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Segmental hair mercury concentrations during gestation and their correlations among baby hair, maternal blood and cord blood mercury levels at parturition

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Methylmercury (MeHg) is one of the most risky substances to affect fetus through fish consumption. Our objective in this study is to evaluate the changes in MeHg exposure from the segmental hair mercury concentrations during gestation and to study the correlations among baby hair, maternal and umbilical cord red blood cells (RBC) as biomarkers of fetal exposure to MeHg at parturition. In total, 40 paired samples of maternal hair from the scarp, maternal and cord RBC, and baby hair were collected at parturition. The maternal hair samples were cut into segmentation of 1cm length from the scalp. Total mercury (THg) was measured for the samples. THg in cord RBC was about 1.6 times higher than in maternal RBC. A strong correlation coefficient ($r=0.91$) was found between THg in maternal and cord RBC. The tendency of the increase or decrease of segmental hair mercury concentration during the gestational period differed individually. The correlation coefficient between the segmental hair Hg concentrations and maternal RBC ($r=0.84$) and cord RBC ($r=0.90$) were strongest in the hair 1 cm from scarp, respectively. The correlation coefficients decreased gradually with the distance from the scarp. The geometric mean Hg concentrations in baby hair at parturition was similar to that in maternal hair 1 cm from scarp, and they showed a strong correlation ($r=0.94$). The findings of this study indicated that MeHg exposure level of pregnant women might change individually reflecting their amount and species of fish consumed, and the segmental hair THg analysis will give the important information. The maternal hair close to scarp at parturition had the strongest correlations among the biomarkers for fetal exposure to MeHg at parturition.