

CORRELATION BETWEEN FISH INTAKE AND DIOXIN IN HUMAN MILK AT THE INDIVIDUAL LEVEL

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Introduction

In order to investigate the dietary intake of dioxin and EDCs in relation to their body burdens at the individual level, their concentrations in human milk have been determined for randomly selected breast feeding women in two seacoast areas in Japan, where fish eating was expected to be more predominant compared to other areas. Although most part of exposures to dioxin among Japanese has been attributed to fish consumption on the average in a general survey by Ministry of Health, data showing their association at the individual level has been limited, probably because it is expected that dioxin concentrations in fish *per se* are varying largely according to kinds of fish, region etc. However, for responding the increasing public concern at the individual level, it seems urgent to develop some convenient and also inexpensive methods to estimate their burden and therefore health risks.

As one possible approaches to this end, in the present study, the feasibility of a questionnaire on food intakes developed by Japan NCC in order to estimate the averaged intake of various food staffs semi-quantitatively and also the possible relationships between the estimated fish intake and body burden of dioxin at the individual level were investigated preliminarily.

Materials and Methods

One city in Hokkaido (K-city) and one town in Okinawa (T-village) both of which are located on the seacoast and their economy is characterized mainly with fishery were selected for the study.

In K-city, 46 pregnant women who were staying a gynecological hospital for delivery were subjected to a questionnaire survey regarding dietary intake according the questionnaire developed by National Cancer Center (NCC) for their cohort study. According to the results of dietary analyses, 7 women with relatively high and low intake of fish and meat were requested to provide milk sample of around 100 ml for analyzing dioxin and EDCs. Their age was 28.4 years, on the average, ranging from 25 to 31 years. Five of them had the first birth during the study period, while the other two had the second one.

As for the subjects in K-city, according to the questionnaire for annually averaged amounts of each of various food items, fish_meat intake index and meat intake index were developed to show the estimated averaged amount of fish meat (salmon, tuna, cod, sea bream, sardine, mackerel, salmon roe, eel, squid, octopus, shrimp, clam, mud snail, fish paste cake etc.) and other meat (beef, pork, chicken, ham, sausage, bacon etc.), respectively.

In T-town, on the other hand, 10 women who just began breast feeding were requested for

sampling their breast milk, who were recruited based on the registry of birth, by the public health nurse in the local government. Their mean age was 27.6 years with a range from 21 to 35 years. The birth order of their babies varied from the 1st for 5 women through 7th for 1 women. Annually averaged amounts of foods are now under survey as a follow-up study with using the same questionnaire as adopted to the subjects in K-city, the results of which will be added to the results at the presentation in the Dioxin2001.

Dioxin (13 PCDD + 15 PCDF + 12 Co-PCB isomers) in human milk was determined with the same GC-MS methods as described in the Dioxin2000 meeting last year. For the 10 samples from T-town, HCH, HCB, DDT as well as dieldrin were also determined.

Results and Discussion

In K-city, dioxin concentration in milk were 15.2 pg TEQ/g-fat (min-max:4.8-25; International-TEF basis) and 17.4 pg TEQ/g-fat (min-max:5.6-28; WHO-TEF basis), which were within the range reported for Japanese people by Ministry of Health so far. There was a significant difference in dioxin concentration, however, between 5 first-child women and 2 second-child women with showing higher values in the former compared to the latter. When 5 first-child women alone were subjected, the fish_meat intake index and meat intake index for beef, pork and chicken were calculated based on the answers to the questionnaire of Japan NCC. Fish meat-index correlated significantly with concentration of dioxin among 5 women who delivered their first baby (Fig.1) while meat intake index did not show significant correlation with dioxin concentration among them (Fig. 2).

As for the subjects of T-town, mean dioxin concentration in milk was 6.7 pg TEQ/g-fat (min-max: 2.6- 10; WHO TEF basis), which was much lower than that in K-city as above. HCH, HCB, p,p'-DDT, p,p'-DDE and dieldrin were 64.8, 5.0, 6.3, 154 and 3.8 ng /g-fat. Since their dietary intake is now being examined with using the questionnaire as above in a follow-up study, the results of their correlation analyses will be described at the meeting.

As far as the results in K-city are concerned, however, it is likely that amount of fish meat intake may be a dominant contributor to the body burden of dioxin even at the individual level at least when the subjects are recruited within a local community. It is also suggested that the dioxin concentrations in milk may be much lower in rural areas in Okinawa as previously indicated by the monitoring data of Japan Ministry of Health compared to the people in other areas such as the present K-city or T-city shown last time.

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References

Japan MOH http://www1.mhlw.go.jp/houdou/1108/h0802-1_18.html

HUMAN EXPOSURE II -POSTER

Fish Intake and Milk Dioxin

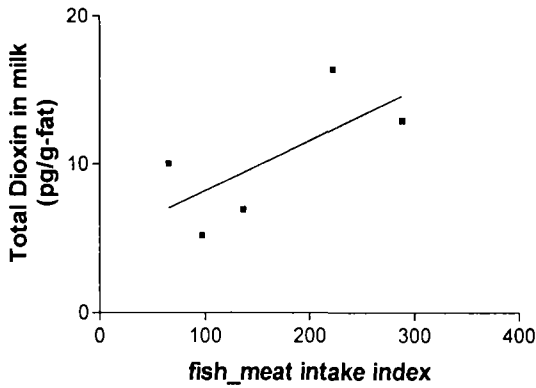


Fig 1. Correlation between fish_meat intake index and dioxin concentration in human milk was significant among 5 first-baby women only ($r=$; $p<0.05$)

Meat Intake and Milk Dioxin

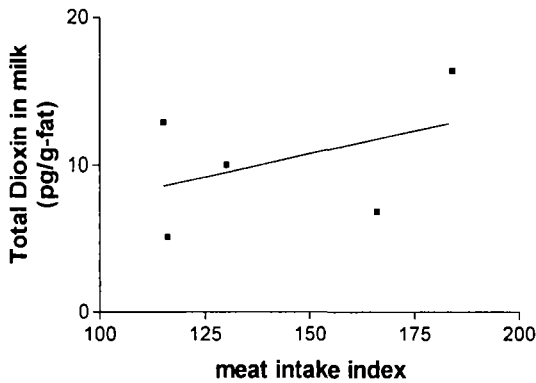


Fig 2. Correlation between meat intake index and dioxin concentration in human milk was not significant among 5 first-baby women only