**FLUORIDE IN MEDICINE, BIOLOGY AND TOXICOLOGY**

Edited by Dariusz Chlubeka  Reviewed by Bruce Spittle

*Fluoride in medicine, biology and toxicology*[^c] is a new book on fluoride from the Department of Biochemistry and Chemistry, Pomeranian Medical University, Szczecin, Poland which has a long and respected history of fluoride research. The editor and chairman of the department, Dariusz Chlubek, has contributed a chapter and coordinated the contributions of 13 colleagues from four countries. The 117-page book contains 14 figures, 14 tables, two black and white photographs, and, on 22 pages, 630 references. There is no index.

The opening chapter of 29 pages by Niloufer Chinoy, India, considers fluoride in the environment. She points out that it has been known since the late 1930s that fluoride has some beneficial functions such as playing a significant role in the prevention of human dental caries and in the maintenance of a normal skeleton in adults as well as possibly being necessary for normal hematocrit levels, fertility, and growth. No comment is made on the debate that is associated with these assertions. The chapter has 205 references but a consequence of the broad coverage is that some areas are not able to be considered in depth. The section discussing the central nervous system is contained in half a page with five references, dated 1961, 1998, 1994, 2000, and 1985, without there being room for discussion of the work of Isaacson[^1-2] or Mullennix[^3], fluoride and intelligence[^4], or fluoride and the pineal gland[^5-6].

Six references are given to fluoride and the thyroid, and the author notes that a high concentration of fluoride interferes with thyroid function. The chapter closes with a three-page discussion on fluoride and free radicals, and antidotes for fluoride toxicity including ascorbic acid, calcium, vitamin E, vitamin D, and supplementation with amino acids and protein.

A chapter by Zbigniew Jańczuk, Poland, on Fluoride prevention of dental caries – current trends accepts the view that there is general agreement that a marked caries reduction has occurred among children and adolescents in most developed countries in recent decades because of the use of fluoride in various forms, but he notes that an improvement of oral hygiene and limitation of sugar consumption must also be taken into account. No discussion is given of the evidence presented by Colquhoun[^7] or Yiamouyiannis[^8] which disputes that the reduction in dental caries was due to water fluoridation. Although note is made of the view held by some other authors that the level of fluoride incorporated into the dental tissues by systemic ingestion is insufficient to play a significant role in caries prevention, the author considers that systemic fluoride supplements may be useful for persons with intractable caries risk. In conclusion, Professor Jańczuk maintains that, when combined with regular oral hygiene measures, one of the benefits of an optimum fluoride exposure is the ability to use...
dietary carbohydrates safely, preferably during meals and snacks. A reference is given to the continuous decrease during the last decade in caries among schoolchildren in Ireland in spite of their relatively high sugar consumptions. The author appears to accept the link postulated between fluoride exposure and caries reduction, rather than discussing recent studies where the cessation of fluoridation has been followed by a continuing decline in the caries rate rather than an increase.9

In a chapter on Fluoride and free radical reactions, Professor Chlubek begins by noting that fluorine is listed among the so-called essential micronutrients although no pathology associated unequivocally with its deficiency has been described so far. He then states that it has been demonstrated beyond doubt that fluorine is indispensable to healthy dentition, thus paving the way for potable water fluoridation and other preventive measures. These statements are followed by a review of free radical reactions, but no references are given for the alternative view that fluoride is neither an essential micronutrient nor necessary for a healthy dentition.

Other chapters look at Fluoride metabolism in plants (Gene W Miller, Olga Vedina; Logan, Utah, USA) Effect of fluoride on germination (Ming-Ho Yu, Bellingham, Washington, USA), Experimental fluorosis (Jerzy Krechniak, Gdańsk, Poland), Fluorine bioaccumulation and elimination in animals and humans (Zygmunt Machoy, Szczecin), Biomonitoring of fluorine pollution (Wojciech Czarnowski, Gdańsk), Health effects of occupational fluoride exposure (Koichi Kono, Tomotaro Dote, Kan Usada, Masashi Shimahara, Takatsuki City, Osaka, Japan), and Bone effects of fluoride in rat model in vivo (Andrzej Bohatyrewicz, Szczecin).

The book thus focuses on a number of facets of the medical, biological, and toxicological aspects of fluoride and provides a compact presentation of some of the research available in 2003. A selection of viewpoints is included. The alternative interpretations held on some of the issues are absent from this slim volume, and thus the publication does not reflect consensus views from the research community on matters such as whether or not fluoride is an essential nutrient, is required for a healthy dentition, is able to reduce the incidence of dental caries when taken systematically, and is added to water for good scientific reasons. However, in the ongoing process of research, discussion, and debate, a deeper understanding of the biological effects of fluoride will emerge. The Pomeranian Medical University Department deserves congratulations on its energy in conducting research on fluoride and bringing together the work of researchers from around the world. As new areas of research emerge such as the effects of fluoride on G-proteins and excitotoxicity, it is likely that the Department will remain at the forefront of fluoride research.

REFERENCES


7 Colquhoun J. Fluorides and the decline in tooth decay in New Zealand. Fluoride 1993;26:125-34.
