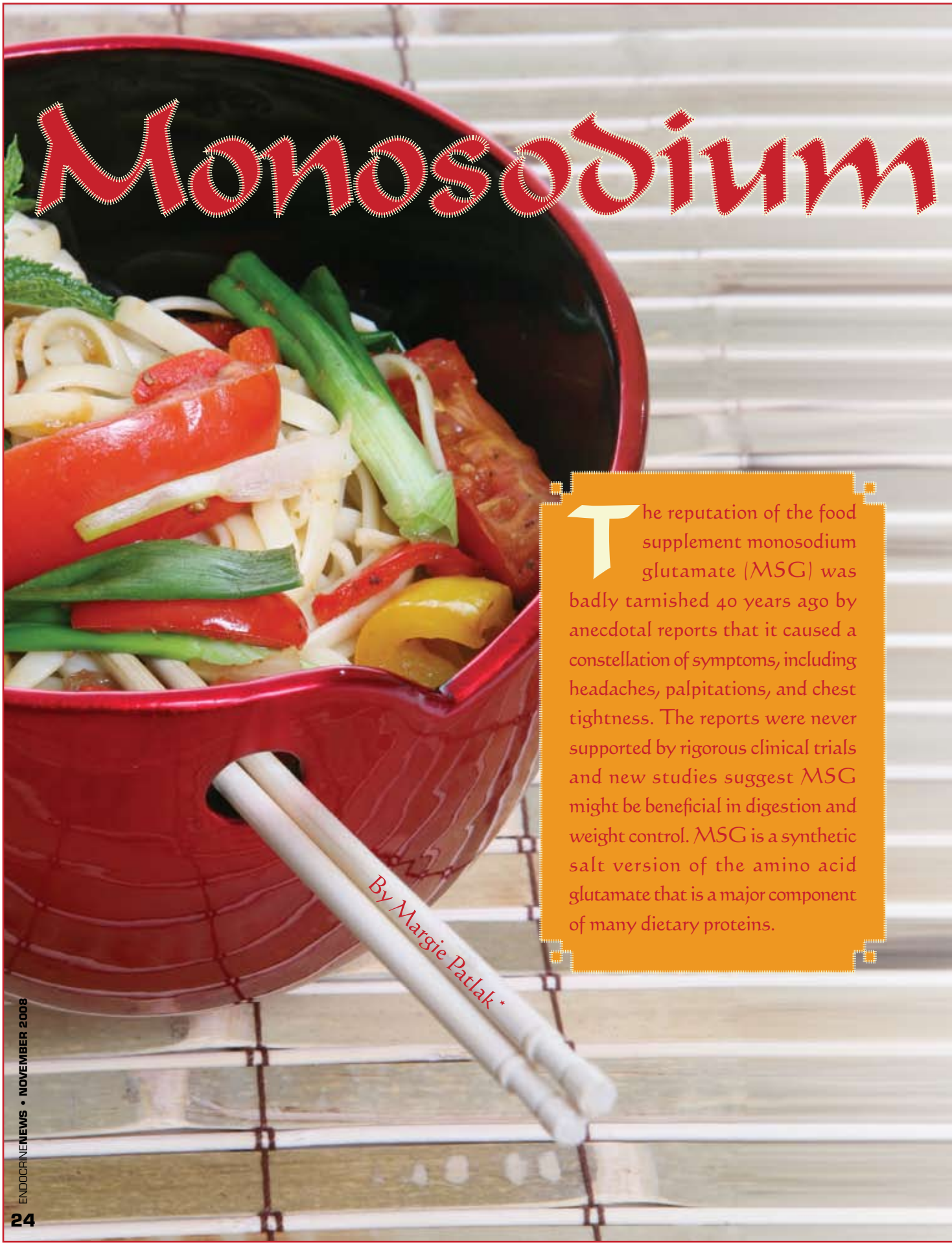
Monosodium



The reputation of the food supplement monosodium glutamate (MSG) was badly tarnished 40 years ago by anecdotal reports that it caused a constellation of symptoms, including headaches, palpitations, and chest tightness. The reports were never supported by rigorous clinical trials and new studies suggest MSG might be beneficial in digestion and weight control. MSG is a synthetic salt version of the amino acid glutamate that is a major component of many dietary proteins.

By Margie Patlak *

Glutamate's Role in Digestion and Weight Control

Kunio Torii, D.V.M., Ph.D., of the Japan-based Institute of Life Sciences of Ajinomoto Co. (which produces MSG), recently summarized his findings on a dietary protein detection system in the body in which glutamate plays a starring role. He spoke at the American Chemical Society's annual meeting about the discovery by his research team, as well as by independent Swiss researchers, that glutamate taste receptors are present in human and rodent stomachs and intestines. In animal studies, when these receptors "taste" glutamate in the lumen of the gut, they trigger the release of neurotransmitters that reach the vagus nerve, which presumably signals the brain.

Dr. Torii also showed in rats, as did Russian scientists in dogs and people, that the "gut–brain axis is a two-way street." Glutamate receptor signals from the gut, on reaching the brain, boost production of saliva, gastric digestive juices, intestinal mucin, and insulin to aid digestion of the dietary protein. One small clinical study found that MSG supplements improved gastric acid secretion and appetite in patients with impaired gastric secretion due to *Helicobacter pylori* infection, aging, or autoimmune gastritis.

Glutamate appears to not only aid digestion, but also might keep waistlines from expanding, several studies suggest. Dr. Torii's MRI brain-imaging studies reveal that MSG in the gut stimulates the brain's lateral hypothalamic area, known to control feeding behavior, and, at least in rodents, apparently helps regulate body weight. He showed that rats given glutamate supplements gained less weight, especially in their abdomens, and had lower leptin plasma levels than controls when both groups ate a diet high in fat and sugar. Another clinical study by researchers at Gunma University in Japan found that glutamate supplements delayed gastric emptying, which can help suppress appetite.

The idea that taste receptors in the gut might help control weight and diabetes was also underscored by Robert Margolskee, M.D., Ph.D., of Mount Sinai School of Medicine in New York. He genetically manipulated mice so they lacked both the T1R3 taste receptor and its messenger compound, gustducin. T1R3 is found in the tongue and the gut and generates the savory taste (umami) that glutamate triggers. Along with another taste receptor, T1R3 also generates the sweet taste triggered by sugars. But T1R3 apparently does more than just help us enjoy a protein-laden meal or a sweet treat. Mice lacking T1R3 or gustducin had faulty regulation of their blood sugar and insulin levels. Gustducin plays a role in all known taste receptor signaling, Dr. Margolskee pointed out, adding, "There are whole taste-signaling pathways present in the gut that could be manipulated to provide novel treatments for obesity, diabetes, and malabsorption."

Most of these intriguing findings in animals still need validation in humans. But they certainly give us something to think about the next time we savor Chinese food. ■

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