Food Chemistry of Components with High Acceptability

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The gastrointestinal (GI) tract is the most primordial organ from the viewpoint of biological evolution. We typically recognize ingestible foodstuffs by their visual and organoleptic properties, such as appearance and odor. However, it remains unclear how the GI tract senses the various foodstuffs ingested. Using biochemical and cytological approaches at the molecular level, we have focused on research into elucidating how the mammalian GI tract copes with the information contained in foods, with the aim of developing novel foodstuffs with high acceptability.

[1] Structure-Function Analysis of Food Proteins

Elucidation of structural characteristics of sweet-tasting protein and its application to food science

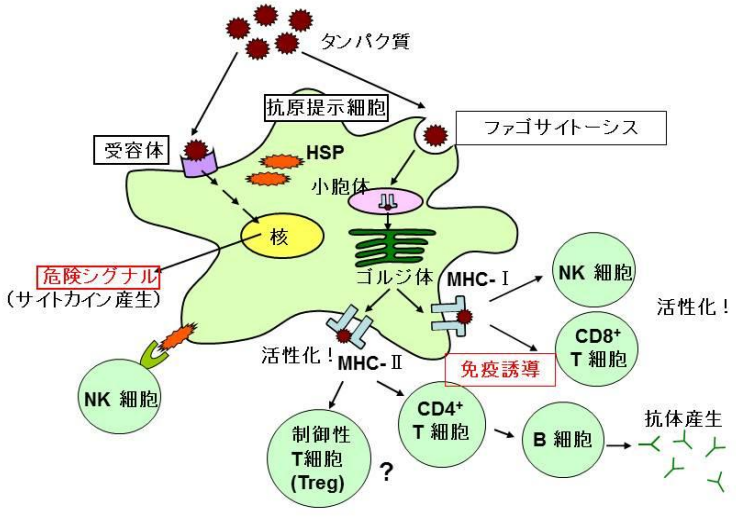
Thaumatin is a sweet-tasting protein originally derived from a plant indigenous to West Africa. It is nearly 100,000 times sweeter than sucrose on a molar basis. However, the molecular mechanisms by which proteinaceous thaumatin exhibits sweetness remain unclear, although the sweet receptor T1R2-T1R3 plays a critical role in the transmission of signals from sweeteners with a low molecular size. We have been analyzing the unique structural characteristics of thaumatin using a cell-based assay with the sweet receptor, in addition to sensory analysis, and have attempted to design a novel sweetener.

Tertiary Structure of Thaumatin

We are also searching for components to suppress bitter taste.

[2] Food Chemistry of Mucosa-interacting Components

Development of Novel Food Component that Controls Intestinal Homeostasis



Antigen-presenting Cells in Immunity

Regulatory immune cells exist to maintain intestinal homeostasis. They physiologically control GI functions in response to periodical stimuli by food ingestion, as well as to a large number of indigenous commensal microflora. Focusing on biological components, stress proteins (HSPs), that exist in all organisms and foodstuffs, we have been analyzing the structural characteristics of HSPs to control intestinal homeostasis and to elucidate the responses of regulatory cells in mucosal immunity for exogenous HSPs, in an effort to improve prophylactic interventions in allergies and diabetes mellitus.

キーワード

Food chemistry, Protein chemistry, Structure, Rheology,
Cell biochemistry, Mucosal immunology
Sweetness, Bitter taste, Thaumatin, Stress proteins

最近の主な研究業績

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