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Prediagnostic Serum Nutrients and Cancer Risk : a Current Epidemiologic study on A-bomb Survivors in Hiroshima and Nagasaki

Michinori Kabuto

Department of Public Health
Nagasaki University School of Medicine
Section of Environmental Psychophysiology
Department of Environmental Health
Japan National Institute for Environmental Studies

Our present epidemiologic study on serum nutrients and subsequent stomach and lung cancer risk was introduced with special emphasis on its background and recent findings related to it. Using the stored sera collected in 1970-72 from about 20000 participants to Adult Health Survey binnually conducted by Radiation Effect Research Foundation (RERF), a cohort of A-bomb survivors in Hiroshima and Nagasaki, the present study was intended to examine whether serum levels of vitamin-A, betacarotane, vitamin-E, selenium, zinc, ferritin, transferrin, ceruloplasmin and so on may have any significance to the risk for subsequent stomach and lung cancer incidence (Kabuto et al., 1986). Two hundred thirty three stomach cancer and 84 lung cancer cases, who were cancer-free in 1970-1972 when they had their blood collected, have been found to be diagnosed during the following about 10 years of 1973-1983. To examine epidemiologically as a case-control analysis, one control for each case were selected from the remaining cancer free (at least 1973-1983) people with matching for age, sex, city (Nagasaki or Hiroshima) and dose of exposure to radiation at A-bomb. The results of the study will appear in a couple of years. Obviously, the number of subjects is one of the largest and its prospective nature of study is quite important to approach to a definite conclusion when compared to many epidemiological studies on cancer risk which have been relating many factors as risk mostly indirectly.

As a background of this type of study, however, it should be pointed out initially that Doll and Peto (1981) summarized for the first time the concept as well as estimated percent of avoidability of cancer risk with respect to some life-style related factors other than exposure to carcinogenic factors. According to the estimated percent contributions of these factors to cancer deaths by all causes in the United States, 35% is related to diet, 30% to tabacco, about 10% to infections, 7% to reproductive and sexual behavior and percents for other factors like alcohol, occupation, pollution, geophysical one, food additives and so on were estimated to be less than 5%. In relation to the above dietary factors, there have been many experimental as well as epidemiological data suggesting the possibility for them to affect significantly cancer risk. Also as the underlying mechanism during carcinogenic process, it has been hypothesized that there should be at least two steps of initiation and promotion along the changes of normal cell to malignant one. Each of these steps could be inhibited or stimulated by nutritional status at least partially through their effects on cellular antioxidant defense system in some cases (Chow, 1979), other life-style related factors, endocrine and immunity status and so on, which might result in modified cancer risk even if there were the same quality and quantity of exposure to carcinogenic

factor or chemicals as well as radiation.

On the other hand, if the results of the same type of studies as the present one are concerned, there have not yet been found consistency. For example, though serum vitamin-A, vitamin-E and selenium have been shown to significantly correlate with cancer incidence in terms of relative risk prospectively in the studies by Kark J.D. et al. (1981), Wald N.I. et al. (1980) and Willett W.C. et al. (1983), re-analysis of the inverse correlation of vitamin-A, a lipid-soluble vitamin, to the risk with adjusting serum cholesterol have resulted in no significant difference in subsequent cancer incidence between the groups divided by the levels of vitamin-A (Willett et al., 1984). This is one example of the points which should be discussed with the results of the present study with special reference to Japanese people whose cancer incidence profile and also lifestyles have been quite different from the others well studied, though.

REFERENCES

1) Chow, C.K., Nutritional influence on cellular antioxidant defense systems, Am J Clin Nutr 32, 1066-1081, 1979.
2) Kabuto, M. et al., Nutrients in relation to cancer risk : a prospective epidemiologic study using stored sera, RERF RP 10-85, January 1986.
3) Kark, J.D. et al., Serum vitamin A (retinol) and cancer incidence in Evans County, Georgia, JNCI 66, 7-16, 1981.
4) Wald, N. et al., Low serum vitamin-A and subsequent risk of cancer, Lancet 813-5, 18 October 1980.
5) Willett, W.C. et al., Prediagnostic serum selenium and risk of cancer, Lancet, 130-134, 16 July 1983.
6) Willett, W.C. et al., Relation of serum vitamins A and E and carotenoids to the risk of cancer, 430-434, 16 February 1984.