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Policy Article

Circadian Timing of Hunger to Avert Obesity: An Environmental Evolutionary Science

Akbar Nikkhah*

Department of Animal Sciences, University of Zanjan, Iran

**Corresponding author: Dr. Akbar Nikkhah, Chief Highly Distinguished Professor, Department of Animal Sciences, Faculty of Agricultural Sciences, University of Zanjan, Foremost Highly Distinguished Scientist, National Elite Foundation, Iran,*

E-mail: anikkha@yahoo.com

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Abstract

This public policy article establishes circadian timing of appetite and nutrient consumption as a working environmental science to feasibly prevent obesity and diabetes. Conventionally, almost all scientific efforts have focused on managing daily amount and type of food intake in programming public nutrition and health. However, a very significant applied environmental science, emerging recently, is timing of appetite and eating different nutrients over the circadian 24-h period.

Keywords: Obesity; Diabetes; Weight Loss; Timing of Appetite

Innovations and Critiques

The science of appetite and eating timing stems from the principle that the circadian evolutionary nature of human life has led to development of almost 24-h rhythms in cell physiology and function [1-3]. As a result, metabolism extent and rate differ substantively during different hours of the 24-h period that are also independent from food intake per se [4-6]. Eating and appetite as biological synchronizers of cell metabolism are highly integrated with the time when they occur in regulating biochemical reactions [7,8]. This means that eating the same amount of the same food at different hours of the 24-h period has different metabolic and health consequences. In other words, cell metabolism and waste management efficiency and thus sensitivity to pathological conditions and agents depend highly on when during 24-h period (i.e., early to late morning, noon, mid to late afternoon, evening, overnight) nutrients are taken.

Basically, human glucose intolerance and insulin insensitivity develop as day leaves for night [4,9]. This phenomenon provides an evolutionary proof for the circadian nature of human activity and resting time that keeps the body and its differential cells well-prepared for varying functions [10]. Endocrinologically, resting can occur most desirably when the gastrointestinal system and interrelated splanchnic and peripheral tissues are not overly involved in nutrient bioprocessing and energetics. Owing to such reduced energy demands at times of limited activity during evening and later overnight, the body has not learnt to require insulin and other facilitating hormones and proteins to assimilate nutrients. As such, any overflow of glucose and energy-producing nutrients later in evening and

overnight would oppose human evolution in healthy management of cell physiology. Thus, at certain circadian times, human is more prone to obesity and diabetes.

The public education programs must increasingly communicate the significance of timing of food intake as an emerging public science in improving human health and welfare. Appetizing and eating energizing foods during day especially early morning must be encouraged. On the other hand, taking large and concentrated meals overnight must be discouraged and minimized [8,10]. Healthy appetite and eating behaviour demand taking frequent but rather small meals during day and avoiding a large single evening meal. This is the lesson that evolution teaches humans [11]. Such guidelines must be expanded and specified for different age groups, physiological states, work conditions, and other relevant divisions according to research findings and be included in future public recommendations. The current dietary references of intake do not have such information yet [12].

Implication

In a nutshell, the increasing rates of obesity, diabetes and related metabolic complexities and life dissatisfaction with the modernizing trends of human life necessitate developing feasible and simple approaches of prevention and treatment. When to develop hunger and optimally eat will be a frontier to accomplishing such a global triumph. However, despite its simplicity, effective timing of hunger requires diligent work towards workable daily routines alongside a well-disciplined exercise program. The future of obesity prevention will highly depend on this environmental evolutionary science.

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