Glutamate function in human nutrition, taste and satiety

Purpose

Glutamate signaling in the gut recently has been unveiled it notifies the brain about the food intake via gastric vagal afferent, and initiates its digestion and homeostatic control of amino acids by the vagal efferent as well as entero hormone release.

Outcomes – knowledge and action points

Glutamate the major constituent of protein serves as the principal signalling molecule for the fifth basic taste umami, through a cascade of molecular mechanisms not only in the gustatory apparatus but also in the gut. Glutamate receptors have been recently localized in the gut mucosa and the gastric vagal afferents' response to glutamate alone amongst other amino acids and sugars suggest its premier role in the gut-brain cross talk. Blood glutamate level does not change appreciably after dietary intake of protein. Glutamate serves as the principal source of energy for he gut mucosa. Intracellular glutamate from glutamine by glutamine synthetase regulates endocrine and exocrine functions in the gut. Glutamate driven vagal afferents activate number brain areas bringing about efficient digestion, energy homeostasis, satiation and over all food preference. Beyond excitatory neurotransmission, glutamate plays a broad integrative role in health and nutrition.

Session Chair/Co-Chair:

Chair: Dennis Bier, USDA in Baylor College of Medicine, USA
Co-chair: Gary Beauchamp, Monell Chemical Senses Center,

Session Topics and Speakers:

Topic 1: *Taste perception, imprinting and formation of preference for food.*
Speaker: Gary Beauchamp, Monell Chemical Senses Center, Philadelphia, USA

Topic 2: *Taste receptors and transduction mechanisms for glutamate*
Speaker: Yuzo Ninomiya, Kyushu University, Dental School, Fukuoka, Japan

Topic 3: *The Essential Regulatory Role of the Non-Essential Amino Acid Glutamate, in Gestation and Early Post-Natal Life*
Speaker: Dennis Bier, USDA/ARS Children's Nutrition Research Center, Baylor College of Medicine, Houston, USA

Topic 4: *Dietary protein digestion, amino acid metabolism and subsequent brain functional changes*
Speaker: Daniel Tome, INRA, Paris, France

Topic 5: *Glutamate signaling in gut and brain function*
Speaker: Kunio Torii, Institute of Life Sciences, Ajinomoto Co., Inc., Kawasaki, Japan

Topic 6: *Activation of the brain by dietary glutamate*
Speaker: Hrudananda Mallick, All India Institute for Medical Research, New Delhi, India