A GROWING CONCERN ABOUT SAFETY

On 14 October 1995, 21,964 residents of the Timaru District, New Zealand, voted on whether the local water supplies should be fluoridated. The Southern Regional Health Authority provided $42,000 towards providing education on the value of fluoridation and the public meetings which were held were addressed by persons who had studied the subject in some depth, including the Deputy Director General of Public Health for New Zealand. Considerable correspondence was published in the local newspaper. The outcome was an “overwhelming” 67% vote against fluoridation. Although it has previously been noted that referenda to initiate or retain fluoridation have been defeated more often than they have been won, the result appears to reflect, at some level, a growing concern about the safety of fluoridation.

It might be considered that opposition to water fluoridation “defies rational understanding” because it is known to be “a safe and the most cost-effective form of preventive dentistry”. However, voters appear to becoming less accepting of reassurances about safety. Although the case might be made that “at one part per million dental fluorosis brings about the most beautiful looking teeth that anyone ever had” or that mild forms of dental fluorosis can make the teeth appear “more attractive”, deeper concern has accompanied questions about hip fractures and the bone cancer osteosarcoma in young men. The suspicion appears to be arising that the underlying mechanism, such as enzyme inhibition, whereby these relatively visible adverse effects may be produced, may also be acting to produce other effects that are less visible but equally serious.

Thus the findings that fluoride toxicity decreased fertility in most animal species studied, and that in humans there was a decreasing total fertility rate with increasing fluoride levels have added to the concerns about safety. Attention has also been drawn to the potential for neurotoxicity with the report of behavioral changes in rats after the ingestion of fluoride, individual case reports of cognitive impairment with fluoride toxicity, and population studies suggesting that children with dental fluorosis may have a decreased mental acuity. Possible mechanisms have been identified whereby fluoride could affect brain function including influencing calcium currents, altering enzyme configuration by forming strong hydrogen bonds with amide groups, inhibiting cortical adenyl cyclase activity and increasing phosphoinositide hydrolysis. Each of these areas of enquiry is in its infancy. Debate is only just beginning to emerge on details such as the date of appearance of rat hippocampal pyramidal cells.

Historically there has been a delay, often of several decades, between the recognition of the adverse effects of a substance, such as asbestos, and the reduction of exposure to it in the environment. The concern is emerging that as increased knowledge is obtained about the more subtle effects of fluoride, it will be seen in a less favourable light than it is viewed in today. In his review and article on Our Stolen Future: Are we threatening our fertility, intelligence, and survival? A scientific detective story, by T Colborn, D Dumanoski, and J P Myers, Richard Foulkes draws attention to the view that not only hormone-disrupting chemicals, such as diethylstilbestrol, but also other substances, such as fluoride,
may be stealing our future as humans by lowering fertility and causing brain dysfunction.\textsuperscript{16,17} He sees a need for clear, immediate and inclusive action on all the substances involved. This might involve an immediate ban on water fluoridation and fluoride dental products. This viewpoint may not be shared by all. At least, however, it is clear that an alternative view, that after 50 years of water fluoridation it has been found to be "close to ideal public health action: vastly improving the health and quality of life for millions without their conscious effort and at a low cost, both monetary and social,"\textsuperscript{18} is not universally accepted.

Thus as the focus of the debate on the safety issues associated with fluoride continues to widen from the clearly visible effects originally studied, such as dental and skeletal fluorosis,\textsuperscript{19} to the occurrence in populations of hip fractures and bone tumours and the less visible areas of fertility and brain dysfunction, a growing concern with safety is beginning to emerge. Resolution of these matters will require both scientific objectivity and political courage.

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References

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