Translational Insights
https://www.sciltp.com/journals/ti

Review

From Public Health to Precision Nutrition: Convergences and Divergences Between the U.S. Dietary Guidelines and the Chronobiology-Based Mediterranean Diet

Giuseppe Annunziata [1,*], Ludovica Verde [2,3], Martina Galasso [1,2], Giovanna Muscogiuri [2,3,4] and Luigi Barrea [5]

[1] Department for the Promotion of Human Sciences and Quality of Life, San Raffaele Roma Open University, Via di Val Cannuta 247, 00166 Rome, Italy
[2] Centro Italiano per la cura e il Benessere del Paziente con Obesità (C.I.B.O), Unità di Endocrinologia, Diabetologia e Andrologia, Dipartimento di Medicina Clinica e Chirurgia, Università degli Studi di Napoli Federico II, 80131 Naples, Italy
[3] Division of Endocrinology, Department of Medicine, The University of Arizona College of Medicine, Tucson, AZ 85004, USA
[4] Dipartimento di Medicina Clinica e Chirurgia, Unità di Endocrinologia, Diabetologia ed Andrologia, Università degli Studi di Napoli Federico II, 80131 Naples, Italy
[5] Dipartimento di Psicologia e Scienze della Salute, Università Telematica Pegaso, Centro Direzionale F2, 80143 Naples, Italy
* Correspondence: giuseppe.annunziata@uniroma5.it

How To Cite: Annunziata, G.; Verde, L.; Galasso, M.; et al. From Public Health to Precision Nutrition: Convergences and Divergences Between the U.S. Dietary Guidelines and the Chronobiology-Based Mediterranean Diet. *Translational Insights* **2026**, *1*(1), 12. https://doi.org/10.53941/ti.2026.100012

Received: 14 April 2026
Revised: 10 May 2026
Accepted: 21 May 2026
Published: 10 July 2026

Abstract: The year 2026 represents an important transition in nutritional science, characterized by efforts to modernize dietary recommendations in response to evolving lifestyles and emerging evidence. This paper provides a critical appraisal of the 2025–2030 U.S. Dietary Guidelines and the updated Mediterranean Diet (MD) model proposed by the Italian Society of Endocrinology (SIE) and the Italian Society of Dietetics and Clinical Nutrition (ADI), highlighting both convergences and divergences. While the U.S. framework emphasizes population-level applicability, nutrient thresholds, and public health impact, the revised MD model proposes a more integrative paradigm incorporating chrononutrition, chronotype, and lifestyle determinants such as sleep and physical activity. Both approaches converge on the promotion of nutrient-dense, minimally processed, predominantly plant-based dietary patterns and the reduction of added sugars, sodium, and ultra-processed foods. However, key differences emerge in the treatment of food processing, protein and fat quality, and especially the temporal dimension of eating, which is systematically addressed only in the MD model. The integration of circadian biology into dietary recommendations represents a significant conceptual advancement, supporting a shift toward personalized, physiology-driven nutrition. Rather than opposing frameworks, these models may be viewed as complementary, operating along a continuum from standardized public health guidance to individualized, systems-based approaches. Bridging these paradigms may facilitate the development of adaptive, multidimensional dietary strategies capable of addressing both global and individual determinants of health.

Keywords: mediterranean diet; dietary guidelines for Americans; chrononutrition; chronotype; ultra-processed foods; precision nutrition; circadian rhythms

1. Introduction

The year 2026 has begun with a renewed effort to revisit and modernize long-standing nutritional recommendations, offering perspectives that are more closely aligned with contemporary lifestyles and firmly grounded in principles readily translatable into practice. On one hand, influential scientific documents from across the Atlantic have reshaped the landscape of American nutrition [1,2], a system long regarded as a major contributor to the global rise in obesity and related comorbidities. These updated guidelines have addressed the longstanding question of whether it is sufficient to consider the quantity of food consumed, or whether the quality of intake must also be accounted for. On the other hand, in Europe, renewed attention has been directed toward re-evaluating the foundational principles of the Mediterranean Diet (MD), the most extensively studied and widely recognized dietary pattern worldwide, consistently characterized as health-promoting [3,4]. In this context, the central question has shifted toward whether dietary recommendations should focus solely on what is consumed or also on the timing of consumption. Accordingly, an official document endorsed by two leading Italian scientific societies has introduced a revised graphical representation of the MD pyramid, emphasizing contemporary concepts such as meal timing, chronotype, and, more broadly, chrononutrition [5].

The publication of these documents represents a major milestone in clinical nutrition research, challenging the traditional view of nutrition as a uniform system characterized by predictable outcomes. Instead, the emerging paradigm conceptualizes nutrition as a complex puzzle, comprising pieces of varying sizes with precise interconnections that must be strategically aligned to achieve an optimal configuration. This evolving framework underscores a shift toward individualized nutrition, in which individual biological and behavioral characteristics must be comprehensively integrated into dietary strategies.

Despite clear areas of convergence between the American and Italian perspectives, particularly with respect to the overall quality of dietary patterns, notable divergences remain. In light of these considerations, the present paper aims to provide a critical appraisal of recent U.S. and Italian dietary recommendations, with the goal of identifying shared principles as well as potential avenues for mutual refinement. Ultimately, such an effort may contribute to the development of globally applicable dietary guidelines, thereby transcending a strictly country-specific approach to the promotion of healthy and sustainable nutrition.

2. The 2025–2030 U.S. Dietary Guidelines

The joint analysis of the Scientific Report of the 2025 Dietary Guidelines Advisory Committee [2] and the Dietary Guidelines for Americans (DGA) 2025–2030 [1] reveals a substantial evolution in the contemporary nutritional paradigm, characterized by the integration of methodological rigor, epidemiological evidence, and their translation into actionable public health recommendations. Both documents framed within a highly concerning epidemiological context, in which diet-related chronic diseases constitute the leading determinants of morbidity, mortality, and healthcare expenditure [1,2]. The report of the Dietary Guidelines Advisory Committee describes epidemiological scenario in which diet-related chronic diseases represent one of the leading causes of morbidity and mortality in the United States. The high prevalence of overweight, obesity, and prediabetes observed in both adults and adolescents underscores the clear need for targeted and effective dietary interventions [2]. In parallel, the operational guidelines highlight the substantial healthcare burden associated with chronic diseases, reinforcing the central role of dietary patterns as key modifiable risk factors [1].

The report of the Dietary Guidelines Advisory Committee is notable for its adoption of an integrated methodological framework combining dietary intake analyses, systematic reviews of the literature, and dietary pattern modeling, while also incorporating innovative approaches such as diet simulations [2]. Within this framework, the concept of health equity emerges as central, defined as the opportunity for every individual to achieve optimal health regardless of socioeconomic status. This perspective entails a systematic consideration of the social determinants of health, highlighting how factors such as income, education, and cultural context profoundly influence both diet quality and clinical outcomes [2]. The operational guidelines implicitly adopt this framework, emphasizing the need to ensure broad access to nutrient-dense foods and to reorient the food system toward higher nutritional quality, distilled into a concise yet impactful message: “eat real food,” alongside the imperative to shift the entire food system toward high-quality dietary inputs [1].

Collectively, the documents converge in identifying a marked misalignment between current dietary patterns and nutritional recommendations. The scientific report documents a widespread underconsumption of nutrient-dense foods (including vegetables, fruits, whole grains, legumes, fish, and dairy products) alongside excessive intake of sodium, added sugars, saturated fats, and refined grains [2]. Similarly, the guidelines identify highly processed foods, rich in refined carbohydrates, sugars, and additives, as a major contributor to the deterioration of population-level metabolic health [1]. This shared analysis leads to a common recommendation: to shift the focus from individual nutrients to overall dietary patterns based on minimally processed foods. The resulting dietary model is characterized by high nutrient density and a predominance of plant-based foods, including vegetables, fruits, legumes, and whole grains, complemented by high-quality protein sources and unsaturated fats. The scientific report links this pattern with a significant reduction in the risk of cardiovascular disease, type 2 diabetes, obesity, and certain cancers, while also suggesting potential protective effects against cognitive decline [2]. The operational guidelines translate these findings into practical recommendations, such as the daily consumption of approximately three servings of vegetables and two servings of fruit, along with two to four servings of whole grains within a standard 2000 kcal dietary framework [1].

Despite the significant progress made toward recommendations based on overall dietary patterns, the DGA framework still retains a certain reliance on a nutrient-centric logic, making extensive use of quantitative thresholds for saturated fat, sodium, and added sugars. While this approach facilitates standardization and the communication of public health messages, it may fail to fully capture the complexity of food matrices or the metabolic effects associated with the degree of food processing and eating habits. At the same time, although behavioral factors are receiving increasing attention, the temporal dimension of eating and the role of circadian rhythms in metabolism remain only minimally incorporated into current recommendations, representing a potentially important area for the future development of dietary guidelines.

A point of partial divergence, yet also interpretative complementarity, concerns the role of proteins and fats. The scientific report emphasizes the importance of source quality, highlighting the benefits of replacing saturated fats with plant-derived unsaturated fatty acids and recommending a reduction in red and processed meat consumption [2]. In contrast, while maintaining the 10% threshold for saturated fat intake, the operational guidelines place greater emphasis on increasing total protein intake, suggesting a range of 1.2–1.6 g/kg/day from both animal and plant sources [1]. This apparent discrepancy reflects a broader transition from a purely restrictive approach to a functional framework supporting muscle mass, metabolic health, and overall physiological resilience.

The report and the guidelines also converge strongly on the need to substantially limit added sugars and sugar-sweetened beverages. The scientific report identifies a moderate association between consumption of sugar-sweetened beverages and increased risk of obesity and type 2 diabetes [2], whereas the operational guidelines explicitly recommend avoiding such products and propose a practical limit of approximately 10 g of added sugars per meal, stating that no level of added sugar intake can be considered optimal [1]. Similarly, both sources align in recommending a sodium intake limit of approximately 2300 mg/day for adults, while acknowledging the challenges posed by the high sodium content of industrially processed foods [1].

A distinctive feature of the scientific report is its focus on eating behaviors and environmental determinants. Portion size is identified as a critical driver of energy intake, with robust evidence demonstrating systematic increases in caloric consumption in response to larger portions. In addition, factors such as meal frequency and timing are examined, with more pronounced effects observed in children and adolescents compared to adults [2]. The operational guidelines partially incorporate these aspects, emphasizing portion control, hydration, and overall diet quality [1].

Particular importance is attributed to nutrition across the life course. Collectively, the documents emphasize the role of exclusive breastfeeding during the first six months of life, followed by the gradual introduction of complementary foods around six months, while maintaining breast milk or formula as the primary nutritional source up to 12 months [1,2]. Early-life dietary exposures are recognized as critical determinants of future food preferences and eating behaviors. In later stages, recommendations are adapted to specific physiological needs, including increased energy, protein, and micronutrient requirements during adolescence, nutritional support during pregnancy and lactation, and maintaining high nutrient density in older adults [1,2].

An additional area of integration concerns the gut microbiota, explicitly addressed in the operational guidelines, which recognize that diets rich in fiber, fermented foods, and plant-based products promote microbial diversity, whereas ultra-processed foods have detrimental effects [1,6]. This concept is fully consistent with the broader framework outlined in the scientific report, which emphasizes the primacy of overall dietary patterns over isolated nutrient effects [2].

Overall, the integration of these two documents delineates an advanced nutritional paradigm in which the most robust scientific evidence supports a dietary model centered on minimally processed, nutrient-dense, predominantly plant-based foods, with substantial reductions in added sugars, sodium, and ultra-processed products. While the effectiveness of such patterns in preventing chronic diseases is well established, areas of uncertainty remain regarding the role of specific nutrients, meal distribution, and the optimization of recommendations for distinct population subgroups. The resulting framework integrates nutrition, behavior, and social determinants of health, representing a substantial evolution beyond traditional dietary models.

3. The 2026 SIE-ADI Mediterranean Diet Pyramid

The recent joint position paper by Barrea et al. (2026), endorsed by the Italian Society of Endocrinology (SIE) and the Italian Society of Dietetics and Clinical Nutrition (ADI), proposes a conceptual and operational revision of the MD pyramid. It introduces a highly innovative element of major pathophysiological relevance: the integration of chronobiology and individual chronotype into the dietary model. The stated objective is to overcome the limitations of traditional representations of the MD, which have historically focused on food quality and frequency without accounting for meal timing or interindividual variability in circadian rhythms [5].

The theoretical rationale underpinning this work rests on the central role of circadian rhythms in regulating metabolic functions. These rhythms are governed by an integrated system of central and peripheral clocks. They modulate a wide range of physiological processes, including hormonal secretion, glucose and lipid metabolism, appetite regulation, and energy expenditure [7–9]. Food intake itself represents a primary zeitgeber, directly influencing the alignment between the biological clock and peripheral metabolic processes [10,11]. Within this framework, the concept of chrononutrition emphasizes not only what is consumed but also when, with evidence indicating that energy intake concentrated earlier in the day is associated with more favorable metabolic outcomes compared with late or irregular eating patterns [12].

A central component of the proposed model is chronotype, defined as the individual predisposition toward specific timing of daily activities and food intake [13]. Individuals with a morning chronotype typically exhibit greater adherence to the MD, more regular meal patterns, and a more favorable metabolic profile [14]. In contrast, evening chronotypes are more likely to delay meals, skip breakfast, and consume energy-dense foods in the evening. Such behavioral patterns have been associated with increased risk of obesity, insulin resistance, and cardiometabolic dysfunction [15–19]. This misalignment, often exacerbated by “social jetlag”, is also linked to elevated inflammatory markers and a reduced response to nutritional interventions [20,21].

Equal emphasis is placed on the interplay between nutrition, sleep, and appetite regulation. The SIE–ADI framework highlights how both sleep duration and quality significantly influence the secretion of key hormones involved in energy balance, such as leptin and ghrelin. Conversely, sleep deprivation is associated with increased consumption of energy-dense foods and decreased insulin sensitivity [5]. Accordingly, sleep is conceptualized as a fundamental determinant of the effectiveness of dietary interventions, equivalent in importance to dietary composition itself. From an applied perspective, the model advocates for personalized nutritional strategies based on chronotype assessment using validated tools (e.g., MEQ, rMEQ, MCTQ) [7,20,22], and proposes gradual realignment strategies for individuals with delayed eating patterns, including progressive advancement of meal timing and stabilization of eating schedules [5]. This approach reflects a broader transition toward precision nutrition, in which dietary recommendations are tailored to individual biological characteristics. Importantly, the strength of evidence supporting the various components of this chronobiology-based framework is not entirely uniform. As reported, robust evidence currently supports the role of circadian alignment and meal timing in the regulation of glucose metabolism, insulin sensitivity, and overall metabolic homeostasis. Similarly, substantial evidence links sleep disruption and circadian misalignment with adverse cardiometabolic outcomes. By contrast, the relationship between chronotype and long-term dietary behaviors, although increasingly supported by observational studies, remains less firmly established and may be influenced by environmental and sociocultural factors. Furthermore, while personalized chrononutrition strategies represent a promising translational perspective, their feasibility, long-term adherence, and large-scale implementation within public health systems still require further investigation.

Moreover, although it is grounded in well-established physiological principles, the real-world adoption of nutritional approaches tailored to individual chronotype may face multiple practical challenges. In clinical settings, reliable chronotype assessment requires both the use of appropriately validated tools and active patient engagement, conditions that are not always feasible in routine clinical practice. From a public health perspective, additional limitations arise from structural factors. These include rigid work schedules, night or rotating shift work, limited institutional autonomy in managing meal timing (for example, in schools or hospitals) and socioeconomic disparities, all of which can substantially reduce the feasibility of dietary recommendations centered on meal timing. Therefore, for chrononutrition to fully realize its potential as a tool for personalized nutrition, it will be necessary to develop flexible and scalable implementation strategies capable of adapting to variability across individual and social contexts, rather than relying on standardized time-based prescriptions.

The updated Mediterranean pyramid is thus structured around the integration of food quality and temporal nutrient distribution. Circadian modulation of nutrient intake is proposed, whereby complex carbohydrates and fiber-rich foods (e.g., whole grains, legumes, fruits) are preferentially consumed in the morning and early part of the day (when insulin sensitivity is generally higher). Evening meals emphasize protein and plant-based foods with a lower glycemic load [5]. This approach is consistent with evidence demonstrating that nutrient timing influences key aspects of metabolic regulation, including mitochondrial function and metabolic flexibility [23–25]. Metabolic flexibility, defined as the organism's ability to adapt substrate oxidation according to nutrient availability and energy demands [26], represents another central concept within this framework. The MD, due to its richness in bioactive compounds (e.g., polyphenols, monounsaturated fatty acids, and dietary fiber), has been shown to enhance mitochondrial function and oxidative capacity, contributing to the prevention of metabolic diseases [27,28]. Integration of chrononutrition further amplifies these effects by optimizing metabolic processes in alignment with circadian rhythms.

A particularly innovative feature of the model lies in its graphical representation. The novel MD pyramid incorporates circadian symbols (sun and moon) to indicate optimal timing for the consumption of different food groups while preserving the traditional hierarchical structure of the pyramid. Notably, the base of the pyramid includes not only foods but also key behavioral determinants, such as regular physical activity, adequate sleep duration and quality, and synchronization of meals with individual chronotype. These factors are integral components of the MD rather than ancillary elements [5].

Overall, the revision proposed by Barrea and colleagues expands the MD's scope beyond its strictly nutritional dimension, integrating environmental, economic, and socio-cultural sustainability. The MD is reaffirmed as a sustainable dietary model characterized by a high intake of plant-based foods, moderate consumption of animal products, and a strong emphasis on local, seasonal, and minimally processed foods. As such, it contributes not only to human health but also to the reduction of environmental impact and the preservation of natural resources, in alignment with global challenges related to food security and climate change. Within this perspective, the MD is conceptualized as a complex system integrating health, environment, culture, and conviviality, recognized as an intangible cultural heritage of humanity [5]. This work therefore proposes an evolution of the MD from a static food-frequency model into a dynamic system integrating food quality, nutrient timing, chronotype, lifestyle, and sustainability. While the most robust evidence supports the role of circadian alignment and temporal nutrient distribution in improving metabolic outcomes, significant research gaps remain regarding optimal quantification of nutritional timing and strategies for large-scale implementation. The resulting model can be defined as an advanced, multidimensional framework capable of bridging physiology, clinical nutrition, and public health within a unified, personalized perspective.

4. Italian and American Dietary Recommendations: A Potential Convergence or Fundamentally Opposing Perspectives?

The comparative analysis between the DGA 2025–2030 [1] and the MD model, particularly in its updated formulation incorporating chrononutrition as proposed by SIE–ADI 2026 [5], reveals fundamental convergence on the core principles of healthy eating, alongside substantial structural divergences reflecting distinct cultural, scientific, and translational paradigms.

The principal areas of convergence and divergence between the two frameworks are summarized in Figure 1.

Schematic overview of the principal convergences and divergences between the 2025–2030 U.S. Dietary Guidelines and the updated chronobiology-based Mediterranean Diet model proposed by SIE–ADI. While both frameworks promote nutrient-dense, predominantly plant-based dietary patterns and chronic disease prevention, they differ substantially in their integration of chronobiology, food processing concepts, personalization strategies, and sustainability-related dimensions.

From a conceptual standpoint, the DGA constitute a normative framework designed for large-scale public health implementation, tailored to a heterogeneous population, with the primary objective of reducing the burden of chronic disease through pragmatic and flexible recommendations. In contrast, the MD is best understood as a holistic, historically rooted, and culturally embedded dietary model, in which nutrition, lifestyle, conviviality, and sustainability form an integrated system. This philosophical divergence is directly reflected in the differing depth and specificity of the respective recommendations.

A first critical limitation of the American guidelines lies in the persistent ambiguity between a nutrient-based and a food-based approach [1]. Although the DGA have progressively incorporated the concept of dietary patterns, they continue to rely heavily on quantitative nutrient thresholds (e.g., <10% of total energy from saturated fats, limits for added sugars and sodium) [1]. While this approach serves regulatory and communicative purposes, it risks perpetuating a reductionist view of nutrition, in which overall food quality and the integrity of food matrices are subordinated to individual nutrient content. By contrast, the MD is inherently food-based: it does not prescribe nutrients per se but promotes specific foods and combinations (e.g., extra-virgin olive oil, whole grains, legumes, fish, fruits, and vegetables), acknowledging the synergistic effects of bioactive compounds within whole dietary patterns [3]. A second point of divergence concerns the role of ultra-processed foods. Although the DGA implicitly acknowledge this issue [1], they do not explicitly incorporate the NOVA classification or the degree of food processing [29]. This may represent an important substantial limitation, given that a significant proportion of the decline in dietary quality within the U.S. population is attributable to high consumption of ultra-processed foods [30,31]. In contrast, the MD inherently prioritizes fresh, seasonal, and minimally processed foods [3]. The absence of explicit guidance on ultra-processed foods within the DGA undermines the clarity of the nutritional message and may generate interpretative ambiguities, particularly when industrial products meet formal nutrient thresholds but fail to align with the qualitative principles of the Mediterranean model. A third critical area relates to the management of protein and fat intake. The DGA recommend increased protein intake (up to 1.2–1.6 g/kg/day) [1], which, although justified for preserving muscle mass and preventing sarcopenia, is not consistently accompanied by sufficient emphasis on protein source quality. This may inadvertently promote greater consumption of animal-based proteins, particularly red and processed meats, in contrast with epidemiological evidence linking such foods to elevated cardiometabolic risk [2]. The MD, by contrast, adopts a qualitatively oriented protein model, emphasizing legumes, fish, and plant-based sources, with only moderate consumption of animal products [3]. Similarly, while the DGA appropriately maintain quantitative limits on saturated fat intake [1], they do not sufficiently emphasize the promotion of monounsaturated fats, particularly extra-virgin olive oil, a cornerstone of the Mediterranean dietary pattern [3]. It is worth highlighting that these two perspectives, although apparently in contrast, may in fact coexist and be integrated. The higher protein intakes typical of the U.S. model are compatible with the principles of the MD, provided that the focus shifts from the quantity of animal protein toward the overall quality of protein sources and the nature of the foods through which they are delivered. From an operational standpoint, achieving recommended protein targets while prioritizing sources from typical Mediterranean foods (including legumes, fish, low-fat dairy products, and minimally processed plant-based proteins) allows the simultaneous pursuit of multiple objectives. On one hand, this approach may help in preservation of muscle mass and support of metabolic efficiency; on the other hand, it contributes to a long-term reduction of cardiometabolic risk. Such an approach would make it possible to reconcile quantitatively adequate protein intake with the nutritional quality and environmental sustainability criteria that characterize the Mediterranean dietary tradition.

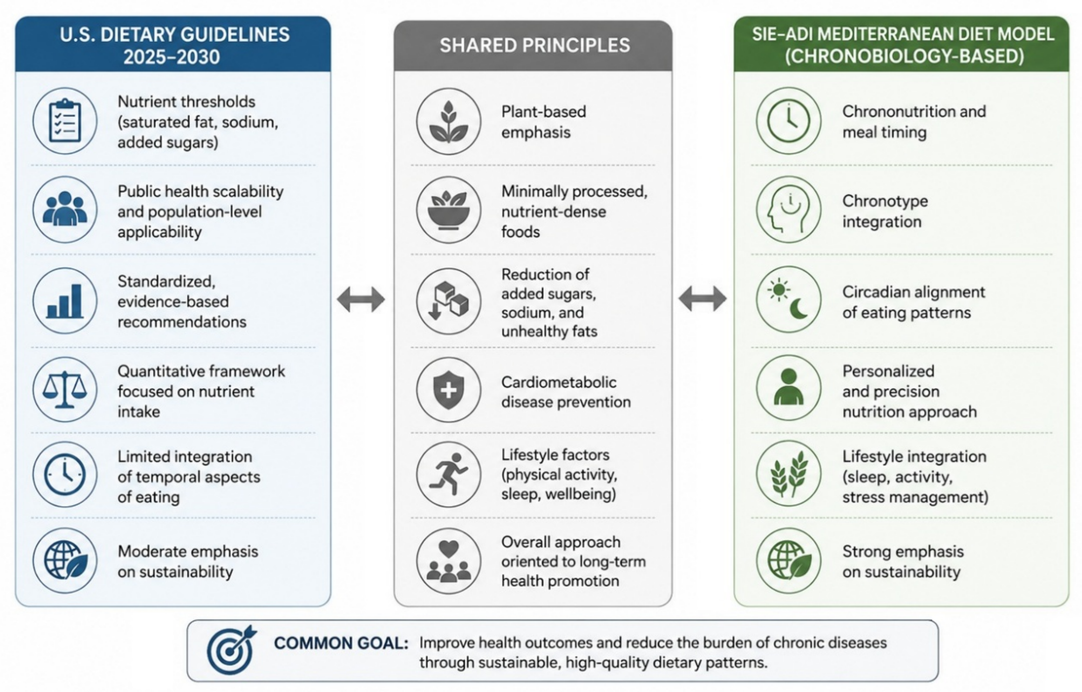

Figure 1. Convergences and divergences between the Dietary Guidelines for Americans (DGA) 2025–2030 and the chronobiology-based Mediterranean Diet model. **Abbreviations:** U.S., United States; SIE, Italian Society of Endocrinology; ADI, Italian Society of Dietetics and Clinical Nutrition.

Another major divergence concerns the lack of systematic integration of meal timing within the DGA framework. The updated Mediterranean model explicitly incorporates chrononutrition, highlighting how the distribution of food intake across the day significantly influences glucose metabolism, insulin sensitivity, and overall energy regulation [5]. Although the DGA acknowledge behavioral aspects such as meal frequency, they

https://doi.org/10.53941/ti.2026.100012

provide no operational guidance on nutrient timing, thereby overlooking an increasingly recognized determinant of metabolic health. It should be noted, however that despite evidence supporting chrononutrition continues to expand, its practical implementation remains strongly influenced by socioeconomic and occupational factors. Individuals engaged in night-shift work, fragmented schedules, multiple concurrent jobs, or long daily commutes often have limited autonomy in regulating meal timing and sleep patterns, resulting in chronic disruption of internal circadian synchronization. Similarly, populations with restricted access (due to either economic or geographic barriers) to minimally processed foods may face substantial difficulties in adhering to dietary recommendations centered on whole foods and regular meal distribution. In these cases, chrononutrition should not be viewed as a rigid set of universally applicable rules, but rather as a flexible and progressive approach aimed at promoting greater circadian regularity while accounting for the real-life conditions and social context of each individual. Even modest behavioral modifications (such as reducing food consumption during late evening hours, improving meal regularity, or shifting the main caloric intake earlier in the day whenever feasible) may translate into clinically meaningful metabolic improvements. Thus, future nutritional guidelines should be capable of integrating biological principles with feasible public health implementation strategies, ensuring that precision nutrition does not paradoxically become an additional driver of existing health disparities.

Differences are also evident in the treatment of lifestyle factors. While the DGA include recommendations related to physical activity and hydration, these are generally framed as ancillary to dietary guidance [1]. In contrast, within the Mediterranean model, physical activity, sleep, conviviality, and meal timing constitute integral and interdependent components. Notably, the integration of sleep and circadian rhythms represents a significant conceptual advancement absent from the American guidelines [1].

From a sustainability perspective, the DGA have taken initial steps toward promoting more sustainable food systems, yet they retain a cautious and largely non-binding approach, likely reflecting political and economic constraints. The MD, by contrast, is inherently sustainable, characterized by a predominance of plant-based foods and a reduced environmental footprint. This dimension, now central in the scientific discourse, would warrant stronger and more explicit integration within the American dietary guidelines.

5. Conclusions and Future Perspectives

The comparative appraisal of the 2025–2030 U.S. Dietary Guidelines and the updated SIE–ADI MD model underscores not merely a contrast between two sets of recommendations, but the coexistence of distinct, yet potentially complementary, paradigms within contemporary nutrition science. While the American framework reflects a necessary and pragmatic response to an urgent public health crisis (prioritizing scalability, accessibility, and epidemiological impact), the Mediterranean model advances toward a more integrative, physiologically grounded approach, embedding dietary behaviors within the broader context of biological rhythms, lifestyle, and sustainability. Rather than representing mutually exclusive visions, these models may be more productively interpreted as operating along a continuum of complexity, where population-level guidance and individualized, systems-based strategies can be synergistically aligned. The future of nutritional science will likely depend on the ability to reconcile these dimensions, bridging standardization with personalization and public health priorities with mechanistic insights, thereby fostering the development of adaptive, multidimensional frameworks capable of addressing both global and individual determinants of health. It is nevertheless important to consider that the long-term effectiveness of these dietary models will depend not only on their physiological robustness, but also on their practical applicability across heterogeneous socioeconomic and occupational contexts. This highlights the need to develop nutritional strategies that can adapt to diverse individual realities while remaining both accessible and sensitive to the cultural specificities of different populations.

In light of these considerations, several potential avenues can be outlined to align the DGA more closely with the Mediterranean model and with emerging scientific evidence. First, a definitive transition from a nutrient-based framework to a fully food-based approach would be warranted, placing greater emphasis on foods and overall dietary patterns rather than on quantitative nutrient thresholds. Second, the guidelines should incorporate a clear and operational stance on ultra-processed food consumption, explicitly distinguishing between nutritional quality and degree of processing. Third, protein recommendations should be refined to prioritize plant-based sources and fish, while more stringently limiting red and processed meats. In parallel, stronger emphasis should be placed on monounsaturated fats (particularly extra-virgin olive oil) as the primary source of dietary lipids. A further advancement could derive from the integration of chrononutrition, including specific guidance on meal timing and daily energy distribution, ideally tailored to individual chronotype. Finally, the DGA would benefit from adopting a more systemic perspective, explicitly incorporating the roles of sleep, circadian rhythms, and social determinants of health, while also strengthening the integration of environmental sustainability within dietary recommendations.

Taken together, these considerations suggest that the DGA represent a cornerstone of public health nutrition, grounded in robust and up-to-date evidence, yet still partially anchored in a traditional nutritional paradigm. Their integration with the principles of the MD, particularly in its most recent evolution, may enable a qualitative shift toward a more holistic, personalized, and physiologically coherent model, better suited to address the complexity of human biology and contemporary global health challenges.

From a translational perspective, the convergence between these dietary paradigms may have important implications for both clinical practice and public health policy. For clinicians, future nutritional counseling should progressively move beyond isolated nutrient targets toward integrated dietary strategies that simultaneously consider food quality, degree of processing, meal timing, sleep patterns, physical activity, and individual circadian characteristics. For policymakers, the integration of chronobiology-based concepts into dietary recommendations may represent a relevant opportunity to improve the effectiveness of prevention strategies targeting obesity, cardiometabolic diseases, and other nutrition-related chronic conditions. In this context, future guidelines may benefit from adopting multidimensional frameworks capable of combining population-level applicability with increasing levels of personalization and metabolic precision.

Author Contributions

G.A.: writing—original draft preparation. L.V.: writing—reviewing and editing. M.G.: writing—reviewing and editing. G.M.: visualization; writing—reviewing and editing. L.B.: conceptualization; visualization; supervision; validation. All authors have read and agreed to the published version of the manuscript.

Funding

This research received no external funding.

Institutional Review Board Statement

Not applicable.

Informed Consent Statement

Not applicable.

Data Availability Statement

Not applicable.

Conflicts of Interest

The authors declare no conflict of interest.

Use of AI and AI-Assisted Technologies

During the preparation of this work, the authors used ChatGPT AI tool to partially generate the Figure 1. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the published article.

References

1. U.S. Department of Agriculture; U.S. Department of Health and Human Services. *Dietary Guidelines for Americans 2025–2030*; U.S. Government Publishing Office: Washington, DC, USA, 2025.
2. U.S. Department of Agriculture; U.S. Department of Health and Human Services. *Scientific Report of the 2025 Dietary Guidelines Advisory Committee*; U.S. Government Publishing Office: Washington, DC, USA, 2025.
3. Willett, W.C.; Sacks, F.; Trichopoulou, A.; et al. Mediterranean Diet Pyramid: A Cultural Model for Healthy Eating. *Am. J. Clin. Nutr.* **1995**, 61, 1402S–1406S. https://doi.org/10.1093/ajcn/61.6.1402S.
4. Muscogiuri, G.; Maiorino, M.I.; Paolini, B.; et al. Mediterranean Diet for the Primary Prevention of Cardiometabolic Diseases: Evidence from a Systematic Review and Meta-Analysis Featured in the Italian National Guidelines "La Dieta Mediterranea". *Nutrition* **2025**, *132*, 112947. https://doi.org/10.1016/j.nut.2025.112947.
5. Barrea, L.; Verde, L.; Camajani, E.; et al. A Novel Chronotype-Based Mediterranean Diet Pyramid: An Updated Representation by the Italian Society of Endocrinology (SIE) and the Italian Society of Dietetics and Clinical Nutrition (ADI). *Curr. Nutr. Rep.* **2026**, *15*, 10. https://doi.org/10.1007/s13668-026-00731-x.

6. Pramono, A.; Kusuma, R.J.; Tyas, T.A.; et al. Gut Microbiota Alterations in Adult Individuals with Obesity and Insulin Resistance: Its Association with Metabolic Parameters and Body Compositions. *Hum. Nutr. Metab.* **2026**, *44*, 200362. https://doi.org/10.1016/j.hnm.2026.200362.
7. Lotti, S.; Dinu, M.; Colombini, B.; et al. Circadian Rhythms, Gut Microbiota, and Diet: Possible Implications for Health. *Nutr. Metab. Cardiovasc. Dis.* **2023**, *33*, 1490–1500. https://doi.org/10.1016/j.numecd.2023.05.009.
8. Green, C.B.; Takahashi, J.S.; Bass, J. The Meter of Metabolism. *Cell* **2008**, *134*, 728–742. https://doi.org/10.1016/j.cell.2008.08.022.
9. Bass, J.; Takahashi, J.S. Circadian Integration of Metabolism and Energetics. *Science* **2010**, *330*, 1349–1354. https://doi.org/10.1126/science.1195027.
10. Oosterman, J.E.; Kalsbeek, A.; la Fleur, S.E.; et al. Impact of Nutrients on Circadian Rhythmicity. *Am. J. Physiol. Regul. Integr. Comp. Physiol.* **2015**, *308*, R337–R350. https://doi.org/10.1152/ajpregu.00322.2014.
11. Xie, Y.; Tang, Q.; Chen, G.; et al. New Insights into the Circadian Rhythm and Its Related Diseases. *Front. Physiol.* **2019**, *10*, 682. https://doi.org/10.3389/fphys.2019.00682.
12. Franzago, M.; Alessandrelli, E.; Notarangelo, S.; et al. Chrono-Nutrition: Circadian Rhythm and Personalized Nutrition. *Int. J. Mol. Sci.* **2023**, *24*, 2571. https://doi.org/10.3390/ijms24032571.
13. Almoosawi, S.; Vingeliene, S.; Gachon, F.; et al. Chronotype: Implications for Epidemiologic Studies on Chrono-Nutrition and Cardiometabolic Health. *Adv. Nutr.* **2019**, *10*, 30–42. https://doi.org/10.1093/advances/nmy070.
14. Lotti, S.; Pagliai, G.; Asensi, M.T.; et al. Morning Chronotype Is Associated with Higher Adherence to the Mediterranean Diet in a Sample of Italian Adults. *Nutr. Metab. Cardiovasc. Dis.* **2022**, *32*, 2086–2092. https://doi.org/10.1016/j.numecd.2022.05.023.
15. Teixeira, G.P.; Mota, M.C.; Crispim, C.A. Eveningness Is Associated with Skipping Breakfast and Poor Nutritional Intake in Brazilian Undergraduate Students. *Chronobiol. Int.* **2018**, *35*, 358–367. https://doi.org/10.1080/07420528.2017.1407778.
16. Yu, J.H.; Yun, C.H.; Ahn, J.H.; et al. Evening Chronotype Is Associated with Metabolic Disorders and Body Composition in Middle-Aged Adults. *J. Clin. Endocrinol. Metab.* **2015**, *100*, 1494–1502. https://doi.org/10.1210/jc.2014-3754.
17. Reutrakul, S.; Hood, M.M.; Crowley, S.J.; et al. The Relationship between Breakfast Skipping, Chronotype, and Glycemic Control in Type 2 Diabetes. *Chronobiol. Int.* **2014**, *31*, 64–71. https://doi.org/10.3109/07420528.2013.821614.
18. Kanerva, N.; Kronholm, E.; Partonen, T.; et al. Tendency toward Eveningness Is Associated with Unhealthy Dietary Habits. *Chronobiol. Int.* **2012**, *29*, 920–927. https://doi.org/10.3109/07420528.2012.699128.
19. Maukonen, M.; Kanerva, N.; Partonen, T.; et al. Chronotype Differences in Timing of Energy and Macronutrient Intakes: A Population-Based Study in Adults. *Obesity* **2017**, *25*, 608–615. https://doi.org/10.1002/oby.21747.
20. Lack, L.; Bailey, M.; Lovato, N.; et al. Chronotype Differences in Circadian Rhythms of Temperature, Melatonin, and Sleepiness as Measured in a Modified Constant Routine Protocol. *Nat. Sci. Sleep* **2009**, *1*, 1–8. https://doi.org/10.2147/nss.s6234.
21. Bakotic, M.; Radosevic-Vidacek, B.; Koscec Bjelajac, A. Morningness-Eveningness and Daytime Functioning in University Students: The Mediating Role of Sleep Characteristics. *J. Sleep Res.* **2017**, *26*, 210–218. https://doi.org/10.1111/jsr.12467.
22. Horne, J.A.; Ostberg, O. A Self-Assessment Questionnaire to Determine Morningness-Eveningness in Human Circadian Rhythms. *Int. J. Chronobiol.* **1976**, *4*, 97–110.
23. Zinna, L.; Verde, L.; Tolla, M.F.D.; et al. Chronodisruption Enhances Inflammatory Cytokine Release from Visceral Adipose Tissue in Obesity. *J. Transl. Med.* **2025**, *23*, 231. https://doi.org/10.1186/s12967-025-06250-7.
24. Peters, B.; Vahlhaus, J.; Pivovarova-Ramich, O. Meal Timing and Its Role in Obesity and Associated Diseases. *Front. Endocrinol.* **2024**, *15*, 1359772. https://doi.org/10.3389/fendo.2024.1359772.
25. de Goede, P.; Wüst, R.C.I.; Schomakers, B.V.; et al. Time-Restricted Feeding during the Inactive Phase Abolishes the Daily Rhythm in Mitochondrial Respiration in Rat Skeletal Muscle. *FASEB J.* **2022**, *36*, e22133. https://doi.org/10.1096/fj.202100707R.
26. Smith, R.L.; Soeters, M.R.; Wüst, R.C.I.; et al. Metabolic Flexibility as an Adaptation to Energy Resources and Requirements in Health and Disease. *Endocr. Rev.* **2018**, *39*, 489–517. https://doi.org/10.1210/er.2017-00211.
27. Khalil, M.; Shanmugam, H.; Abdallah, H.; et al. The Potential of the Mediterranean Diet to Improve Mitochondrial Function in Experimental Models of Obesity and Metabolic Syndrome. *Nutrients* **2022**, *14*, 3112. https://doi.org/10.3390/nu14153112.
28. Chen, W.; Zhao, H.; Li, Y. Mitochondrial Dynamics in Health and Disease: Mechanisms and Potential Targets. *Signal Transduct. Target. Ther.* **2023**, *8*, 333. https://doi.org/10.1038/s41392-023-01547-9.
29. Monteiro, C.A.; Cannon, G.; Moubarac, J.C.; et al. The UN Decade of Nutrition, the NOVA Food Classification and the Trouble with Ultra-Processing. *Public Health Nutr.* **2018**, *21*, 5–17. https://doi.org/10.1017/S1368980017000234.
30. Loch, L.K.; Kirch, M.; Singer, D.C.; et al. Ultra-Processed Food Addiction in a Nationally Representative Sample of Older Adults in the USA. *Addiction* **2026**, *121*, 510–521. https://doi.org/10.1111/add.70186.
31. Kim, H.; Hu, E.A.; Rebholz, C.M. Ultra-Processed Food Intake and Mortality in the USA: Results from the Third National Health and Nutrition Examination Survey (NHANES III, 1988–1994). *Public Health Nutr.* **2019**, *22*, 1777–1785. https://doi.org/10.1017/S1368980018003890.