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ORIGINAL RESEARCH

Origins and evolution of the Western diet: health implications in the 21st century - Evidence review

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1. ABSTRACT

The analyzed publication proposes an evolutionary interpretation of the dietary changes that occurred after the advent of agriculture and, above all, industrialization. According to the authors, staple foods and processing techniques introduced in relatively recent times have profoundly altered the glycemic load, dietary fats, micronutrient density, sodium/potassium ratio, acid-base balance, and fiber intake. The available text is only an abstract: it therefore does not report a systematic selection of studies, an examined population, or original quantitative results.In the narrative of “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi, the study contributes to the concept of discordance between the modern food environment and human biology. Subsequent research indicates that a diet rich in ultra-processed foods can increase energy intake and body weight in the short term; observational studies synthesized in meta-analysis also associate greater exposure to these products with unfavorable outcomes. However, human evolution also includes adaptations to starch-rich diets: the thesis cannot therefore be understood as proof that grains or agriculture are inherently incompatible with all human beings.

ONLINE ARTICLE

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MISSION

LIFE Science Hub – Journal of Science was founded with the aim of making scientific knowledge accessible without giving up methodological rigour, quality of sources and authoritativeness of content. The journal promotes the dissemination of knowledge in the health, nutrition, medical and longevity sciences, building a bridge between the world of research and society.

Through articles, reviews, in-depth analyses and expert contributions, the Journal champions evidence-based medicine and science, fostering a correct interpretation of scientific data and countering misinformation. Every piece of content is developed with the aim of translating the complexity of research into understandable, useful and applicable information, while keeping intact the principles of accuracy, transparency and scientific independence.

Free from political, industrial and commercial influence, the journal stands as an authoritative and independent editorial space, dedicated to promoting scientific culture, professional development and the growth of health awareness among the public.

2. ANALYZED STUDY

The central question was whether the rapid transformation of diet and lifestyle, which began with agriculture and animal husbandry and was accelerated by industrialization, may have created a gap between the characteristics of the modern diet and those selected throughout human evolutionary history. The hypothesis is that this gap may contribute to the prevalence of chronic diseases in Western societies.The connection to sections 1.1.3, 1.1.4, 1.2, and 1.2.1 of "The Choice to Live in Health or Illness" by Dr. A. Colonnese and R. Panzironi primarily concerns the idea that agriculture, refining, and industrialization have changed the nutritional quality of food and certain overall characteristics of the diet. The publication is relevant because it identifies seven altered nutritional parameters: glycemic load, fatty acid composition, macronutrient composition, micronutrient density, acid-base balance, sodium/potassium ratio, and fiber.However, this is an interpretive work and a conceptual synthesis. It can offer a plausible biological framework and document which changes the authors consider relevant, but it cannot by itself prove that such changes cause a specific disease, nor can it demonstrate that every agricultural or industrially processed food produces the same effect in every person.

3. MATERIALS AND METHODS OF THE ORIGINAL STUDY

The available material consists exclusively of the publication's abstract. From this text, it emerges that the authors compared, from a historical-evolutionary perspective, the characteristics attributed to ancestral diets with those associated with foods introduced or profoundly modified during the Neolithic period and the Industrial Age.The available material does not report a bibliographic research strategy, inclusion or exclusion criteria for studies, a data collection period, a recruited population, sample size, control groups, predefined endpoints, or statistical analyses. Furthermore, no new experimental data on human participants, animals, or cells are reported.For these reasons, the work should be read as a narrative review with an evolutionary hypothesis. This type of article is useful for integrating data from different disciplines, but it is less suitable than a systematic review or a clinical trial for estimating the causal strength of a relationship between diet and disease.

4. RESULTS

The authors argue that agriculture and animal husbandry, which appeared about 10,000 years before the publication, along with subsequent industrial technologies, have modified seven crucial aspects of the diet. In simple terms, the contemporary diet has made it easier to quickly consume available carbohydrates, concentrated fats, sodium, and calories, while in many circumstances reducing fiber and micronutrient density—that is, the amount of vitamins and minerals in relation to the energy consumed.In the abstract, the authors point to relevant changes such as the increase in glycemic load—the overall impact of a portion of food on glycemia—the modification of the fatty acid profile, the change in the balance between macronutrients, the lower relative content of micronutrients, the alteration of the acid-base balance, the increase in the sodium/potassium ratio, and the reduction of fiber. The proposed conclusion is that the collision between a genome selected under past conditions and recent foods may contribute to chronic diseases in Western societies.The available material does not report absolute values, percentages, statistical comparisons, P-values, or confidence intervals. It therefore does not allow for quantifying how much each of the seven changes affects the risk of obesity, diabetes, hypertension, cardiovascular diseases, or other chronic conditions. Furthermore, the abstract does not directly document the estimates reported in the book regarding the energy share of foods in the U.S. diet or the ratio between omega-6 and omega-3 fatty acids.

5. INTERPRETATION

The most robust significance of this publication is that the way foods are produced and processed can simultaneously alter many nutritional variables. It is not just about the presence of a single nutrient: a highly processed food can differ from a minimally processed one in terms of physical structure, consumption speed, palatability, fiber, energy density, and ingredient combination.Within the scope of “The Choice to Live in Health or Illness” by Dr. A. Colonnese and R. Panzironi, the segment actually supported by the study is: agricultural and industrial

processing measurable changes in the nutritional characteristics of the diet possible unfavorable metabolic pressure. The work does not directly demonstrate the final step—that this discordance is a general cause of chronic diseases—because it does not compare groups of people over time nor does it test dietary interventions.The word "discordance" should therefore be understood as a biological hypothesis. It is reasonable to verify the individual steps separately: whether certain dietary patterns promote higher energy consumption; whether they are associated with specific health outcomes; and whether the human genome has truly had, or has not had, the opportunity to adapt to certain food sources. Modern evidence supports some of these steps, but it does not transform the entire evolutionary framework into a single causal demonstration.

6. INDEPENDENT SUPPORTING EVIDENCE

A controlled clinical trial directly tested a central element of the narrative: whether the degree of food processing can influence how much one eats. Twenty weight-stable adults followed, in random order, a diet rich in ultra-processed foods and a diet based on unprocessed foods, for 14 days each. Although presented with a similar amount of calories, macronutrients, sugars, sodium, and fiber, participants consumed an average of 508 kcal more per day during the ultra-processed diet. They gained an average of 0.9 kg, while they lost an average of 0.9 kg during the unprocessed diet. This is short-term causal data, but the sample was small and the hospitalization in a metabolic ward does not replicate daily life [1].An umbrella review, which is a synthesis of previously published meta-analyses, then evaluated 14 meta-analyses with 45 pooled analyses and nearly 9.9 million participants. Greater exposure to ultra-processed foods was found to be associated with a higher frequency of various adverse outcomes, including some cardiometabolic ones and mortality. This evidence expands the picture described by the analyzed study, because it links the contemporary food environment to health outcomes in the population. However, it remains predominantly observational: dietary habits, economic conditions, physical activity, and other factors may contribute to the associations detected [2].These two studies do not prove that the modern genome is globally unsuited to post-Neolithic foods. However, they confirm a more limited and verifiable point of the book's narrative: certain changes inherent to industrial nutrition, particularly the widespread availability of ultra-processed products, can promote higher energy intake and are associated with less favorable health outcomes.

7. CONFLICTING EVIDENCE

A significant limitation of the broader formulation of the "evolutionary mismatch" is that human evolution did not stop before the advent of agriculture. A genetic study observed that populations with a traditionally high intake of starch possessed, on average, more copies of the AMY1 gene, which is associated with the production of salivary amylase, the enzyme that initiates starch digestion in the mouth. The authors interpreted this distribution as being consistent with positive selection linked to a starch-rich diet [3].This result does not prove that all people adapt to grains in the same way, nor does it establish the clinical effects of a diet rich in refined starch. However, it does show that the claim that the genome had no chance to adapt to agricultural foods is too absolute. Adaptation can be partial, vary between populations, and may not be sufficient to compensate for the effects of highly refined or ultra-processed modern foods.No directly conflicting evidence sufficiently relevant to the fact that agricultural and industrial technologies have altered the nutritional characteristics of the diet has been identified; this does not prove the absence of contrary findings. The main caution concerns, rather, the interpretive leap between dietary change, genetic adaptation, and the general causality of chronic diseases.

8. QUADRO COMPARATIVO E SINTESI DELLE EVIDENZE

The table distinguishes the publication under review from the independent research used to verify the individual steps of the narrative.

Quadro comparativo

Reference	Study type	Population or model	Main result	Direction of evidence	Strength of evidence
Original study	Narrative review with evolutionary hypothesis	No experimental population reported in available material	Proposes that the Neolithic period and industrialization have modified seven nutritional characteristics of the diet	biologically consistent evidence	preliminary
[1]	Crossover RCT in a metabolic ward	20 weight-stable adults	The ultra-processed diet increased energy Intake by 508 kcal/day and weight by 0.9 kg in 14 days	direct confirmation	moderate
[2]	Umbrella review of observational meta-analysis	45 pooled analyses; approximately 9.9 million participants	Higher exposure to ultra-processed foods associated with higher frequency of multiple adverse outcomes	indirect confirmation	moderate
[3]	Observational genetic study	Human populations with traditional high or low starch consumption	Populations with high starch consumption had, on average, more copies of AMY1	discordant evidence	moderate

9. SINTESI EDITORIALE E CONCLUSIONI

CONCLUSIONS

The study analyzed provides a useful historical and biological framework for understanding how agriculture and industrialization have simultaneously transformed various aspects of the diet. The most well-supported part of the narrative concerns the fact that ultra-processed foods can promote higher energy intake in the short term and are associated, in population studies, with less favorable health outcomes.

The idea of a discordance between the modern environment and human biology is moderately supported as an interpretive hypothesis, but it is not proven as the sole or universal cause of chronic diseases. Genetic adaptations to starch digestion show that human evolutionary history also includes responses to dietary changes occurring after the Paleolithic era. Therefore, assessments are needed that distinguish between food quality, degree of processing, quantity, social context, and individual variability.

Aggiornato al 17/11/2026. Questo contenuto riflette una sintesi divulgativa delle evidenze scientifiche al momento della pubblicazione e non sostituisce il parere medico.

10. TRANSPARENCY AND SCIENTIFIC RESPONSIBILITY

Artificial Intelligence was used solely as a tool for editorial and documentary support. All content, interpretations, bibliographic citations and conclusions have been verified, reviewed and approved by the author, who assumes full scientific responsibility for them.

The manuscript was also subjected to independent peer review prior to publication.

To ensure the greatest transparency, the complete history of the article, including the dates of submission, revision, acceptance and publication, as well as information on the peer review process, is available on the dedicated Article History page.

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