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Chrono-Nutrition: Circadian Rhythm and Personalized Nutrition

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Abstract

The human circadian system has a period of approximately 24 h and studies on the consequences of "chornodisruption" have greatly expanded. Lifestyle and environmental factors of modern societies (i.e., artificial lighting, jetlag, shift work, and around-the-clock access to energy-dense food) can induce disruptions of the circadian system and thereby adversely affect individual health. Growing evidence demonstrates a complex reciprocal relationship between metabolism and the circadian system, in which perturbations in one system affect the other one. From a nutritional genomics perspective, genetic variants in clock genes can both influence metabolic health and modify the individual response to diet. Moreover, an interplay between the circadian rhythm, gut microbiome, and epigenome has been demonstrated, with the diet in turn able to modulate this complex link suggesting a remarkable plasticity of the underlying mechanisms. In this view, the study of the impact of the timing of eating by matching elements from nutritional research with chrono-biology, that is, chrono-nutrition, could have significant implications for personalized nutrition in terms of reducing the prevalence and burden of chronic diseases. This review provides an overview of the current evidence on the interactions between the circadian system and nutrition, highlighting how this link could in turn influence the epigenome and microbiome. In addition, possible nutritional strategies to manage circadian-aligned feeding are suggested.

Keywords: chrononutrition, circadian rhythm, circadian rhythm disruption, personalized nutrition, clock genes,

Full text

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