

ON THE FUTURE OF FOOD

LONGEVITY

THE VERIFIED PLATE

Potential mid-term impacts on food product development



CONSTANTIN GEIER 22411 · MAGDALENA PAWŁOWSKA 22491 ·

LUKAS SCHLERF 22504

INNOM1720 – APPLIED PROJECT MANAGEMENT

HOCHSCHULE STRALSUND MSC INTERNATIONAL

INNOVATION MANAGEMENT

CONTENTS

INSIDE THE REPORT

- 01 Executive summary
- 02 Introduction
- 03 Methodology
- 04 Findings - five signals, one direction
- 05 Scenario - The Verified Plate (2035)
- 06 Limitations & future research
- 07 Implications for product development
- 08 Conclusion
- 09 References



FIG.02

PROOF, NOT ASSERTION, BECOMES THE PRODUCT

Population aging is now a present condition for the food industry, not a distant forecast. Longevity, the years a person lives in good health, is changing how food is developed. This report examines that change through weak signals drawn from two sources, those observed at VivaTech 2026 and those surfaced through scientific literature research, and recorded together in a trend radar on the FIBRES platform. It asks which signals indicate the mid-term impacts of longevity on food product development, and what manufacturers should do about them. The signals form five clusters.

Ingredients are being changed to add benefit and remove harm. Artificial intelligence is becoming a design layer that shortens the path from a tested compound to an approved claim. Prevention is drawing food towards the clinic. The supply chain is becoming auditable, turning provenance into a verifiable competitive asset. Consumer interfaces are rewarding products whose health relevance can be proven and read.

A scenario - The Verified Plate - condenses these trends into one mid-term picture for around 2035, in which longevity products compete on proof rather than on assertion. It was chosen from three candidate futures using Field Anomaly Relaxation and a falsification test after Popper (1959; 1963), and it survives that test more convincingly than the alternatives. The four resulting recommendations share one logic: build the capacity to prove a benefit before the market demands it. Reformulation and machine-readable data are low-regret actions for now, supply-chain provenance is a medium-term investment, and the convergence of food and clinical channels is a strategic option to monitor.

“Proof is becoming the product. The ability to evidence a benefit is the asset worth building now.”

WHY THE OLDEST CUSTOMERS ARE RESHAPING EVERY PRODUCT DECISION

Population aging has shifted from a long-range projection to a current reality for the food industry. Between 2015 and 2050, the share of the world's population aged over 60 is expected to nearly double, increasing from 12% to 22%, which amounts to around 2.1 billion people. By 2030, one in six individuals globally will be aged 60 or over (WHO, 2025). Europe currently has the oldest age structure of any region, positioning its food processors at the forefront of this demographic shift.

This shift is not uniform across regions, and this unevenness has implications for product distribution. Japan leads in demographics, with nearly 30% of its population already aged 65 or older (Statistics Bureau of Japan, 2024). Furthermore, Japan has a functional-food culture that treats food as a preventive measure in mainstream practices rather than as a niche market. Europe follows closely behind, blending an aging population with a dense and well-capitalized food-processing sector and a tightly regulated environment for health claims. North America is aging more slowly but spends more per capita on health-oriented products.

These three regions will not converge on the same products simultaneously; therefore, manufacturers need to consider not only what trends are emerging but also where they will manifest first. For European processors, the situation is both challenging and beneficial: the oldest market is also their home market, meaning that any developments will unfold right on their doorstep, whether they choose to participate or not.

12→22%

World population aged 60+, 2015–2050

2.1bn

People aged 60+ by 2050

1 in 6

Aged 60+ by 2030 (WHO, 2025)

\$184–370bn

Functional-food market, 2025



BETTER YEARS, NOT JUST MORE OF THEM

Longevity changes how the industry approaches health. In this context, the term refers not just to raw life expectancy, but to "healthspan", the number of years lived in good health. This perspective emphasizes the role of food as a crucial factor in extending healthspan. The market for foods that offer benefits beyond basic nutrition is both large and expanding, with estimates for the global functional food market ranging from approximately USD 184 billion to over USD 370 billion by 2025. Annual growth in this sector is expected to be in the mid-to-high single digits through the early 2030s (Global Market Insights, 2025). A systematic review by Leitão et al. (2022) of 36 studies confirmed that diets high in vegetables, fruits, fish, and unsaturated fats significantly protect against telomere shortening, cardiovascular disease, and cognitive decline, key indicators of healthy aging. It is important to differentiate between lifespan and healthspan, as they fundamentally shape the commercial logic of longevity foods. Lifespan refers to the total number of years a person lives, while healthspan denotes the number of those years spent in good health, free from chronic diseases and functional decline. This distinction is crucial.

Food specifically deserves focus in this discussion because longevity science identifies various levers for promoting health: pharmaceuticals, supplements, lifestyle changes, and diet, each serving distinct roles. Pharmaceuticals require the most rigorous evidence and have the slowest path to market. While supplements can be brought to market quickly, they often face credibility issues due to a lack of supporting evidence. Food, on the other hand, occupies a unique position: it is consumed daily without the hassle of taking a pill or the skepticism attached to supplements. When benefits are integrated into common foods, they can reach individuals hundreds of times a year without requiring behavior change.

However, the evidence for promoting healthy longevity is unforgiving when it comes to marketing claims. Significant improvements in healthy longevity stem from overall dietary patterns rather than from specific ingredients. Research indicates that the largest gains in life expectancy are associated with sustained shifts toward eating legumes, whole grains, and nuts, rather than any individual hero compound (Fadnes et al., 2022). Additionally, the epidemiological data do not strongly support the use of multivitamin supplementation as a strategy for longevity (Hu, 2024). For manufacturers in this sector, the key takeaway is that the value lies in verifiable, pattern-level benefits, rather than in proprietary superfoods.

“The most powerful longevity intervention may be the one the consumer never notices they are taking.”

A WIDENING GAP, AND WHERE TO LOOK

The gap between lifespan and healthspan has been widening: across 183 countries, the average shortfall reached 9.6 years in 2019, a figure that has steadily increased over the past two decades (Garmany & Terzic, 2024). This indicates that improvements in longevity have outpaced advancements in healthy longevity. Longevity-focused products do not aim to increase lifespan; instead, they concentrate on enhancing healthspan. A product that helps preserve muscle, protect the heart, or slow cognitive decline seeks to promise better years rather than merely more years. This is a more honest and defensible claim. It also emphasizes the importance of proof in this category: benefits that improve healthspan unfold slowly and invisibly over decades, making them difficult for consumers to perceive. Thus, these benefits must be demonstrated clearly.

VivaTech 2026, Europe's largest start-up and technology event, served as the foundation for this study. The exhibition gathered early-stage ventures, corporate innovators, and investors from the food, health, and agricultural technology sectors, providing a rich source of insights at the intersection of longevity science and food product development. Yuan et al. (2024) describe functional foods as an essential extension of functional agriculture, characterized by precise nutrition and the delivery of both nutritional and medicinal value. This aligns with what the group observed on the show floor. Rattan and Kaur (2022) remind us that food should not be seen merely as a means of delivering nutrients, but as a cultural, behavioral, and physiological phenomenon that is central to healthy aging. This underscores the idea that technology signals alone do not create trends; both supply and demand must align, and both were represented in Paris.

THE RESEARCH
QUESTION

Which weak signals observed at VivaTech 2026 indicate the mid-term impacts of longevity on food product development, and what should food manufacturers do about them?

The question is bounded to the mid-term, roughly five to fifteen years, because that horizon is long enough for emerging signals to mature into commercial reality, yet short enough to inform current development decisions.

THE EVIDENCE THAT THE BENEFIT IS REAL

Before a manufacturer can sell a product as proof of health benefits, solid evidence must exist to support those claims. Currently, four independent streams of evidence confirm the same conclusion, and their agreement, despite varying biases, enhances the reliability of the findings.

At the top of this evidence hierarchy is randomized trial data. The PREDIMED study, the largest dietary trial of its kind, followed 7,447 high-risk adults in Spain. It found that a Mediterranean diet, supplemented with extra-virgin olive oil or nuts, reduced major cardiovascular events by approximately 30% compared to a low-fat control group (Estruch et al., 2018). This trial also serves as a lesson in the importance of verification: flaws in the original randomization led to a retraction in 2013, and only the re-analyzed results from 2018 remain valid—illustrating that a claim is only as trustworthy as the scrutiny it withstands.

Long-term cohort studies provide a broader perspective, offering insights that a four-year trial cannot. Tessier et al. (2025) followed 105,015 individuals for three decades, defining healthy aging as reaching the age of seventy without the presence of eleven chronic diseases, while maintaining cognition and functional ability. They discovered that only 9.3% of participants achieved this outcome, and adherence to a plant-forward diet significantly increased the odds of reaching it.

Modeling helps translate these associations into actionable numbers. The Food4HealthyLife model suggests that shifting from a typical Western diet to one rich in legumes, whole grains, and nuts starting in early adulthood could potentially add about a decade to life expectancy. Notably, those who make dietary changes later in life can also achieve meaningful benefits (Fadnes et al., 2022).

Population data on centenarians supports these findings, indicating that nutrient-dense, predominantly plant-based diets and moderation contribute to longevity. However, this evidence is somewhat weaker because celebrated "Blue Zone" longevity areas may be influenced by unreliable age records and inadequate registration rather than diet alone (Newman, 2024). This caution refines rather than undermines the observed patterns.

Importantly, the benefits of a healthy diet can be quantified. Studies show that higher diet quality correlates with slower epigenetic aging as measured by DNA methylation clocks, which statistically account for a significant portion of the link between diet and mortality (Kim et al., 2022). This gives longevity-promoting foods the objective and machine-readable proof of benefit that will ultimately determine which products succeed in the market.

~30%	105,015	~10 yrs	9.3%
Fewer cardiovascular events, Mediterranean diet (Estruch et al., 2018)	Adults followed for 30 years (Tessier et al., 2025)	Potential life-expectancy gain from early dietary change (Fadnes et al., 2022)	Reached age 70 ageing healthily (Tessier et al., 2025)



The study applies a structured foresight process: defining the search area, scanning for weak signals both at VivaTech 2026 and in the scientific literature, validating each signal against peer-reviewed sources, categorising and clustering signals into trends, building and testing scenarios, and drawing implications for practice. Three data-gathering methods were combined: live exhibition scanning at VivaTech 2026 (17-20 June), structured desk research grounded in scientific literature, and two rounds of primary interviews - one with exhibitors on the supply side, one with visitors on the demand side.

Each method played a distinct role, and their combination was deliberate. Live exhibition scanning supplied breadth: across the four show days the team moved systematically through the food, agritech, healthtech and artificial-intelligence halls, logging any claim that met the weak-signal criterion directly into the FIBRES trend-radar platform rather than relying on later recall. Desk research supplied depth and discipline: every logged signal was checked against at least one peer-reviewed source within forty-eight hours, and any signal that could not be corroborated was flagged rather than silently dropped, so the strength of the evidence base behind each cluster stayed visible. Scientific literature also worked in the other direction, surfacing signals that never appeared on the show floor. The interviews supplied direction: the two rounds let the team test whether a signal that looked significant at the exhibition was also felt as significant by the people who would make or buy the resulting products.

SCANNING 58

Signals logged live in the FIBRES trend radar across food, agritech, healthtech and AI halls - recorded on the floor rather than from later recall.

VALIDATION

Each signal corroborated against at least one peer-reviewed source anything unproven was flagged, never silently dropped.

SCENARIO 3→1

Three internally consistent futures built via Field Anomaly Relaxation; one selected after a Popperian falsification test.

SELECTED BY ELIMINATION, NOT PREFERENCE

The scenario stage relies on two key methods that require clarification, as the central claim of the report is based on them. The first method, Field Anomaly Relaxation, was developed by Russell Rhyne (1981; 1995). This structured technique allows for the construction of internally consistent futures. Instead of simply extrapolating a single trend, it identifies the few driving forces that genuinely shape an outcome, specifies the plausible states each force could assume, and tests all possible combinations of those states for internal consistency, discarding any contradictory outcomes. The result is a limited set of coherent, distinct futures rather than a single, averaged forecast. In this instance, the four driving forces selected were regulatory speed, openness of evidence, consumer trust, and distribution channels, as the signals themselves clustered around these themes.

The second method, the falsification test, is based on the philosophy of Karl Popper (1959; 1963). Popper argued that a proposition gains credibility not through supportive evidence but by enduring genuine attempts to disprove it. In this context, each candidate future underwent rigorous scrutiny using data gathered from interviews and desk research performed by the team. A future was retained only if no collected evidence contradicted it. This approach enables the report to assert that The Verified Plate not only survives scrutiny but was selected through a process of elimination rather than mere preference.

A STRICT CRITERION, KEPT VISIBLE

Signal identification followed a strict criterion: a claim was considered a candidate for a weak signal only if it indicated a novel change that could significantly impact food product development and was not yet an established practice. We excluded duplicate entries and platform demonstration items not originating from our group's own observations to ensure that the radar reflected genuine signals rather than marketing claims.

The fifty-eight remaining signals were categorized into five groups based on their directional alignment rather than their sector proximity. This organization was based on where each signal pointed, rather than the industry it originated from. The combination of breadth (scanning), depth (desk research), and direction (interviews) was intentional: each method tested a different aspect of whether a weak signal was legitimate, and any signals that could not be corroborated were flagged instead of discarded.

FIG.05

FOUR DRIVING FORCES

- 01 Regulatory speed & strictness on health claims
- 02 Openness vs. privatisation of evidence
- 03 Consumer trust in labels & scores
- 04 Distribution channel - retail, clinical or AI-guided

LIMITS - The method has clear limits. The signal set is a snapshot from one event; the clustering reflects the team's judgement; the scenario is exploratory rather than predictive; and the interviews are small in number and corroborative rather than representative.

FIVE SIGNALS, ONE DIRECTION

The radar presents its first story through a distinct shape. Most signals are currently nestled in the product-development phase, indicating a dynamic atmosphere where innovation is actively unfolding, while only a handful remain in the nascent ideation stage, and very few have reached the maturity of established practices. A significant proportion of these signals are evaluated as having high impact, suggesting that their potential to influence the market is substantial.

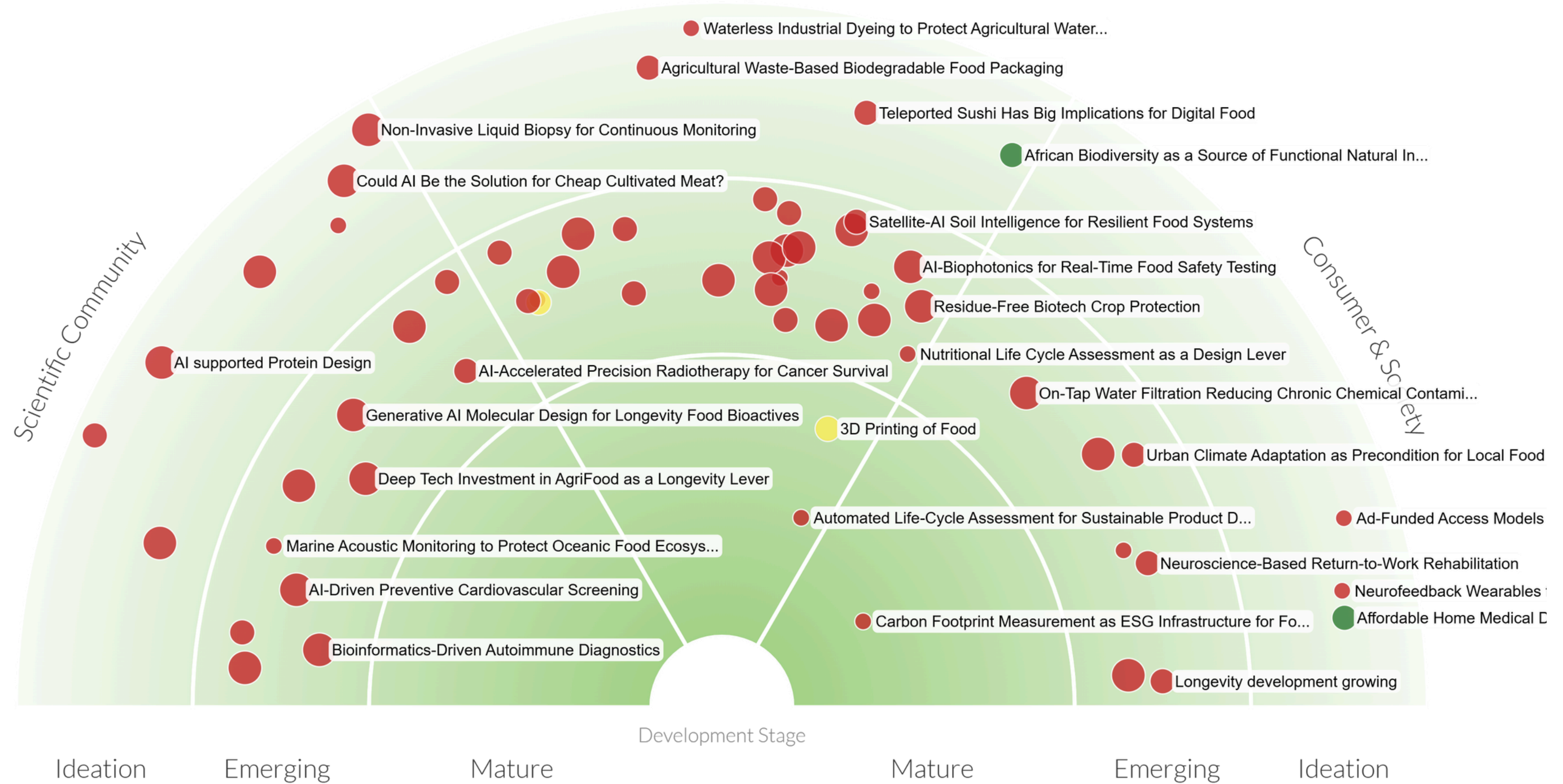
Interestingly, the concept of longevity has recently moved from the confines of research laboratories to the vibrant environment of product development. This shift is so new that standardized practices are yet to emerge, highlighting the innovative spirit within the field. As such, the landscape remains ripe for exploration, with clear directional signs pointing toward untapped opportunities. There is a unique chance to actively shape the future, guiding it rather than merely following the well-trodden paths of existing trends.

01	THE INGREDIENT CHANGES FIRST	Reformulating to add benefit and remove harm
02	AI BECOMES THE DESIGN LAYER	From tested compound to approved claim, faster
03	FOOD MOVES TOWARDS THE CLINIC	Prevention, diagnostics, food-as-medicine
04	THE SUPPLY CHAIN BECOMES AUDITABLE	Provenance as a verifiable competitive asset
05	THE SHOPFRONT REWARDS PROOF	Interfaces conditioned on evidence and legibility

FIG.06



Product Development





THE INGREDIENT CHANGES FIRST

Companies are simultaneously changing food ingredients in two ways: by adding benefits or removing harmful components. For instance, salt-offset technology reduces the sodium that enters the bloodstream while preserving flavor. Precision-fermented proteins, such as those produced by Verley (featured at VivaTech 2026), offer leucine-rich whey without the use of animals. Additionally, microalgae platforms can provide DHA and GABA at an industrial scale. The added benefits are built in and remain invisible to consumers, requiring no extra effort on their part.

Hu (2002) established a key principle in nutritional epidemiology: overall dietary patterns, rather than individual nutrients in isolation, are the best predictors of long-term health outcomes. This principle supports the whole-product reformulation approach seen at the show.

Two emerging trends have yet to be clearly named but enhance this pattern. The probiotic-nutrition trend observed at Carembouche addresses sarcopenia, the age-related loss of muscle, through the gut-muscle connection. It uses specific Lactobacillus strains to promote muscle maintenance indirectly via the microbiome. This approach reframes a structural issue of aging, suggesting that it can be addressed with everyday fermented products rather than requiring clinical interventions. Muscle loss is one of the strongest predictors of frailty and early mortality (Liu et al., 2017).

The silk-fibroin biomaterial trend, showcased at United Silk, takes a different approach. Instead of adding or removing an active ingredient, it provides a food-grade material for encapsulating proteins and nutrients, helping them survive processing and digestion. While this technology is rated as medium impact rather than high impact, enabling technologies like this often determine which benefits are commercially viable.

SIGNAL	START-UP	MECHANISM	STAGE	IMPACT
Probiotic vs. sarcopenia	Carembouche	Gut-muscle axis, Lactobacillus	EMERGING	● HIGH
Precision-fermented dairy	Verley	Leucine-rich whey, animal-free	EMERGING	● HIGH
Microalgae nutrients	AlgaleX	Fermentation-derived DHA/GABA	EMERGING	● HIGH
Salt-offset technology	Toymedical	Sodium-block, taste preserved	EMERGING	● HIGH
Silk fibroin biomaterial	United Silk	Protein/nutrient encapsulation	EMERGING	○ MEDIUM

Read together, the cluster shows reformulation working on three fronts at once: removing harm, adding benefit, and improving the delivery of both.

AI BECOMES THE DESIGN LAYER

Tools initially developed for drug discovery, such as generative molecular design and physics-based AI searches, are now being applied to food compound libraries. Aqemia, which was recognized as one of the Top 100 at VivaTech 2026, exemplifies this trend: its platform, which combines quantum physics and generative AI, raised \$100 million and secured a multi-year agreement with Sanofi. This same architecture can search for food bioactives at a significantly lower regulatory cost. Additionally, AI documentation tools like Biolevate (featured on the VivaTech Black Stage) are streamlining the health-claim process, reducing what traditionally takes 5 to 10 years down to just months. The challenge now is not identifying which compounds are important, but demonstrating their efficacy quickly enough to secure health claims.

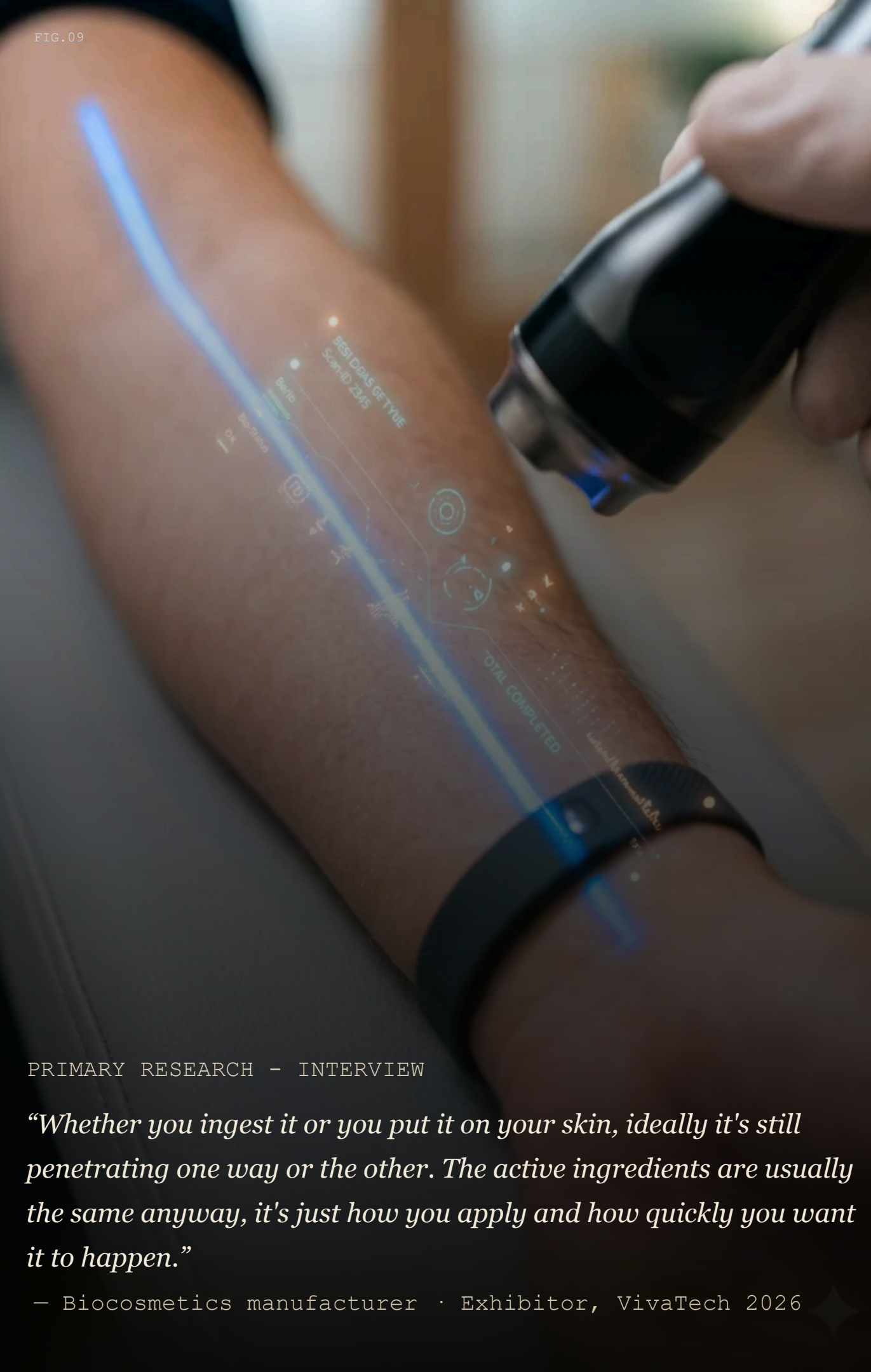
Beneath these two main trends, two additional developments indicate the future direction of design in agriculture. AI-controlled growing, as seen with Bienesis, applies machine learning not just within laboratories but also in the field, optimizing growing conditions to enhance the phytochemical content of crops even before processing. This approach effectively designs the raw materials rather than just focusing on the final formulation. Meanwhile, the generative agri-data initiative associated with Inria and INRAE takes a more foundational approach: it utilizes extensive agronomic datasets as training material for artificial intelligence, creating a data infrastructure essential for optimizing both crop levels and specific compounds.

SIGNAL	START-UP	MECHANISM	STAGE	IMPACT
Generative molecular design	Aqemia	Physics-AI for bioactives	EMERGING	● HIGH
AI regulatory documentation	Biolevate	AI for health-claim dossiers	EMERGING	● HIGH
AI-controlled growing	Bienesis	Phytochemical optimisation	EMERGING	○ MEDIUM
Generative agri-data (GAIA)	Inria / INRAE	Agronomic datasets as AI	EMERGING	● HIGH

The design layer is not confined to molecules: it moves upstream into agriculture and downstream into the regulatory dossier at once, so advantage accrues to those who connect those ends, not those who automate a single step.



PRIMARY RESEARCH - INTERVIEW
“Longevity is becoming a big topic, not only in human food, but also in pet foods. While there are more regulatory constraints in human food, it is easier to implement something new in the pet industry. I think it's the starting point, and then the human industry will follow.”
— Ingredient supplier · Exhibitor, VivaTech 2026



PRIMARY RESEARCH - INTERVIEW

“Whether you ingest it or you put it on your skin, ideally it's still penetrating one way or the other. The active ingredients are usually the same anyway, it's just how you apply and how quickly you want it to happen.”

— Biocosmetics manufacturer · Exhibitor, VivaTech 2026

FOOD MOVES TOWARDS THE CLINIC

Affordable, non-invasive diagnostics are making continuous health monitoring a norm. Once an individual's health risks are identified, dietary changes become a tailored response rather than a broad suggestion. Clinical AI assistants, such as Nabla and those recognized in the VivaTech Top 100, are emerging as key channels for delivering proven food options to patients as part of their care. A recurring theme in primary interviews revealed that the distinction between food and pharmaceutical products is diminishing. One exhibitor, who works with active ingredients in both sectors, noted that the gap is becoming very small, with many active ingredients being similar or identical.

The diagnostic insights behind the headlines present a unified story about decreasing costs and reducing friction in health monitoring. For instance, Viit Health’s non-invasive metabolic monitoring compresses a metabolic read into a thirty-second optical scan, eliminating the need for needles and laboratory waiting times, which previously made such monitoring occasional rather than routine. Talos Corp's preventive aneurysm screening leverages machine learning to identify risks before acute events occur, shifting the focus of clinical encounters from treatment to proactive anticipation. Additionally, the liquid biopsy concept from CGenetix, still in the ideation stage and therefore the least developed, looks ahead to consistent detection using circulating biomarkers. Each of these innovations makes it cheaper and more frequent to assess an individual's internal risk profile, and an increase in the frequency of these assessments broadens the scope for targeted dietary interventions.

SIGNAL	START-UP	MECHANISM	STAGE	IMPACT
Non-invasive metabolic monitoring	Viit Health	Optical/NIR + AI, 30-sec scan	EMERGING	● HIGH
Preventive aneurysm screening	Talos Corp.	ML risk analysis, pre-acute	EMERGING	● HIGH
Non-invasive liquid biopsy	CGenetix	Circulating biomarkers, repeatable	IDEATION	● HIGH
AI clinical assistants as channel	Nabla	Clinical copilot recommends diet	EMERGING	● HIGH

Diagnostics are the demand-generating layer beneath food-as-medicine: the more often risk is measured, the more often a dietary response can be prescribed.

THE SUPPLY CHAIN BECOMES AUDITABLE

Sensors in plants and soil, satellite measurements, and digital traceability are transforming the tracking of ingredient history into a verifiable process. This issue is significant: a global review by Oceana (2016) of over 200 studies across 55 countries found that approximately one in five seafood samples was mislabelled, which can have serious health implications for consumers following longevity-diet advice. Among the exhibitors promoting real-time provenance verification were Seafood Souq (UAE, VivaTech Growth stage) and PlantVoice (France).

As of 2025, the EU’s Corporate Sustainability Reporting Directive (CSRD) has narrowed its scope, meaning that provenance tracking is not yet mandatory for all companies. This creates value for those who adopt it voluntarily as a competitive differentiator.

The concept of provenance goes beyond just seafood traceability. PlantVoice employs an in-planta biosensing technology that uses sensors within the plant to detect stress before visible symptoms appear, effectively turning crop history into a continuous record rather than a retrospective estimate. The satellite-AI technology at Sagri measures soil carbon remotely, while Hedge focuses on regenerative agriculture, making soil quality financeable by turning environmental attributes into assets that can attract investment. Furthermore, Veganic replaces chemical inputs with microbial consortia for crop protection, eliminating a class of contaminants from the supply chain right at the source. Together, these innovations illustrate how provenance is evolving from a simple label into a measurable, instrumented, and in some cases, investable attribute of products.

SIGNAL	START-UP	MECHANISM	STAGE	IMPACT
In-planta biosensing	PlantVoice	Sap sensor, stress before symptom	EMERGING	○ MEDIUM
Satellite-AI soil intelligence	Sagri	Soil carbon via remote sensing	EMERGING	○ MEDIUM
Residue-free crop protection	Veganic	Microbial consortia vs. chemistry	EMERGING	● HIGH
Regenerative ag investment	Hedge	Soil value made financeable	EMERGING	● HIGH
Digital seafood traceability	Seafood Souq	Vessel-to-consumer tracing	EMERGING	● HIGH

For a longevity manufacturer this is significant: a health claim is only as trustworthy as the chain behind it, and a chain that can be audited in real time converts trust from a marketing assertion into a verifiable fact.





PRIMARY RESEARCH — INTERVIEW

“I rely on labels and scores. I want someone to just tell me which foods are bad for me instead of making me figure it out myself.”

— Visitor survey respondent · Demand-side, VivaTech 2026

THE SHOPFRONT REWARDS WHAT CAN BE PROVEN

AI-assisted retail, represented by VusionGroup and Platinum Partner VivaTech 2026, highlights products that can demonstrate their relevance; products that cannot be recognized by these systems become invisible. Visitor interviews confirmed alignment with consumer demand. When asked what longevity meant to them, shoppers expressed a desire for healthier living, trust in labels and scores, and straightforward information about which foods are beneficial.

On the supply side, innovations like circular pulse proteins from INTACT Regenerative and on-tap water filtration from Pureva aim to eliminate harmful elements, verify helpful ones, and make information accessible.

The remaining signals in this category indicate that the shopfront logic is expanding in two distinct directions. The automated life cycle assessment at Holis integrates a nutrition and impact score during the design phase, ensuring that a product’s sustainability and health profile are calculated during development rather than estimated afterward. This makes the eventual machine-readable claim a natural outcome of the product's creation.

Additionally, the biometric personalized skincare solution at Beaute INEE, though rated low impact and categorized as a boundary case, illustrates a similar convergence from the cosmetic perspective. It uses biometric readings to inform personalized anti-aging responses. Its low rating is also telling, marking the limits of where the longevity and proof rationale remains applicable.

SIGNAL	START-UP	MECHANISM	STAGE	IMPACT
AI-connected retail interfaces	VusionGroup	Smart shelves, health profiling	EMERGING	○ MEDIUM
Circular pulse protein	INTACT Regenerative	Dry fractionation, Blue-Zone protein	EMERGING	● HIGH
Automated LCA / ecodesign	Holis	Nutrition + impact score in design	EMERGING	○ MEDIUM
Biometric personalised skincare	Beaute INEE	Biometrics + AI, anti-ageing	EMERGING	○ LOW

Shoppers do not want more information, they want a verdict. Systems that can deliver a trustworthy verdict will mediate the purchase, and products legible to those systems will be the ones the verdict favours.

THE VERIFIED PLATE

2035 · FIVE TRENDS · THREE CHARACTERS · ONE LOAF

The five signals indicate a clear direction, but a direction alone does not create a vivid picture. This section transforms the trends into one possible future. It follows three individuals whose lives intersect over a single loaf of bread: the woman who bakes it, the man who purchases it, and the doctor who recommends it. The story is crafted for readers.

The supporting evidence is presented in brackets where appropriate, and the methodology used to build and test this future is outlined separately afterward.

THE LOAF THAT LOOKS ORDINARY

Marta Brenner makes bread for a living, and this morning she is watching the reorder rate for a plain white loaf her team redesigned four years ago. The number is steadily climbing. Although the loaf looks ordinary, it is anything but. Her team implemented two significant changes, each addressing an issue associated with old age.

The first change was to reduce the salt content. The new bread contains less salt, yet it still tastes salty, thanks to a technology that tricks the taste buds while decreasing the sodium absorbed into the bloodstream. The World Health Organization (2023) has been warning for years that most people consume far more salt than is recommended.

The second change involved increasing the protein content. They replaced traditional milk protein with one derived from fermentation, rather than sourcing it from cows. This added protein helps older adults maintain muscle mass, which is crucial because muscle loss in old age significantly raises the risk of early death by approximately sixty percent (Liu et al., 2017). One modification benefits heart health, while the other supports muscle preservation. These advantages are not highlighted on the packaging; they are inherently included in the product, and their effectiveness is tracked through data that a computer can interpret.

Marta remembers the turning point: 2028, when the European Union rewrote its rules on health claims. AI systems approved to handle evidence files cut the wait from years to months. From that moment, the advantage went to whoever could show a real benefit first. Her team had spent two slow years building exactly that kind of evidence. Those two years suddenly looked like the best decision the company had ever made.

WHAT CANNOT BE READ DOES NOT GET PICKED

Jonas is fifty-eight years old and is shopping after work, feeling tired. A month ago, a quick scan at his doctor's office revealed a heart risk he wasn't aware of. Ten years earlier, such a test barely existed. Now, it takes just thirty seconds and requires no needles.

As Jonas walks through the supermarket, his phone reads the information for him. He has allowed the supermarket's app to access his health record, and as he moves down the aisle, it checks each product against that record. When he reaches the bread aisle, a small green mark appears next to Marta's loaf, while nothing appears next to the loaf beside it.

He chooses the marked loaf, thinking only that shopping has become easier. What he doesn't realize is that the loaf without a mark, right next to his selected one, tastes the same. However, the company that made that loaf never developed the data for it, so when his app scans the shelf, that loaf has no information to show. It is not a worse product; it's simply one that the app cannot read. In 2035, products that cannot be read simply do not get selected.

A DOCTOR'S OFFICE · A MONTH LATER

“For the first time in his life, Jonas had a loaf of bread recommended to him by his doctor.”

THE VERIFIED PLATE · 2035

HOW THIS FUTURE WAS BUILT AND TESTED

Field Anomaly Relaxation (Rhyne, 1981; 1995) shaped four driving forces; three internally consistent futures survived combination testing; each then faced a Popperian falsification attempt (Popper, 1959; 1963). A future is retained only if no evidence from the team's own research breaks it.

THE VERIFIED PLATE

SELECTED

Longevity products compete on proof rather than assertion. It survives every falsification attempt the evidence allows.

THE TWO-SPEED WORLD

RETAINED · WARNING

A plausible counter-future in which proof stays privatised and access to verified food splits along the lines of wealth.

SILENT REFORMULATION

DISCARDED

Contradicted by visitor-interview data showing strong demand for labels, scores and openness.

FOUR DRIVING FORCES

01 · REGULATORY SPEED

02 · OPENNESS OF EVIDENCE

03 · CONSUMER TRUST

04 · DISTRIBUTION CHANNEL

The conclusions presented should be interpreted with an awareness of the limitations inherent in the methodology employed - and these limitations naturally inform a future research agenda.

WHAT THIS STUDY CANNOT CLAIM

01 A SINGLE EVENT

Firstly, the collection of signals analysed represents a snapshot captured during a singular event. While the VivaTech exhibition showcases a rich and innovative array of ideas, it is just one event, held in one city over the span of one week. Consequently, the absence of a particular signal on the exhibition floor should not be taken to imply that it is non-existent within the broader global landscape of trends and innovations.

03 A SMALL INTERVIEW POOL

Thirdly, the pool of interviews conducted was relatively small, primarily designed to validate the findings rather than to represent a comprehensive sample of perspectives. These interviews aimed to explore whether a signal resonates within the targeted audience, rather than gauging its overall recognition on a wider scale.

02 SUBJECTIVE CLUSTERING

Secondly, the decision to categorise the signals into five distinct groups reflects subjective judgement rather than an absolute categorisation. Different researchers might apply the same directional-alignment principle but arrive at varying signal boundaries. Clustering by directional trends instead of sectoral divisions is legitimate, yet may not be seen as an objective standard by all scholars or practitioners.

04 EXPLORATORY SCENARIOS

Fourthly, the scenarios produced are by nature exploratory. The Field Anomaly Relaxation method generates plausible and internally consistent future scenarios, yet does not assess their likelihood. The falsification tests merely indicate that a proposed future has not yet been disproved by existing evidence, but do not confirm its veracity.

A FUTURE RESEARCH AGENDA

→ SCAN MULTIPLE EVENTS

Expanding the scope to encompass multiple events across diverse exhibitions and geographic locations would help ascertain whether the five identified clusters are unique to VivaTech or indicative of a broader, more stable structure within the industry.

→ A STRUCTURED PANEL

A more extensive, structured panel of interviews - participants selected systematically rather than through convenience sampling, with an analysis for inter-rater agreement, would elevate the findings from mere validation to solid, empirical evidence.

→ QUANTITATIVE VALIDATION

Incorporating quantitative signal validation techniques that assess each signal against established criteria for maturity and impact, rather than relying solely on expert judgements, would enhance the replicability and rigor of the research.

→ REVISIT AT 12 & 24 MONTHS

Finally, revisiting these signals after twelve and twenty-four months would let researchers evaluate the effectiveness of their foresight: the true value of a weak-signal study lies in tracking which signals have gained prominence, which have waned, and which may have been overlooked entirely.

BUILD THE ABILITY TO PROVE BEFORE THE MARKET DEMANDS IT

Four actions, one logic: build the ability to prove before the market demands it. If the mid-term future rewards proof, the actions a manufacturer should take now are those that build the capacity to evidence a benefit before the market demands it. Each recommendation connects to a specific cluster, so the advice can be traced back to the signals that justify it.

01 SEPARATE FORMULATION FROM CLAIMS - AND RESOURCE BOTH Several longevity ingredients are scientifically ready while their approved claims are not, because substantiation is slow and costly. A company that treats these as one problem will either delay a sound product or overstate a benefit. Treating them as distinct workstreams lets a reformulated product reach the market on its merits while the claims file matures independently. This is the immediate, low-regret action for any manufacturer reformulating around Clusters 1 and 2. LOW-REGRET · CLUSTERS 1-2	02 BUILD MACHINE-READABLE EVIDENCE IN FROM DAY ONE In the scenario, retail and clinical systems surface only what they can read. A product whose nutritional profile, provenance and evidence exist as structured data will be recommended; one without it will be invisible to the same systems. This is cheap done early and expensive done late. It connects directly to Cluster 5 and the AI-connected retail signals. LOW-REGRET · CLUSTER 5	03 TREAT PROVENANCE AS AN ASSET AHEAD OF REGULATION The signals from Cluster 4 show sourcing technologies that make clean provenance verifiable. The EU CSRD perimeter narrowed in 2025 rather than widening (European Commission, 2025), so the case for provenance investment rests on advantage and trust rather than compliance alone, which makes it durable even if reporting obligations contract further. Companies that build provenance capability now own a differentiator their late-moving competitors cannot copy quickly. MEDIUM-TERM · CLUSTER 4	04 PREPARE FOR THE MEETING OF FOOD AND CLINICAL CHANNELS The exhibitor interviews described a blurring line between ingested and topical actives, and the scenario places food inside preventive care. A manufacturer that monitors clinical distribution and partners early with diagnostic or clinical-AI providers reaches the consumer at the point of highest motivation: a diagnosis. This is the longest-horizon move and carries the most uncertainty: the rules for AI-mediated dietary advice do not yet exist, which is precisely why it should be watched now rather than later. STRATEGIC OPTION · CLUSTER 3
--	---	--	---

This report asked which weak signals, observed at VivaTech 2026 and surfaced through scientific literature, indicate the mid-term impacts of longevity on food product development, and what manufacturers should do about them. The 58 signals resolved into five clusters spanning ingredient-level change, AI as a design layer, prevention and food as medicine, a data-verified supply chain, and consumer interfaces conditioned on proof and sustainability. Together they point one way.

“Longevity is moving food product development away from benefits asserted on packaging towards benefits that are engineered, verified, and made legible to the systems that recommend them.”

The scenario moved towards a mid-term outlook in which a longevity product competes based on evidence rather than mere claims. This shift led to four sequenced recommendations, all based on a common logic: develop the capability to demonstrate benefits before the market demands it. While the conclusions drawn from this analysis are constrained by the method used- drawing on signals from a single event, reflecting the team's judgment, and relying on a limited number of interviews - these limitations do not undermine the key finding. The transition from claims to evidence is evident across all clusters and is supported by both suppliers and consumers. Rattan and Kaur (2022) remind us that food is more than just a means of delivering nutrients; it serves as a cultural and personal cornerstone of health. The signals observed at VivaTech 2026 indicate that the industry is starting to recognize this reality.

NOT A PREDICTION THAT CAN BE WAITED OUT

There is a final point worth stating plainly, because it determines how this report should be used. The shift it describes is not a prediction that can be waited out.

Each of the four recommendations is a capability that takes time to build, evidence files take years to mature, machine-readable data is cheap only if designed in from the start, and provenance and clinical partnerships are relationships, not purchases. The cost of building these capabilities falls steeply the earlier it is paid, and the penalty for waiting is not merely a slower product but, in the world the scenario describes, an invisible one. The signals do not promise that The Verified Plate is certain; the retained counter-scenario shows it is not. What they establish is narrower and firmer: across every cluster, on both the supply side and the demand side, the direction of travel is from benefits asserted toward benefits proven. A manufacturer cannot control whether that direction holds. It can only control whether it is ready when it does.

The report's recommendation is therefore not to predict the future but to become hard to falsify within it - to build, now and cheaply, the capacity to prove a benefit that the market has not yet thought to demand.

STATEMENT OF INDEPENDENT AUTHORSHIP

“We acknowledge the use of the AI tool Claude (from Anthropic) in preparing this report. Its role was to assist in organizing and clustering the collected weak signals and to support our data analysis. The AI tool served as an aid only; all underlying research, data collection, result interpretation, and conclusions are our own.

Additionally, we utilized Gemini for creating images.

“I hereby declare that I authored this thesis independently and have not used any sources or aids other than those referenced. In particular, I have not used any AI-based systems for text generation unless expressly permitted. I have explicitly marked all material quoted either literally or by content from the sources used. This work, with identical or substantially similar content, has not been previously submitted for any examination process.”



CONSTANTIN GEIER
22411



MAGDALENA
PAWŁOWSKA
22491



LUKAS SCHLERF
22504

Dai, Z. (2025). Eating well for ageing well: the role of diet and nutrition in promoting healthspan and longevity. <i>Proceedings of the Nutrition Society</i> , 1–12.	Leitão, C., et al. (2022). The effect of nutrition on aging — a systematic review. <i>Nutrients</i> , 14(3), 554.	Rhyne, R. (1981). Whole-pattern futures projection, using field anomaly relaxation. <i>Technological Forecasting and Social Change</i> , 19(4), 331–360.
Estruch, R., et al. (2018). Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with EVOO or nuts. <i>New England Journal of Medicine</i> , 378(25), e34.	Li, Y., et al. (2020). Healthy lifestyle and life expectancy free of cancer, cardiovascular disease, and type 2 diabetes. <i>BMJ</i> , 368, l6669.	Rhyne, R. (1995). Field anomaly relaxation: the arts of usage. <i>Futures</i> , 27(6), 657–674.
European Commission. (2025). <i>Corporate Sustainability Reporting Directive (CSRD): Omnibus simplification package</i> .	Liu, P., et al. (2017). Sarcopenia as a predictor of all-cause mortality. <i>Maturitas</i> , 103, 16–22.	Scott, A. J. (2021). The longevity society. <i>The Lancet Healthy Longevity</i> , 2(12), e820–e827.
Fadnes, L. T., et al. (2022). Estimating impact of food choices on life expectancy: a modeling study. <i>PLOS Medicine</i> , 19(2), e1003889.	Newman, S. J. (2024). Supercentenarian and remarkable age records exhibit patterns indicative of clerical errors and pension fraud [Preprint]. <i>bioRxiv</i> .	Statistics Bureau of Japan. (2024). <i>Current population estimates as of 1 October 2024</i> .
Garmany, A., & Terzic, A. (2024). Global healthspan–lifespan gaps among 183 WHO member states. <i>JAMA Network Open</i> , 7(12), e2450241.	Oceana. (2016). <i>Deceptive dishes: seafood swaps found worldwide</i> . Oceana.	Tessier, A.-J., et al. (2025). Optimal dietary patterns for healthy aging. <i>Nature Medicine</i> , 31, 1644–1652.
Global Market Insights. (2025). <i>Functional food market size, share and growth forecast 2025–2034</i> .	Popper, K. R. (1959). <i>The logic of scientific discovery</i> . Hutchinson.	World Health Organization. (2023). <i>WHO global report on sodium intake reduction</i> .
Hu, F. B. (2002). Dietary pattern analysis: a new direction in nutritional epidemiology. <i>Current Opinion in Lipidology</i> , 13(1), 3–9.	Popper, K. R. (1963). <i>Conjectures and refutations</i> . Routledge.	World Health Organization. (2025). <i>Ageing and health [Fact sheet]</i> .
Hu, F. B. (2024). Diet strategies for promoting healthy aging and longevity: an epidemiological perspective. <i>Journal of Internal Medicine</i> , 295(4), 508–531.	Rattan, S. I. S., & Kaur, G. (2022). Nutrition, food and diet in health and longevity. <i>Nutrients</i> , 14(24), 5376.	Yuan, Y., et al. (2024). Advancing insights into functional foods. <i>Food Science and Human Wellness</i> .
Kim, Y., et al. (2022). Higher diet quality relates to decelerated epigenetic aging. <i>The American Journal of Clinical Nutrition</i> , 115(1), 163–170.		

Drag your own images onto any slot in this report. To generate them, paste a prompt below into Gemini's image model — each maps to a figure by number. The frame differs per page — generate each image at the aspect ratio noted in its FRAME line so it fills the slot cleanly; no text in any image.

FIG.01 · COVER Cinematic hero — a single rustic artisan loaf on a dark brushed-steel counter, one warm tungsten spotlight, volumetric haze, shallow DOF, 50mm, chiaroscuro, near-black background, photoreal, no text. FRAME · 16:9 FULL-BLEED · 1920×1080
FIG.02 · CONTENTS A cinematic still life on dark slate, shot slightly from above: a single elegant empty ceramic plate, a soft luminous halo rising from it and a faint ring of glowing light-points and fine motes hovering above the rim, as if proof itself were quietly materialising over the plate, warm tungsten key meeting a faint clinical-blue rim light, volumetric haze, shallow depth of field, deep near-black background, reverent and future-facing, no food, photoreal, no text. FRAME · 3:4 PORTRAIT · ~806×1080
FIG.03 · INTRODUCTION Documentary portrait of a vital woman in her seventies in a sunlit modern kitchen, preparing fresh vegetables and herbs at a wooden counter, soft window light, warm dignified tones, bright eyes and an easy strength, shallow focus, evoking healthy ageing and quiet energy, photoreal, no text. FRAME · 3:4 PORTRAIT · ~845×1080
FIG.04 · METHODOLOGY I Wide shot of a vast tech-expo hall at dusk, blurred crowds among glowing startup booths, teal & amber light, long-exposure motion blur, futuristic, photoreal, no readable text. FRAME · ULTRA-WIDE BANNER ~7:1 · 1728×258
FIG.05 · METHODOLOGY II Abstract foresight — a dark field of softly glowing connected light points forming a constellation/radar, depth of field, fine particles, deep navy-black, cinematic, photoreal, no text. FRAME · 16:9 LANDSCAPE · ~864×497
FIG.06 · FINDINGS A dark data-radar — concentric rings of faint light with scattered glowing signal points of varying brightness, teal and warm accents, volumetric haze, cinematic, photoreal, no text. FRAME · 2:3 PORTRAIT · ~768×1080

FIG.07 · CLUSTER 1 Macro inside a future-food facility — rows of glass bioreactors of microalgae glowing faint green, condensation, cool industrial light, shallow DOF, photoreal, no text. FRAME · 2:3 PORTRAIT · ~730×1080
FIG.08 · CLUSTER 2 A dim lab at night — large translucent screens showing glowing 3D molecular structures generated by AI, reflections, cool blue light, a scientist silhouette, cinematic, photoreal, no readable text. FRAME · 2:3 PORTRAIT · ~730×1080
FIG.09 · CLUSTER 3 Close-up of a non-invasive optical health scan — a thin band of cool light passing over a wrist, faint data glow, clinical yet warm, soft focus, futuristic medical, photoreal, no text. FRAME · 2:3 PORTRAIT · ~730×1080
FIG.10 · CLUSTER 4 A regenerative farm field at dawn, low mist — discreet soil & plant sensors among crops, a faint satellite-data glow on the horizon, cool morning light, cinematic wide shot, photoreal, no text. FRAME · 2:3 PORTRAIT · ~730×1080
FIG.11 · CLUSTER 5 A modern supermarket aisle — a shopper's hand reaching to a shelf where a small glowing green health-score marker hovers beside one product, soft retail light, shallow focus, photoreal, no readable brand text. FRAME · 2:3 PORTRAIT · ~730×1080
FIG.12 · SCENARIO I Film still — a baker in her thirties in a dim northern-German bakery at dawn, watching a softly glowing screen, flour dust and steam, warm rim light, melancholic, 2035, photoreal, no text. FRAME · 16:9 FULL-BLEED · 1920×1080

FIG.13 · SCENARIO II Supermarket bread aisle — a small green verification checkmark glowing beside one loaf and nothing beside the next, a tired man's hand reaching in, cool light with green accent, shallow focus, photoreal, no readable text. FRAME · 16:9 FULL-BLEED · 1920×1080
FIG.14 · CONCLUSION Cinematic low-key still — a single elegant empty ceramic plate resting on a dark table, lit by one soft warm shaft of light from the side, a faint luminous halo and fine motes of light hovering just above the rim as if proof itself were quietly materialising, the glow concentrated in the centre of the frame while the top and bottom fall away into deep shadow, calm, resolved and quietly reverent, shallow depth of field, photoreal, no text. FRAME · 16:9 FULL-BLEED · 1920×1080
FIG.15 · SCENARIO — MARTA II Cinematic close detail in a northern-German artisan bakery before opening — a baker’s flour-dusted hands resting on a plain pale loaf on a worn wooden bench, a softly glowing screen out of focus behind, warm tungsten rim light, fine flour and steam in the air, deep shadow, shallow depth of field, 2035, photoreal, no text. FRAME · 16:9 FULL-BLEED · 1920×1080
FIG.16 · SCENARIO — DOCTOR Cinematic still in a calm modern doctor’s office at dusk — a single plain loaf of bread on the corner of a clinician’s desk beside a softly glowing screen, warm light meeting faint clinical-blue, deep shadow framing the edges, reverent and quiet, shallow depth of field, 2035, photoreal, no text. FRAME · 16:9 FULL-BLEED · 1920×1080
FIG.17 · A FINAL POINT Soft high-key still life on a pale cream backdrop — a single empty ceramic plate in bright, diffused daylight, a faint luminous halo and a few fine motes of light drifting just above its rim, airy and minimal, warm neutral tones, gentle shadows, generous negative space, calm and editorial, photoreal, no text. FRAME · 16:9 FULL-BLEED · 1920×1080