

1 Letter from the Editor

Lead Article

2 Long-term effects of neonatal glutamine-enriched nutrition in very-low-birth-weight infants

Annelies van Zwol, Josef Neu, and Ruurd M van Elburg

Several studies in very-low-birth-weight (VLBW) infants have investigated the effect of parenteral or enteral glutamine supplementation on morbidity, mortality, and outcome in the neonatal period. No evidence of toxicity of glutamine supplementation was found in these clinical trials, but the results for efficacy on a limited number of outcomes have been mixed. The use of glutamine supplementation in VLBW infants has not become routine. Some authors suggest that further study in this area is no longer warranted. In this review, more recent research in the area of glutamine supplementation is described, which suggests additional studies are warranted.

Special Articles

9 Dietary fiber type reflects physiological functionality: comparison of grain fiber, inulin, and polydextrose

Kaisa Raninen, Jenni Lappi, Hannu Mykkänen, and Kaisa Poutanen

Dietary fiber is a nutritional concept based not on physiological functions but on defined chemical and physical properties. Recent definitions of dietary fiber differentiate inherent plant cell wall-associated fiber from isolated or synthetic fiber. For the latter to be defined as fiber, beneficial physiological effects should be demonstrated, such as laxative effects, fermentability, attenuation of blood cholesterol levels, or postprandial glucose response. Grain fibers are a major natural source of dietary fiber worldwide, while inulin, a soluble indigestible fructose polymer isolated from chicory, and polydextrose, a synthetic indigestible glucose polymer, have more simple structures. Inulin and polydextrose show many of the same functionalities of grain fiber in the large intestine, in that they are fermentable, bifidogenic, and laxative. The reported effects on postprandial blood glucose and fasting cholesterol levels have been modest, but grain fibers also show variable effects. New biomarkers are needed to link the physiological functions of specific fibers with long-term health benefits.

22 Relationship between molecular structure of cereal dietary fiber and health effects: focus on glucose/insulin response and gut health

Raymond Gemen, Jan F de Vries, and Joanne L Slavin

Epidemiological and animal data show associations between whole grain and dietary fiber intakes and disease risk reduction. Dietary fiber can be considered a "black box" since its molecular structure can vary significantly. Limited data are available linking the health effects of dietary fiber to certain molecular structures. The present review was conducted to examine the existing knowledge of structure/effect relationships with a focus on human intervention studies that examined the relationships between the molecular structure of cereal dietary fiber and both the blood glucose and insulin responses and gut health. An extensive search of the existing literature was conducted using the PubMed database for the period 1993–2008. Of 48 publications originally identified using the search criteria, 13 provided molecular information in conjunction with fiber type. Several indications show a link between molecular structure and physiological effects. Limited data from human intervention trials are available to verify hypotheses derived from in vitro studies that relate the molecular structure of cereal dietary fiber to both insulin and glucose response and gut health.

34 Folate metabolism pathway and Plasmodium falciparum malaria infection in pregnancy

Abalo Chango and Latifa Abdennebi-Najar

Malaria induced by Plasmodium falciparum is a major cause of mortality. P. falciparum has the ability to use host plasma folate as its primary folate source. Folate is a cofactor needed for both malaria parasite growth and host erythrocyte production. This review examines the possible impairment of the folate-mediated one-carbon metabolism pathway as a result of P. falciparum malaria infection during pregnancy. Folate deficiency during malaria infection is presented, with an emphasis on the controversy regarding the decrease of plasma or erythrocyte folate secondary to malaria. Maternal folate deficiency increases the risk of adverse pregnancy outcomes. Functional folate deficiency and/or increased plasma homocysteine levels during pregnancy of infected women in areas endemic for malaria is a probable scenario accentuating the impairment of placenta function leading to the occurrence of neural tube defects, low birth weights, and intrauterine growth retardations. Potential questions that may be answered in future investigations using an appropriate protocol to study pregnant women with malaria are also addressed.

Nutrition in Clinical Care

41 Oral silicon supplementation: an effective therapy for preventing oral aluminum absorption and retention in mammals

José L Domingo, Mercedes Gómez, and M Teresa Colomina

Silicon is an essential element for some lower forms of life. However, it is not generally considered an essential nutrient for mammals and the mechanisms underlying its potential essentiality remain partially unknown. In recent years, a possible association between the aluminum and silicon levels in drinking water and Alzheimer's disease (AD) has been suggested. It has been reported that silicon might have a protective effect for limiting oral aluminum absorption. This review is focused primarily on the potential role of silicon in preventing oral aluminum absorption and retention in mammals. The results of a number of studies suggest that dietary silicon supplementation could be of therapeutic value for preventing chronic aluminum accumulation in the brain, and hence, be a potential therapy for AD. However, it must be noted that controversy remains about whether aluminum accumulation in the brain is a cause or a consequence of AD. It is suggested that further investigation of this issue is warranted.

Emerging Science

52 Genetics of eating behavior: established and emerging concepts

Eleanor R Grimm and Nanette I Steinle

Understanding why we eat and the motivational factors driving food choices is important for addressing the epidemics of obesity, diabetes, and cardiovascular disease. Eating behavior is a complex interplay of physiological, psychological, social, and genetic factors that influence meal timing, quantity of food intake, and food preference. Reviewed here is the current and emerging knowledge of the genetic influences on eating behavior and how these relate to obesity; particular emphasis is placed on the genetics of taste, meal size, and selection, and the emerging use of functional magnetic resonance imaging to study neural reactions in response to food stimuli in normal, overweight, and obese individuals.

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