflammation, and promote cellular repair.



# Toxin Burden and Inflammatory Load:

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- Animal products and processed foods carry:
  - **Persistent organic pollutants (POPs)**
  - **Endotoxins (LPS)** that trigger immune activation
  - **Advanced glycation end-products (AGEs)** from cooking
  - **Heme iron**
  - **Neu5Gc**
  - **Nitrate compounds**
- Whole plant foods contain none of these and are rich in:
  - Detoxifying agents (e.g., glutathione precursors)
  - Antioxidants (e.g., flavonoids, carotenoids)
  - Anti-cancer and anti-inflammatory compounds

# How a Whole Food Plant-Based Diet Optimizes Cellular Systems and Longevity Pathways

## Methylation & Epigenetic Balance

- Rich in **folate, choline, betaine, and B vitamins**, plant-based diets support healthy DNA methylation and gene expression.
- Cruciferous vegetables (e.g., broccoli, kale) and legumes enhance **detoxification and epigenetic regulation**.  
(*Kim et al., 2023; Nutrients*)

## Mitochondrial Function & Energy Production

- Plant foods are high in **polyphenols, nitrate, and magnesium**, which improve **mitochondrial biogenesis** and reduce oxidative stress.
- Caloric moderation and nutrient density enhance **mitochondrial efficiency and resilience**.  
(*Chuang et al., 2019; Cell Metabolism*)



## Microbiome & Gut-Immune Axis

- **High fiber, prebiotics, and polyphenols** from plants increase microbial diversity, produce short-chain fatty acids (SCFAs), and improve gut barrier function.
- SCFAs like **butyrate** promote Treg cell formation and **systemic immune regulation**.  
(*Wastyk et al., 2021; Elinav et al., 2024*)

# Optimizes Cellular Systems and Longevity Pathways

## Endothelial & Cardiovascular Health

- **Leafy greens, beets, and citrus** promote **nitric oxide synthesis**, improving vasodilation and reversing endothelial dysfunction.
- Anti-inflammatory, low-glycemic, and low-saturated-fat dietary pattern reduces arterial plaque and improves lipid profiles.  
*(Ornish et al., 1998; Esselstyn et al., 2014)*



## Metabolic Health & Insulin Sensitivity

- Plant-based diets lower insulin resistance through high fiber, low glycemic load, and reversal of ectopic fat.
- Improves metabolic flexibility and reverses type 2 diabetes in clinical trials.  
*(Barnard et al., 2009; Kahleova et al., 2023)*

# Longevity Signaling Pathways

- **Sirtuins:** Activated by plant polyphenols (e.g., resveratrol, quercetin) found in berries, onions, and grapes.
- **Autophagy & AMPK:** Stimulated by fiber-rich, calorie-light plant foods and intermittent fasting patterns.
- **mTOR Modulation:** Downregulated by plant proteins and phytonutrients, promoting healthy cell turnover and reduced cancer risk.  
*(Longo & Panda, 2022; Aging Cell)*
- **Telomerase and Telomere Lengthening** Improved activity and length with WFPBD D'Angelo, Stefania 2024 Antioxidants

A whole food, plant-based diet is not just anti-inflammatory—it is **pro-regenerative**. It nourishes the microbiome, restores mitochondrial vitality, supports immune tolerance, and activates the cellular signaling pathways that promote **healing, resilience, and longevity**.

# First Principles → Whole Plant Foods Are Optimal

If we design our food intake based purely on what the body *requires to function and thrive*—not culture, cravings, or industry—the conclusion is clear:

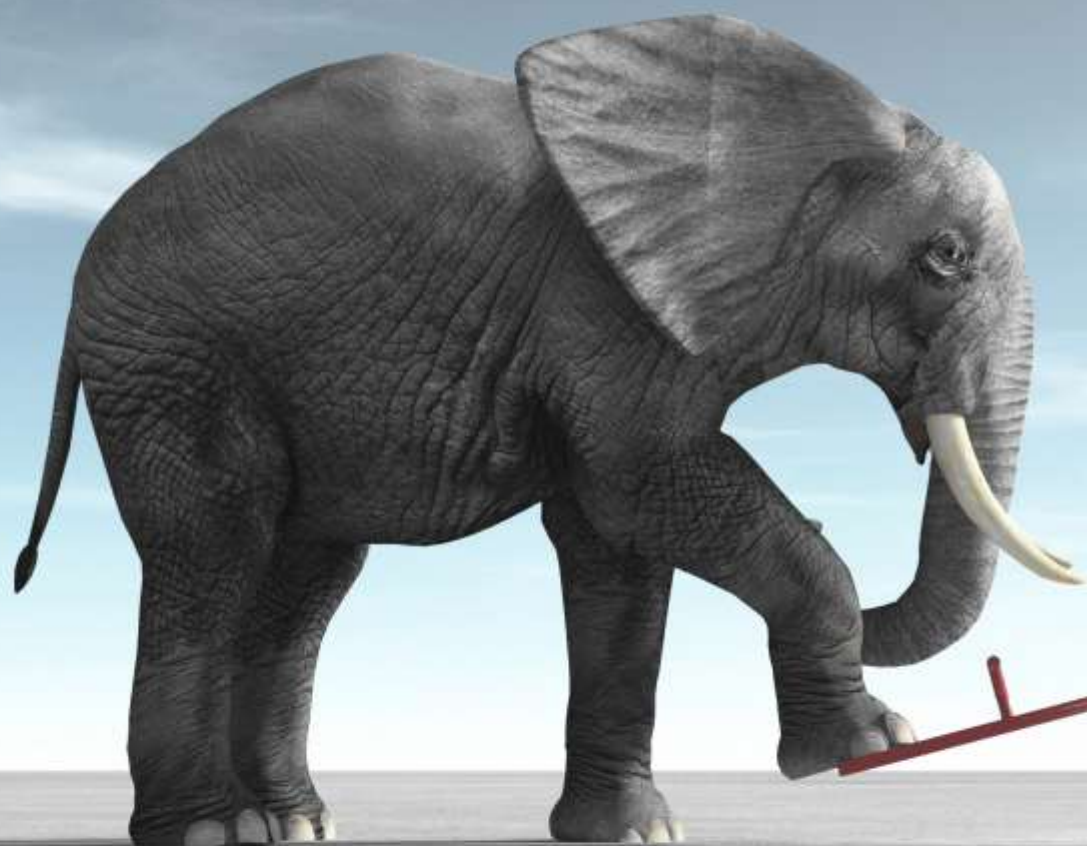
**Whole plant foods are the scientifically optimal fuel.**

| First Principle                                      | Implication                      | Best Matched By             |
|------------------------------------------------------|----------------------------------|-----------------------------|
| Cells need efficient fuel (ATP)                      | Glucose is most efficient        | Complex carbs from plants   |
| Cells need raw materials & low damage                | Low-toxin, nutrient-rich intake  | Fruits, vegetables, legumes |
| Biology is built for fiber & diversity               | Fermentable fiber, polyphenols   | Whole plants                |
| Health is sustained by low inflammation, low insulin | Fewer AGEs, endotoxins, oxidants | Plants (not meat/dairy)     |
| Optimal diet prevents/reverses disease               | Reverses CVD, diabetes, obesity  | Whole food plant-based diet |



The greatest challenge in nutritional science is not discovering the science of an ideal diet, it is helping people sustainably live it within the realities of biology, psychology, culture, community and the modern food environment.





**Demand**



**Resources**

# Stress and Weight Gain

| Hormone/Pathway     | Effect on Hunger/Cravings                                                     | Weight Gain Link                        |
|---------------------|-------------------------------------------------------------------------------|-----------------------------------------|
| Cortisol Surge      | Boosts appetite; craves "quick energy" (sugar/fat/salt hyper-palatable foods) | Lowers metabolism; stores abdominal fat |
| Ghrelin Rise        | "Hunger hormone" amplifies signals, especially emotional eating               | Disrupts satiety; promotes overeating   |
| Insulin/Blood Sugar | Drops sugar → urgent cravings; fat storage mode                               | Cycle of spikes/crashes → gain          |
| Brain Reward        | Activates hedonic pathways for calorie-dense junk                             | Reduced serotonin → comfort eating      |

**Key Stat:** Chronic stress links to 20-30% more calories from sweets/fats.

# Adverse Childhood Experiences

- Potentially traumatic events occur before the age of 18 that can impact a person's sense of safety, security, and connection with others
  - 68% of people have at least 1
  - 40% at least 2
  - 15-20% at least 4
- Losing a parent-death, divorce or separation
- Physical abuse
- Sexual abuse
- Verbal abuse
- Witnessing abuse
- Substance abuse
- Physical neglect
- Emotional neglect
- Mental illness
- Imprisonment

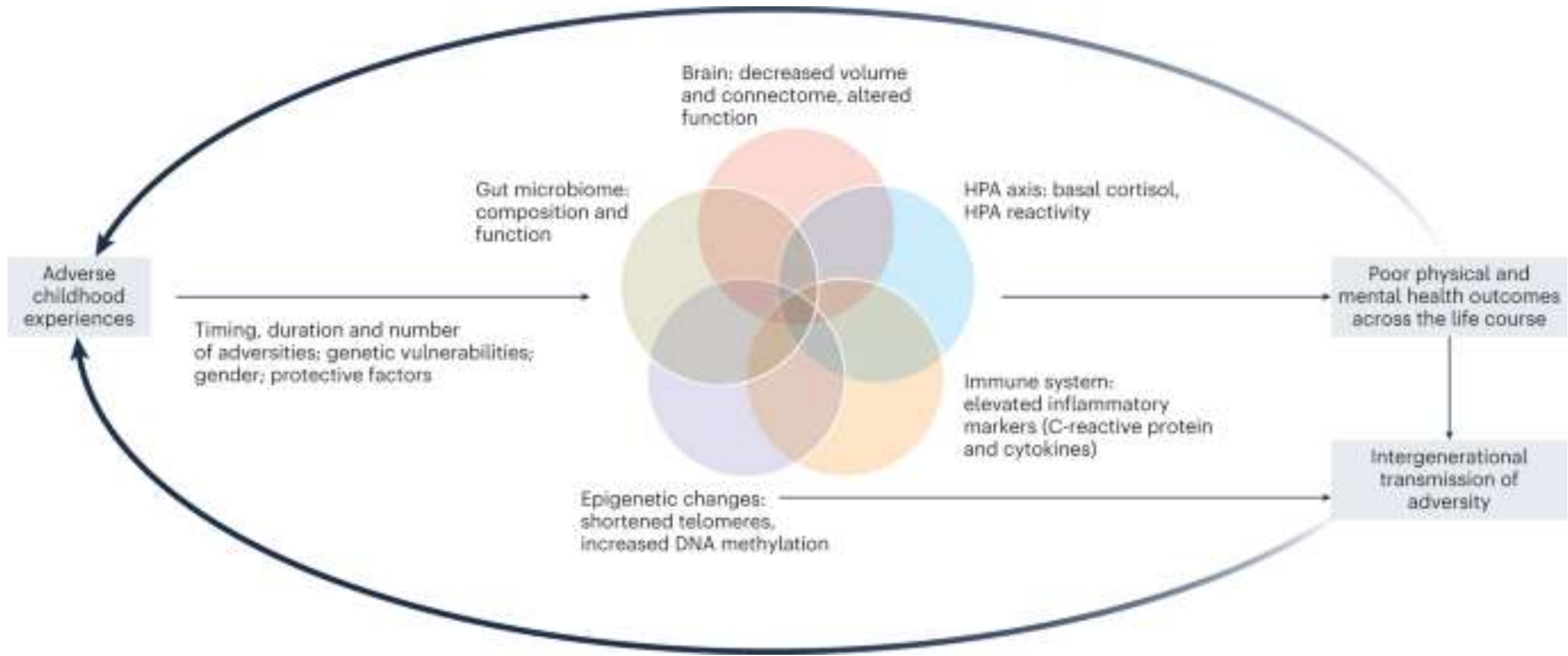
# Why does it matter?

People with 4 or more ACEs compared with those with none have:

- 460% increased risk of depression
- 430% increased risk of alcohol abuse
- 100% greater risk of hospitalization for autoimmune disorders
- 100% greater risk of cancer
- 80% greater risk of obesity
- Why is this happening



# Effects of Adverse Childhood Experiences



# Feelings



# Needs

# Core Needs

1. Certainty/Clarity/Order
2. Significance/Meaning
3. Variety/Play
4. Connection/Love/Acceptance
5. Contribution/Purpose
6. Growth
7. Physical well-being
8. Peace/Hope
9. Autonomy/Dignity/Honor



# Community with a Mission



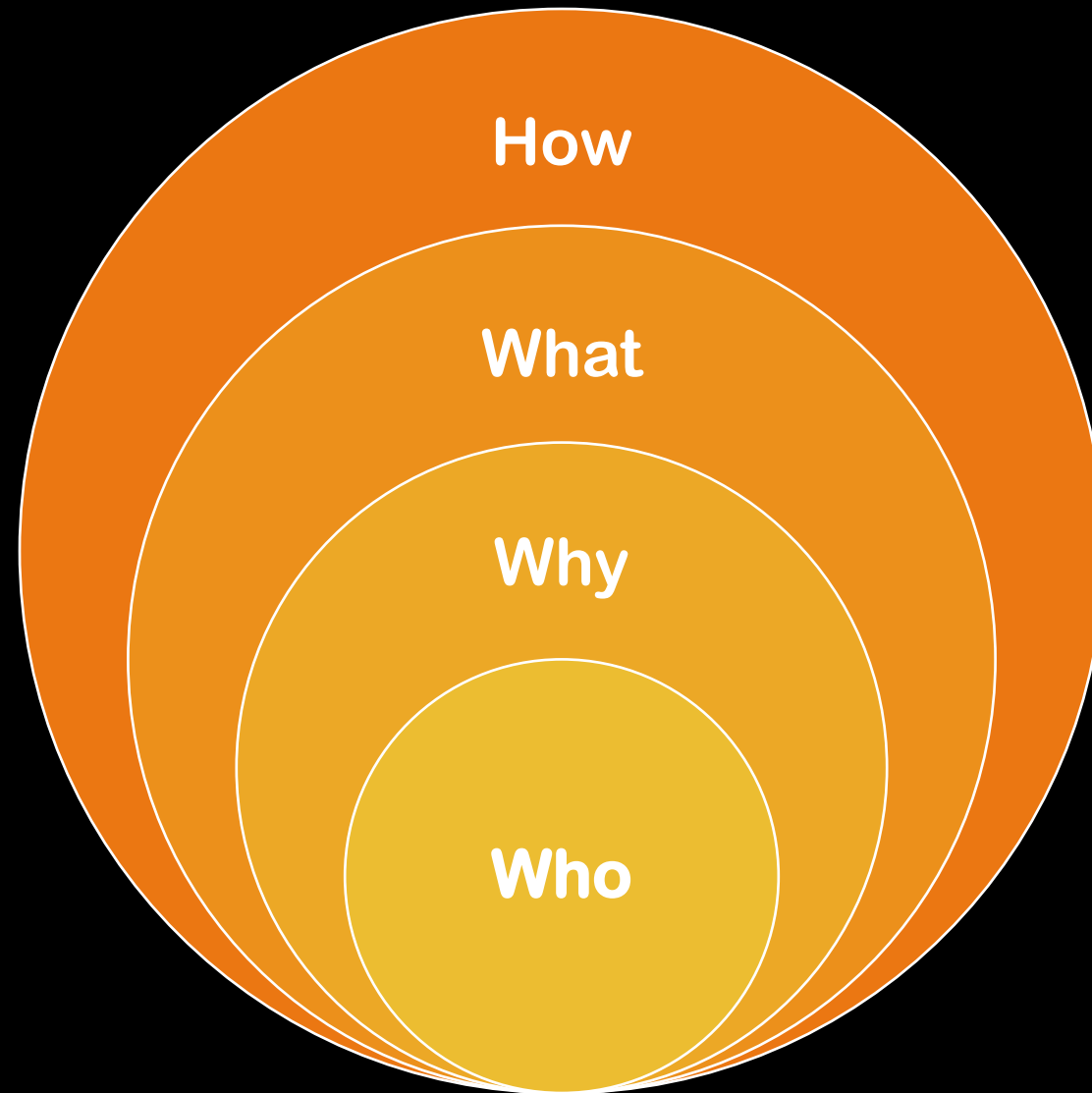
# IDENTITY SHIFT — THE MISSING KEY TO TRANSFORMATIVE CHANGE





**Being Informs Doing**

*“We don’t just eat differently—we become someone who eats differently.” Scott Stoll, MD*



# The Science: Why Willpower Fails But Identity Succeeds

- The Maintain IT Model
- Willpower relies on executive function (EF) — a limited, fatigue-prone resource
- Identity-congruent behaviors bypass EF entirely, becoming automatic and self-sustaining
  - Being Informs Doing
  - People behave consistently with their identity
- Conclusion: Core identity transformation is the primary pathway to permanent behavior change

# Social Identity Studies In Behavior Change Science



- **Meta-Analysis — 115 Studies | 112,112 Participants**(de Hoog Pat-El, Soc Sci Med, 2024)
- **Social identity significantly predicts health behavior across all domains**
- Effect is strongest when identity is health-specific (e.g., "I am a healthy eater" vs. general identity)
- Works for both diet AND exercise — across cultures and populations

# Identity Alignment and Change



- **Plant-Based Adherence Study — 96 Adults** (Ruehlman Karoly, J Health Psychol, 2022)
- **Those with values-based identity alignment were 17× more likely to sustain a plant-based diet**
- Health-only motivation → **94% more likely to fail**
- Values-based identity accounted for 49% of the variance between adherent and non-adherent groups

# The Habit-Identity Bridge

- When behaviors explicitly linked to core personal values, habit-identity associations become significantly stronger
- Stronger habit-identity links → higher self-esteem, greater cognitive self-integration, orientation toward ideal self
- This creates a self-reinforcing loop: Identity drives behavior → behavior reinforces identity

## Identity over Willpower

- Diets fail at 80–95% because they rely on willpower.
- > Identity transformation succeeds because **you don't have to fight yourself when the behavior is yourself.**

| OLD PARADIGM                 | NEW PARADIGM                       |
|------------------------------|------------------------------------|
| "Follow this diet plan"      | "Who do you want to become?"       |
| Calorie counting restriction | Values exploration alignment       |
| Willpower & discipline       | Identity integration- automaticity |
| External accountability      | Internal congruence/harmony        |
| 80–95% long-term failure     | Self-sustaining transformation     |

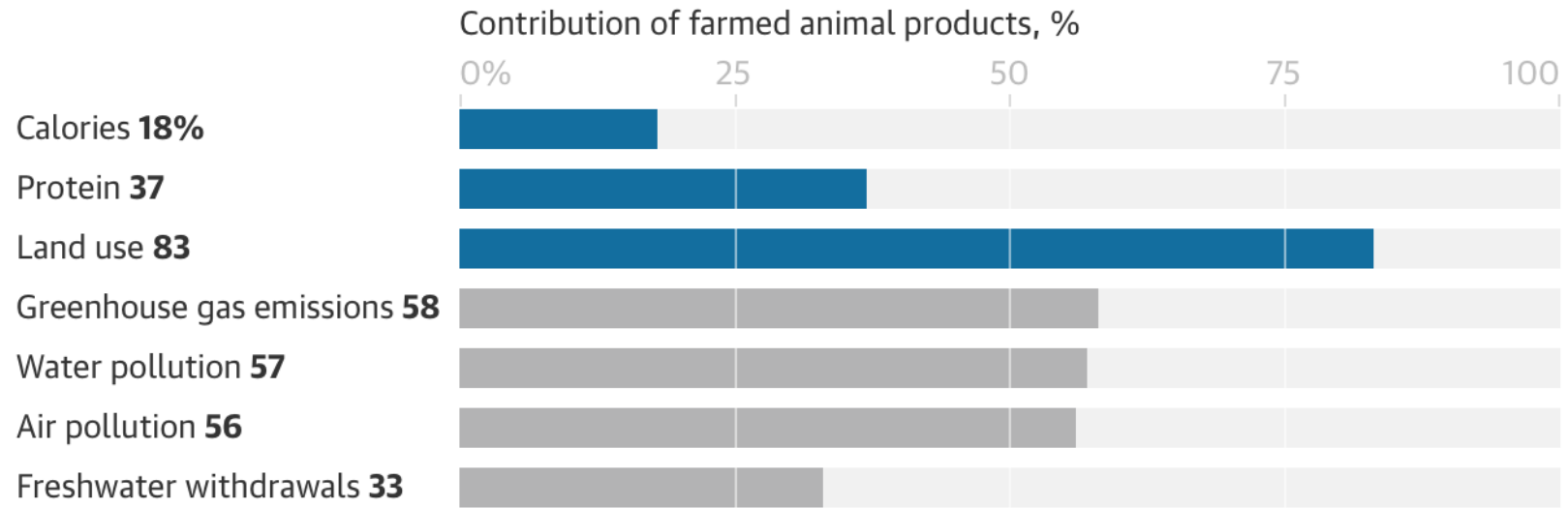
# Global Impact of Diet



# Antibiotic Resistance

- It is assumed that the global consumption of antimicrobials in livestock and humans will increase by 67% between 2010 (63,151 tons  $\pm$  1560) and 2030 (105,596  $\pm$  3605), of which approximately two-thirds will be associated with the rising number of food-producing animals (Bloomer E et al. J Pub Health Pol 2018)

## More than 80% of farmland is used for livestock but it produces just 18% of food calories and 37% of protein



Guardian Graphic | Source: Poore and Nemecek, Science

June 2018 Largest study to date-Included 38,700 farms 119 countries

40 food products that represent 90% of what we eat

“Agriculture is a sector that spans all the multitude of environmental problems...Really it is animal products that are responsible for so much of this. Avoiding consumption of animal products delivers far better environmental benefits than trying to purchase sustainable meat and dairy.”

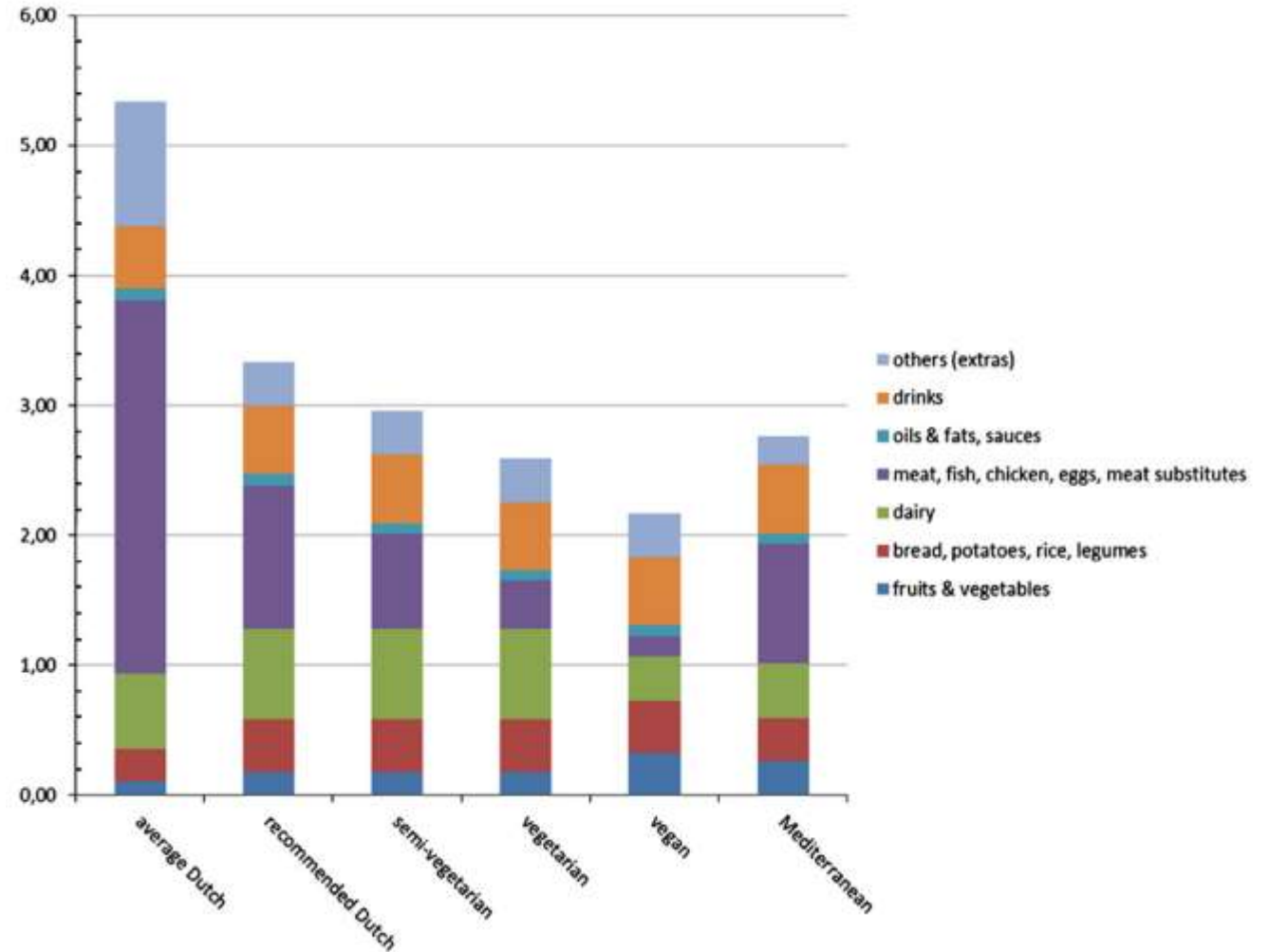
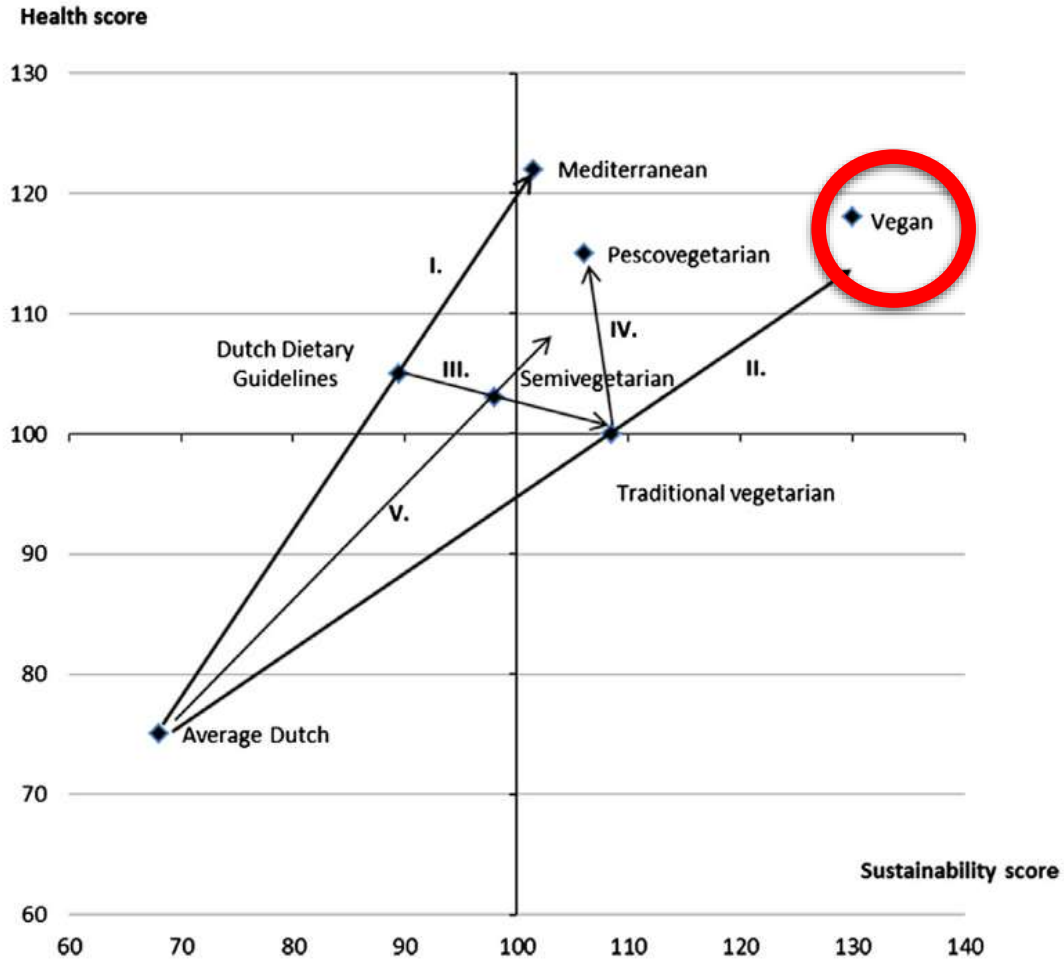
Dr. Joesph Poore- Lead researcher Oxford

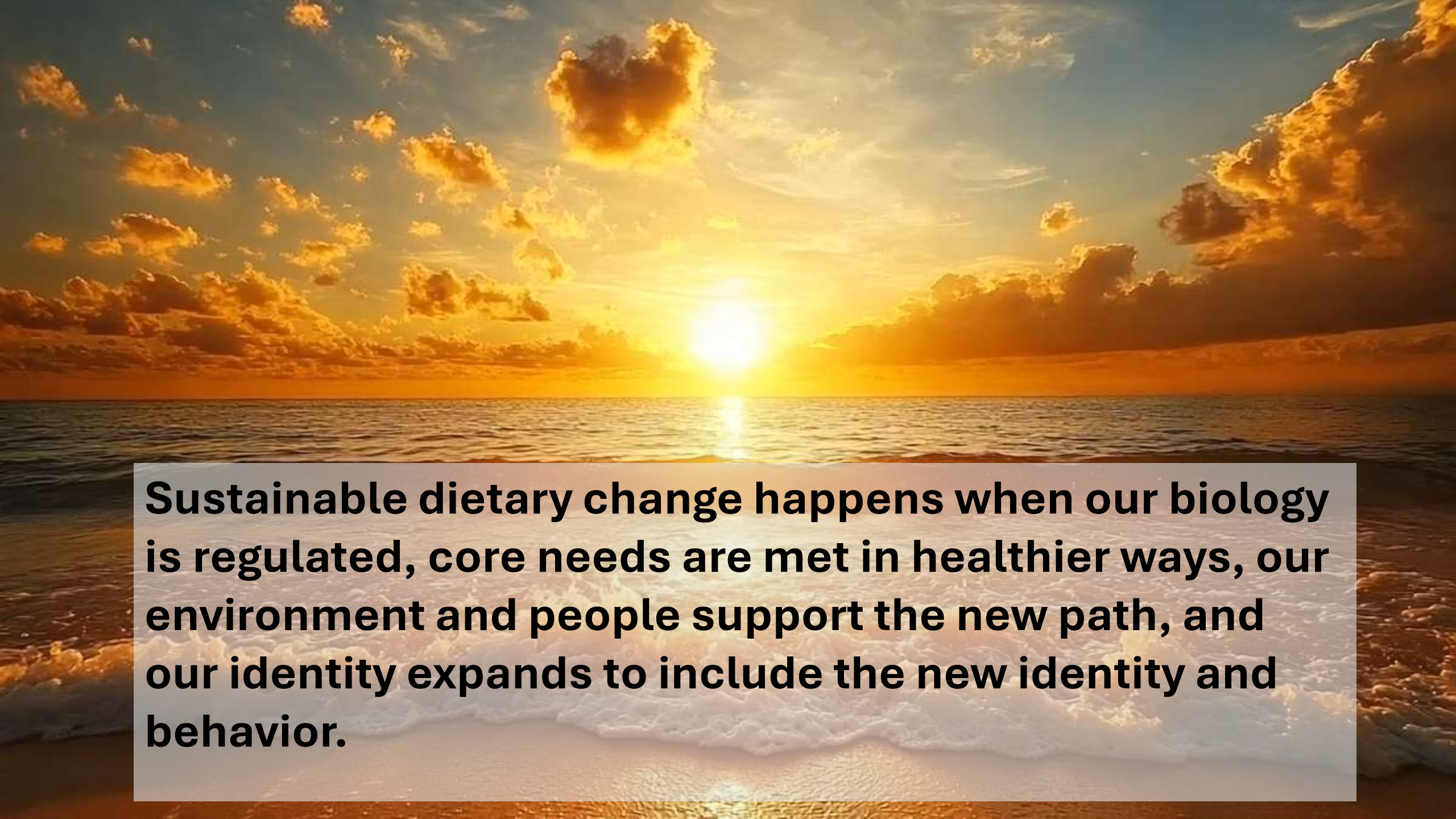
# Land Use

- If everyone ate a carnivore diet...
  - Total Agricultural land today is 11.8 billion acres
- Require 54.5 billion acres

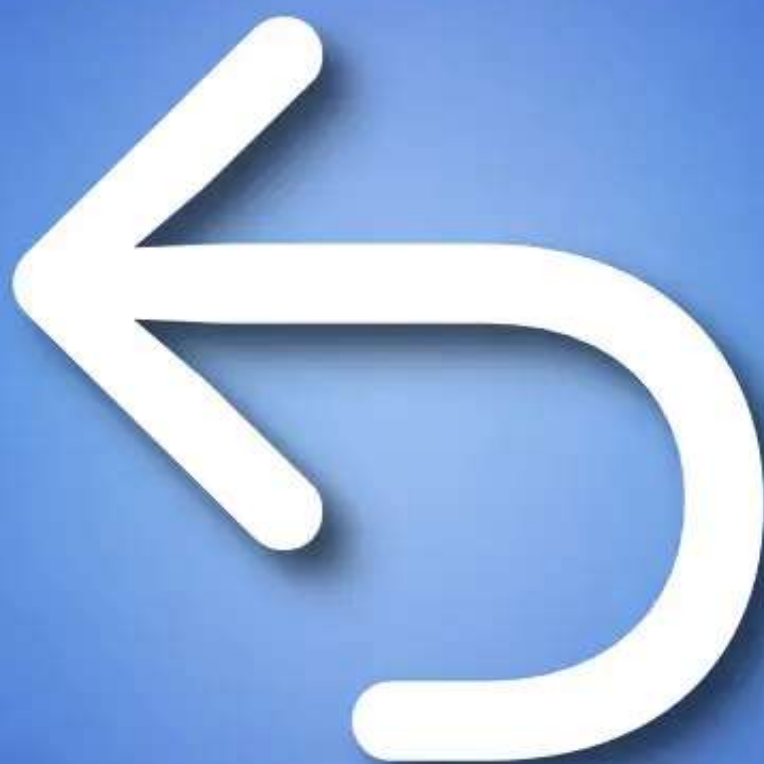


# Diet and Resource Sustainability



A vibrant sunset scene over a calm ocean. The sun is a bright, glowing orb on the horizon, casting a shimmering reflection on the water. The sky is filled with large, billowing clouds that are illuminated from below, giving them a golden-orange hue. The overall atmosphere is peaceful and inspiring.

**Sustainable dietary change happens when our biology is regulated, core needs are met in healthier ways, our environment and people support the new path, and our identity expands to include the new identity and behavior.**





# The Plantrician Project

*Planting the seeds of change™*

[illegible]

- A 2025 multinational clinician survey across seven specialties identified the most common barriers reported by physicians: [6]
- **Polypharmacy and regimen complexity** — the single most consistent barrier across all specialties
- **Patient skepticism** and perceived lack of medication benefit, especially in asymptomatic conditions
- **Socioeconomic constraints** including medication cost and pharmacy access
- **Time constraints** — clinicians universally cited insufficient time to address adherence
- **Fragmented healthcare records** preventing coordinated adherence tracking
-

- People are more adherent when they:
- Believe the illness is serious
- Believe the treatment works
- Believe they are personally vulnerable
- Experience symptoms that reinforce need for treatment
- Aren't experiencing depression or hopelessness

# What Is Protein Utilization?

**Protein utilization-** efficiency with which the body absorbs, digests, and incorporates dietary amino acids

## **Key Measures:**

- **Biological Value (BV)** – nitrogen retained vs. absorbed
- **Net Protein Utilization (NPU)** – % of ingested protein retained
- **Protein Digestibility-Corrected Amino Acid Score (PDCAAS)** – measures digestibility and essential amino acid content (used by FDA/WHO)
- **Digestible Indispensable Amino Acid Score (DIAAS)** – newer method; measures ileal digestibility and amino acid profile

