



RE: Perchlorate Advisory Panel meeting  
John Reichard  
to:  
Thomas Carpenter  
09/24/2012 05:08 PM  
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From: "John Reichard" <reichard@tera.org>

To: Thomas Carpenter/DC/USEPA/US@EPA

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5 Attachments



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Dear Mr. Carpenter,

I completely understand. I am certainly happy to make oral comments at the chair's pleasure, if there is the opportunity. As a faculty member of the University of Cincinnati, I recently served on a QA review of an oral RfD based on the Chilean work. This review will shortly be loaded to the National Library of Medicine's Toxnet. I am also preparing a white paper integrating the literature supporting a revision of the RfD.

I have attached the abstract of the whitepaper that is currently being prepared and can submit it shortly.

Very best regards,

John

John F. Reichard, PharmD., PhD.

Toxicologist

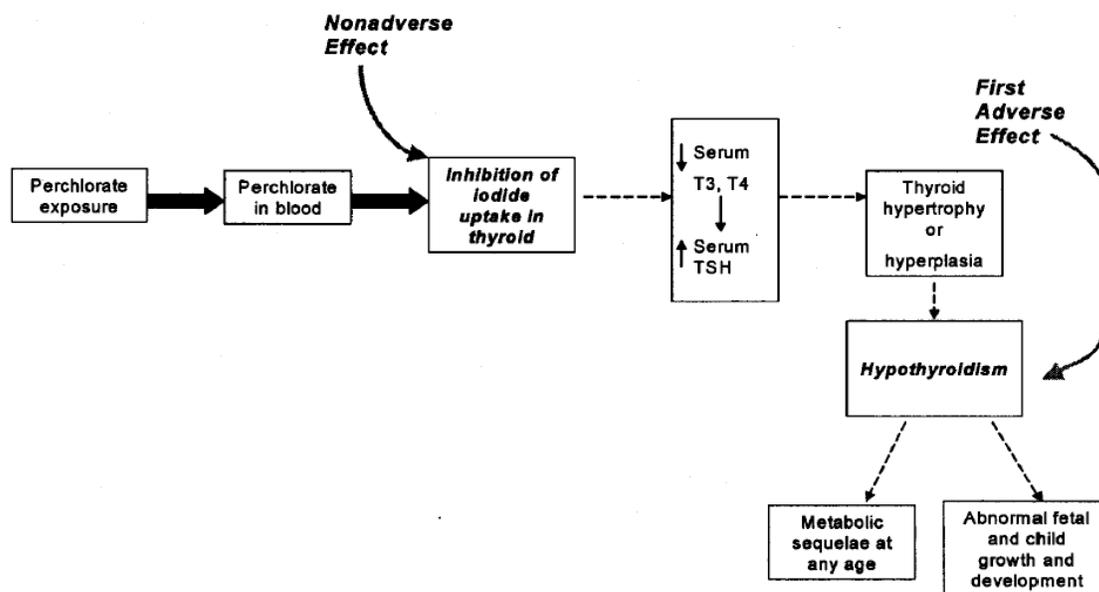
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In 2011, EPA announced its decision (76 FR 7762- 7767) to regulate perchlorate under the Safe Drinking Water Act (SDWA, §1412.b.4.B). EPA is now developing a maximum contaminant level goal (MCLG) and National Primary Drinking Water Regulation (NPDWR) for perchlorate based a reference does (RfD) of 0.7  $\mu\text{g}/\text{kg}/\text{day}$ . The NRC derived this Reference Dose (RfD) on the basis of a precursor, non-adverse effect (i.e., inhibition of iodide uptake).

The NRC's approach to setting a reference dose for perchlorate using a non-critical precursor event and EPA's reliance on this approach, are both misguided because this approach does not follow the EPA (2002) RfD method. Moreover, the approach depends on information in adults, rather than more recent data using perchlorate's critical effect in pregnant women and their offspring. The correct EPA approach is to use the critical effect<sup>1</sup> and not a distant precursor to the critical effect. The NAS panel definition of perchlorate's first adverse effect, hypothyroidism, allows others to define the critical effect as either this endpoint, or its immediate precursor. Accordingly, by the NAS definition, the immediate precursor would be thyroid hypertrophy and hyperplasia (Figure 1). Perhaps more importantly, if this unconventional, approach using a non-critical effect is taken for other chemicals, the values of the resulting RfDs would entirely depend on which precursor effect was chosen, or whether any precursor effects were even monitored. The purpose of this white paper is to provide critical guidance to the Science Advisory Board (SAB) regarding the current perchlorate RfD and recommend that EPA update its RfD prior to publishing a Health Advisory.



**Figure 1.** The mode of action model suggested by the NAS for perchlorate toxicity in humans indicating the first adverse effect in the continuum, the immediate precursor event and more distant non-critical events.

<sup>1</sup> The critical effect is defined as a decrease in serum thyroxine (T4) which is causally linked to neurodevelopmental effects