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## Human Placenta and Markers of Heavy Metals Exposure

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In their review, Esteban-Vasallo et al. (2012) discussed the use of human placenta to evaluate biomarkers of exposure to heavy metals. They correctly concluded that the use of placental tissue specimens to assess heavy metal exposure is actually underused. Surprisingly, they did not mention the well-documented relationship between mercury released from mercury-containing dental amalgam fillings and mercury disposition in placental tissues (Clarkson and Magos 2006; Gundacker and Hengstschläger 2012; Richardson et al. 2011).

Studies have suggested an association between mercury levels in placental tissues and the observed mercury dental amalgams in women (Ask et al. 2002; Palkovicova et al. 2008; Richardson et al. 2011). Elevated placental mercury levels have been reported in dental workers who, throughout pregnancy, were exposed to mercury vapor ( $Hg^0$ ) released during preparation of mercury amalgam in dental offices (Guzzi and Pigatto 2007; Wannag and Skjaeråsen 1975). As noted by Drasch et al. (1994), the mother-to-fetus transfer of mercury  $Hg^0$  from amalgams has been reported in human autopsy samples, and elevated levels of total mercury have been observed in the brain, liver, and kidney of human fetuses; these levels have been linked to the number of maternal amalgam-restored surfaces.

Transplacental exposure to heavy metals may affect child growth and cause neurodevelopmental delays. Thus, further efforts should be made to measure and quantify maternal exposure to heavy metals in placenta to estimate environmental prenatal exposure.

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## Human Placenta and Markers of Heavy Metals Exposure: Esteban-Vasallo et al. Respond

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We appreciate the interest of Pigatto et al. in our review (Esteban-Vasallo et al. 2012). We understand their concern regarding mercury amalgams; however, the purpose of our review was to summarize the available information on total mercury, cadmium, and lead levels in human placental tissue, obtained from studies that reported original quantitative data. Published evidence suggests a possible association between mercury released from mercury-containing dental amalgam fillings and levels of this metal in diverse fetal tissues (kidney, brain, and cord blood) (Drasch et al. 1994). In contrast, studies focusing on human placenta and amalgams are scarce and their results inconsistent. The only two studies included in our review that assessed a possible relationship between dental fillings and total mercury—a small study in Taiwan (46 women) (Hsu et al. 2007) and another in Jamaica (52 women) (Grant et al. 2010)—found no association. Only Ask et al. (2002)

reported higher mercury levels in mothers with a higher number of fillings, but they studied inorganic mercury and not total mercury.

None of the studies mentioned by Pigatto et al. in their letter (Clarkson and Magos 2006; Gundacker and Hengstschläger 2012; Richardson et al. 2011) includes original data, although we did identify an additional reference from those articles that might provide more data on this issue, a symposium abstract by Ursinyova et al. (2006). In this abstract, the authors described a significant correlation between the number of amalgams and placental mercury levels in 409 women; however, these findings have not yet been published in a full report that would allow us to better evaluate the results. In addition, Wannag and Skjaeråsen (1975) seemed to provide original information, but we were unable to find this paper for our review. In this context, we have to disagree with Pigatto et al.; in our opinion, the association between mercury exposure from dental amalgam fillings and levels of this metal in human placenta cannot yet be considered as well-established.

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