Exposure assessment to methylmercury of French pregnant women: Bio-Monitoring of MeHg in hairs and assessment of MeHg intake through fish consumption (CORAI study)

Pouzaud F[a]., Blanchemanche S[a]., Krempf M[b]., Grandjean P[c]., Verger P[a].

a INRA Met@risk, Paris, France - b INSERM U539-CRNH, Nantes, France. - c Institute of Public Health, Odense, Denmark

Background and objectives

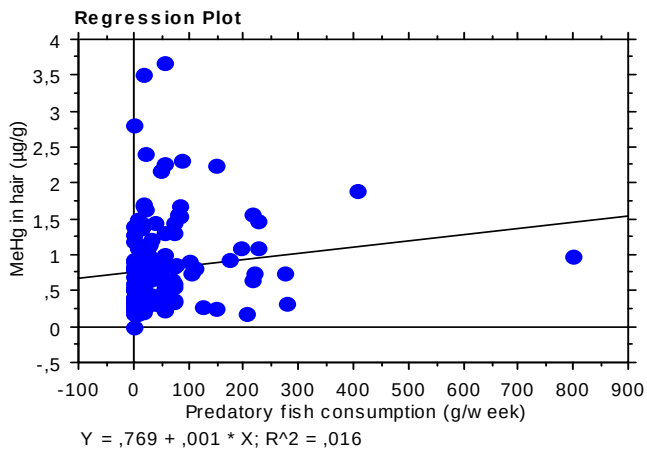
The safety and nutritional benefits related to fish consumption have become an increasing public health concern in recent years. In particular, because the risk related to the dietary exposure to methylmercury should be balanced with the benefit of omega 3 fatty acids. This study

Materials and methods

From 1st September 2005 until August 2006, we recruited 161 French pregnant women (18-45 yrs) at their initial clinical obstetric appointment in Nantes, a large city of the western French coast, known to have a high proportion of fish consumers. Eligible participants were asked to donate hair samples at 12 and 32 weeks of pregnancy. A food frequency questionnaire focusing on the consumption of various fish species and on portion sizes of fish eaten was performed for each women both at 12 and 32 weeks of pregnancy. The amounts of fish consumed were combined with the average concentrations for MeHg in the corresponding fish species available on the French market.

Preliminary Results

The total fish consumption at the 95th percentile of the distribution is about 1050 grams per week when the consumption of predatory fish (Swordfish, Grenadier, Ling, Marlin, Grouper, Shark, Dogfish, Tuna) is 215 grams per week at the 95th percentile. The concentration of MeHg in hairs is positively correlated with predatory fish consumption. (Spearman correlation, Rs=019, p<0,05).



Consistently with previous results, about 5% of French women of childbearing age consuming fish are exposed above the tolerable weekly intake of 1.6 µg/kg bw established for MeHg.

Considering the analysis of MeHg in hairs, the maximum level measured is about 4 times lower than the BMDL calculated from the Feroes' cohort.

	Modelled dietary exposure		MeHg in Hairs	
Unit	µg/kg bw/week	µg/kg bw/week	µg/g	µg/g
Period	12 weeks	32 weeks	12 weeks	32 weeks
Mean	0.56	0.67	0.81	0.81
SD	0.71	0.76	0.58	0.53
95th percentile	**1.79**	**1.66**	1.89	1.95
Maximum	**4.82**	**6.71**	**3.66**	**2.82**
References	**PTWI: 1.6**	**PTWI: 1.6**	**BMDL: 14**	**BMDL: 14**

Table 1: Summary table describing the distribution of MeHg ingested and its concentration in hairs.

Conclusions

This first monitoring of MeHg in a group of 161 pregnant women in France confirms the results of previous studies showing for a significant number of French women, a dietary exposure above the international health based guidance value of 1.6 µg/kg bw/week. On the other hand the internal exposure to this contaminant measured in women's hairs shows that this parameter remain well below the BMDL calculated from the Faroes' study. No significant changes were observed between the first and the third trimester of pregnancy.
Further ongoing analysis are necessary to better characterise high consumers of fish and potential risks and benefits related to this behaviour.