Oral Dietary Supplements Before and After Surgery

If routine oral dietary supplements do not increase a patient’s total nutritional intake—or supply nutrients when no other food is given there is no reason to believe that the patient will benefit from such supplements. This might be the simple explanation behind why MacFie et al. did not demonstrate any effects at all of oral nutritional supplements given perioperatively.1 In fact the patients who got the supplements did not totally consume more energy of protein than the controls, at least not in the postoperative days. The explanation could either be that they already had sufficient nutritional intake or that the supplements were not consumed in sufficient amounts.

All of MacFie et al.’s patients followed a modern, postoperative regimen in which nasogastric tubes were avoided, and drinking and eating were allowed and advocated immediately after operation. This regimen of feeding the bowel immediately after emergency surgery3,4 or elective gastrointestinal operation5 is not only known to improve nutritional intake considerably,2 but has proven to reduce postoperative morbidity. In such studies demonstrating this effect3–5 the patients were given an average of 1500 kcal and 50 g protein daily. An intake of this magnitude has been shown to improve nitrogen balance and reduce weight loss.6,7 The patients were given an average of 1500 kcal and 50 g protein daily. This is far less than the amount seen in earlier studies.6 and explains why weight loss and lean body mass were the same in controls as in those offered supplements. It must still be reasonable to expect well-informed and motivated patients to drink liquid supplements adding about 600–800 kcal and 20–30 g protein to the nutritional intake after colonic surgery, as seen in both old6 and recent9 studies. A supplement of this magnitude has been shown to improve nitrogen balance and reduce weight loss.6,7

Two good reasons for increasing patients’ nutritional intake during the last weeks before surgery might be that they are malnourished or have suboptimal spontaneous nutrition during the time before operation, therefore depleting their nutritional stores. No former studies have focused on patients’ nutritional intake at home before surgery and neither was this intake measured in the present study.1 We therefore do not know if the majority of the intervention patients would theoretically benefit from a nutritional intervention, as only one fifth of them were malnourished. Neither do we know if the supplements given during the last 15 d before surgery (mean, 500 kcal and 17 g protein daily) actually improved the patients’ total preoperative nutritional intake. We doubt however, as the average intervention patient lost 1–2 kg during this period—the same or a little more than the controls.

Thus, after having read MacFie et al.’s article, I am still in doubt. The authors may be right when they write, “these results suggest that the routine use of perioperative oral dietary supplements undergoing gastrointestinal surgery confers no clinical or functional benefit,” since their patients were well nourished—or they may be wrong, since they did not succeed in improving the nutritional intake of their patients.

Effect of Theanine, r-glutamylglycine, on Brain Monoamines, Striatal Dopamine Release and Some Kinds of Behavior in Rats

In general, Japanese people drink several cups of tea (green tea, black tea, oolong tea, and others) daily to take a break or relieve stress. The physiological and pharmacological actions of various components of these teas such as catechins, caffeine, r-aminoisobutyric acid (GABA) have been investigated.1–3 The administration of catechins,1 caffeine,2 and GABA3 have affected blood pressure. Catechins have antioxidative, antivirus, anticarcinogenic,4 and hypcholesterolemic effects. In addition, oral intake of green tea or (—)-epigallocatechin gallate (EGCG), a major constituent of green tea, has been shown to exert antitumor effects.5 Caffeine and caffeine-containing beverages cause a significant decrease in serum tryptophan level and significant increases in the concentrations of tryptophan, serotonin, and 5-hydroxyindole acetic acid (5HIAA) in the brain.6 The study, conducted by Hartmann et al., demonstrates the behavioral effect of Kocha Kinoko, which is produced by a partial fermentation of tea using a zooglea. This effect may be attributable to neurochemical changes mediated by some components found in Kocha Kinoko.

We recently examined the effect of theanine, r-glutamylglycine, which is one of the major components of amino acids found in Japanese green tea, brain neurotransmitters, and

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certain kinds of behavioral patterns. Some physiological functions of theanine are summarized as follows. Theanine administered intragastrically is absorbed by a common Na⁺-coupled cotransporter in the brush-border membrane.7 Absorbed theanine is distributed to various organs and incorporated into the brain through the blood-brain barrier via the leucine-prefering transport system.8 Theanine is a derivative of glutamic acid, which is one of the major neurotransmitters in the brain. It is also known that the regulation of blood pressure involves catecholaminergic and serotonergic neurons in both the brain and peripheral nervous system.9,10 Therefore, we examined the blood pressure after the administration of theanine. Oral intake of a high dose of theanine to spontaneously hypertensive rats (SHR) significantly decreased the blood pressure.11 r-glutamylmethylamide, an analogue of theanine included in a small quantity in the green tea extract, also caused a hypotensive effect in SHR.12 On the other hand, the administration of glutamine or glutamic acid to SHR changed neither the blood pressure nor the heart rate. We then investigated the effects of theanine on brain amino acids and monoamines, and the striatal release of dopamine (DA). Administration of theanine caused a significant increase in DA concentrations in the brain, especially in the striatum, hypothalamus, and hippocampus.8 Direct administration of theanine into brain striatum using the microdialysis technique caused a significant increase of DA release in a dose-dependent manner. Microdialysis of the brain with calcium-free Ringer buffer attenuated the theanine-induced DA release. By using the antagonist of non-N-methyl-D-aspartate (NMDA) glutamate receptor, MK-801, or of NMDA glutamate receptor, AP-5, the mechanism whereby theanine stimulates the DA release (+)-2-amino-5-phosphonopentanoic acid, has been investigated.8 To elucidate the mechanism for the theanine-induced DA release, a current study is using a superfusion technique (unpublished data).13

On the other hand, some behavioral effects of theanine have been researched. Locomotion, standing, hole-poking, (animal’s tendency to explore a novel environment), and grooming analyzed by the open-field hole-poke apparatus, were unaltered by the administration of theanine. However, cognition was influenced by long-term intake (3 mo) of theanine; a passive or active avoidance test, performed by using step-through cages, showed that the avoidance learning-ability was significantly improved in animals given theanine. The increase in the score of the avoidance test was accompanied by a decrease of serotonin and 5HIAA in the cerebral cortex (unpublished data).14 The memory ability estimated by the transfer test using Morris water maze apparatus was also improved by the administration of theanine, as compared with the control (unpublished data).14 In the brightness-discrimination learning test, which is related to pellet reinforcement and light-brightness, the correct response ratio and number of obtained pellets were unaltered by theanine intake. However, the number of total responses (R⁺, correct) of rats given the theanine-contained diet was less than that of control rats (unpublished data),15 indicating that the rats administered with theanine were able to obtain the pellets more efficiently than that of control rats.

Taken together, the overall results of some components in or produced from teas may exert various physiological and neurochemical functions. In consequence, teas such as green tea, black tea, oolong tea, and Kocha Kinoko, produced by the partial fermentation of tea by a zooglea, may well be taken for various purposes per individual case.

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**Modulation of the Catabolic Response to Surgery**

**THE CATABOLIC RESPONSE TO SURGERY**

The body’s response to trauma is composed of a variety of physiological changes, often termed the acute phase response. Accelerated muscle-protein breakdown, stimulated amino-acid oxidation, accompanied by a decrease in whole-body protein synthesis, represent typical features of altered protein metabolism homeostasis in surgical and critically ill patients. The extent of protein loss following trauma depends on a variety of factors: nutritional status of the host, underlying disease process, type of anesthesia, and severity of injury. Traditionally the catabolic response to surgery has been ascribed to the increased secretion of catabolic-acting hormones (catecholamines, cortisol, glucagon), and decreased secretion or effect of anabolic hormones (insulin). However, recent evidence suggests that surgical injury leads to the activation of

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