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Abstract

Phenomics and Genomics of Food Selection in Instinctive Nutrition †

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Abstract: Revealing the genetic background and phenotypes (phenome) of food selection and food preferences is a key factor to developing personalized nutrition in contemporary precision medicine and healthy lifestyles. Food choice in humans has multiple determinants, with complex interactions and the integration of genetic, physiological, psychological and sociocultural factors. Food intake involves ingestion, comprising an initiation phase, a termination/satiation phase and a interingestive period, which are under the genetic control of gastrointestinal neuroendocrine hormones, including cholecystokinin, leptin, ghrelin and FTO gene, contributing to obesity. Taste modalities are motivational priorities in food choices. The genomics of taste perception and preferences reveal genetic polymorphisms and genetic variations in taste receptors for bitter, sweet, umami, salty, and sour tastes and oleogustus. The integrated multisensory olfactory–gustatory perception, defined as flavor, is modulated by visual, auditory, tactile, and cognitive influences. Dopaminergic activation is crucial for the hedonic principle of ingesting food. The possibility of organisms sending signals to the brain in case of metabolic deficits, which gives rise to specific taste eagerness, is discussed. Based on this aspect, the concept of instinctive nutrition is formulated.

Keywords: genomics; phenotype; taste perception; food selection; instinctive nutrition

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