

## Comments on the Article “The Toxicology of Mercury and Its Chemical Compounds” by Clarkson and Magos (2006)

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Clarkson and Magos (2006) provide their perspectives on the toxicology of mercury vapor and dental amalgam. As scientists who are involved in preparing a German federal guideline regarding dental amalgam, we welcome additional scientific data on this issue. However, Clarkson and Magos do not present all the relevant studies in their review. The additional data provided here show that: (a) Dental amalgam is the main source of human total mercury body burden, because individuals with amalgam have 2–12 times more mercury in their body tissues compared to individuals without amalgam; (b) there is not necessarily a correlation between mercury levels in blood, urine, or hair and in body tissues, and none of the parameters correlate with severity of symptoms; (c) the half-life of mercury deposits in brain and bone tissues could last from several years to decades, and thus mercury accumulates over time of exposure; (d) mercury, in particular mercury vapor, is known to be the most toxic nonradioactive element, and is toxic even in very low doses, and (e) some studies which conclude that amalgam fillings are safe for human beings have important methodological flaws. Therefore, they have no value for assessing the safety of amalgam.

**Keywords** Amalgam, Autism, Ethylmercury, Mercury, Toxicity, Thimerosal

### INTRODUCTION

In their, 2006 article, Clarkson and Magos (2006) provide their perspectives on the toxicology of mercury vapor and dental amalgam. In the following comments, we challenge some of the conclusions of Clarkson and Magos on the basis of new scientific literature.

### SIGNIFICANCE OF DENTAL AMALGAM FOR MERCURY BODY BURDEN

Dental amalgam is the main source of mercury body burden, as studies in animals (Danscher et al., 1990; Galic et al., 1999, 2001, Hahn et al., 1989, 1990; Lorscheider et al., 1995; Lorscheider and Vimy, 1991; Vimy et al., 1990) and humans show. An approximate 2–5-fold increase of the mercury level in blood and urine as well as a 2- to 12-fold increase of the mercury concentration in several body tissues was observed in amalgam bearers (Barregard et al., 1999; Becker et al.,

2002, 2003; Drasch et al., 1992, 1994, 1997; Egglestone and Nylander, 1987; Gottwald et al., 2001; Guzzi et al., 2002, 2006; Levey et al., 2004; Lorscheider et al., 1995; Kingmann et al., 1998; Mortada et al., 2002; Nylander, 1986, 1991; Nylander et al., 1987; Pizzichini et al., 2003; Weiner and Nylander, 1993; Zimmer et al., 2002). Also, mercury from maternal amalgam fillings leads to a significant increase of mercury concentration in the tissues and the hair of fetuses and newborn children. Placental, fetal, and infant mercury body burden correlates with the numbers of amalgam fillings of the mothers (Ask et al., 2002; Drasch et al., 1994; Holmes et al., 2003; Morgan et al., 2002; Takahashi et al., 2001, 2003; Vather et al., 2000; Yoshida et al., 2002, 2004). Mercury levels in amniotic fluid (Luglie et al., 2003) and breast milk (Drasch et al., 1998; Oskarsson et al., 1996; Vimy et al., 1997) are significantly correlated with the number of maternal amalgam fillings. Mercury from amalgam may be transformed into organic mercury compounds by microorganisms in the gastrointestinal tract (Leistevuo et al., 2001; Heintze et al., 1983; Yannai et al., 1991). Leistevuo et al. (2001) found an increase of methylmercury concentration in amalgam bearers of three times compared to persons without amalgam, although frequency and kind of fish consumption were identical in both groups.

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