Vitamin B<sub>6</sub>

Technical Background

- Vitamin B<sub>6</sub> is one of the essential, water-soluble B vitamins. It exists in plants and animals in several forms (termed “vitamers”) that are interchangeable and comparably active. The chemical form that is typically provided in vitamin supplements is pyridoxine hydrochloride (or pyridoxine HCl).<sup>1</sup>

- Like all true vitamins, B<sub>6</sub> functions as a coenzyme, meaning that it works in tandem with one or more enzymes to catalyze metabolic reactions in our cells. Vitamin B<sub>6</sub> serves as a cofactor for over 100 enzymes in the human body, many of which are involved in amino acid metabolism.<sup>1,2</sup> Because these types of reactions are central to the function of all cells, vitamin B<sub>6</sub> ultimately plays a central role in human metabolism and health.

- Primary processes mediated by vitamin B<sub>6</sub> include the generation of lipid metabolism, nervous system function, hormone modulation, and immune function.<sup>1,2</sup>

- Vitamin B<sub>6</sub> affects nervous system function largely through its role in the synthesis of neurotransmitters such as serotonin, taurine, norepinephrine, and dopamine. It also appears to be involved in development of the myelin sheath around nerve cells.<sup>1</sup> Animal studies suggest that vitamin B6-deficiency may affect brain function.<sup>3</sup>

- Vitamin B<sub>6</sub> is important in regulating homocysteine levels in blood, which constitutes an important risk factor for cardiovascular disease and stroke.<sup>4,5</sup>

- A large longitudinal study recently identified an inverse relationship between long-term intake of dietary vitamin B<sub>6</sub> and colorectal cancer. This relationship was especially pronounced amongst women who drank alcohol.<sup>6</sup>

Sources and Recommended Intake

- The Recommended Dietary Allowance for vitamin B<sub>6</sub> is 1.3 mg per day for adults, 0.5 mg per day for children, and 1-1.3 mg per day for adolescents.<sup>7</sup> Requirements increase with age, increasing protein intake, and during pregnancy and lactation.<sup>1</sup> Alcoholism, smoking, and chronically high caffeine intake may also boost vitamin B<sub>6</sub> requirements.<sup>3</sup>

- Vitamin B<sub>6</sub> is available in a wide variety of foods. Best sources include potatoes, spinach, legumes, nuts and seeds, avocado, whole grains, wheat bran, rice bran, chicken and pork.<sup>1</sup>

- Food processing and storage can reduce vitamin B<sub>6</sub> content by 10-50%. This vitamin is particularly unstable in light and during cooking under alkaline conditions.<sup>1</sup>

- Vitamin B<sub>6</sub> is readily (>75%) absorbed.<sup>1</sup>

- Too much vitamin B6 can be toxic. The Tolerable Upper Intake level has been set at 100 mg per day.<sup>7</sup>

Abstracts

Background & Aims: Vitamin B6 has a crucial role in 1-carbon metabolism, which involves DNA synthesis and DNA methylation. Aberrations in these processes have been implicated in colorectal carcinogenesis. We examined the association between long-term dietary vitamin B6 intake and risk of colorectal cancer and whether this association is modified by consumption of alcohol, which may disrupt 1-carbon metabolism. Methods: Our study population comprised 61,433 women in the population-based Swedish Mammography Cohort. The women were aged 40 to 76 years, had no history of cancer, and completed a food-frequency questionnaire at baseline in 1987-1990. Dietary information was updated in 1997. During a mean follow-up of 14.8 years, 805 incident colorectal cancer cases were diagnosed. Results: After controlling for age and other potential confounders, long-term intake of dietary vitamin B6 was significantly inversely associated with risk of colorectal cancer (P value for trend = .002). Compared with women in the lowest quintile of vitamin B6 intake, those in the highest quintile had a 34% lower risk (multivariate rate ratio, 0.66; 95% confidence interval, 0.50-0.86). The association was most pronounced among women with moderate to high alcohol consumption. The multivariate rate ratio of colorectal cancer comparing extreme quintiles of vitamin B6 intake was 0.28 (95% confidence interval, 0.13-0.59) among women who consumed ≥30 g/wk of alcohol (approximately equivalent to 2 drinks per week). Conclusions: Findings of this study suggest that vitamin B6 may play a role in the prevention of colorectal cancer, particularly among women who drink alcohol.

References