



Centers for Disease Control
and Prevention (CDC)
Atlanta, GA 30341-3724

July 8, 2016

RE: Comments Regarding the NIH National Toxicology Program's Systematic Literature Review on the Effects of Fluoride on Learning and Memory in Animal Studies

Dear Colleagues,

In July 2016, the National Institute of Environmental Health Sciences, National Toxicology Program (NTP), released a review of scientific literature on the effects of fluoride on learning and memory in animal studies. The Centers for Disease Control and Prevention's (CDC) Division of Oral Health would like to clarify some of the key findings of this report in the context of the 2015 U.S. Public Health Service (PHS) Recommendation for Fluoride Concentration in Drinking Water for the Prevention of Dental Caries. Above all, we want to assure you that the NTP report does not change this recommendation, and CDC maintains its confidence that optimally fluoridated drinking water is a safe and effective tool to prevent tooth decay in children and adults.

The objective of the NTP evaluation was to conduct a systematic review of existing animal studies to develop NTP level-of-evidence conclusions about whether fluoride exposure is associated with impairment in learning and memory. The review included 32 studies that exposed laboratory animals to fluoride during development or adulthood and then assessed them for neurobehavioral effects based on their responses to tests of learning and memory. It is important to note that almost all of the studies they reviewed used exposure levels that far exceeded the PHS recommended level for human consumption in public water systems (0.7 parts per million); many of the studies assessed exposures at 50 or 100 times those levels or more.

NTP used the GRADE system for rating the confidence in the body of evidence. Researchers concluded that there was a **low level-of-evidence** for learning and memory effects on rats or mice treated during gestation through adulthood. "Low level-of-evidence" reflects NTP's limited confidence in the apparent relationship between fluoride and learning and memory and a probability that the true effect may be substantially different from the apparent relationship.

Among rats and mice exposed shortly after weaning or in adulthood, researchers found a **moderate level-of-evidence** to support an effect on learning and memory from the Morris water maze test, and a **low level-of-evidence** to support an effect on learning and memory from the T-maze, Y-maze, and other tests. The "moderate level-of-evidence" reflects a possibility that the true effect may be reflected in the apparent relationship, but the researchers' confidence in this conclusion is constrained by weakness present in the included studies.

Current recommendations for water fluoridation (PHS, 2015) are designed to achieve benefits of fluoridation while minimizing any potential harms. CDC is continually reviewing and updating its

guidance to achieve the best balance of public health benefit and reducing or eliminating potential harms. CDC believes that this NTP review adds to the available science base on possible health effects of exposure to high levels of fluoride. CDC also agrees with NTP investigators that additional work is needed to assess any potential harms of fluoride at levels relevant to the practice of community water fluoridation.

Sincerely,

A handwritten signature in blue ink that reads "Lorena Espinoza DDS, MPH". The signature is written in a cursive style.

Lorena Espinoza, DDS, MPH
Associate Director for Science
Division of Oral Health
National Center for Chronic Disease Prevention
and Health Promotion
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