

Cohort study on the neurobehavioral effects of perinatal exposure to halogenated organic environmental pollutants and heavy metals in Japanese children: Protocol and description

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Several longitudinal prospective cohort studies on the effects of perinatal exposures to polychlorinated biphenyls (PCBs) and dioxins on growth of children have demonstrated that the transplacental and lactational exposures to PCBs significantly relate to the delay in the neurodevelopment. Dioxins and PCBs are highly lipophilic and chemically stable compounds that accumulate in the food chain. Therefore, the main sources of environmental exposure to those toxic compounds are dairy products, meat and fish; especially seafood eating might be most responsible. In addition to these halogenated pollutants, methylmercury has been also shown to be a potent neurotoxicant to the developing fetal brain. Since the main source of this compound is also seafood, the combined effects of these compounds must be clarified in Japan. The final destination of this study is to examine the effects of perinatal exposures to environmentally persistent organic pollutants and heavy metals on neurobehavioral development in Japanese children. This study will show the protocol and description of the study cohort which has been in progress in the Tohoku area in Japan since 2001.

We have started to recruit pregnant mothers with informed consent at two hospitals from December 2000. To establish an optimal study population, only infants born at term (36 to 42 week of gestation) without congenital anomalies or diseases were included. Pregnancy and delivery had to be completed without overt signs of serious illness or complications. Several biological samples including maternal blood, cord blood, placenta, cord, breast milk and maternal hair were collected. For the assessment of infant neurodevelopment, Brazelton Neonatal Behavioral Assessment Score (NBAS), Bayley Scales for Infant Development (BSID), Kyoto Scale of Psychological Development (KSPD) and Fagan Test of Infant Intelligence (FTII) were applied. The home environment and the socio-economical status are also measured. Although our cohort study is not yet completed, the sample size will be more than 500 mother-infant pairs. We will welcome any suggestion and comment to our study protocol.

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