

FLUORIDE TOXICITY AND DONKEYS

SUMMARY: For the first time, fluoride toxicity in donkeys is described: dental fluorosis with irregular wearing and excessive abrasions of the teeth, intermittent lameness, hoof deformities, tendon hardening, colic, diarrhoea, retention of urine, repeated abortions, and sterility. New evidence is reported showing that fluoride affects basic intracellular mechanisms such as the Golgi apparatus, dental and skeletal structures, and systemic functions including fertility, carbohydrate metabolism, and renal function. Those who advocate the addition of fluoride to water supplies need to recognize the occurrence of these toxic effects from fluoride.

Keywords: Fluoride toxicity in donkeys; Golgi apparatus; Infertility in donkeys; Osteo-dental fluorosis in donkeys.

In this issue of *Fluoride*, Choubisa has described, for the first time in the scientific literature, fluoride toxicity in donkeys.¹ The signs included dental fluorosis with irregular wearing and excessive abrasions of the teeth, intermittent lameness, hoof deformities, tendon hardening, colic, diarrhoea, retention of urine, repeated abortions, and sterility.

Other papers in this issue clarify some of the mechanisms by which fluoride exerts its toxicity. Yu and Meng found that fluoride adversely affected the Golgi apparatus in cell cytoplasm in which protein modification occurs.² Han, Wang, Yan, Niu, and Wang found that fluoride can reduce the formation of type I collagen and dentin phosphoprotein, key components for optimal mineralization of teeth.³ Whereas the collagen fibres in control dentin were aligned neatly in even rows, those in fluorosed dentin were arrayed in loose and crooked rows with holes present. Chiba et al. found that fluoride can alter carbohydrate metabolism by decreasing pp185 tyrosine phosphorylation in muscle tissue and increasing insulin resistance.⁴ Hosokawa et al. found that fluoride can exacerbate renal dysfunction.⁵

When there is evidence that fluoride affects basic intracellular mechanisms, dental and skeletal structures, and systemic functions including fertility, carbohydrate metabolism, and renal function, those who advocate the addition of fluoride to water supplies have a serious obligation to reconsider the advisability of such action.

Bruce Spittle, Managing Editor

REFERENCES

- 1 Choubisa SL. Osteo-dental fluorosis in domestic horses and donkeys in Rajasthan, India. *Fluoride* 2010;43(1):5-12.
- 2 Yu Y, Meng B. Impact of fluoride and superoxide dismutase on the Golgi apparatus in rat rib-cage chondrocytes. *Fluoride* 2010;43(1):13-8.
- 3 Han TL, Wang M, Yan XY, Niu RY, Wang JD. Decreased expression of type I collagen and dentin phosphoprotein in teeth of fluorosed sheep. *Fluoride* 2010;43(1):19-24.
- 4 Chiba FY, Colombo NH, Shirakashi DJ, Gomes WDdeS, Moimaz SAS, Garbin CAS, et al. *Fluoride* 2010;43(1):25-30.
- 5 Hosokawa M, Asakawa H, Kaido T, Sugaya C, Inoue Y, Tsunoda M. Determination of renal function in ICR-derived glomerulonephritis (ICGN) mice by subacute administration of fluoride in drinking water. *Fluoride* 2010;43(1):31-44.