Supplemental Materials

Do Interactions Between Gut Ecology and Environmental Chemicals Contribute to Obesity and Diabetes?

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Supplemental Material, Table 1. Phase II metabolism of obesogenic/diabetogenic chemicals[a]

	Enterohepatic cycling	Phase II conjugates			References
Non-pesticide persistent organic pollutants		Glucuronide	Sulfate	Glutathione	
Polyfluorinated alkanoic acids	AE[a]				NA
Polybrominated flame retardants	y[a]	y	y		(Schauer et al. 2006)
Polychlorinated biphenyls	y	y	y	y	(Redgrave et al. 2005)
Polychlorinated dibenzodioxins	y	y			(Hakk et al. 2001)
Polychlorinated dibenzofurans	y	y	y	y	(Burka et al. 1990)
Pesticides					
Alachlor	y			y	(Heydens et al. 1999)
Aldrin	y	y			(ATSDR 2002a)
Amitraz	y	y	y		(Hornish 1984)
Chlordane	EA[a]	y			(ATSDR 1994)
Chlorpyrifos	y	y			(ATSDR 1997)
Chlorpyrifos methyl	AE				(ATSDR 1997)
Cyanazine	AE			y	(Crayford and Hutson 1972)
DDD	y	y			(ATSDR 2002b)
DDE	y	y			(ATSDR 2002b)
DDT (o,p' and p,p')	y	y			(ATSDR 2002b)
Diazinon	AE				(ATSDR 2008)
Dieldrin	y	y			(ATSDR 2002a)
Endrin	y	y			(ATSDR 2002a)
Heptachlor	y	y	y	y	(ATSDR 2007)
Hexachlorobenzene	y	y	y	y	(ATSDR 2002c)
Hexachlorocyclohexane-γ & β	y	y	y	y	(ATSDR 2005)
Mirex	AE				(ATSDR 1995)
Trans-nonachlor	AE				(Tashiro and Matsumura 1978)
Trichlorofon	y	y			(Vale 1998)
Vacor	AE				
Metals					
Arsenic[b]	y			y	(Klaassen 1974)
Cadmium	y			y	(Cherian and Vostal 1977)
Lead	AE				
Mercury[b]	y			y	(Clarkson and Magos 2006)
Tributyl tin	y				(Iwai et al. 1982)
Other chemicals					
Bisphenol A	y	y	y		(Ginsberg and Rice 2009)
Diethylstilbestrol	y	y	y		(Metzler 1981)
Genistein	y	y			(Shelnutt et al. 2002)
Nicotine	AE				(Hukkanen et al. 2005)
Nonylphenol	y	y			(Green et al. 2003)
Octylphenol	y	y			(Upmeier et al. 1999)
Phthalates	y	y			(Seckin et al. 2009)
Totals	**27/37**	**23/37**	**9/37**	**10/37**	

Supplemental Material, Table 1. Phase II metabolism of obesogenic/diabetogenic chemicals[a]

Abbreviations: 1,1-*bis*-(4-chlorophenyl)-2,2-dichloroethene (DDD); 1,1-*bis*-(4-chlorophenyl)-2,2-dichloroethene (DDE); 1,1-*bis*-(4-chlorophenyl)-2,2,2-trichloroethane (DDT).

Footnotes:

[a] The information in this table indicates if evidence was found (y=yes, AE= absence of evidence, EA=evidence of absence) that obesogenic/diobetogenic environmental chemicals undergo enterohepatic cycling. The nature of the phase II conjugates is indicated, (either glucuronide, sulfate, or glutathione) and relevant, since these can be further metabolized by gut microbiota. It is likely that interindividual variation in gut microbiota will play an important role in the bioavailability of these environmental chemicals and may result in increased exposure, thereby increasing the risk of obesity and diabetes.

[b] Both arsenic (As) and mercury (Hg) can be methylated by gut biota, while As has also been shown to be thiolated (Van de Wiele et al. 2010).

References for Supplemental Material

Table 1. Phase II metabolism of obesogenic/diabetogenic chemicals

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