# Metabolic Solutions Info Report

Metabolic Solutions Institute 902-584-3810

**Fluoride & Brain Damage**
May 5, 1999

**BSA Environmental Services**
**21403 Chagrin Blvd Suite 101**
**Beechwood, Ohio 44122**

Re: Request for information on drinking water fluoridation

Dear Dr. Romoser-Breno,

To start, I must correct a statement you made in your letter regarding my being an "expert on drinking water fluoridation issues." Prior to 1982, my knowledge of fluoride was limited to television commercials which said it was good for my teeth. Rather, my expertise was detection of neurotoxicity, which brought me to the Department of Psychiatry at Boston's Children's Hospital and Neuropathology at the Harvard Medical School. It was there I met Dr.Jack Hein, Director of the Forsyth Dental Center and the scientist responsible for putting monofluorophosphate (MFP) into toothpaste.

Dr. Hein was a student of Dr. Harold Hodge, the chief pharmacologist on the Manhattan Atomic Bomb Project who conducted the world-renowned studies on fluoride (1) and started water fluoridation. Dr. Hein invited me to Forsyth to study the neurotoxic potential of materials that dentists use, starting with fluoride, and we set up the first toxicology department in any dental research institution in the world. I was made Head of the department, and Dr. Hodge moved to Boston and became a member of my department where he stayed until his death in 1990. Another Manhattan Project scientist and fluoride researcher, Dr. Ben Amdur, also joined the department.

My investigations of the neurotoxicity of fluoride started in 1987. Using a new computer pattern recognition system capable of a sensitivity and objectivity other behavioral measures did not possess, we studied an animal model first developed for the study of dental fluorosis. Frankly, we expected to find nothing.

The results from the first experiment we thought must be wrong, so we kept repeating the study with more animals, different doses, sexes, ages and methods of administration. Like quicksand, every effort we made sank us further into the realization that brain function was impacted by fluoride. Scientific integrity dictated that we publish our results (2,3), but the fact that we were employed as a dental research institution made us "weak at the knees" to do so.

In our 1995 paper (2), we reported that brain function is vulnerable to fluoride, and that the effects on behavior depended on the age of exposure and that fluoride accumulated in brain tissues. Rats exposed as adults displayed behavior-specific changes typical of cognitive deficits, whereas rats exposed prenatally had dispersed behaviors typical of hyperactivity. Brain histology was not examined, but the behavioral changes were consistent with those seen when hippocampal development is interrupted and memory problems emerge. Overall, we concluded that the rat study flagged potential for motor dysfunction, IQ deficits and/or learning disabilities in humans.

Criticisms of our study by dentists say that our results with rats are "not relevant to humans" because "the doses were too high" (75-125 ppm NaF in drinking water). These criticisms are without merit because our doses of fluoride in rats produce a level of fluoride equivalent to that found in humans drinking 5-10 ppm fluoride in water, or humans that are receiving "fluoride treatment" for osteoporosis. This plasma level is exceeded ten times over one hour after children receive topical applications of some dental fluoride gels. Thus, humans are exposed to levels of fluoride that we know alters behavior in rats. Perhaps dentists "see no problem" with this fact, but scientists involved with toxicity risk assessment will view it differently.

The fluoride levels in the drinking water of our rats were not high -- they were taken from the well-known animal model developed for the study of dental fluorosis, a model used repeatedly by dental researchers for several years.

Other criticisms of equal absurdity have been expressed by dentists about our studies. However, they are not important to dwell upon now because the first study was but one piece of an emerging picture. Soon after our study was published, we learned of two epidemiology studies from China showing IQ deficits in children overexposed to fluoride via drinking water or soot from burning coal (4,5).

Next, we found a literature review that assembled case reports spanning 60 years on neurological effects in humans exposed to fluoride (6). A common theme of these reports was that fluoride exposure impaired memory and concentration, and that it caused lethargy, headache, depression and confusion in humans. The depression is not something to ignore because suicide occurs more frequently than expected in populations of fluoride workers (7).

More recently, another laboratory investigation found that chronic exposure to fluoride (1ppm, the average concentration in fluoridated water systems) in drinking water of rats compromised neuronal and cerebrovasculature integrity (blood-brain barrier) and increased aluminum concentrations in brain tissues (8).

Another study found that fluoride in the drinking water of rats decreased membrane lipids important to proper brain function (9). Moreover, the latest studies have shown that fluoride accumulates in human and animal pineal glands where it impairs melatonin production (10,11), a finding critical when it is considered that melatonin is an agent that protects the central nervous system from radiation by scavenging free radicals (12).

Finally, there is a recent study published which reports that silicofluorides in fluoridated drinking water increase levels of lead in children's blood, a risk factor that predicts higher crime rates, attention deficit disorder and learning disabilities (13). Unfortunately, the link between fluoride and the brain does not end with the above-mentioned studies. In 1993 while studying the neurotoxicity associated with the treatment of childhood leukemia, we demonstrated that the fluorinated steroid used for treatment (dexamethasone) disrupted behavior in rats to a greater degree than its non-fluorinated counterpart prednisolone (14,15). This finding prompted a clinical study of children treated for leukemia, where it was found that the fluorinated steroid was more detrimental to IQ than the non-fluorinated steroid, in particular reading comprehension, arithmetic calculation and short-term working memory deficits were greater (16). In short, this finding has fueled a growing concern about the contribution of fluorinated pharmaceuticals to the total body burden of fluoride.

As you decide whether or not to fluoridate the water supplies of Fort Detrick, it is imperative that you consider the impact on total body burden of fluoride. The soldier today is a different individual, facing a very different situation than that encountered 50 years ago when fluoridation was promoted as a "safe and effective" means to "protect against tooth decay". The difference stems from the fact that fluoride exposure today is out of control, well beyond the dose touted as "optimum for caries prevention", and people today are exposed to substances and conditions that will interact with fluoride exposure and magnify harmful effects (i.e., exposure to beryllium, lead, strontium, aluminum, cholinesterase-inhibiting pesticides, uranium hexafluoride, stress, nutritional deficiencies, increased water consumption due to extreme exercises, fluorinated pharmaceuticals, and fluorinated nerve gases including Sarin).

In summary, my opinion is that there are no advantages to water fluoridation. The risks today far exceed the hoped-for benefit. Dr. Hodge during the Manhattan Project requested funds from Col. Stafford L. Warren to do animal experimentation to determine the central nervous system effects of fluorides (17). He did so because he had clinical evidence that the fluoride component of uranium hexafluoride caused "mental confusion, drowsiness and lassitude" among the workmen. Yet, he never got to do those studies, and because this information was at the time classified, he never discussed his findings with me.

Perhaps, however, this explains why he was so intensely interested in my fluoride studies up until the time of his death.

Therefore, in good conscience I can only discourage the notion of fluoridating the water supply of Fort Detrick. The

evidence against the "safety" of this public health policy will keep mounting and never disappear again. My ignorance of fluoride in the beginning was a matter of chance.

If you ignore this evidence today, it will be a matter of choice. Good luck with doing the right thing.

Sincerely,

Phyllis J. Mullenix, Ph.D.

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