



From Bread & Water to Ai

The Past, Present & Future of Nutrition & Correctional Foodservice

Nick Padula, MS, RD, CSSD

ACFSA 2026 • Burbank, California

A Little About Me

- Professor at University of Southern California and Long Beach CC
 - Teach FS Management among other courses
- Consultant Dietitian
 - Notably a Juvenile Correctional Facility
- Sports Dietitian
 - USA Volleyball National Teams and Cypress CC Athletics

Why am I here?



- The Los Angeles County Sheriff's Department hosts USC students for internships and Foodservice Management class site visits.
- The Lynwood Women's Jail tour is consistently one of the most memorable visit.
- One student flew from Arizona to Los Angeles to participate.





From Bread & Water to Ai

Menu

Appetizer

History of Correctional FS and Nutrition

Main Course

Current Trends – Clinical, Peptides, GLP-1, and Effects on Foodservice

Dessert

Future Trends – AI and Robots

**“If you don’t study history, it’s as if you
were born yesterday.”
-Howard Zinn, Historian**

**LET’S TAKE A LOOK AT
WHERE CORRECTIONAL
FOODSERVICE CAME FROM.**

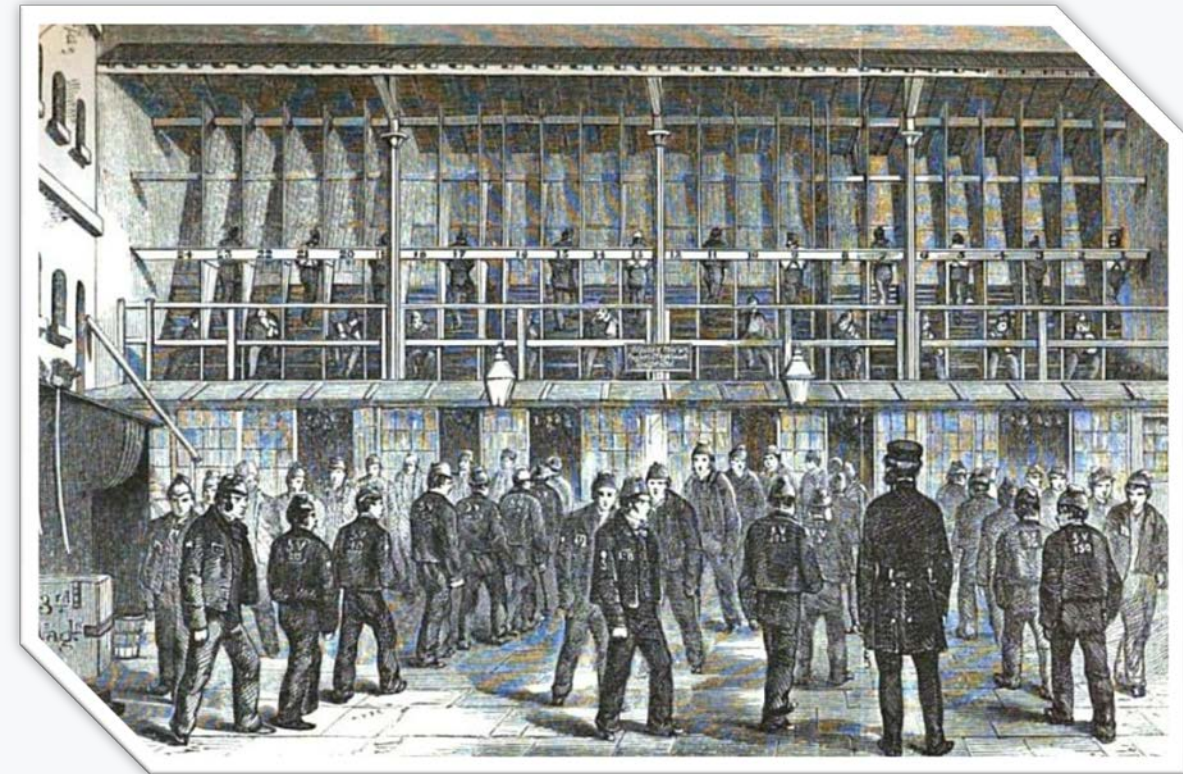
**THE STORY
STARTS LONG
BEFORE MENUS,
DIETITIANS OR
NUTRIENT
ANALYSIS.**



Before There Was a Prison Menu

A prison was not always a place where the institution provided three meals a day.

- **Confinement could be temporary:** awaiting trial, punishment, debt, transportation or execution.
- **Long-term incarceration as a standardized institution developed later.**
- **Because the purpose of confinement varied, the food system varied too.**



KEY MESSAGE: CORRECTIONAL FOODSERVICE WASN'T ALWAYS A FOODSERVICE OPERATION.

Imagine entering prison and hearing: ***“Who is bringing your dinner?”***

- Eighteenth-century English prisons generally did not provide full meals.
- Prisoners often arranged food through family, friends, keepers or outside vendors.
- London authorities did provide a daily loaf of bread, but this was not a complete institutional diet.
- People without money or outside support were especially vulnerable.

FOOD ACCESS COULD REFLECT INCOME + FAMILY SUPPORT + SOCIAL STATUS.

18TH CENTURY

So, Who Fed the Prisoner?



THE PRISONER

Purchased food when they had money.

FAMILY & FRIENDS

Delivered food or provided money.

VENDORS

Sold provisions to prisoners.

PRISON WORKERS

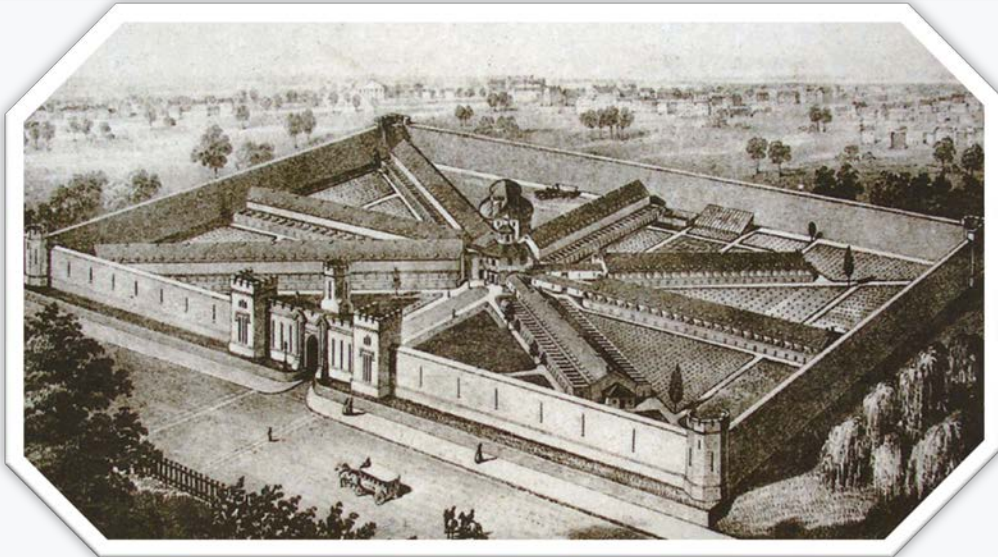
Could provide or sell provisions.

CHARITY

Helped prisoners without resources.

LOCAL AUTHORITIES

Provided basic items.



Food access was unequal.

That inequality became one argument for more standardized institutional provisioning and defined dietary allowances.

19TH CENTURY



Bread. Gruel. Potatoes. Soup.

BREAD

Staple source of energy

GRUEL / PORRIDGE

Oatmeal or flour cooked with water

POTATOES

Cheap and filling

SOUP

Efficient way to stretch ingredients

MEAT

More expensive and often limited

CHEESE

Energy, protein and fat



GRUEL (noun): a historically infamous, thin, watery porridge made by boiling a small amount of **cereal grain**—**most commonly oatmeal, cornmeal, or barley**—in a large volume of water or cheap milk

19TH CENTURY 1822–1823: When the Diet Goes Wrong

Cheap + Filling + Durable + Scalable



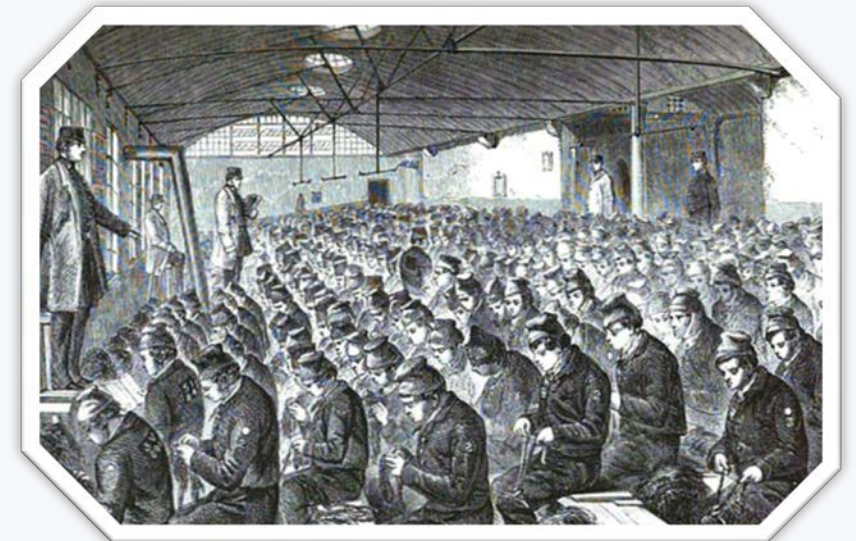
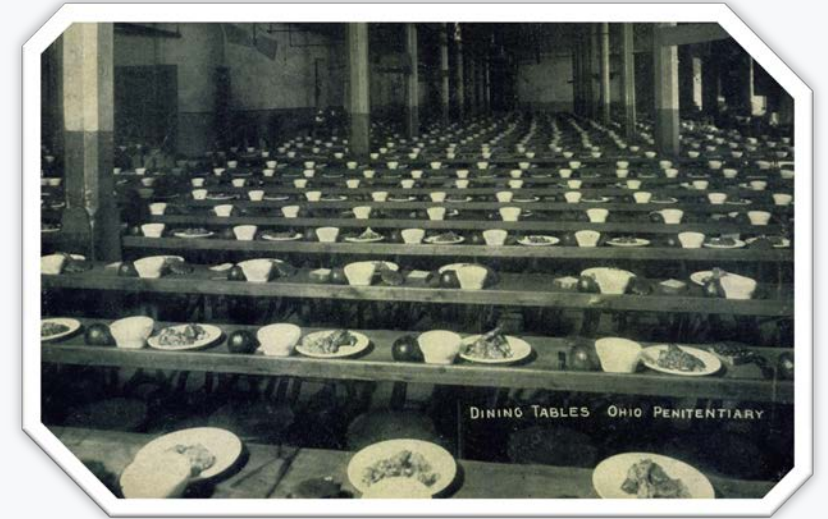
Millbank Prison & Scurvy

1822–1823, dietary restrictions at London's Millbank Prison contributed to an outbreak of scurvy

Enough calories ≠ adequate nutrition

The institutional diet could be filling while still lacking essential nutrients.

This is an important turning point: Food quantity and food quality are not the same thing.



FOOD AS PUNISHMENT



Food could serve two very different purposes:

NOURISHMENT

Keeping someone alive, functional and able to work.

PUNISHMENT

Restricting food as a disciplinary measure.

The institution controls the food. The institution controls the punishment.

1791 → 1970s

Where Was the 8th Amendment?

“Cruel and Unusual Punishments” The Eighth Amendment was ratified in 1791.

But:

It did NOT immediately create modern constitutional rules governing prison nutrition.

The major change comes much later:

1960s–1970s Federal courts increasingly scrutinize prison conditions under the Constitution.



NUTRITION BEGINS TO BECOME PART OF THE INSTITUTION'S RESPONSIBILITY.

1791 → 1970s

1977: Cunningham v. Jones

What happened?

Alford Cunningham was confined after an attempted jailbreak.

Officials restricted him to **one meal per day for approximately 15 days** as discipline.

The remaining meal was not clearly established to provide adequate nutrition.

The Sixth Circuit focused on whether the diet was sufficient to **maintain normal health.**

The important principle:

Punishment does not eliminate the obligation to provide adequate nutrition.

NUTRITION BEGINS TO BECOME PART OF THE INSTITUTION'S RESPONSIBILITY.

Nutraloaf: Punishment Without Nutritional Deprivation



1980s–1990s

Correctional facilities increasingly used “**nutriloaf**” / **disciplinary loaf** as an alternative to withholding food.

Made from nutritionally complete meal components

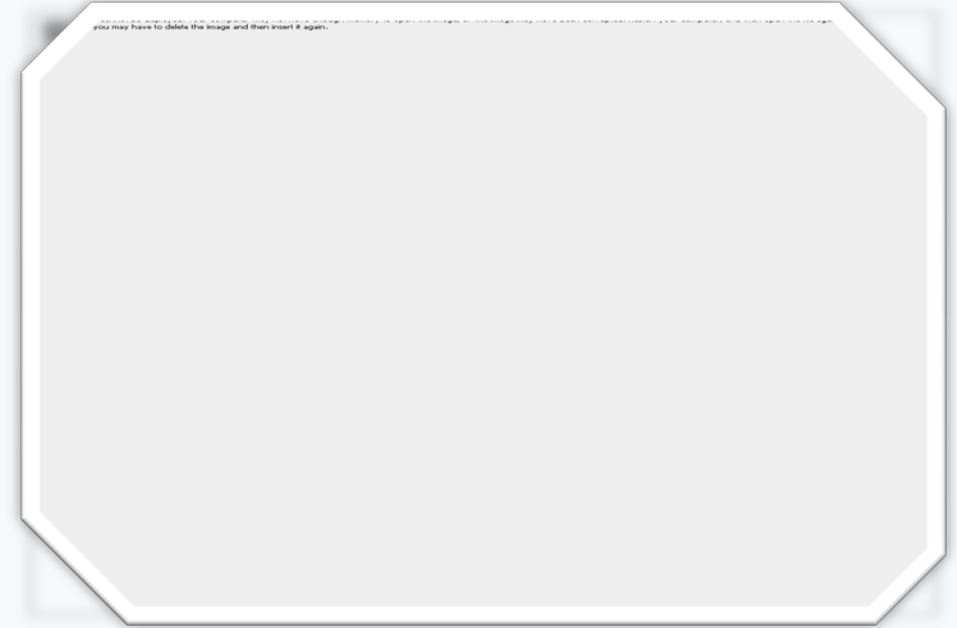
Ground/blended and baked into one loaf

Intended to address security/disciplinary concerns

Nutritionally adequate, but intentionally unappealing

1993 — LeMaire v. Maass

The Ninth Circuit upheld disciplinary food loaf under the circumstances presented, emphasizing that prisoners are entitled to **adequate nutrition**, not necessarily appealing food.



1994 → TODAY

Defined Nutrition Guidelines Enter the Room



1994 — Farmer v. Brennan

The Supreme Court stated that prison officials have an Eighth Amendment duty to provide humane conditions of confinement, including **adequate food, clothing, shelter, and medical care.**



Federal + State Regulations

Translate that obligation into operational standards



- RDA/DRI-based standards
- Three meals/day
- Medical & special diets
- Food safety

THE INSTITUTION IS NO LONGER JUST FEEDING PEOPLE — IT IS MANAGING NUTRITION.

When "adequate nutrition" gets taken too far

LOOK HOW FAR WE'VE COME

From Subsistence To Foodservice Systems



THEN

BYO Food

THEN

Bread • Gruel • Rations • Discipline

TODAY

Menus • Therapeutic diets • Food safety • Clinical nutrition

NEXT

GLP-1s • AI • Precision nutrition • Automation

Correctional Foodservice Today

This isn't just feeding people.

1

Nutrition

2

**Clinical
Conditions**

3

Food Safety

4

Procurement

5

Labor

6

Cost

7

Logistics

8

Security

9

**Menu
Acceptance**

10

**Religious /
Cultural Diets**

11

**Therapeutic
Diets**

12

**Special
Populations**

The Modern Nutrition Challenge

One population. Very different needs.

1

Obesity

2

Diabetes

3

Hypertension

4

Cardiovascular
Disease

5

GI Disorders

6

Food Allergies

7

Malnutrition

8

Sarcopenia

9

Mental /
Behavioral
Health

10

The Next
Trends

THE PIVOT

What happens when medicine changes the way people eat?

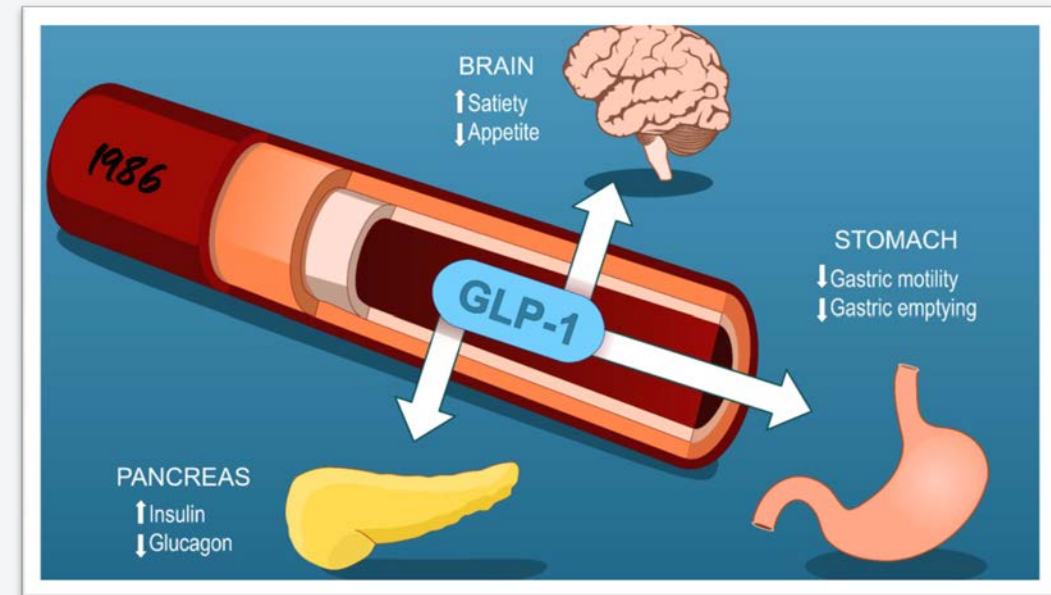
Enter the GLP-1 era.



GLP-1s Are Changing Nutrition

Not just “weight-loss drugs.”

- GLP-1 receptor agonists
- GLP-1 / GIP therapies
- Appetite suppression
- Reduced energy intake
- Changes in food preferences / tolerance
- Long-term obesity treatment



Weight Loss ≠ Fat Loss

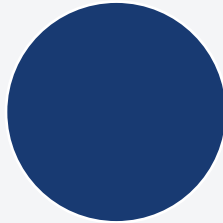
The quality of weight loss matters.

**TOTAL WEIGHT
LOSS**

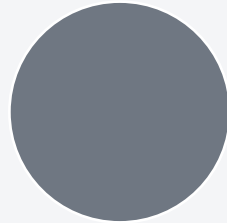
FAT MASS

LEAN MASS

FUNCTION



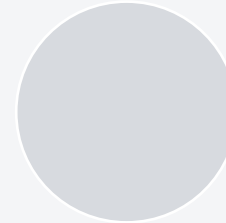
Fat



Muscle



Water



Other

**Emerging
question:**

**How do we preserve muscle while weight comes
down?**

GLP-1 Nutrition: What Should We Care About?

1. Protein & muscle preservation
2. Lean mass and strength
3. Micronutrient adequacy
4. Hydration
5. GI tolerance
6. Energy intake
7. Food quality
8. Fiber
9. Meal size and composition
10. Long-term weight maintenance

Why Do We Care About Preserving Muscle? Low muscle mass and strength are associated with:

- ↑ All-cause mortality
- ↑ Falls and fractures
- ↑ Disability and loss of independence
- ↑ Hospitalization risk
- ↓ Functional capacity



GLP-1 Nutrition: How do we implement these goals?

1. **Protein first** — prioritize protein at each meal
2. **Smaller, nutrient-dense meals** — maximize nutrition when appetite is limited
3. **Distribute protein throughout the day** rather than relying on one large serving
4. **Resistance training** — preserve muscle, strength, and function
5. **Hydration plan** — encourage regular fluid intake throughout the day
6. **Fiber + fluids** — support bowel regularity
7. **Modify portions for GI tolerance** — smaller meals; limit very high-fat/heavy meals when symptomatic
8. **Prioritize micronutrient-dense foods** — fruits, vegetables, dairy/fortified alternatives, whole grains, lean proteins
9. **Monitor intake and symptoms** — especially persistent nausea, vomiting, constipation, or very low intake
10. **Plan for maintenance** — build sustainable eating patterns that continue beyond active weight loss

GLP-1s Change the Menu Conversation

TRADITIONAL QUESTION

“Does the menu meet nutrient standards?”

NEW QUESTIONS

Can people actually eat enough to meet their nutritional needs?

Are protein and other high-value nutrients prioritized and easy to consume?

Does the menu provide enough nutrition in a smaller volume of food?

How do we preserve muscle while energy intake declines?

How do we build sustainable eating behaviors while the medication is working?

“Big Food” is changing their marketing to address this new market.



Why Protein is #trending now

Examples:

Nestlé — Vital Pursuit: launched specifically for GLP-1 users and weight management; smaller “portion-aligned” frozen meals with ≥ 20 g protein and essential nutrients.

Healthy Choice / Conagra — “On Track”: added “GLP-1 Friendly” labeling to selected frozen meals emphasizing high protein, fiber, lower calories, and smaller portions.

Danone: explicitly markets parts of its portfolio toward a “GLP-1 lifestyle,” emphasizing protein for muscle maintenance, fiber for GI health, and micronutrient density.

General Mills: expanding protein-forward cereals, granolas, and snacks, reflecting the broader shift toward protein-dense foods as consumers increasingly prioritize protein.

GLP-1 Nutrition: What happens when GLP-1 is stopped?

- **Appetite suppression decreases**
- **Hunger and food preoccupation may return**
- **Satiety may decrease**
- **Energy intake commonly increases**
- **Weight regain is common after**
- **Medication + Lifestyle Intervention**

During GLP-1 therapy, build:

- Sustainable eating patterns
- Protein-forward meal habits
- Portion awareness
- Food quality
- Regular physical activity
- Resistance training
- Sleep and recovery habits
- Self-monitoring skills
- Strategies for hunger and appetite management
- Long-term weight-maintenance behaviors



The Peptide Revolution



GLP-1 medications are peptides—but not all peptides are created equal.

FDA-Approved Peptide Therapies

- Clinically tested in humans
- Established safety and efficacy
- Standardized dosing and manufacturing
- FDA-approved indications



The Emerging “Research Peptide” Market

- Growing popularity outside traditional clinical practice
- Often marketed for **healing, recovery, muscle growth, fat loss, and longevity**
- Limited or inadequate human clinical evidence for many products
- Long-term safety may be unknown

FDA-approved peptide	Example brand	Primary use
Semaglutide	Ozempic, Wegovy	Diabetes / obesity
Tirzepatide	Mounjaro, Zepbound	Diabetes / obesity
Liraglutide	Victoza, Saxenda	Diabetes / obesity
Dulaglutide	Trulicity	Diabetes
Exenatide	Byetta/Bydureon	Diabetes
Insulin & insulin analogs*	Humalog, NovoLog, etc.	Diabetes
Glucagon	Baqsimi, Gvoke	Severe hypoglycemia
Pramlintide	Symlin	Diabetes
Teriparatide	Forteo	Osteoporosis
Calcitonin	Miacalcin	Osteoporosis/other indications
Leuprolide	Lupron	Prostate cancer, endometriosis, other hormone-sensitive conditions
Oxytocin	Pitocin	Labor/obstetrics

“Wellness Influencer” Peptide Boom

GLP-1 is probably the beginning, not the end.

- BPC-157
- TB-500
- GHK-Cu
- MOTS-c
- CJC-1295
- Ipamorelin

What are people claiming?

Healing • Recovery • Muscle • Fat Loss •
Longevity • Gut Health • Skin/Hair

What do we actually have?

Animal / mechanistic data

- Limited human data
- Often no robust Phase III trials
- No FDA-approved indication
- Unknown long-term safety



first peptide party

Cormac



(@cormachayden_)

362 likes · 62 replies

x.com

Idk this person but just to give you an idea of how people are peptide maxxng in SF nowadays 😂

Social Media Peptide Superstars



BPC-157 — marketed for injury/tissue healing

TB-500 — marketed for recovery/wound healing

GHK-Cu — marketed for skin/hair/tissue repair

MOTS-c — marketed for metabolism/longevity

CJC-1295 / Ipamorelin — marketed for GH/recovery/body composition

KPV — marketed for inflammation/gut health

Wolverine Stack
BUILT FOR RECOVERY. MADE TO PERFORM.
TB-500 + BPC-157
FOR TISSUE REPAIR, RECOVERY, AND PEAK PERFORMANCE

ACCELERATES TISSUE REPAIR	SUPPORTS MUSCLE, TENDON & LIGAMENT HEALING	REDUCES INFLAMMATION	SUPPORTS JOINT & MOBILITY	ENHANCES CELLULAR REGENERATION	IMPROVES RECOVERY & PERFORMANCE

LICENSED 503A STERILE COMPOUNDING | PURITY > 99% | QUALITY YOU CAN TRUST

The advertisement also features two glass vials labeled TB-500 and BPC-157, and a muscular man in a black t-shirt looking off to the side.

FDA concluded in its July 2026 review that there was insufficient clinical safety information and found no human studies using the proposed oral, subcutaneous, nasal, or transdermal routes.

What Else Comes Next In the Nutrition World?

One menu → personalized nutrition?

1

Nutrigenomics



2

Microbiome



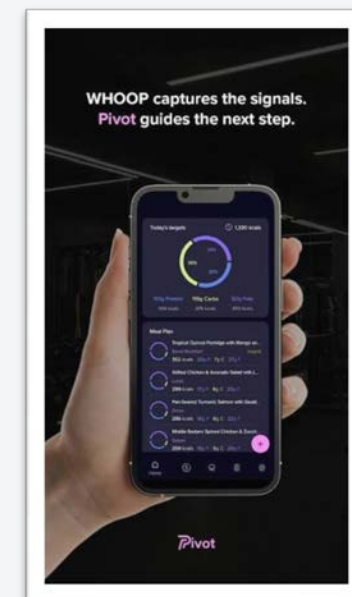
3

Digital health



4

Individualized Health



Nutrigenomics

How your genes interact with the food you eat

GENES ☐ + **NUTRIENTS** ☐ → **CELLULAR RESPONSE** ☐ → **HEALTH OUTCOME**

Examples

- **Omega-3s** → influence inflammatory gene pathways
- **Folate** → supports DNA synthesis and methylation
- **Caffeine** → CYP1A2 genetic variation can affect caffeine metabolism
- **Sodium** → genetic differences may influence blood-pressure response

The key idea:

Your genes are not your destiny. Nutrition can influence how genes are expressed, while genetic variation can influence how individuals respond to food.



Nutrigenomics

CYP1A2

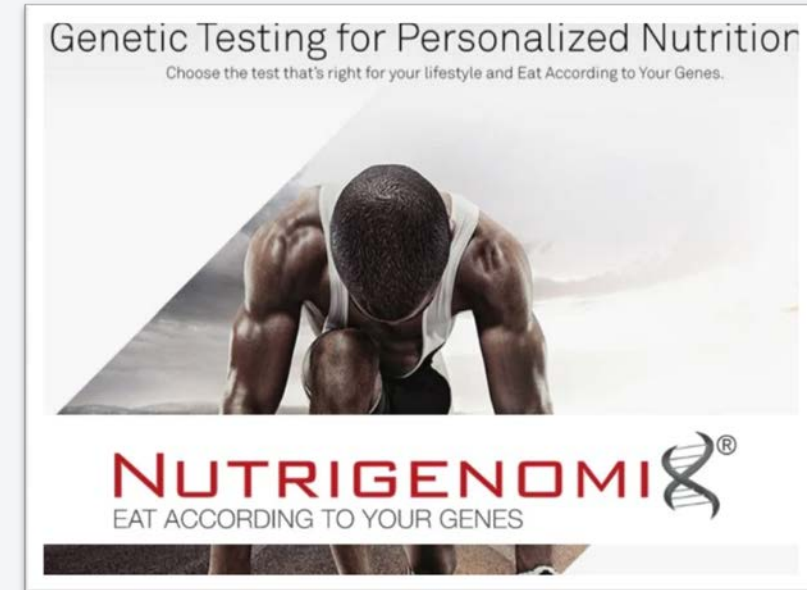
is a gene that provides instructions for making a **liver enzyme responsible for metabolizing many compounds—including most of the caffeine you consume.**

What differs is the **variant (genotype)**--variants can affect how quickly someone clears caffeine:

- **Faster metabolizers** → break down caffeine relatively quickly; effects may wear off sooner.
- **Slower metabolizers** → caffeine remains in circulation longer; effects such as stimulation or sleep disruption may last longer.

Nutrigenomics ≠ “eat for your genes”

The science is promising, but most personalized nutrition applications are **not yet precise enough to replace foundational dietary guidance.**



The Gut Microbiome

Your gut is an ecosystem—not just a collection of bacteria

Gut microbiome = the community of microorganisms living in the gastrointestinal tract **plus their genes and functional activity**

Includes:

- Bacteria
- Archaea
- Fungi
- Viruses

What does it do?

Food → Microbes → Microbial activity → Host effects

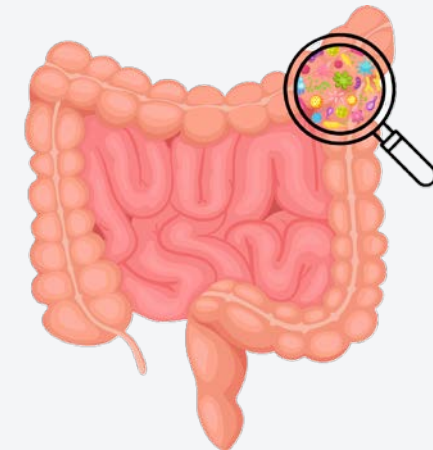
Microbes can:

Ferment dietary carbohydrates

Produce metabolites such as **short-chain fatty acids**

Modify bile acids and other compounds

Interact with the immune system and intestinal barrier



Gut Microbiome Testing

Your gut is an ecosystem.

Provide sample 🍌

Measure → Validate → Intervene → Measure the outcome

Specific organism or microbial function

Reproducible testing

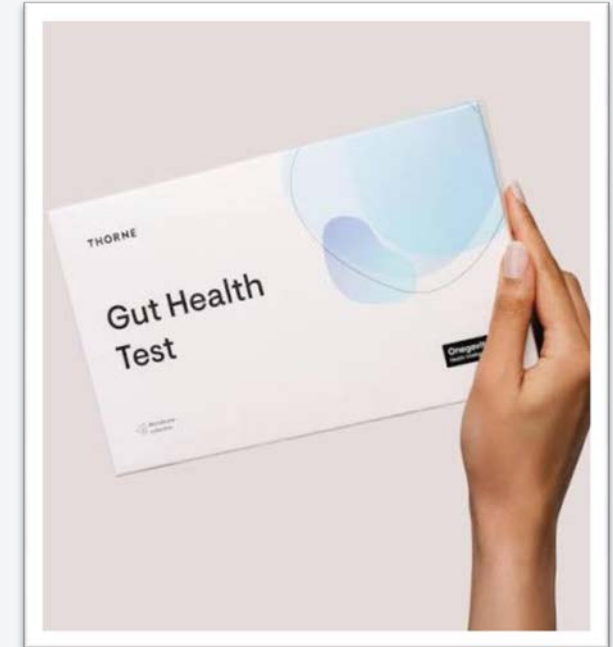
Defined intervention

Clinically meaningful outcome

Is it accurate?

Test → “Imbalance” → Personalized supplement

- ☐ ☐ “Low diversity” ≠ automatically unhealthy
- ☐ ☐ More of a “good” bacterium ≠ automatically better
- ☐ ☐ Microbiome association ≠ causation
- ☐ ☐ A personalized report ≠ clinically validated personalized nutrition



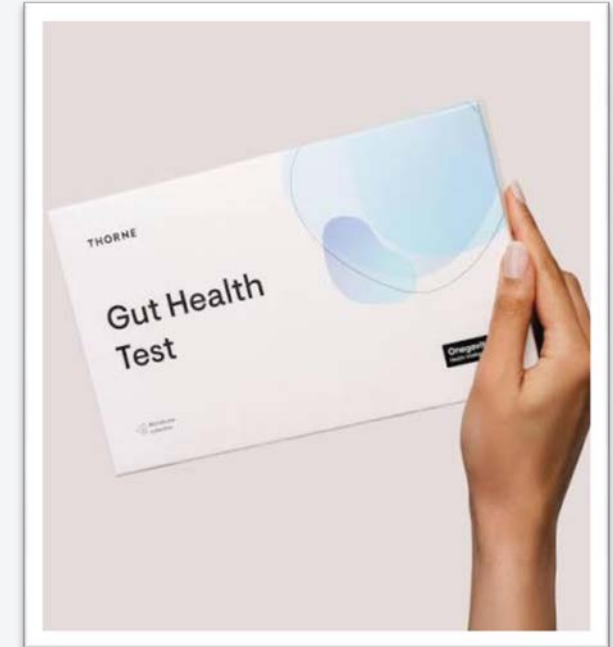
Gut Microbiome Testing 🍌

Your gut is an ecosystem.

**The question to ask
“What changed—and did that change actually
improve a meaningful health outcome?”**

Bottom line:

**We can increasingly measure the microbiome. We
are still learning how to reliably translate those
measurements into individualized clinical
recommendations.**



Digital Wearables for Individualized Data

We're measuring more than ever.



1 — Glucose

Dexcom Stelo • Abbott Lingo • Dexcom G7 • FreeStyle Libre 3 Plus

CGMs provide continuous interstitial glucose data. Stelo and Lingo are OTC options in the U.S.

2 — Activity

Apple Watch • Garmin • Fitbit • WHOOP

Steps, exercise duration, training load, movement patterns and activity intensity.

3 — Sleep

Oura Ring • WHOOP • Apple Watch • Garmin

Sleep duration, timing, consistency, estimated stages and recovery-related metrics. Consumer sleep-stage and proprietary sleep scores should be interpreted more cautiously than basic duration/consistency.



Digital Wearables for Individualized Data

We're measuring more than ever.

4 — Heart Rate

Apple Watch • Garmin • WHOOP • Oura Ring

Continuous HR, resting HR, exercise HR and HRV. Some devices also incorporate ECG or other cardiovascular features.

5 — Energy Expenditure

Garmin • Apple Watch • Fitbit • WHOOP

Algorithms combine heart rate, accelerometry and personal characteristics to **estimate** energy expenditure.

6 — Dietary Intake

Meta Ray-Ban smart glasses • AI food-photo apps • research wearable cameras/sensors

This is the least mature category. Image recognition, wearable cameras and AI can increasingly identify eating events and estimate intake, but accuracy remains a major limitation.



Digital Wearables for Individualized Data

MORE DATA ≠ BETTER NUTRITION

The further a wearable moves from direct measurement to algorithmic estimation, the greater the potential for measurement error.

Is the device directly measuring the variable—or estimating it from an algorithm? An Apple Watch, Garmin, WHOOP, or Oura isn't six independent measurements—it often uses overlapping sensor data and proprietary algorithms to derive multiple outputs.

That distinction is huge for **sleep stages, energy expenditure, recovery scores, and increasingly dietary intake.**



THE TECHNOLOGY SHIFT

Is AI is coming for nutrition?



AI Is Coming for Nutrition (But Not Your Jobs)

Potential applications

1

Nutrition assessment

2

Documentation

3

Patient education

4

Translation

5

Diet analysis

6

Menu analysis

7

Meal planning

8

Workflow automation

What Is Here Now — and What Is Developing?

1 — Nutrition Assessment

NOW: AI-assisted food recognition, malnutrition/risk screening, pattern recognition in EHR and biometric data

COMING: Multimodal assessment combining **diet + labs + wearables + CGM + genetics + medical history** into a longitudinal patient profile.

2 — Documentation

NOW: AI scribes can convert conversations into draft notes, summarize records, and help structure documentation.

COMING: Ambient documentation—the dietitian conducts the visit while AI drafts the assessment, intervention, goals, and follow-up documentation for clinician review.

What Is Here Now — and What Is Developing?

3 — Patient Education

NOW: Generative AI creates handouts, simplifies medical language, answers common questions, and adapts education to health literacy.

COMING: Dynamic education that changes based on the patient's behaviors, questions, biomarkers, and progress. Chatbots are already one of the major AI categories being studied in nutrition care.

4 — Translation

NOW: Near-real-time translation of written nutrition materials and conversations.

COMING: Voice-to-voice multilingual counseling, including culturally adapted rather than simply word-for-word translated education.

What Is Here Now — and What Is Developing?

5 — Diet Analysis

NOW:

Take a picture → identify foods → estimate portions → calculate nutrients.

AI dietary-assessment research now incorporates computer vision, NLP, wearable sensors and multimodal models.

COMING: Passive/semi-passive intake capture using cameras and wearable sensors instead of traditional food log.

The major remaining challenge is **portion-size and nutrient estimation in real-world meals**, where errors can accumulate through multiple steps.

6 — Menu Analysis

NOW: AI can rapidly evaluate menus for nutrients, allergens, dietary restrictions, cost, and recipe composition.

COMING: Dynamic institutional menus optimized simultaneously for nutrition, preference, inventory, food waste, procurement and cost.

What Is Here Now — and What Is Developing?

7 — Meal Planning

NOW: Generate meal plans around calories, macros, allergies, preferences, culture, budget and available foods.

COMING: Adaptive meal planning:

CGM + activity + sleep + intake + goals → tomorrow's recommendations

Rather than giving someone a static seven-day meal plan, the system continually adjusts recommendations as new data arrive.

8 — Workflow Automation

NOW: Scheduling, follow-ups, summaries, referral triage, data extraction and repetitive administrative tasks.

COMING: AI agents that connect multiple steps:

Referral → chart review → assessment prep → visit → documentation → education → follow-up

AI's Biggest Problem

AI doesn't know when it's wrong.

GOOD

Organization
Calculations
Drafting
Pattern recognition

USE WITH CAUTION

Nutrient estimates
Clinical recommendations
Personalized nutrition

HUMAN REQUIRED

Clinical judgment
Safety
Ethics
Accountability

The FS Manager/Dietitian's Role Changes

Less: data entry • calculation • repetitive documentation • generic education

More: validation • interpretation • clinical judgment • behavior change • relationship building

AI in Food Waste



What if we could see waste before we threw it away?

Automation & Robotics

Who is going to make the food?

1

Automated preparation

2

Portioning

3

Inventory

4

Transportation

5

Cleaning

6

Food production

COULD AUTOMATION IMPROVE SAFETY AND CONSISTENCY — NOT JUST REDUCE LABOR?



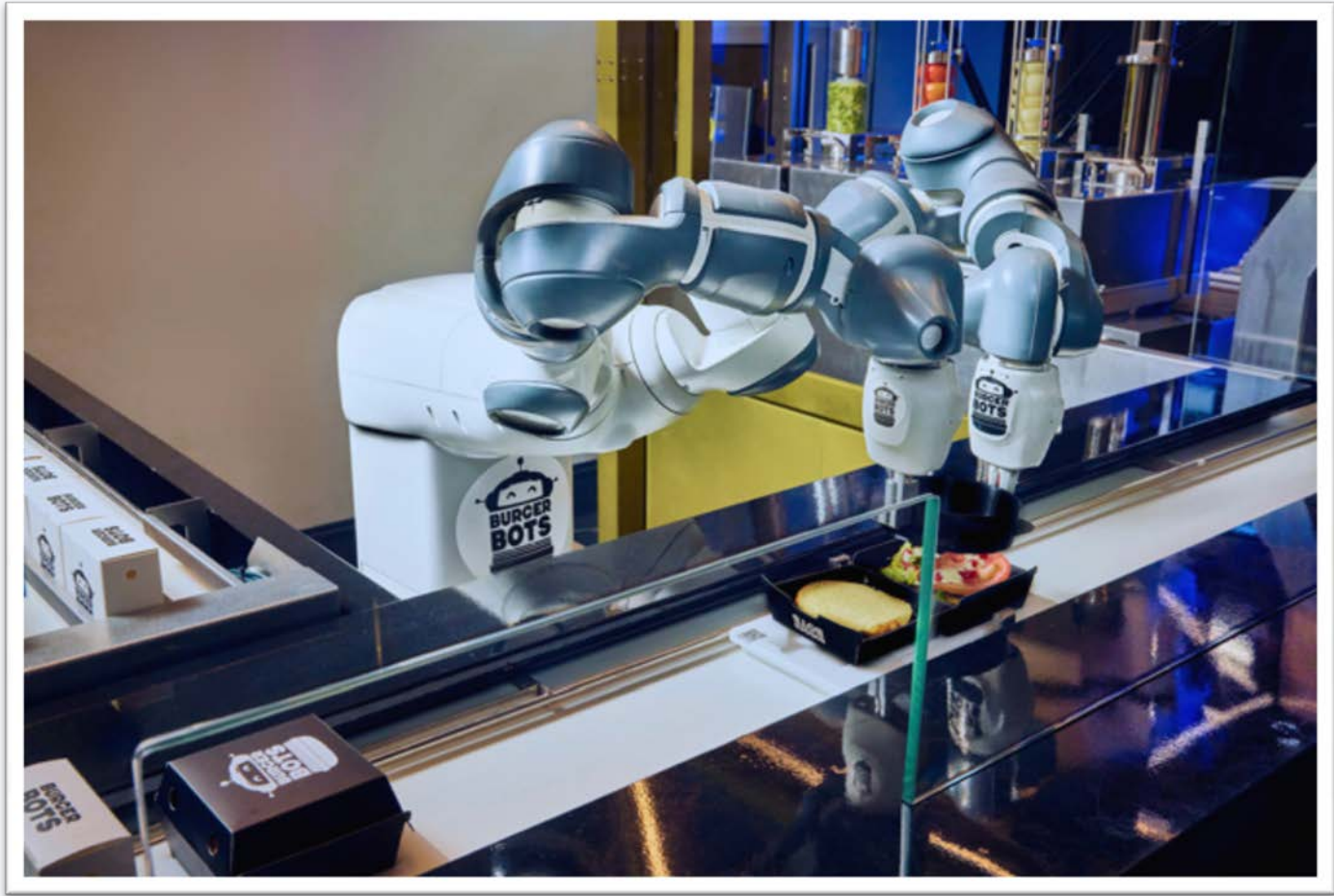
Project Open Hand

The San Francisco-based nonprofit uses Chef robots powered by physical AI to address staff shortages and deliver consistent, medically tailored meals to people in need.



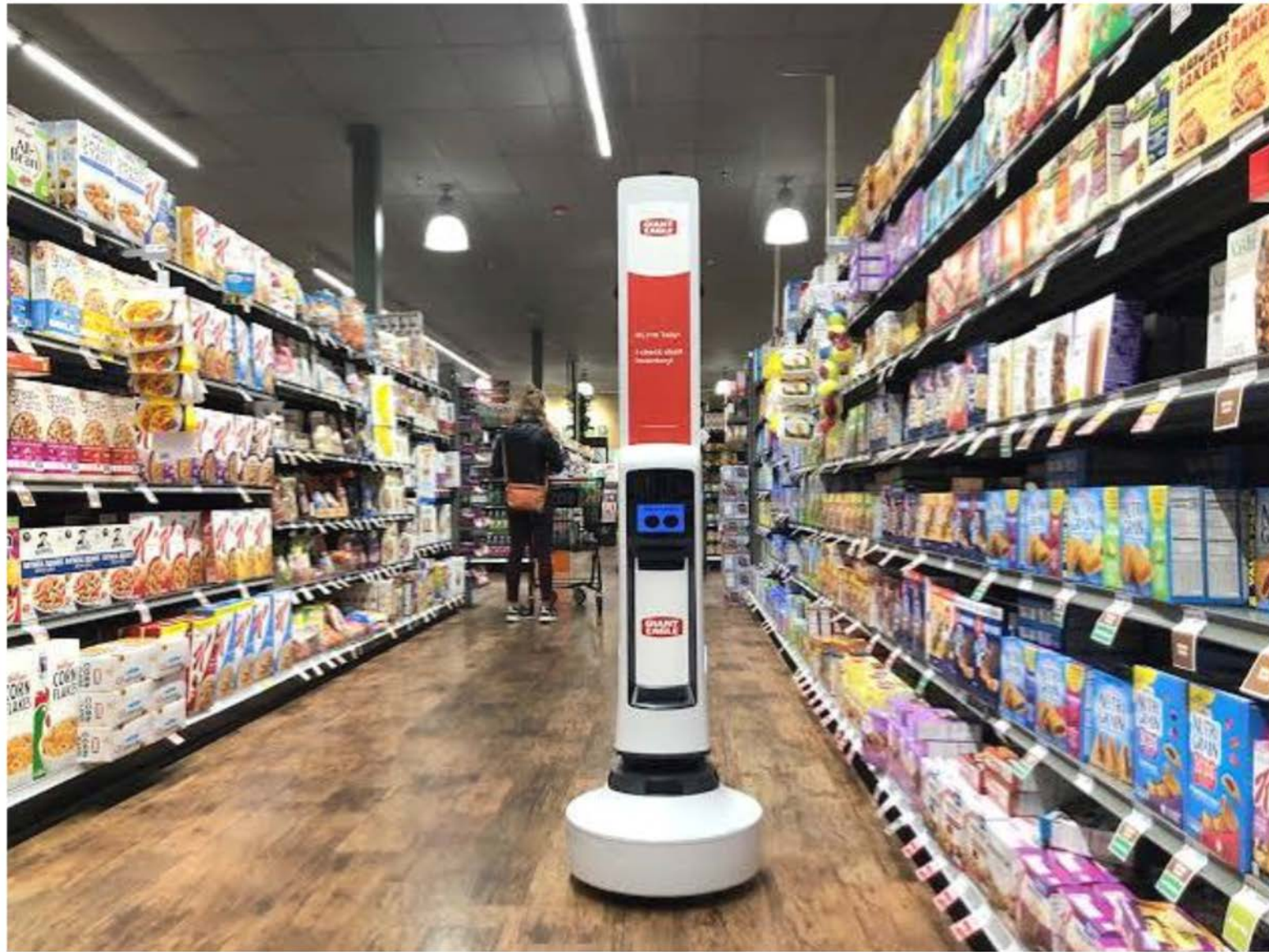
Cafe Spice

Using Chef's robots, Cafe Spice was able to boost output by 2-3x, ease labor shortage constraints, and lower food giveaway by 67%.





Tally, the Inventory Robot





Hype vs. Reality

Not every emerging trend deserves an intervention.

HIGH EVIDENCE

HIGH RELEVANCE

Protein
GLP-1 nutrition
Food waste
AI workflow

PROMISING

EMERGING

Precision nutrition
Microbiome
Wearables
Automation

LOW EVIDENCE

HIGH HYPE

Some peptide products
“Miracle” supplement stacks
Novelty/new technology

The Trend Filter

Before we chase the next big thing...

- 1 Is the science good?
- 2 Does it solve a real problem?
- 3 Does it improve outcomes?
- 4 Can we operationalize it?
- 5 Is it worth the cost?



The Future Correctional Foodservice Professional

NOT JUST

**FOODSERVICE
MANAGER
OR
DIETITIAN**

BUT INCREASINGLY

**NUTRITION
+
OPERATIONS
+
TECHNOLOGY
+
DATA
+
HUMAN BEHAVIOR**

**THE JOB
GETS
MORE
INTERESTING.**

THE ARC

We've come a long way.

From Bread & Water → AI.



We Used to Ask...

“Who’s feeding the prisoner?”

And now:

“Can we get a robot in our dish room?”

Thank You



FROM BREAD & WATER → AI

Nick Padula, MS, RD, CSSD

Professor of Nutrition, USC
Consultant Dietitian • Senior Living & Juvenile Correctional Facility

QUESTIONS & DISCUSSION

