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## Toxicity of ethylmercury (and Thimerosal): a comparison with methylmercury

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### Abstract

Ethylmercury (etHg) is derived from the metabolism of thimerosal (o-carboxyphenyl-thio-ethyl-sodium salt), which is the most widely used form of organic mercury. Because of its application as a vaccine preservative, almost every human and animal (domestic and farmed) that has been immunized with thimerosal-containing vaccines has been exposed to etHg. Although methylmercury (meHg) is considered a hazardous substance that is to be avoided even at small levels when consumed in foods such as seafood and rice (in Asia), the World Health Organization considers small doses of thimerosal safe regardless of multiple/repetitive exposures to vaccines that are predominantly taken during pregnancy or infancy. We have reviewed *in vitro* and *in vivo* studies that compare the toxicological parameters among etHg and other forms of mercury (predominantly meHg) to assess their relative toxicities and potential to cause cumulative insults. *In vitro* studies comparing etHg with meHg demonstrate equivalent measured outcomes for cardiovascular, neural and immune cells. However, under *in vivo* conditions, evidence indicates a distinct toxicokinetic profile between meHg and etHg, favoring a shorter blood half-life, attendant compartment distribution and the elimination of etHg compared with meHg. EtHg's toxicity profile is different from that of meHg, leading to different exposure and toxicity risks. Therefore, in real-life scenarios, a simultaneous exposure to both etHg and meHg might result in enhanced neurotoxic effects in developing mammals. However, our knowledge on this subject is still incomplete, and studies are required to address the predictability of the additive or synergic toxicological effects of etHg and meHg (or other neurotoxicants).

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