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Relationship of Dietary Iodide and Drinking Water Disinfectants to Thyroid Function in Experimental Animals

N W Revis, P McCauley, and G Holdsworth

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Abstract

The importance of dietary iodide on the reported hypothyroid effect of drinking water disinfectants on thyroid function was investigated. Previous studies have also showed differences in the relative sensitivity of pigeons and rabbits to chlorinated water. Pigeons and rabbits were exposed for 3 months to diets containing high (950 ppb) or low (300 ppb) levels of iodide and to drinking water containing two levels of chlorine. Results showed that the high-iodide diet prevented the hypothyroid effect observed in pigeons given the low-iodide diet and chlorinated drinking water. Similar trends were observed in rabbits exposed to the same treatment; however, significant hypothyroid effects were not observed in this animal model. The factor associated with the observed effect of dietary iodide on the chlorine-induced change in thyroid function is unknown, as is the relative sensitivity of rabbits and pigeons to the effect of chlorine. Several factors may explain the importance of dietary iodide and the relative sensitivity of these species. For example, the iodine formed by the known reaction of chlorine with iodide could result in a decrease in the plasma level of iodide because of the relative absorption rates of iodide and iodine in the intestinal tract, and the various types and concentrations of chloroorganics (metabolites) formed in the diet following the exposure of various dietary constituents to chlorine could affect the thyroid function. The former factor was investigated in the present studies. Results do not confirm a consistent, significant reduction in the plasma level of iodide in rabbits and pigeons exposed to chlorinated water and the low-iodide diet. The latter factor is being investigated.