

ULTRA-PROCESSED FOODS:

REIMAGINING THE FUTURE OF THE GROCERY STORE



David Julian McClements

*Department of Food Science
University of Massachusetts*



THE PANELISTS



LAUREN ABDA
Branch Foods



NOEL ANDERSON
Mosaic Food



BRITT BURTON-FREEMAN
Illinois Institute of
Technology



CIARAN FORDE
Wageningen
University



JOSÉ M. ORDOÑÁS
Tufts University

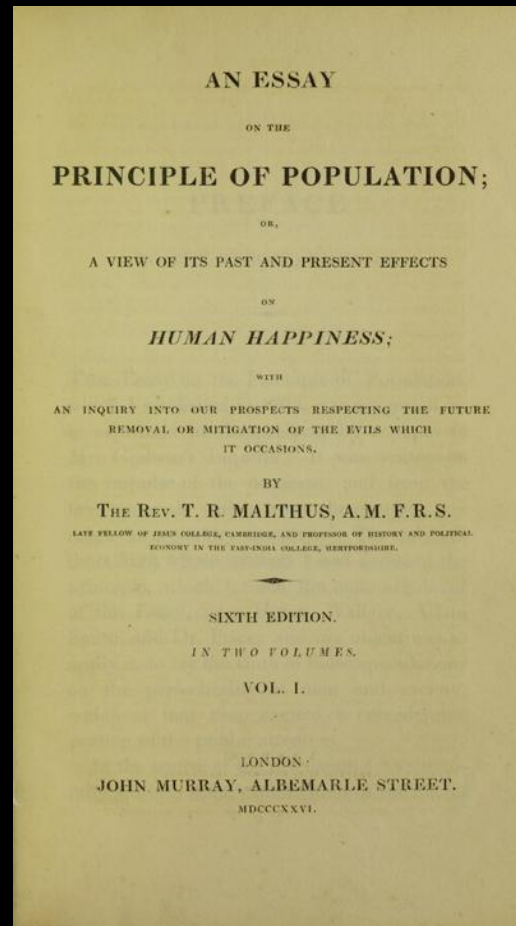
WHAT WILL OUR FOOD SYSTEM LOOK LIKE IN 2036?



HISTORICAL FOOD CONCERNS: FEEDING THE WORLD



Thomas Robert Malthus
English economist
(1766 –1834)



HISTORICAL FOOD CONCERNS:

TECHNOLOGICAL INNOVATIONS



- **High-yield crop varieties**
- **Fertilizers & pesticides**
- **Irrigation**
- **Mechanization**
- **Genetic engineering**

Our World in Data

**THE GREEN
REVOLUTION**

Technological innovations have enabled us to feed the world

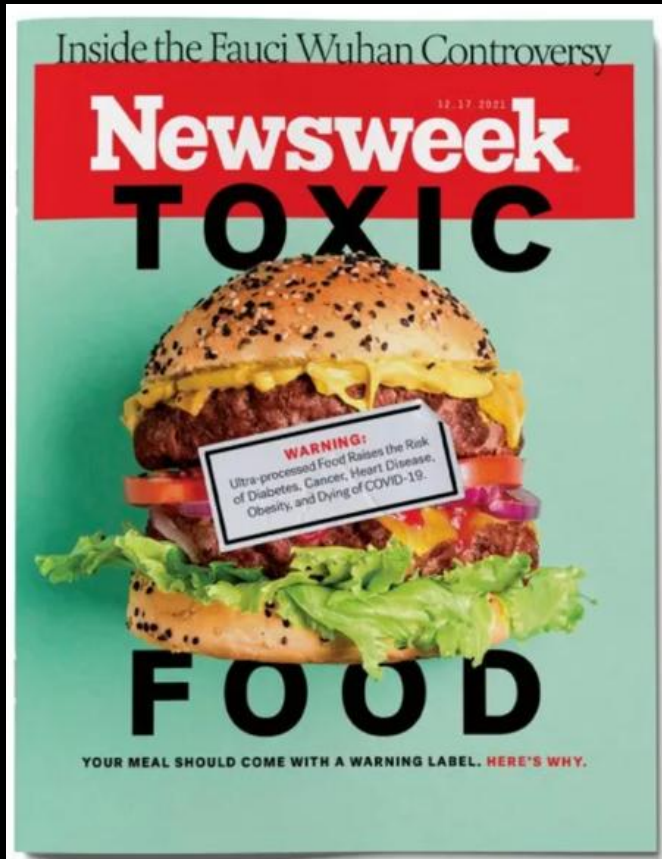
MODERN FOOD AND AGRICULTURE HAS BEEN INCREDIBLY SUCCESSFUL



MODERN FOODS

- Abundant
- Affordable
- Safe
- Convenient
- Delicious
- Diverse

THE DOWNSIDES OF THE MODERN FOOD AND AGRICULTURE INDUSTRY



ULTRA-PROCESSED FOODS

ORIGIN OF THE CONCEPT

NOVA FOOD CLASSIFICATION

Group 1: Unprocessed or minimally processed foods



Group 2: Processed culinary ingredients



Group 3: Processed foods



Group 4: Ultra-processed foods



Credit: Cambridge University Press / The Authors / World Cancer Research Fund



Carlos Monteiro
2009 (University of
São Paulo, Brazil)

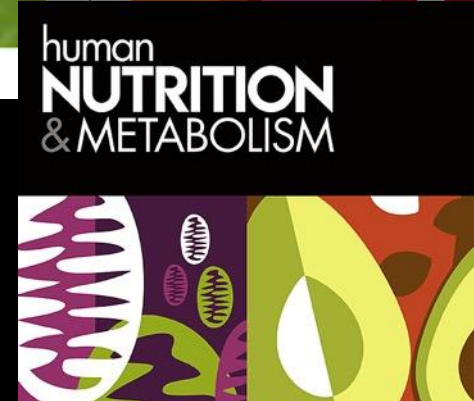
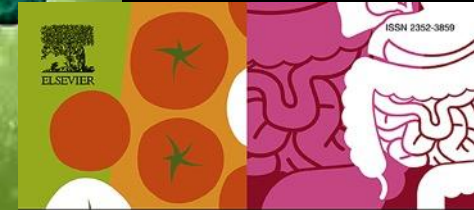
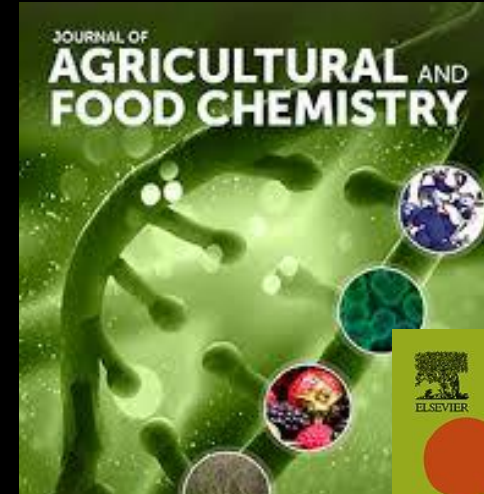
UPF defined as any product containing at least one ingredient not typically used in traditional culinary practices or an additive intended to enhance “cosmetic” appeal

UPFs:

In the News

One topic the left and right
can agree on!

UPFs: In Academic Research



Huge rise in academic research on UPFs over past decade

Web of Science, February 2026

UPFs: In Policy



UPF paradigm is being introduced into policies around the world

UPFs: IN THE COURTS



Robert King Law Firm

Ultra Processed Foods Lawsuit Health risks related to UPFs

KING LAW

Type 2 diabetes UPFs can interrupt normal metabolic function. Some children whose diets consist of high amounts of UPFs have been found to have elevated rates of type 2 diabetes and obesity.	Non-alcoholic fatty liver disease Artificial additives, high fructose levels, and unhealthy fats can significantly increase the risk of non-alcoholic fatty liver disease (when too much fat builds up in your liver).	Other chronic conditions • Hypertension (high blood pressure) • Low HDL cholesterol (the "good" cholesterol) • Hypertriglyceridemia (high fat levels in blood) • Depression • Hormonal cancers • Digestive tract cancers
--	--	---

THL Tortkorman Law

Accidents & Injuries ▾ Dangerous Drugs ▾ Defective Products ▾

Ultra-Processed Foods Lawsuit [2026 Update]

Home » Ultra-Processed Foods Lawsuit

Last Updated: March 16th, 2026

Ultra-Processed Foods Lawsuit Overview

The Ultra-Processed Foods Lawsuit centers on claims that ultra-processed food consumption is linked to type-2 diabetes, hypertension, fatty liver disease, and other serious health conditions in children.

The food industry is facing increasing litigation on UPFs

ADVERSE HEALTH EFFECTS OF UPFs:

Three Hypotheses

Ultra-Processed Foods and Human Health 1

Ultra-processed foods and human health: the main thesis and the evidence

Carlos A Monteiro, Maria LC Louzada, Euridice Steele-Martinez, Geoffrey Cannon, Giovanna C Andrade, Phillip Baker, Maira Bes-Rastrollo, Marialaura Bonaccio, Ashley N Gearhardt, Neha Khandpur, Marit Kolby, Renata B Levy, Priscila P Machado, Jean-Claude Moubarac, Leandro F M Rezende, Juan A Rivera, Gyorgy Scrinis, Bernard Srour, Boyd Swinburn, Mathilde Touvier

THE LANCET

HYPOTHESES

1. UPF dietary patterns have replaced traditional ones
2. UPF-rich diets have poorer dietary quality than traditional diets
3. The poor dietary quality of UPFs is increasing chronic disease risk

ADVERSE HEALTH EFFECTS OF UPFs:

Multiple Chronic Diseases Linked to UPFs

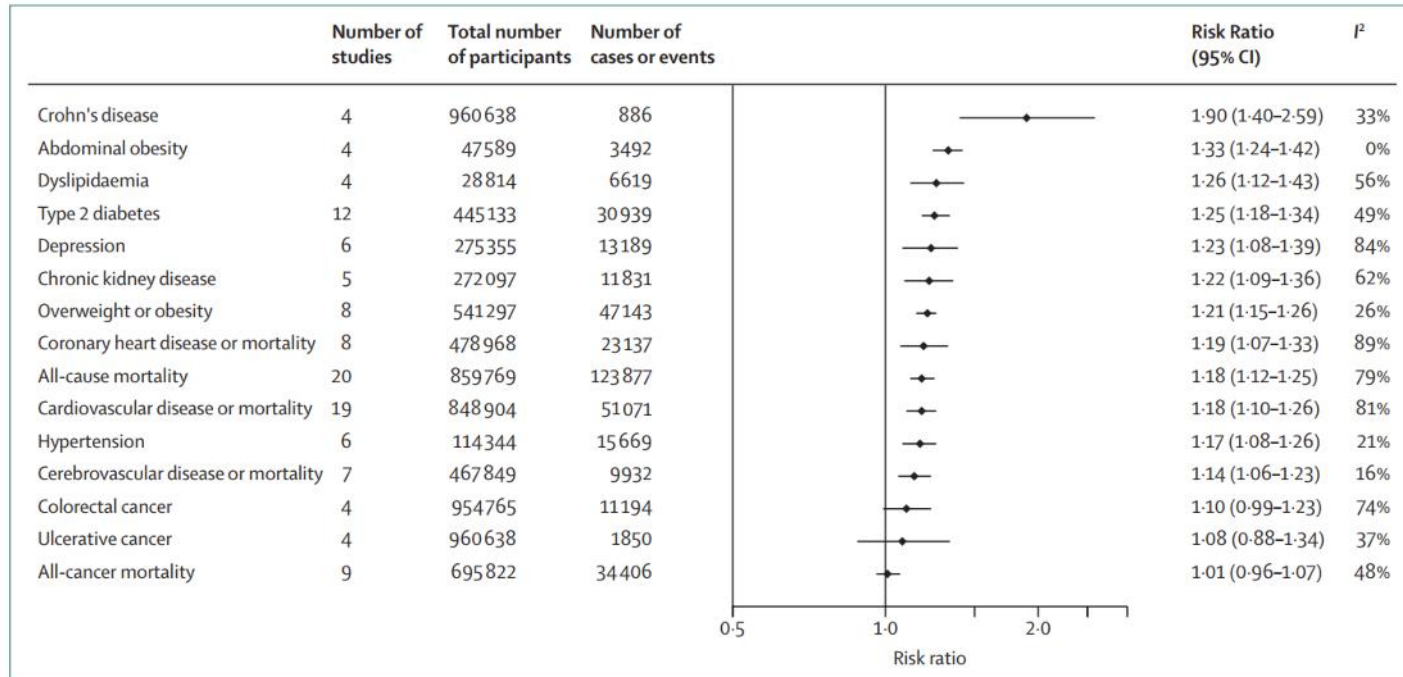
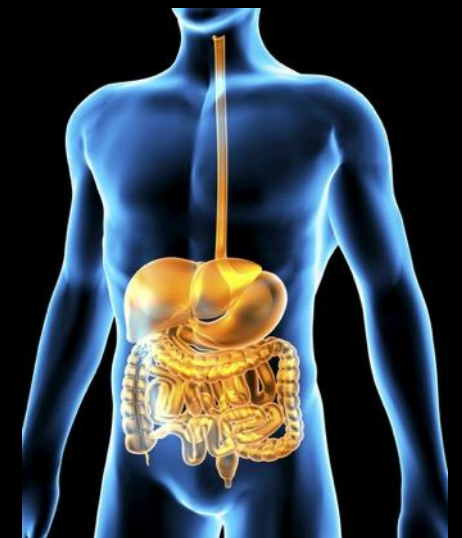


Figure 4: Results from meta-analyses of prospective studies assessing associations between highest versus lowest exposure to the ultra-processed dietary pattern and risk of chronic disease outcomes
Error bars are 95% CIs.



WHY ARE UPFs CAUSING HEALTH PROBLEMS?

A Complex Issue

**A complicated
problem we do not
fully understand yet**



GENETIC MISMATCH THEORY:

Our Bodies Evolved in a Different Era



Our ancient ancestors lived in an environment where food was scarce and relatively tough. They evolved to seek out foods, efficiently extract energy from them, and store it for periods when there was no food.

THE ORIGINAL ULTRA-PROCESSING OF FOODS:

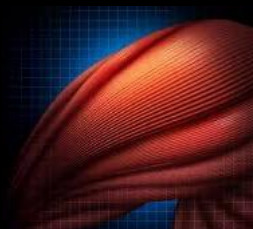
The Remarkable Human Body

Foods

Fats, Proteins,
Carbs, Fibers,
Minerals,
Phytochemicals



Food Processing
Energy & Building
Blocks

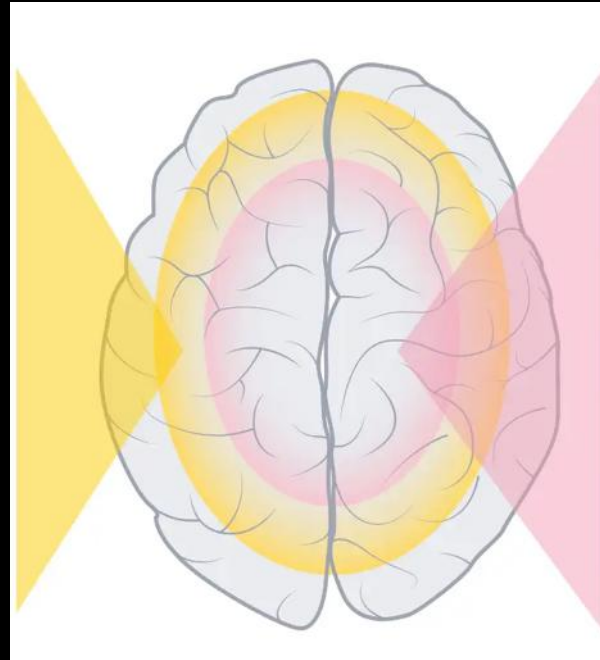


CONTROLLING EATING BEHAVIOR:

How Do We Control What We Eat?

Conscious Control

Planning
Willpower
Judgements
Decisions



Unconscious Processes

Hunger
Appetite
Satiety
Satiation

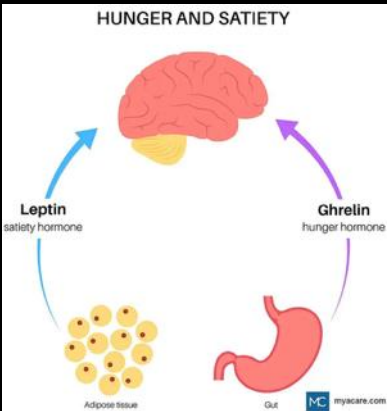
EATING BEHAVIOR:

What, when, where,
How much

CONTROLLING EATING BEHAVIOR:

Brain and Central Nervous System Coordinate Eating

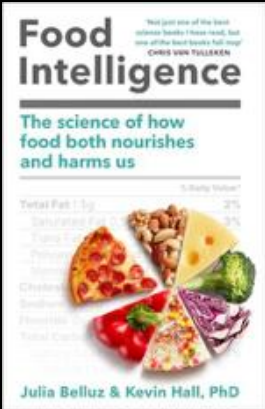
Conductor
Brain & CNS



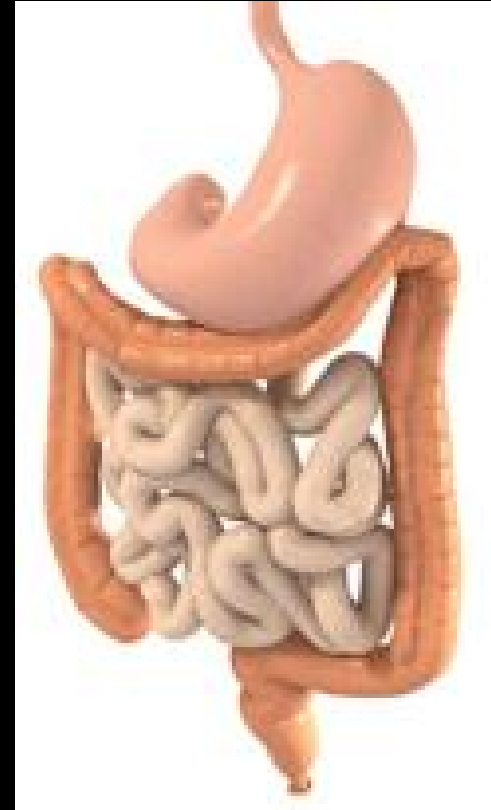
Music
Biological
Signals

Orchestra
Bodily Functions

HOMEOSTASIS



ORIGIN OF ADVERSE HEALTH EFFECTS: Evolutionary Mismatch?



Modern humans live in an environment where foods are abundant, accessible, convenient, affordable and easy to eat and digest.

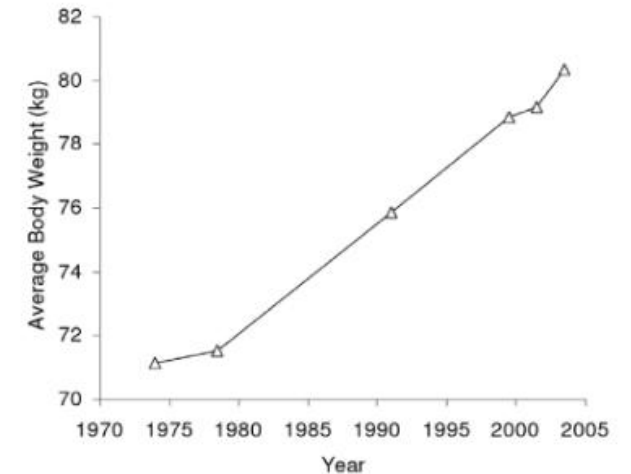
ORIGINS OF ADVERSE HEALTH EFFECTS: A Victim of Our Success?



**Modern
Agriculture**

Food Production

Body Weight



MODERN FOOD ENVIRONMENT:

Hijacking our Psychologies & Physiologies



Supermarkets, convenience, stores, restaurants, cafes, and institutions full of affordable, convenient, and hyperpalatable foods that are energy dense.

THE ROLE OF FOOD INDUSTRY:

Hacking our Desires and Choices



The food industry aggressively markets and advertises UPFs

WHAT CAN WE DO?



CONTROLLING THE FOOD ENVIRONMENT



Agriculture



Government



CONSUME

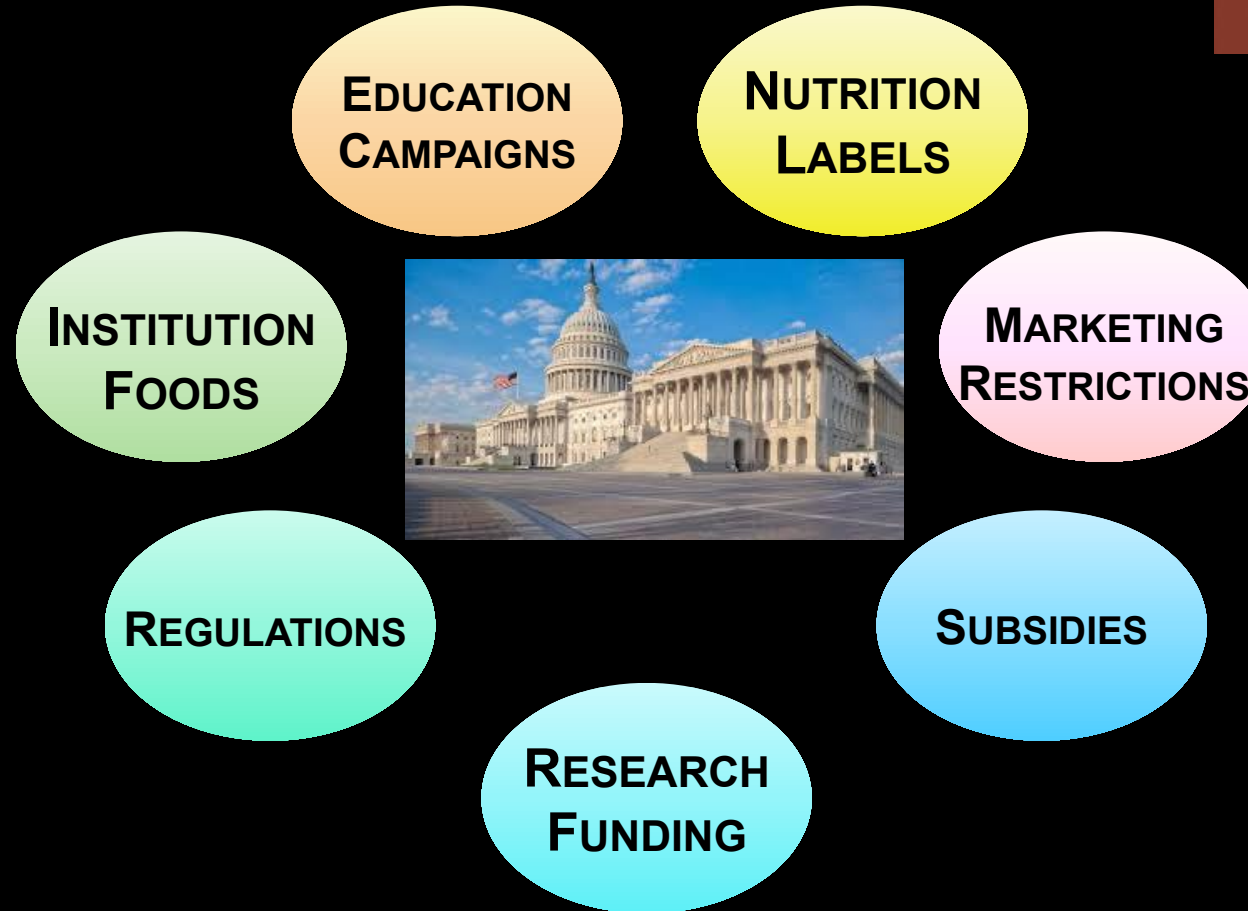


**Food
Manufacture
rs**

**Food
Retailers**

MITIGATING UPF EFFECTS:

FOOD POLICY APPROACHES



MITIGATING UPF EFFECTS:

Changing the Foods We Eat

WHOLE FOOD APPROACH



Healthier Diet but...

*Time consuming, laborious,
and expensive*

FOOD REDESIGN APPROACH



Healthier Diet without...

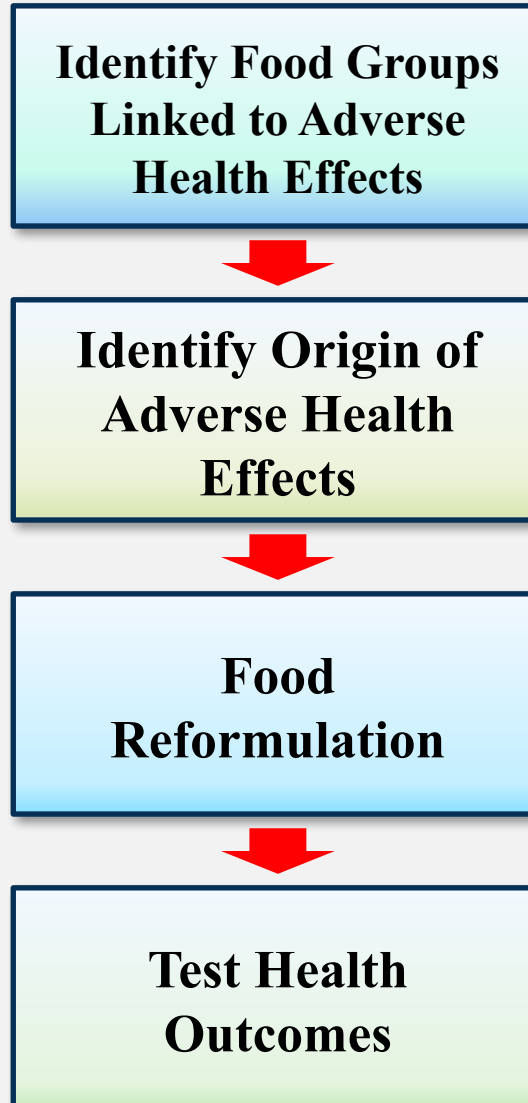
*Changing consumer lifestyle or
habits*

HOW TO ADDRESS THE PROBLEM: DEVELOPING PRACTICAL SOLUTIONS

**AROUND 50-70% OF
FOODS IN MODERN
DIET ARE UPFs**



A FOOD REDESIGN STRATEGY



PROBLEMATIC FOODS GROUPS

FOODS LINKED TO HEALTH PROBLEMS



PROBLEMATIC UPFs

- SOFT DRINKS
- PROCESSED MEATS
- SNACKS & DESSERTS
- PREPARED MEALS
- BAKED GOODS

Evidence from observational studies suggests that some food categories are more problematic than others

UNDERSTANDING ORIGIN OF PROBLEM

Eating Frequency
Eating Rate
Calories Consumed

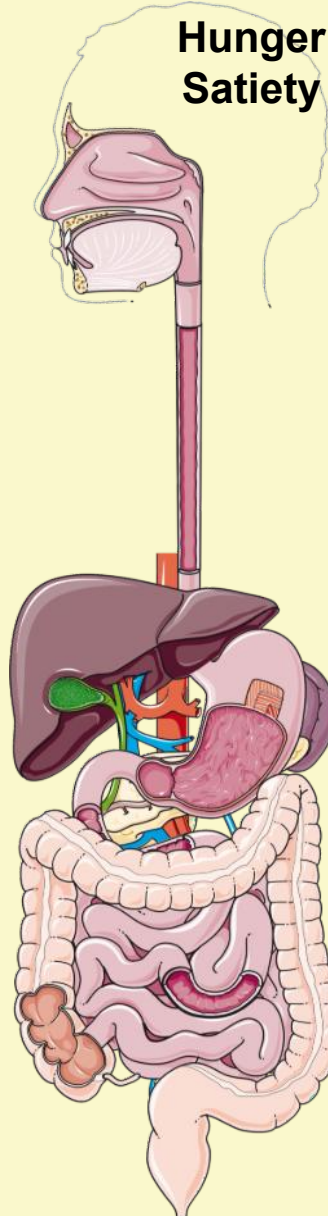
Hunger
Satiety

Digestion Rate
Absorption Rate
Absorption Location

Microbiome
Effects

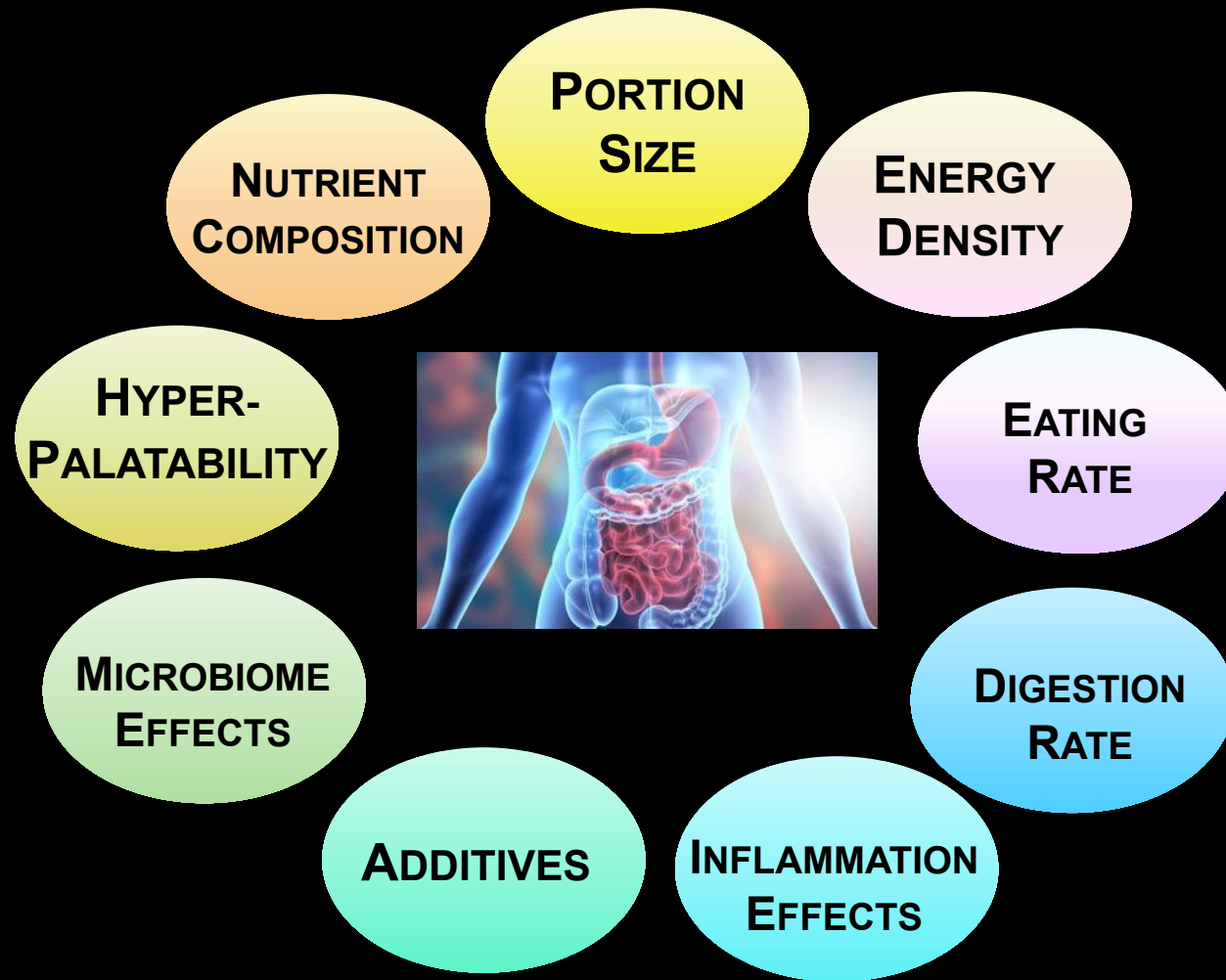
Distribution
Metabolism
Storage

**IMPACT OF FOODS ON
EATING BEHAVIOR AND
NUTRIENT PROCESSING**



FACTORS IMPACTING EFFECTS:

NUMEROUS FACTORS MAY INFLUENCE HEALTH



MITIGATING THE EFFECTS OF UPFs: Food Science Innovation Approaches



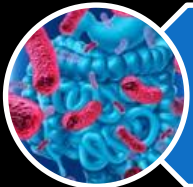
**Food
Composition**



Eating Rate



Digestion Rate



**Microbiome
Effects**

REDESIGNING UPFs

STEALTH APPROACHES TO HEALTHY EATING



**Healthy
Meal**

MEALS



**Healthy UPF
Meal?**



**Unhealthy
UPF Meal**

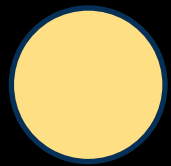
REDESIGNING UPFs

HEALTHIER SALAD DRESSINGS

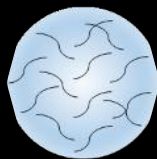
Full-fat



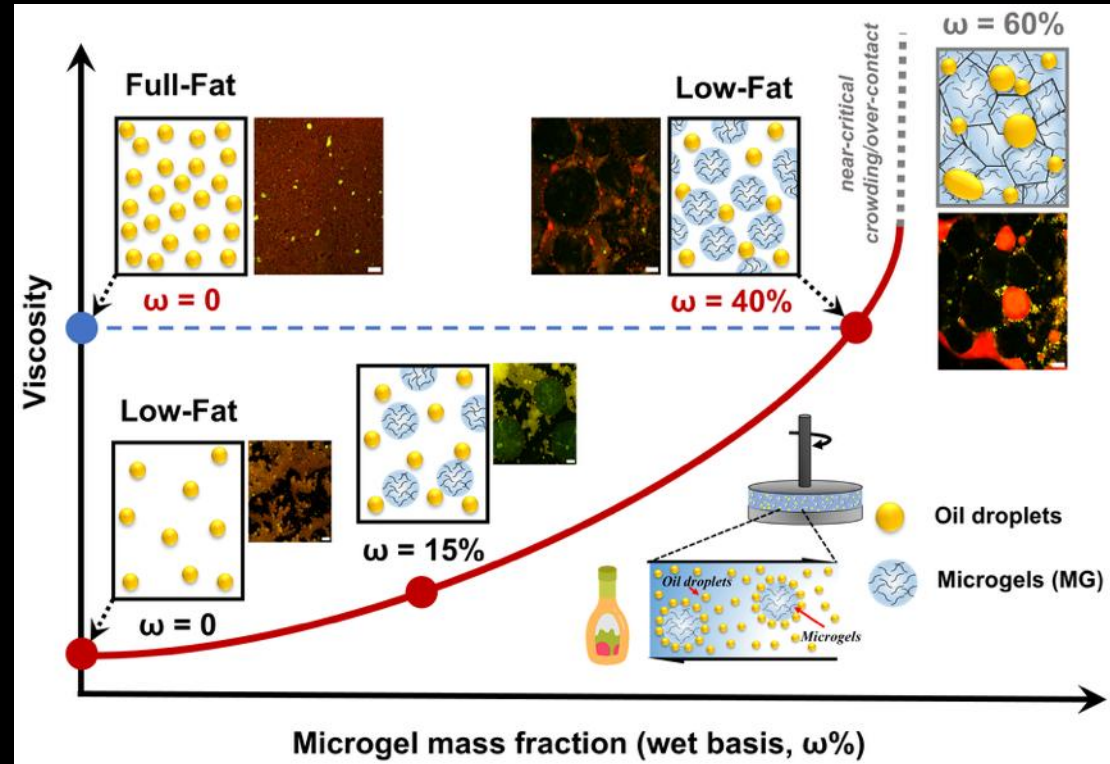
Low-fat



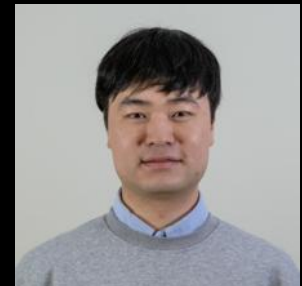
Fat



Protein +
Dietary Fiber



Tian Ma



REDESIGNING UPFs

HEALTHIER SALAD DRESSINGS



GastronomiQc
Lab _____

Université Laval

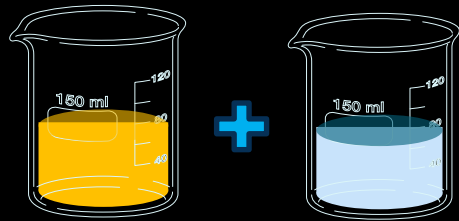


Turgeon, Sylvie



Perreault, Véronique

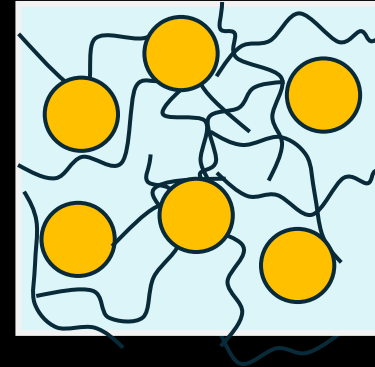
REDESIGNING UPFs: HEALTHIER BUTTER



30% olive oil
8% potato protein
8% β -glucan
0.5% β -carotene



**Plant-based
Butter**
310 calories



Emulsion Gel



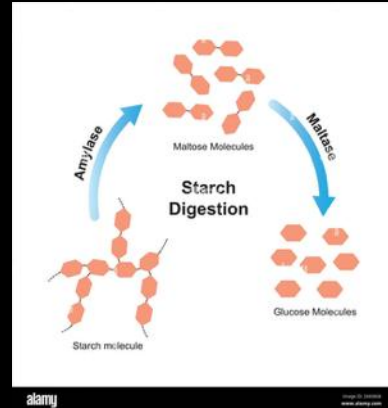
Real Butter
720 calories



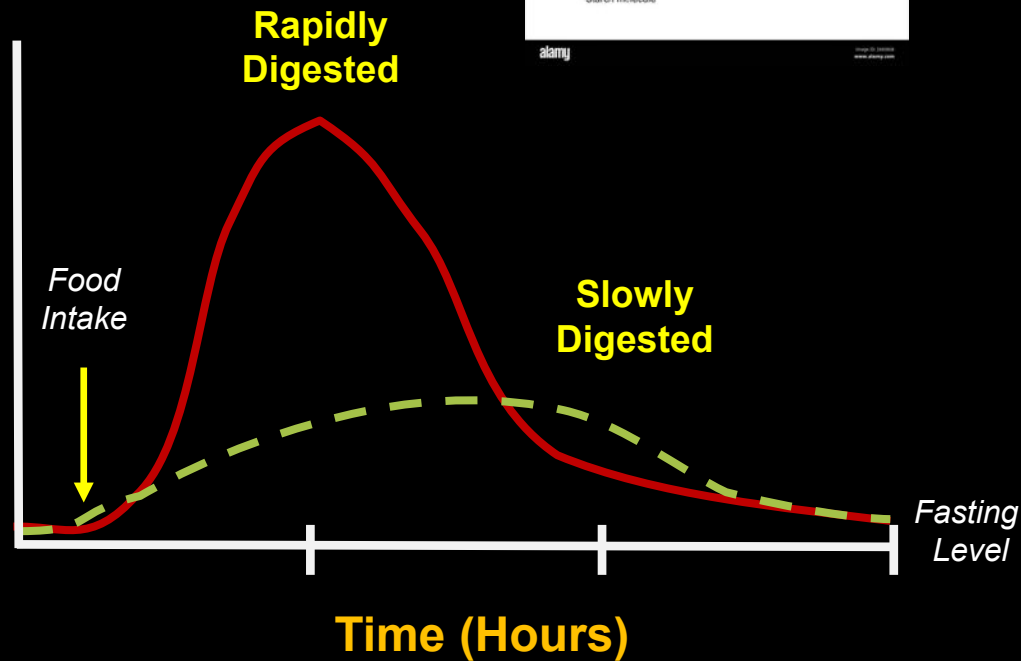
**Yunfei
Huang**



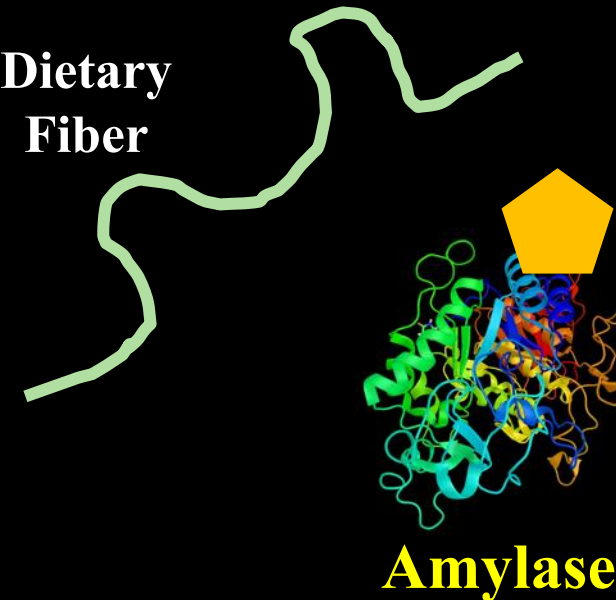
REDESIGNING UPFs: HEALTHIER BREAD AND BAKED GOODS



**Blood
Nutrient
Levels**



**Dietary
Fiber**



Polyphenol

Amylase

REDESIGNING ULTRA-PROCESSED FOODS

STEALTH APPROACHES TO HEALTHY EATING



**Healthy
Snacks**

SNACKS



**Unhealthy
UPF
Snacks**



**Healthy
UPF
Snacks?**

REDESIGNING ULTRA-PROCESSED FOODS

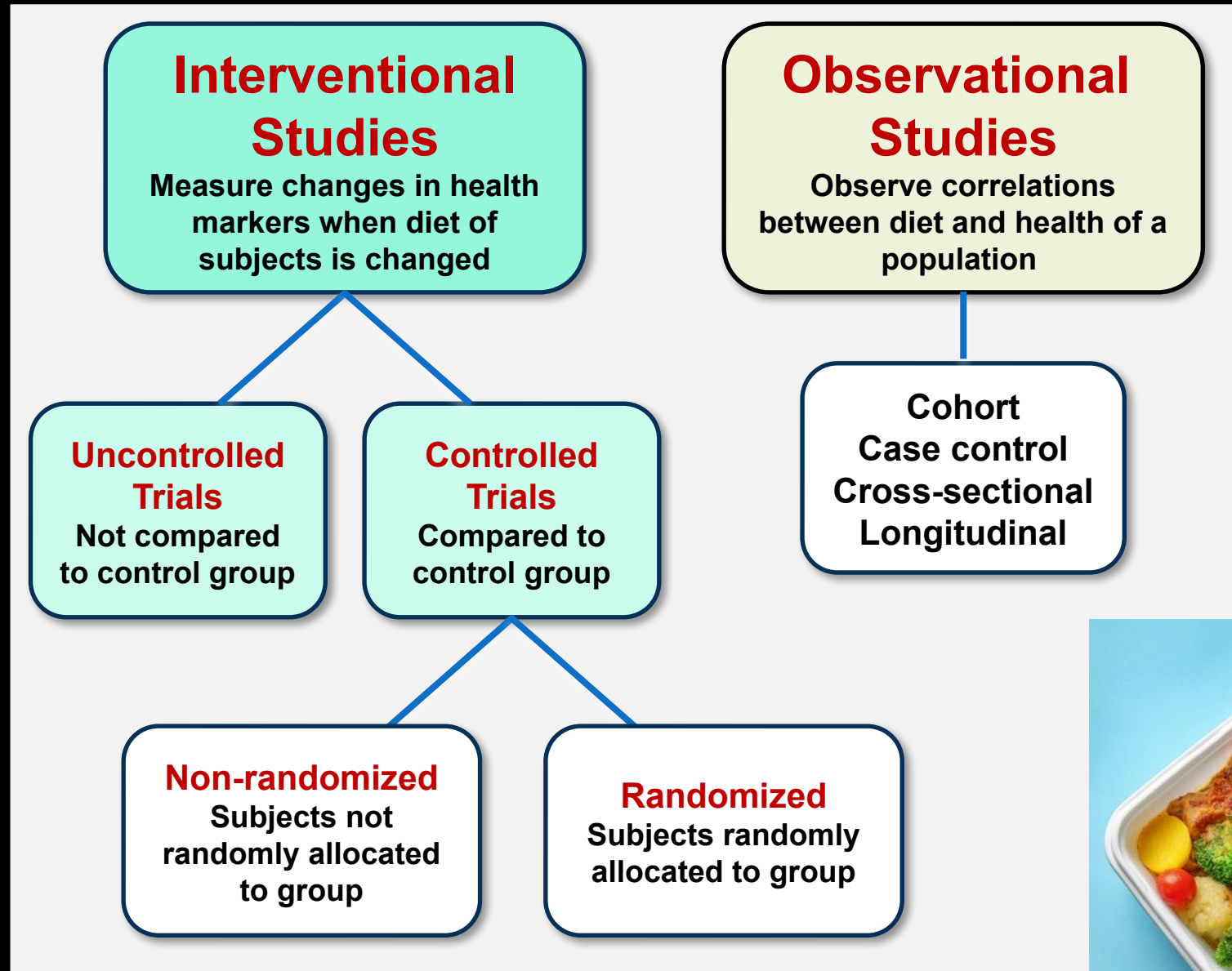
STEALTH APPROACHES TO HEALTHY EATING



HEALTHY READY MADE UPF MEALS?

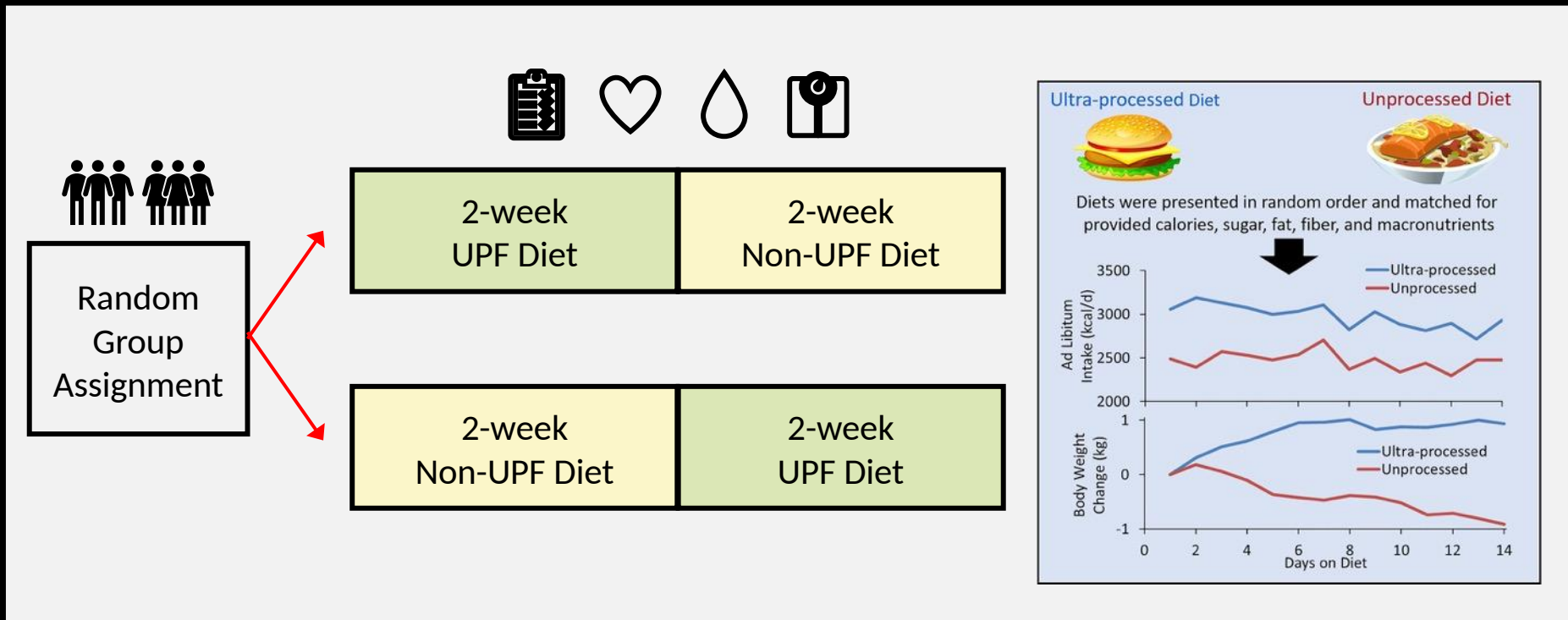
- Low total calories
 - Low energy density
 - High nutrient density
 - High fiber content
-
- **Slow eating rate**
 - **Low digestion rate**
 - **High satiety**
 - **Beneficial microbiome**

TESTING REFORMULATED UPFs



INTERVENTIONAL STUDIES OF UPFs

THE KEVIN HALL STUDY (2019)



“as good a clinical trial as you can get”

“the most important study ever done to explain weight gain”

“worse than worthless”

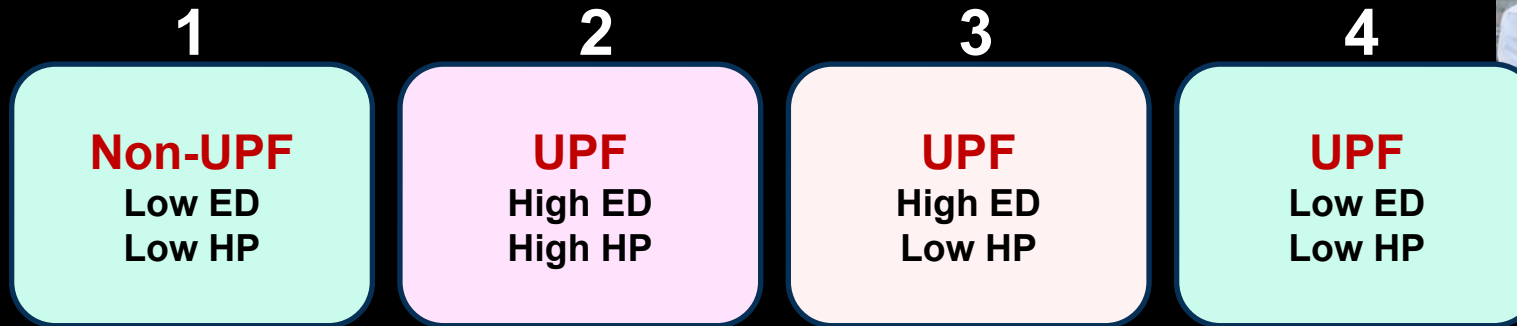
Is the experimental evidence on ultra-processed food and obesity reliable?

David S. Ludwig^{a,b,c,d} 

Critical Reviews in Food Science and Nutrition (2026)

INTERVENTIONAL STUDY OF UPFs

THE KEVIN HALL STUDY (2026)

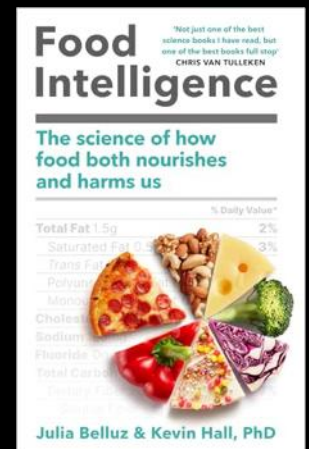


Hypothesis:

Energy Density (ED) and High Hyper-palatability (HP) of Foods Impact Eating Behavior Rather than Degree of Processing

EARLY FINDINGS

Diets 1 and 4 led to weight loss
Diet 2 less to considerable weight gain



THE PROBLEM MAY NOT BE PROCESSING

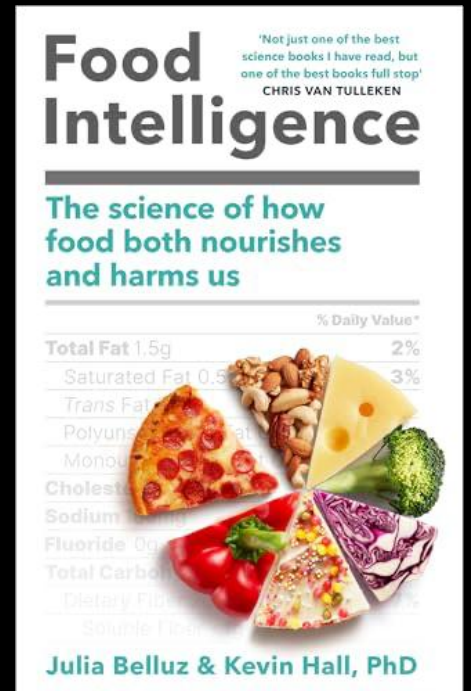
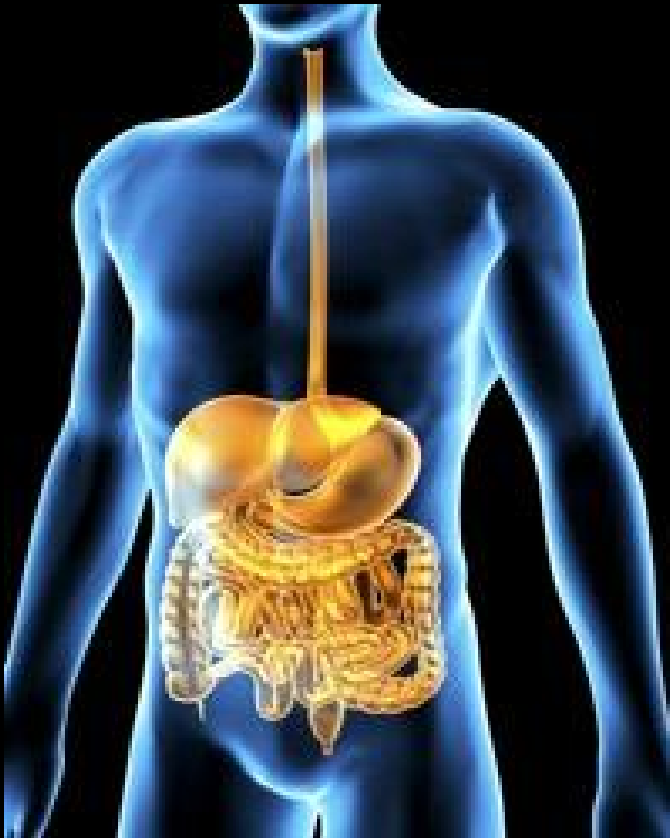
ULTRA-PROCESSED FOODS

REFRAMING THE PROBLEM

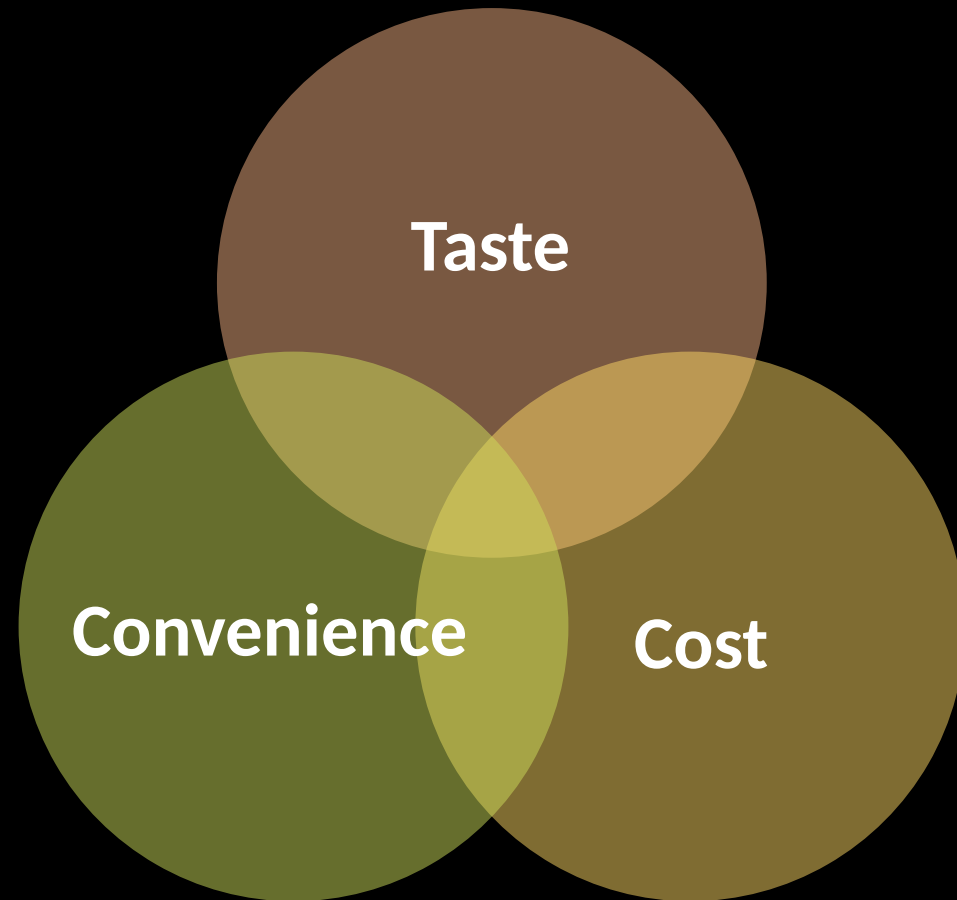
- **The current food system is causing numerous health problems**
- Evidence-based approaches needed to understand origin of problem
- **Policy, scientific and technological innovations needed to improve healthiness and sustainability of modern food system**
- The UPF paradigm may stifle innovation, reducing the introduction of healthier and more sustainable food products



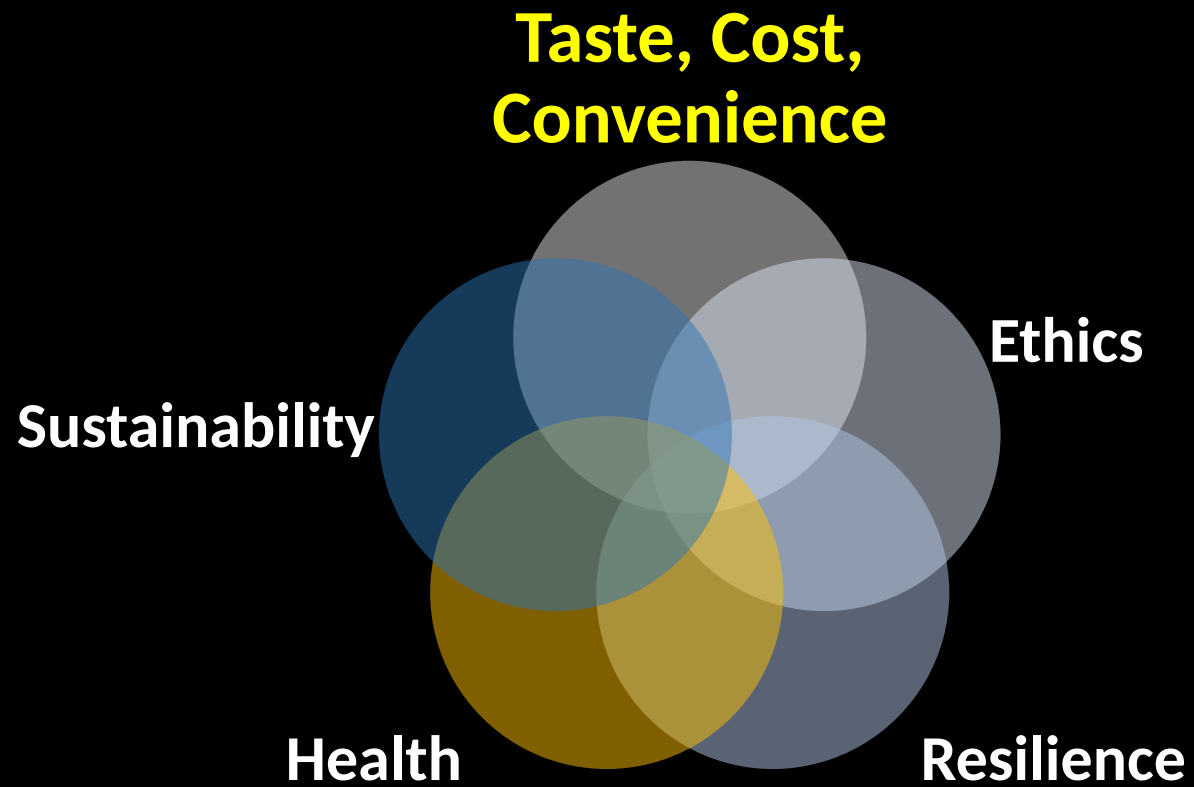
“Nutrition Isn’t Rocket Science It’s Harder”



FOOD SCIENCE & ENGINEERING: The Old Paradigm



FOOD SCIENCE & ENGINEERING: The New Paradigm



ACKNOWLEDGEMENTS

