

EFFECTS OF FLUORIDE ON THE ULTRASTRUCTURE AND EXPRESSION OF TYPE I COLLAGEN IN RAT HARD TISSUE

Xiaoyan Yan,^{a,b,d} Qingli Nie,^a Hongwei Wang,^c Cuiping Feng,^a Zilong Sun,^a
Ruiyan Niu,^a Jundong Wang^a
Taigu, Taiyuan, and Luoyang, People's Republic of China

SUMMARY: Long-term excessive fluoride (F) intake disrupts the balance of bone deposition and remodeling activities and is linked to skeletal fluorosis. Type I collagen, which is responsible for bone stability and cell biological functions, can be damaged by excessive F ingestion. In this study, we examined the effects of excessive F ingestion on the ultrastructure and collagen morphology of bone tissues in rats by using transmission electron microscopy (TEM). Sodium fluoride (NaF) was orally administrated to rat at 150 mg/L for 60 and 120 days. We also investigated the effect of F consumption on the expression levels of *COL1A1* and *COL1A2* in the bone tissues of rats by using quantitative real time (qRT)-PCR, to elucidate the molecular mechanisms of F-induced collagen protein damage. Our results showed that F affected collagen I arrangement and produced ultrastructural changes in bone tissue. Meanwhile, the mRNA expression of *COL1A1* and *COL1A2* were reduced and the Col I protein levels decreased in the fluorosis group. We concluded that F adversely affected collagen I arrangement and caused ultrastructural changes in bone tissue. Reduced *COL1A1* mRNA expression and altered Col I protein levels may contribute to the skeletal damage resulting from F exposure

Key words: Fluoride; Hard tissue; Rat; Type I collagen; Ultrastructure.

^aShanxi Key Laboratory of Ecological Animal Science and Environmental Veterinary Medicine, Shanxi Agricultural University, Taigu, Shanxi – 030801, People's Republic of China; ^bDepartment of Biology, Taiyuan Normal University (TYNU), Taiyuan – 030031, People's Republic of China; ^cCollege of Animal Science and Technology, Henan University of Science and Technology, Luoyang, Henan, 471003, People's Republic of China; ^dFor correspondence: Xiaoyan Yan, Department of Biology, Taiyuan Normal University (TYNU), Taiyuan – 030031, People's Republic of China; E-mail: y_xiaoyan@yahoo.com