

S01-03 Relationship between methylmercury (MeHg) and docosahexaenoic acids (DHA) in pregnant women and fetuses

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Objective: MeHg is one of the substances most risky to fetal brain development, and most of the exposure to MeHg is through maternal fish consumption. On the other hand, DHA, which is important for the fetal brain and its growth, is also derived from maternal fish consumption. If human exposure to MeHg were independent of nutrition from fish, we would aim at zero exposure. However, fish plays an important cultural role among Japanese and contains n-3 polyunsaturated fatty acids, such as DHA. Therefore, this study was designed to determine the relationship between MeHg exposure and DHA concentrations in pregnant women and fetuses to consider the risk and benefit of maternal fish consumption during the gestation period. Methods: Venous blood samples were collected from 55 pairs of mothers from early gestation, and mothers and fetuses (cord blood) at parturition. Hg in blood and fatty acids in plasma were measured, respectively. Results and Discussion: Maternal mercury level showed a tendency to decline from early gestation to parturition. Fetal MeHg level was about 1.8 times higher than mothers. Significant positive correlations with MeHg ($r=0.78$) and DHA ($r=0.67$) were observed between mother and fetuses, indicating that both substances in fetuses reflect maternal exposures. Significant positive correlations of MeHg and DHA were observed in mothers both at early gestation ($r=0.29$) and at parturition ($r=0.36$). A significant positive correlation with MeHg and DHA was also observed in fetuses ($r=0.36$). These results suggest that they were derived from fish consumption and were selectively transferred from mothers to fetuses. Hair/blood Hg ratios were 356 at early gestation, 339 at partition, and higher than 250 at the steady state, which indicates that MeHg distribution can not be explained by a single-compartment model. This must be taken into consideration in risk assessment of MeHg during gestation. Though the origins of the two fatty acids are completely different, DHA showed significant positive correlations with arachidonic acid, which is also important for fetal brain and its growth. This phenomenon is interesting, and it may suggest that the ratio of these fatty acids is also important.

Keywords: Methylmercury; Docosahexaenoic acid; Blood; Mothers; Fetuses