HEALTH/BIOLOGICAL EFFECTS

Fluoride is unable to reduce dental erosion from soft drinks

The main aim of the present study was to compare the erosive capabilities of some fruit-flavoured drinks, fresh or saturated with CaF_2, with their content of acids and with previous results from some carbonated soft drinks. The other aim was to measure and compare the rates of dissolution of CaF_2 in some carbonated and non-carbonated drinks and water. Seven commercially available fruit-flavoured drinks were diluted for drinking. Two human molars, each with two approximately 4 x 4 mm windows, were exposed continuously to 500 mL of each drink with or without prior equilibration with CaF_2 under gentle agitation for 48 h. The depths of the erosions were then measured on microradiographs made from sections. Dissolution rate of CaF_2 was measured by suspending 0.5 g of the salt in 0.5 litre of the drinks for 2, 10 and 60 min followed by solution analysis. The pH of the drinks was 2.83-3.51. The amount of NaOH required to bring pH to 5.5 ranged from 12-42 mmol/L, which is more than the amount necessary for most carbonated soft drinks. Equilibration with CaF_2 gave total fluoride concentrations of 3-8 ppm. The depths of the lesions induced by the drinks without added fluoride were 450-625 µm whilst those developed by the drinks equilibrated with CaF_2 were 350-625 µm. The dissolution of CaF_2 was faster in the carbonated drinks and in distilled water than in the non-carbonated drinks. In conclusion, non-carbonated fruit-flavoured drinks contain considerable amounts of acids which, *in vitro*, induce erosions in teeth similar to those induced by carbonated soft drinks. Saturation with CaF_2 reduced the *in vitro* development of erosions by 28% induced by drinks with pH above 3; in drinks with pH below 3, erosions were not affected by pH, despite total fluoride concentrations of up to 20 ppm.

Authors: Larsen MJ, Richards A.
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Keywords: Calcium fluoride, Dental caries, Dental erosion, Fruit drinks, Soft drinks.
Source: Caries Res 2002 Jan-Feb;36(1):75-80.

Fluoride concentrations in saliva and dental plaque in young children after intake of fluoridated milk

This study determined fluoride (F) concentrations in whole saliva and dental plaque after intake of fluoridated milk using a randomised crossover experimental design. Eighteen healthy children (6-8 years) were subjected to each of four different 3-day drinking regimens: (a) 200 mL F-free tap water; (b) 200 mL tap water with 1.0 mg F; (c) 200 mL standard milk, and (d) 200 mL standard milk with 1.0 mg F. A washout period of 7 days was organised between the different drinking regimens. All children used F-free toothpaste

prior to and during the trial and were instructed to avoid F-rich food and drinks. F concentration in unstimulated whole saliva was determined at baseline and after 15 and 120 min and in plaque samples at baseline and after 2 h. The mean baseline values ranged from 0.01 to 0.02 mg F/L in saliva and between 10.4 and 14.2 mg F/L in dental plaque. A statistically significant ($p < 0.05$) increase of F was disclosed in saliva 15 min after drinking F-containing milk and water (0.052 and 0.058 mg F/L, respectively). After 2 h, the salivary F^- concentrations were back to baseline values. In the plaque, however, a statistically significant ($p < 0.01$) twofold increase was found at 2 h after the intake of fluoridated milk and water, respectively. The results indicate that consumption of fluoridated milk contributes to a F storing process with significantly elevated F concentrations in dental plaque up to 2 h after intake. Further studies are required to determine the 'therapeutic concentration' of F in dental plaque after intake of fluoridated milk.

Authors: Petersson LG, Arvidsson I, Lynch E, Engstrom K, Twetman S.
For Correspondence: Medical and Oral Health Centre, Halmstad, Sweden.
Keywords: Children, Fluoride in milk, Fluoride in plaque, Fluoride in saliva.
Source: Caries Res 2002 Jan-Feb;36(1):40-3.

Vitamin C ameliorates fluoride-induced embryotoxicity in pregnant rats

Oral administration of sodium fluoride (40 mg/kg body weight) from day 6 to 19 of gestation caused, as compared to control, significant reductions in body weight, feed consumption, absolute uterine weight and number of implantations. Significantly higher incidence of skeletal (wavy ribs, 14th rib, <6 sternal centre, dumbell-shaped second and fifth sternebrae, incomplete ossification of skull and thickening of tibia) and visceral (subcutaneous haemorrhage) abnormalities were also observed in NaF-treated dams than that of control. Oral administration of vitamin C (50 mg/kg body weight) and vitamin E (2 mg/0.2 mL olive oil/animal/day) from day 6 to 19 of gestation along with NaF significantly ameliorates NaF-induced reductions in body weight, feed consumption, absolute uterine weight (only with vitamin E treatment) and number of implantations. As compared with NaF-treated alone, the total percentage of skeletal and visceral abnormalities were significantly lowered in fluoride plus vitamin C-treated animals. Vitamin E was less effective. These findings suggest that vitamin C significantly reduced the severity and incidence of fluoride-induced embryotoxicity in rats.

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For Correspondence: Dept. of Zoology, University School of Sciences, Gujarat University, Ahmedabad, India.
Keywords: Amelioration of embryotoxicity, Embryotoxicity, Rat study, Vitamin C, Vitamin E.
Source: Hum Exp Toxicol 2001 Dec;20(12):619-23.

Effect of fluoride exposure on synaptic structure of brain areas related to learning-memory in mice

The learning-memory behavior was tested in mice on a Y-maze after drinking different concentration of sodium fluoride. The impairment on the structure of Gray 1 synaptic interface in the CA3 area of mice hippocampus were quantitatively analyzed by electron microscopy and computer image processing appliance. The main results are as follows: the learning ability of mice drinking high concentration of fluoride presented remarkable deterioration, the thickness of post-synaptic density (PSD) was decreased, and the width of synaptic cleft was remarkably increased. The results suggested that the impairment on the learning capability induced by fluorosis may be closely related with the pathological changes of synaptic structure in the brain of mice.

Authors: Zhang Z, Xu X, Shen X, Xu X.
For Correspondence: Dept. of Biology, Zhejiang Normal University, Jinhua 321004, China.
Keywords: Brain, Fluoride toxicity, Learning-memory, Mouse study.
Source: Wei Sheng Yan Jiu. 1999. Jul; 28(4):210-2. [In Chinese].

COMMENT

These findings in mice of altered learning and hippocampal structural change after drinking water containing sodium fluoride complement previous rat and human studies. Fluoride administration may be followed by altered behaviour or learning (see Mullenix PJ, Denbesten PK, Schunior A, Kernan WJ. *Fluoride* 1995;28:151-2; Li XS, Zhi JL, Gao RO. *Fluoride* 1995;28:189-92; Zhao LB, Liang GH, Zhang DN, Wu XR. *Fluoride* 1996;29:190-2; Mullenix PJ. *Fluoride* 1998;31:S23; Lu Y, Sun ZR, Wu LN, Wang X, Lu W, Liu SS. *Fluoride* 2000; 33:74-8). Similarly it may lead to brain changes (see Isaacson RA, Varner JA, Jensen KF. *Fluoride* 1998;31:96-9; Varner JA, Jensen KF, Horvath W, Isaacson RL. *Fluoride* 1998;31:91-5; Jensen K, Varner J, Isaacson R. *Fluoride* 1998;31:S23; Chlubek D, Nowacki P, Mikolajek W, Lagocka R, Jakubowska K, Rzeuski R. *Fluoride* 1998;31;S24; Shivarajashankara YM, Shivashankara AR, Bhat GP, Rao SM, Rao SH. *Fluoride* 2002;35:12-21). *In toto* there is now a consistent body of scientific evidence that fluoride can alter learning and brain structure in ways that are both significant and deleterious.

Bruce Spittle

The toxicity of the combination of selenium, fluoride and arsenic on rat embryos

Whole embryo rotated culture technique was used to investigate the toxicity of the combination of selenium, fluoride and arsenic on rat embryos at day 9.5 of gestation. The result of factorial analysis (3 x 3 x 3) showed that the main effect of the combination of selenium, fluoride and arsenic on the developmental toxicity was synergistic. The mixtures with different level of these three chemicals in combination could result in different developmental toxicity. The low level combinations mainly caused teratogenic effect, and the high level combinations (selenium 2.0 μg + fluoride 10 μg + arsenic 1.0 μg/mL culture media) caused lethal effect. The results suggested that the disorders of yolk-sac placenta in structure and function were one of teratogenic mechanisms for the combination of selenium, fluoride and arsenic.

Authors: Li Y, Sun M, Wu D, Chen X.
For Correspondence: National Center for Material and Infant Health, Beijing Medical University, Beijing 100083, China.
Keywords: Arsenic toxicity, Fluoride toxicity, Rat embryo study, Selenium toxicity.
Source: Wei Sheng Yan Jiu. 1999 Mar 30;28(2):74-6 [Article in Chinese].

A blind caries and fluorosis prevalence study of school-children in naturally fluoridated and nonfluoridated townships of Morayshire, Scotland

Objectives: To undertake a blind caries and fluorosis prevalence study of Grade 1 (aged 5/6 yr) and Grade 4-7 (aged 8-12 yr) children from naturally water-fluoridated (1 ppm, since 1985) Burghead, Findhorn & Kinloss (F), and nearby nonfluoridated Buckie & Portessie (N-F), in rural Morayshire, Scotland.

Methods: A blind clinical (+ 10% repeats) caries study of the above townships' 5/6-yr-old lifetime (15 F; 43 N-F), and 8-12-yr-old lifetime (55 F; 136 N-F)/school-lifetime (31 F; 37 N-F) residents was undertaken following bussing of these children to a common examination site in close-by Elgin Town Hall. Initially, each child was asked about their own perception of the aesthetics of their maxillary front teeth. Fluorosis was assessed clinically using the TF Index, as well as photographically - for later blind scoring (+ 10% repeats for lifetime 8-12-yr-olds) of slides by four dental and two lay 'jurors', alongside a now-established UK 'bench-mark' mildly mottled (TFI = 2), fluorosis comparator slide, judged in previous studies to be aesthetically lay-acceptable. In addition, by parental questionnaire, information was sought concerning their child's fluoride supplement and dentifrice usage histories.

Results: For 5/6-yr-olds, mean primary caries scores were 96.0% less in fluoridated than nonfluoridated subjects ($P < 0.01$). In 8-12-yr-olds, DMFT values favoured water-fluoridated subjects; their caries-free trend was significant ($P < 0.001$ overall). Clinically, 33% of all lifetime F subjects and 18% of all N-F pupils had fluorosed maxillary anterior teeth ($P = 0.045$), but no statistically significant difference was found between the 7% F and 3% N-F subjects with TFI scores > 2 ($P = 0.25$). Photographically, 'jury' mottling assessment (+ 10% repeats) of projected slides resulted in at least 1 : 6 positive scores in 43.6% of F and 30.9% of N-F pupils, albeit they unanimously scored only nine F and five N-F children as having fluorosed teeth ($P < 0.01$). In no case did all members score TFI > 2. Dental and lay scorers rated TFI = (1/2) in only a further 9.1% and 5.5% of F subjects, respectively, compared to 0.7% and 1.5% respectively of N-F pupils. Again, TFI > 2 was scored unanimously in no child. No differences were found regarding the children's own degree of anterior tooth aesthetic nonacceptability between F (11%) and N-F (12%) prevalence ($P = 0.75$). Finally, only one F child had taken F supplements and, while 26 N-F had used F drops, no significant relationship was found between their usage and TFI values in the latter group ($P = 0.49$). Additionally, no relationship was noted between clinical TFI scores and the age at which parents stated fluoridated dentifrice toothbrushing commenced, between 0 and 24 + months of age.

Conclusions: Considerable caries benefit has accrued to those Morayshire rural children who have received naturally fluoridated water (at 1 ppm) throughout their lives, as compared to their socioeconomically similar, nonfluoridated rural counterparts. Furthermore, in spite of all but two subjects claiming to have brushed regularly with fluoridated dentifrice (and no evidence of the availability of nonfluoridated toothpaste being purchasable in the five townships), only borderline mild fluorosis disadvantages have been noted clinically, and none by the subjects' own aesthetic perceptions. Finally, no evidence was found to suggest any delay in permanent tooth eruption patterns of the F subjects. It would seem appropriate therefore, that adjustment of Scots' drinking waters' natural fluoride levels to 1 ppm should be pursued to extend similar dental advantages to the vast majority of that population (both young and old) which, it is well documented, has the worst dental health of mainland UK.

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Keywords: Dental caries, Dental fluorosis, Children, Epidemiology, Fluoridation, Scotland.
Source: Community Dent Oral Epidemiol 2002 Feb;30(1):70-9.

COMMENT

In the introduction, the authors of this study acknowledge recent "antifluoridationist" criticisms of water fluoridation. These "fears" were listed as:

1. fluoridation is not needed because of the widespread availability of fluoridated dentifrice;
2. there is a 'supposed' [sic] fluorosis hazard associated with fluoridation; and,
3. there have been no blinded water fluoridation studies.

To address the first criticism the authors cite their own work claiming that dental decay rates increase after cessation of fluoridation programs despite only fluoridated toothpaste availability but neglect to mention other studies that did not show any significant increase in dental decay after fluoridation was terminated. To address the other two criticisms, the authors designed the present study.

Blinding of caries detection: The investigators took great care to blind the examiners of the identity of the patient by transporting them from the fluoridated and non-fluoridated areas to a neutral examining facility. They even went so far as to cover up any characteristic school uniform or clothing. Despite the attempt to blind the examiners, the subjects would of course not be blinded if they knew the fluoride status of their drinking water. The fact that they agreed to take part in the study would likely trigger their curiosity and some of the older children would no doubt know if their drinking water contained fluoride. The study was, therefore, not double-blind.

Blinding of fluorosis diagnosis: This was well done. Despite very small numbers of subjects, it was interesting to note that there were significantly more (almost 2 times more) fluorosed subjects in the fluoridated areas.

Randomization: There was no description of randomization in the selection of subjects.

Gender distribution: There was no reporting of the breakdown of male and female subjects in each age group or socioeconomic group. A preponderance of females in any one stratified group or cell would skew not only the caries results, but also the dental fluorosis results. Since dental eruption occurs in girls at a different rate than in boys, this would affect not only the time that the teeth would be in contact with cariogenic challenges but it would also affect the numbers of fluorotic teeth that are counted.

Age stratification: If the non-fluoridated areas had a higher proportion of older children, even older by just a few months, there would be a false impression of increased caries incidence since caries increases with age.

Socioeconomic status: There were more subjects from the low socioeconomic status in the non-fluoridated areas. There were no corrections made for this discrepancy. It is well known that the low socioeconomic status is associated with

a higher risk for caries. Could it be that some of the difference between fluoridated and non-fluoridated subjects in terms of caries rates could be due to their socioeconomic status?

Factoring in delayed tooth eruption: The authors claim there was no evidence of delayed tooth eruption in fluoridated children, yet there was no detail discussion as to how this was assessed (i.e. were emergence times carefully measured?). Furthermore, it appears that only the percentage of first molars and anterior incisors in the 5 and 6 year olds that were 'present' in the oral cavity was calculated. The percentage of permanent teeth present in the other age groups was not reported. Since there was no significant difference in the presence of molars and incisors in the 5/6 year old cohort, the authors suggested that there was no difference in tooth eruption rates. To be able to say this with confidence the investigators would have to measure emergence times precisely (to the exact month for each child) and correct for differences due to gender. Using larger numbers of subjects they might be able to determine with more precision the actual eruption times of the first molars and anterior incisors in this age group.

Results (caries): This study lacks power because of the low numbers of subjects. This was evident when examining the pattern of caries incidence with age. All studies with sufficient subjects in the past have shown that caries increases with age (DMFT scores increase steadily from one year to the next), even in the fluoridated areas. This is not the case in this study. The authors reported DMFT scores in the fluoridated areas as follows:

AGE	DMFT
8 yr	0.3
9 yr	0.00
10 yr	0.89
11-12 yr	0.29

Can these DMFT scores be used to generalize about the benefits of water fluoridation when they do not follow the well-established pattern of the general population?

Results (dental fluorosis): While none of the 191 children examined has severe dental fluorosis, there was more fluorosis in the fluoridated areas. Few subjects recognized the fluorosis or were concerned about it. However, the panel of judges rated 9 subjects out of 55 to be definitely fluorosed. This is a very large proportion of the population with this kind of fluorosis. It is hard to comprehend the final conclusion of the authors stating that "water fluoridation at the 1 ppm F level has been beneficial to the dental heatlh of these youngsters, with few accompanying adverse tooth-mottling effects".

Other concerns: The authors acknowledge that nearly every subject used fluoridated toothpaste. Fluoridation is supposed to protect those people who

cannot afford to use fluoridated toothpaste. Obviously, dentifrice use is not the problem in this area of Scotland. There were some children in the study, however, that skewed the caries rates because of their very high caries rates. This problem seems to have been made worse in this study because of the small numbers of subjects. It is quite possible that the higher dmft scores in the nonfluoridated areas could have resulted from a select few patients in the low socioeconomic group (of which there were more in the nonfluoridated areas) with extremely high caries incidence. It would be interesting to see a breakdown of the actual caries in each subject in each area to see if this is the case. Until this is done, the study cannot make the claim that there was such a large benefit of water fluoridation.

Finally, it should be noted that this study is examining the differences between naturally fluoridated areas and areas with very low fluoride levels in the drinking water. Modern fluoridation studies compare artificially fluoridated areas with non-fluoridated areas. The use of artificial fluoride, especially hydrofluosilicic acid, presents its own problems that this study was not designed to investigate. If this study holds up in terms of its findings and Scotland decides to fluoridate more towns, the 'upward adjustment' referred to by the authors should be done with natural fluoridated waters, not with industrial toxic waste by-products.

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Editor's Note: In accord with our policy to facilitate open discussion, we invite interested readers to submit further comment on this or other related research reported in *Fluoride*.

Urinary fluoride excretion of young children exposed to different fluoride regimes

Aims: To compare 24-hour urinary fluoride excretion in young children exposed to different fluoride regimes.

Design: Twenty-four-hour urine samples were collected from children aged between 1.8 and 5.2 years. Samples were collected from Cork, Ireland (n = 19) where the water is fluoridated to a concentration between 0.8 and 1.0 mg/L; Knowsley, UK, where the water fluoride concentration is <0.1 mg/L (n = 22); and from children in Knowsley drinking milk containing 0.5 mg fluoride in nursery school each day (n = 16). The volume of the samples was measured, they were analysed for fluoride concentration and the 24-hour urinary fluoride excretion was calculated.

Results: It was found that the mean fluoride excretion in response to usual conditions of fluoride intake in these children was 0.21 mg (SD = 0.14) in

non-fluoridated Knowsley; 0.36 mg (SD = 0.11) in fluoridated Cork and 0.30 mg (SD = 0.10) in the children drinking fluoridated school milk.

Conclusions: The daily fluoride excretion in these children, corrected for age and fluoride ingested from toothpaste, appeared to indicate that the fluoride intake in the children drinking fluoridated school milk was somewhere between those living in an optimally fluoridated area and those in a low fluoride area.

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Keywords: Children, Fluoride in school milk, Urinary fluoride analysis,
Source: Community Dent Health 2002 Mar;19(1):12-7.

Fluorosis: diagnosis, risk assessment and epidemiology

Fluorosis is the most widespread side-effect of fluoride use and appears as discrete white spots on the enamel up to severe enamel dysplasia. There are different techniques for scoring fluorosis in epidemiological surveys. In the literature there is no uniform way of selection of teeth and data processing. Fluorosis risk is determined by environmental factors such as water and food fluoride content as well as individual factors such as use (or misuse) of fluoride supplements and fluoridated oral hygiene products. In a group of Flemish schoolchildren, fluorosis prevalence is low and mainly related to use of fluoride supplements and toothpaste in childhood.

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Keywords: Belgium, Children, Epidemiology, Dental fluorosis.
Source: Rev Belge Med Dent 2001;56(4):291-309. [Article in French].

Perceptions of fluorosis in northern Cape communities

The objective of the study was to determine the perception of fluorosis in communities living in the Northern Cape Province of South Africa where there is a considerable range in fluoride levels of drinking water. The fluoride levels of the drinking water were categorised as suboptimal (0.40-0.60 ppmF), optimal (0.99-1.10 ppmF) or supra-optimal (1.70-2.70 ppmF). The teeth of 694 children aged 6, 12 and 15 years were examined. Dental fluorosis occurred among children of all ages in all areas studied. As anticipated there appears to be a direct relationship between fluoride levels in the drinking water and levels of dental fluorosis, and the severity of the condition increased with an increase in levels of fluoride in the water supplies. Children in low fluoride areas showed some form of mild fluorosis (37%

very mild and 17% mild). However, 19% of this group experienced moderate or severe forms of fluorosis. In areas with optimal levels of fluoride 30% of children showed a questionable form of fluorosis and 21% mild fluorosis. Moderate or severe forms of fluorosis were recorded in 31% of children in the optimal fluoride area. The Community Fluorosis Index (CFI) scores for the sub-optimal and optimal areas were of medium public health significance and for the supra-optimal area of very high public health significance. Of concern is the high percentage of children (45%) in the supra-optimal area with severe forms of fluorosis. The awareness and concern for stains on teeth were mostly expressed by children with moderate or severe fluorosis. This study suggests that the proposed fluoride concentration (not more than 0.7 ppmF) prescribed in the Regulations on Fluoridating the Water Supplies for South Africa would minimise the risk of dental fluorosis.

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Keywords: Dental fluorosis, Fluoride in water, Northern Cape communities, Perceptions of fluorosis, South Africa.
Source: SADJ 2001 Nov;56(11):528-32.

Prevalence and trends in enamel fluorosis in the United States from the 1930s to the 1980s

Background: The National Survey of Dental Caries in U.S. School Children: 1986-1987 conducted by the National Institute of Dental Research, or NIDR, remains the only source of national data about the prevalence of enamel fluorosis. The authors analyze these data and describe changes in the prevalence of enamel fluorosis since the 1930s, as reported by H. Trendley Dean.

Methods: A sample of children comparable to those described in the 1930s was selected from the NIDR data set among children living in households served by public water systems during the child's first eight years of life. The type of water system (that is, natural, optimal and suboptimal) for each household had been recorded in the NIDR data set using data from the 1985 U.S. Fluoridation Census. The NIDR data set included information about the children's history of fluoride exposure obtained from parents.

Results: In the 1986-1987 period, the prevalence of enamel fluorosis (ranging from very mild to severe) was 37.8 percent among children living in residences with natural fluoride (0.7 to 4.0 parts per million fluoride ions, or F^-), 25.8 percent in the optimal fluoride group (0.7 to 1.2 ppm F^- and 15.5 percent in the suboptimal fluoride group (< 0.7 ppm F^-). The largest increase in fluorosis prevalence from the 1930s to the 1980s was in the suboptimal fluoride group (6.5 to 15.5 percent).

Conclusions and clinical implications: Exposure to multiple sources of fluoride may explain the increase in enamel fluorosis from the 1930s to the 1980s. The exposure to fluoride from sources such as dietary supplements has decreased since the 1980s because of reductions in the recommended dosage, but these changes occurred too late to have an effect on the study cohort. Evidence of simultaneous use of systemic fluorides indicates the need to reinforce guidelines for the appropriate use of fluorides and promote research on measuring total fluoride exposure.

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Keywords: Children, Dental fluorosis, Epidemiology, Prevalence, Trends, United States of America.
Source: J Am Dent Assoc 2002 Feb;133(2):157-65.

Evidence for a transition state analog, MgADP-aluminum fluoride-acetate, in acetate kinase from methanosarcina thermophila

Aluminum fluoride has become an important tool for investigating the mechanism of phosphoryl transfer, an essential reaction that controls a host of vital cell functions. Planar AlF_3 or [tetrahedral] AlF_4^- molecules are proposed to mimic the phosphoryl group in the catalytic transition state. Acetate kinase catalyzes phosphoryl transfer of the ATP g-phosphate to acetate. Here we describe the inhibition of acetate kinase from Methanosarcina thermophila by preincubation with $MgCl_2$, ADP, $AlCl_3$, NaF, and acetate. Preincubation with butyrate in place of acetate did not significantly inhibit the enzyme. Several NTPs can substitute for ATP in the reaction and the corresponding NDPs in conjunction with $MgCl_2$, $AlCl_3$, NaF, and acetate inhibit acetate kinase activity. Fluorescence quenching experiments indicated an increase in binding affinity of acetate kinase for MgADP in the presence of $AlCl_3$, NaF, and acetate. These and other characteristics of the inhibition indicate that the transition state analog, MgADP-aluminum fluoride-acetate, forms an abortive complex in the active site. The protection from inhibition by a non-hydrolyzable ATP analog or acetylphosphate, in conjunction with the strict dependence of inhibition on the presence of both ADP and acetate, supports a direct in-line mechanism for acetate kinase.

Authors: Miles RD, Gorrell A, Ferry JG.
For Correspondence: Biochemistry and Molecular Biology, Pennsylvania State University, University Park, PA 16802.
Keywords: Acetate kinase, Aluminium fluoride, Phosphoryl transfer, Transition state analog.
Source: J Biol Chem. In press 2002.

BIOCHEMICAL EFFECTS

Hypocalcaemia in parental and F(1) generation rats treated with sodium fluoride

The potential of sodium fluoride (NaF) to affect serum cations was assessed in the parent (P) and F(1) generation rats. The sperm-positive pregnant experimental female rats received 40 mg NaF/kg body weight from day 6 of gestation either up to 21 days of lactation or only up to gestation followed by withdrawal of the treatment during lactation. On day 21 of lactation, blood samples were collected from P and F(1) generation rats, allowed to clot and centrifuged at 1000 g for 10min to obtain serum for analysis of various cations. Statistically significant increases in the concentrations of sodium and potassium in the serum of P and F(1) generation rats were observed in the NaF-treated group; however, calcium and phosphorus concentrations were significantly lower than their vehicle control. Withdrawal of NaF treatment during lactation caused significant recovery in sodium, potassium and phosphorus concentrations in P and F(1) generation rats as compared with NaF-treated animals. Although statistically significant recovery was not observed, the calcium concentration in P and F(1) generation rats was comparatively higher on withdrawal of NaF treatment than in the NaF-treated group. It is concluded that the exposure of 40 mg NaF/kg body weight in pregnant female rats caused significant alterations in cationic concentration which recovered significantly (except calcium) on withdrawal of the treatment.

Authors: Verma RJ, Sherlin DM.
For Correspondence: Verma RJ, Sherlin DM.
Keywords: Calcium, Cations, Hypocalcaemia, Phosphorus, Potassium, Rat study, Sodium.
Source: Food Chem Toxicol 2002 Apr;40(4):551-4.

ENVIRONMENTAL FLUORIDE POLLUTION

Drinking water supply and management practices in British Columbia, 1997-98

Background: Questions regarding control over a water fluoridation system in a British Columbia (BC) community led to a drinking water management survey in 1997-98.

Method: A questionnaire was constructed based on published drinking water control and management criteria and was sent to 91 communities.

Results: 73/91 surveys were returned (80% response rate); 31 reported a protected water supply system, 40 reported logging and/or cattle grazing in watershed areas, 25 reported a lack of primary disinfection. Water fluoridation was reported in 12 locations, 3 of which did not monitor fluoride levels. Testing for protozoans was done routinely in 19 locations, 15 using ap-

proved laboratories. 15 water contamination events were reported, 9 of biological origin. Statistically significant associations were found between contamination events and: wooden delivery systems, lack of primary chlorination, increased number of protozoan tests, and increased number of personnel.

Interpretation: At the time of the survey in British Columbia, a number of communities were vulnerable to preventable drinking water contamination.

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Keywords: Fluoridation in Canada, Monitoring fluoride in water.
Source: Can J Public Health 2002 Jan-Feb;93(1):14-8. Comment in: Can J Public Health. 2002 Jan-Feb;93(1):10-2.

RECTIFICATION

My apologies to Jundong Wang, Jianhua Hong, Junping Li, Yuhong Guo, Jianfeng Zhang, and Junhu Hao of Shanxi, China that the quality of reproduction of the photographs in their paper "Effect of high fluoride and low protein on tooth matrix development in goats" in *Fluoride* 2002;35:51-55 was inferior because of excessive darkness. In checking the proofs I assumed that because some photographs in the issue appeared clear that all the photographs had been reproduced optimally. The original photographs for the paper, by Jundong Wang *et al*, were of excellent quality. Unfortunately, I did not carefully compare the photographs in the proofs with the scans of the photographs that I had received earlier. To prevent recurrence of this problem in the future, I will make sure that the reproduction of photographs in the printing proofs closely matches the quality of the originals or satisfactory scans of them. Again, I extend my apologies to the authors, and I thank them for publishing their report in *Fluoride.* My best wishes to them for their future research.

Bruce Spittle, Managing Editor, *Fluoride.*