



HAL
open science

Monoamine oxidase activity in placenta in relation to manganese, cadmium, lead, and mercury at delivery.

Nadia Abdelouahab, Guy Huel, Alexander Suvorov, Bernard Foliguet, Valérie Goua, Ginette Debotte, Josiane Sahuquillo, Marie-Aline Charles, Larissa Takser

► To cite this version:

Nadia Abdelouahab, Guy Huel, Alexander Suvorov, Bernard Foliguet, Valérie Goua, et al.. Monoamine oxidase activity in placenta in relation to manganese, cadmium, lead, and mercury at delivery.. *Neurotoxicol. Teratol.*, 2009, 32 (2), pp.256-61. 10.1016/j.ntt.2009.08.010 . inserm-00422145

HAL Id: inserm-00422145

<https://www.hal.inserm.fr/inserm-00422145>

Submitted on 6 Oct 2009

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Table 1: Socio-demographic and pregnancy information of the pregnant women.

	Mean \pm SD	Range
Age (years)	29.0 \pm 5.0	19.0 – 39.0
Gestational age (weeks)	39.5 \pm 1.7	28.0 – 42.0
	(%)	
Boys	49	
High education level (>12 years)	56	
Worked during pregnancy	74	
Primiparity	47	
Smoked during pregnancy	25	

Table 2: Descriptive statistic of metal blood concentrations at delivery and MAO activity in placenta

	N	Arithmetic mean ± SD	Interquartile range	Minimum	Maximum
Maternal Mn, ug/L	160	10.5 ± 4.1	8.0 – 12.0	3.0	29.0
Cord Mn, µg /L	159	31.2 ± 13.4	22.5 – 40.4	3.0	75.0
Maternal Pb, µg /L	160	18.4 ± 12.1	12.0 – 20.0	2.0	90.0
Cord Pb, µg /L	159	14.9 ± 9.3	9.0 – 19.0	1.0	63.0
Maternal Cd, µg /L	160	0.98 ± 0.43	0.7 – 1.2	0.1	2.3
Cord Cd, µg /L	159	0.7 ± 0.4	0.5 – 0.9	0.1	2.9
Maternal hair Hg, µg/g	144	0.67 ± 0.5	0.33 – 0.81	0.13	3.5
MAO, nmol/g protein	163	7.8 ± 5.1	3.8 – 10.4	0.4	26.2

Table 3: Correlation matrix for metals in maternal blood and MAO activity (nmol 4-HOQ/g of protein, log transformed) in placenta

	MnB	PbB	MAO activity	MAO-A mRNA $2^{-\Delta\Delta C_t}$ ^a
MnB	-	0.11 (160)	0.19* (160)	0.44* (20)
PbB	0.11 (160)	-	-0.05 (160)	0.15 (20)
CdB	-0.10 (160)	0.08 (160)	-0.12 (160)	-0.02 (20)

Pearson r (n)

^aSpearman r (n)

* p=0.05

Table 4: Correlation matrix for metals in cord blood and MAO activity
(nmol 4-HOQ/g of protein, log transformed) in placenta

	MnB	PbB	MAO activity	MAO-A mRNA $2^{-\Delta\Delta C_t}$ ^a
MnB	-	0.21** (159)	0.20* (159)	0.50* (20)
PbB	0.21** (159)	-	-0.16* (159)	0.05 (20)
CdB	-0.16* (159)	0.14 (159)	-0.20* (159)	-0.14 (20)

Pearson r (n)

^aSpearman r (n)

* p<0.05

** p<0.01

Table 5: Mother – cord correlations for metals (n=157)

	Maternal PbB	Maternal CdB	Maternal MnB
Cord PbB			
Pearson R	0.41	-0.01	0.09
p	<0.0001	NS	NS
Cord CdB			
Pearson R	0.04	0.25	-0.19
p	NS	0.001	0.02
Cord MnB			
Pearson R	0.09	-0.11	0.33
p	NS	NS	<0.0001

Table 6: Monoamine oxidase activity (nmol 4-HOQ/g of protein, log transformed) in placenta in relation to maternal and cord metals concentrations ($\mu\text{g/L}$) in all subjects

	Slope estimate \pm St Error	t	p	Model R ²
Cord blood metals				11%
Mn	0.006 \pm 0.001	3.00	0.003	
Pb (log transformed)	-0.25 \pm 0.09	-2.62	0.01	
Cd (log transformed)	-0.12 \pm 0.09	-1.31	0.19	
Maternal blood metals				4%
Mn	0.01 \pm 0.006	2.38	0.02	
Pb (log transformed)	-0.13 \pm 0.11	-1.21	0.23	
Cd	-0.02 \pm 0.06	-0.28	0.78	

Models adjusted for smoking during third trimester

Mercury concentrations were not included in the final analysis due to 16 subjects with missing values and low correlation with MAO activity.

Table 7: Correlation matrix for metals at delivery and MAO activity (nmol 4-HOQ/g of protein, log transformed) in placenta in subjects with high and low MAO activity

	MAO activity > 7.5 nmol/g of protein	MAO activity < 7.5 nmol/g of protein
Cord blood metals		
Mn	0.29* (74)	-0.004 (85)
Pb (log transformed)	-0.06 (74)	-0.12 (85)
Cd (log transformed)	-0.13 (74)	-0.21 [#] (85)
Maternal metals		
Mn	0.32** (76)	-0.008 (84)
Pb (log transformed)	0.05 (76)	-0.05 (84)
Cd	-0.15 (76)	-0.17 (84)
Maternal hair Hg	0.09 (70)	-0.26* (74)

Pearson r (n)

^aSpearman r (n)

* p<0.05

** p<0.01