

Maternal consumption of cured meats and vitamins in relation to pediatric brain tumors.

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Abstract

Brain tumors are the leading cause of death from childhood cancer, yet the causes of most of these tumors remain obscure. Few chemicals are effective in causing brain tumors experimentally after systemic administration of low doses; a notable exception is one group of N-nitroso compounds, the nitrosamides (in particular the nitrosoureas). Feeding pregnant animals nitrosamide precursors (e.g., sodium nitrite and an alkylamide such as ethylurea) causes a high incidence of nervous system tumors in offspring. This population-based epidemiological study was designed to test the hypothesis that maternal consumption during pregnancy of meats cured with sodium nitrite increases the risk of brain tumors among offspring. The intake of vitamins C and E blocks endogenous formation of nitroso compounds and was expected to be protective. Mothers of 540 children under age 20 with a primary brain tumor diagnosed during 1984-1991 and 801 control children in the same 19 counties on the U.S. West Coast were interviewed. Risk increased with increasing frequency of eating processed meats [odds ratio (OR) = 2.1 for eating at least twice a day compared to not eating; 95% confidence interval (CI) = 1.3-3.2; P = 0.003]. Risk also increased with increasing average daily grams of cured meats or mg of nitrite from cured meats (P for each <0.005) but not with nitrate from vegetables. Daily use of prenatal vitamins throughout the pregnancy decreased risk (OR = 0.54; CI = 0.39-0.75). Risk among mothers who consumed above the median level of nitrite from cured meat was greater if vitamins were not taken (OR = 2.4; CI = 1.4-3.6) than if they were (OR = 1.3). These effects were evident for each of three major histological types and across social classes, age groups, and geographic areas. This largest study to date of maternal diet and childhood brain tumors suggests that exposure during gestation to endogenously formed nitroso compounds may be associated with tumor occurrence. Laboratory exploration is needed to: (a) define dietary sources of exposure to alkylamides; (b) investigate the reactivity of nitrite in high concentration such as around bits of cured meats in the stomach after ingestion compared to nitrite in dilute solution; and (c) confirm that simultaneous ingestion of alkylamides and cured meats leads to the endogenous formation of nitrosamides.

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