

Perspective: Nutrient Intake Chronophysiology: A Rising Public Health Concern

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This article establishes a circadian chronological foundation for food and nutrient intake orchestration in modern and postmodern humans, and illuminates roadmaps for future real-world research.

Chronophysiology is an evolutionary multiscience that enables animals and human to cope with the irregular environment. Timing of food intake has been discovered to orchestrate periprandial circadian rhythms of nutrient ingestion, digestion, transport, and metabolism. As such, chrono-orchestration of food intake regulates appetite and eating rate. Chrononutritional physiology is a major unnoticed healthy science that, in light of realistic modeling and understanding of voluntary feed intake in food-producing ruminant models, offers practical perceptions towards establishing health-improving feasible nutritional programs and regimens [1-5]. This is crucial considering that reliable hunger and nutrient intake predictions are indispensable for healthy and onchophobic provision of foods and nutrients to human cells. Such insightful knowledge can help formulate guidelines to prevent overnutrition and public health issues namely overweight gain, obesity, and diabetes [4].

The evolutionary rhythms of food searching and intake behavior have contributed to circannual and circadian patterns of endocrinology and metabolism. Due to the severe modifications in life style due to transition from tradition towards modernity and postmodernity, natural rhythms of appetite and nutrient intake have faced dramatic changes. As a result of over-intake and less natural eating behavior particularly on fats and sugars, maximizing synchronies between external environments and internal cell physiology has become a unachievable dogma. Untimely nutrition has exacerbated the modern problems by increasing risks

of obesity, glucose intolerance, insulin resistance, diabetes mellitus, and resulting cardiovascular irregularities [3].

Dynamically, eating timing is considered as a key feasible life director that appreciably affects how quickly nutrients are ingested, how extensively they are assimilated, and how proportionately the resulting substrates are distributed among different functions (i.e., deposition, oxidation, secretion, and excretion). These mechanisms are real-life scientific tools whereby the modern man will be able to optimize life quality and satisfaction, health indices, and longevity. However, circadian food intake chronology has not yet been accommodated in dietary reference intake guidelines [6].

Therefore, chronobiological management practices (e.g., circadian food intake timing and frequency) offer viable and pragmatic models to improve nutrient transformation and utilization efficiency. These strategies can well be practiced by all, particularly overweight people, diabetics, shift-workers, and athletes preparing for professional matches and games. Future research will need to explore data on nutrigenomics and immunopathology of food intake chronology. This is a path wherein medical nutrition will reveal and keep its innovative healthy disciplines on the rise.

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REFERENCES

- [1] Nikkhah A. Chronophysiology of ruminant feeding behavior and metabolism: an evolutionary review. *Biol Rhythm Res* 2013; 44(2): 197-218. <http://dx.doi.org/10.1080/09291016.2012.656437>

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- [2] Nikkhah A. Bioscience of ruminant intake evolution: feeding time models. *Adv Biosci Biotechnol* 2011; 2: 271-274. <http://dx.doi.org/10.4236/abb.2011.24039>
- [3] Nikkhah A. Ruminant chronophysiological management: an emerging bioscience. *Open Access Anim Physiol* 2011; 3: 9-12. <http://dx.doi.org/10.2147/OAAP.S24071>
- [4] Nikkhah A. Science of eating time: A novel chronophysiological approach to optimize glucose-insulin dynamics and health. *J Diab Mellit* 2011; 2(1): 8-11. <http://dx.doi.org/10.4236/jdm.2012.21002>
- [5] Nikkhah A. Timing of feed presentation entrains periprandial rhythms of energy metabolism indicators in once-daily fed lactating cows. *Biol Rhythm Res* 2012; 43(6): 651-661. <http://dx.doi.org/10.1080/09291016.2011.631773>
- [6] Dietary Reference Intakes (DRI). Recommended Intakes for Individuals, Food and Nutrition Board, Institute of Medicine, National Academies. National Academy of Sciences, Washington, 2007; D.C. USA.

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