

## **Cohort study on the neurobehavioral effects of perinatal exposure to halogenated organic environmental pollutants and heavy metals in Japanese children: an interim report**

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Several longitudinal prospective studies to examine the effects of in utero and lactational exposure to PCBs and dioxins on physical and neurobehavioral development in children have been undertaken. Some of those studies indicated that perinatal exposures to PCBs and dioxins were associated with postnatal growth delay and poorer cognitive functioning. Similar neurobehavioral effects were also observed after the perinatal exposures to heavy metals. Especially, methylmercury has been identified to be a potent neurotoxicant to the developing fetal brain in a Faroese cohort study. Since cadmium (Cd) affects the level of thyroid-stimulating hormone, the exposure to Cd could be a confounding factor. We designed a prospective longitudinal cohort study to examine the effects of perinatal exposure to PCBs, dioxins and heavy metals on neurobehavioral development in Japanese children. Since we did not yet completed our cohort study, this is an interim report to show our study protocol.

### **METHODS**

We are recruiting the healthy pregnant mothers with informed consent at two large hospitals in Sendai; Hospital A from December 2000 and Hospital B from April 2001. To establish an optimal study population (approx. 400 infant-mother pairs), 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. A blood sample was taken from the mothers at 28 week of their pregnancy. Blood was collected in a vacuum tube with heparin, and centrifuged within 6 h for 20 min at 3500 rpm; plasma and whole blood were separately stored at -80°C until analysis. A blood sample of the umbilical cord was also taken into a bottle containing heparin after the delivery, and treated similarly. The tissues from placenta and cord were collected and stored at -80°C until analysis. Two days after the delivery, hair samples were taken from the mothers and the questionnaire including food intake frequency were performed. The mothers were finally asked to give us a sample of breast milk a month after the delivery. For the assessment of neurobehavioral development, Brazelton Neonatal Behavioral Assessment Score (NBAS) were performed when the newborn was at three days old, and other tests including Bayley Infant Neurodevelopment Screener (BINS) and Fagan Test of Infant Intelligence (FTII) will be done with growing of the children.

### **RESULTS**

We had already obtained 200 consents from 510 mothers explained by the end of October 2001, indicating that we expect that the mean rate of consent obtained is 40%. The yearly birth number of the two hospitals is 1400. Supposing that 20% of mothers will be excluded due to several conditions, we explain to 1120 mothers and obtain 448 consents a year. Mother's blood, placenta blood, breast milk, mother's hair, placenta and cord were collected. The details of the cohort protocol will be shown in the poster.

### **COMMENT**

We did not yet completed our prospective longitudinal study. We welcome comments and suggestions to us. (nakaik@mail.cc.tohoku.ac.jp)