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Editorial

Optimizing Cardiovascular Health via Food Intake Timing: Bioengineering of Internal Physiology

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Timing of food intake is a feasible life-time philosophy that requires profound thoughts in medical and nutritional bioengineering of internal metabolism and public health. Peripheral cells do not tolerate much glucose during evening and night times. Metabolically, glucose is mostly demanded during active times of the 24-h period [1,2]. This editorial establishes and empowers a practical postmodern advice to minimize evening food intake, especially from sugars and starches to effectively manage heart and metabolic health by decreasing risks of central adiposity, metabolic syndrome, diabetes mellitus, hypertension, and cardiovascular complexities. This cascade represents a facet from bioengineering of internal human physiology.

Improved perceptions of human physiology depend on optimal understanding of comparative interspecies physiology. Animal physiology can be better understood through exceptional insights into ruminant physiology with highly integrative systems ecology [3]. Ruminants are inimitable food sources that can be utilized as suitable metabolic models to investigate gene, cell, organ and whole body physiology [4,5]. For instance, nocturnal vs. diurnal feeding of dairy cows can increase intake rate and postprandial release of metabolites from the rumen (i.e., pregastric fermenter) and periphery [6,7]. Nocturnal nutrient intake, also, can improve milk energy output [8] and nutrient efficiency in dairy and beef cattle [5]. Such discoveries highlight the practicality and significance of nutrient intake timing in optimal orchestration of nutrient partitioning and metabolic health [9]. Nonetheless, ruminants differ from human in the nature of splanchnic and peripheral metabolism. Thus, different effects of manipulating food intake time on cell nutriphyiogenomics would be anticipated in different species. Clarifying this obliges expanded future research.

Peripherally circulating glucose levels increase when inactive period (i.e., dark period) terminates. This glucose upsurge occurs in the anticipation of the activity, scientifically termed 'dawn-phenomenon' [10]. The peripheral glucose peaks coincide with corticosterone rises, which in turn help increase glucose supply, thus increasing insulin requirements [11]. The dawn-phenomenon is partly caused by growth hormone driven hepatic glucose production. Nocturnal melatonin secretion induced by darkness, moreover, increases postprandial insulin demands [12]. Nocturnal glucose intolerance is partly due to increased melatonin secretion and reflects reductions in glucose demands because glucose is demanded the least during inactive times or night-time. Accordingly, glucose intolerance is an evolutionary adaptation for the resting body to cope with inactivity and darkness. Minimizing evening and night food meals would permit melatonin, insulin, growth hormone, corticosterones, and other players to manage nocturnal and circadian intermediary metabolism for optimal physiology and health. Based on this evolutionary analysis, nocturnal eaters and workers encounter suboptimal internal and external rhythms of nutrients and hormones metabolism. Such groups will thus require special refined and bioengineered nutritional and life-style programs [13,14].

Supported by the most recent animal models discoveries, a novel real-world metabolic guideline is constructed to help efficiently bioengineer and harmonize external cues with internal rhythms in cell physiology. This is to improve heart and metabolic health and diminish risks of metabolic syndrome, diabetes, and cardiovascular abnormalities. Strong-minded global education of bioengineering and omics technologies and state-of-the-art science expansion will enable the postmodern human to exercise optimal timing of nutrient intake as a feasible life philosophy for quality life.

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