



## **Glutamate and Nutrition**

Glutamate, a common amino acid, is found in abundance in nature. It is a natural component in virtually all protein-containing foods, such as meats, fish, milk (including human milk) and many vegetables. Glutamate is also produced by the human body, and is an essential link in human metabolism. When glutamate is added to food, several specific flavor characteristics are enhanced – such as impact, body or "fullness", roundness, mouthfeel, and complexity. The recent discovery of a taste receptor for glutamate on the tongue has confirmed that the taste of glutamate, "umami", is the fifth basic taste along with sweetness, saltiness, sourness, and bitterness.

A major function of amino acids in the body is to serve as building blocks for proteins. Amino acids, however, are also the precursors of many physiological substances and a source of energy. The intestine is an extremely active organ, producing a large amount of mucous, and its cells have a high rate of growth. Its rate of protein synthesis is about 4 to 5 times the body's average on a weight basis. It therefore needs and consumes energy at a considerable rate. It has been demonstrated that food-derived glutamate is the main energy source for the intestine. Studies using stable isotopes have demonstrated that the intestine obtains most of its energy from amino acid metabolism. In fact the intestine has a voracious appetite for glutamate, and it has been shown that of all the glutamate eaten as food only about 4% escapes into the body.

The rest of the body has to synthesize nearly all of the glutamate that is needed. This is especially so for the brain where glutamate is used as a neurotransmitter. The blood brain barrier which controls the type of molecules that enter the brain, does not allow the passage of glutamate, so the brain has to make its own glutamate from glucose and other amino acids.

The brain uses glucose as its main source of energy, and it could be said that the intestine, by using glutamate as its main energy source, is leaving the glucose for the brain.

Of all the organs the intestinal tract has the greatest contact with the external environment, in the form of the food which we eat. It is therefore the body's first line of defense. Food-derived glutamate is required together with cysteine and glycine for the production of glutathione, an antioxidant molecule that plays an important role in the body's defense mechanism. The amino acid composition of breast milk is very similar for many kinds of mammals, including humans. Glutamate (together with glutamine) is the most abundant of the 20 kinds of amino acids, accounting for 20 percent of amino acids from milk. The fact that glutamate is present in large amounts in human milk and all animal milk suggests that it plays a major, possibly protective, role.

The taste of glutamate, umami, is deeply rooted in biology. Human beings have enjoyed its taste and nutritional benefits from time immemorial. It can be expected that further research into the functions of glutamate and analysis of genome data of various organisms will give more insight into the origins of umami as a basic taste.

For further information about glutamate please visit our website **[www.glutamate.org](http://www.glutamate.org)**

**References:**

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