BONE EFFECT UNDER CAUSED BY CO-EXPOSURE TO FLUORIDE AND ARSENIC

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Abstracts

INTRODUCTION
Chronic exposure to combined fluoride and arsenic continue to be a major public health problem worldwide. Although there have been reports in the literature about the toxicity of arsenic and fluoride individually, there is very little known about the combined effects of these two elements. In this study, based on the population and in vitro, the aim is to explore the combined bone toxicity of fluorine and arsenic and provides a scientific basis for the mechanism, prevention and control of endemic combined fluoride-arsenic poisoning on bone toxicity.

METHODS
The population-based study group was selected from people living in fluoride-arsenic polluted areas due to burning coal in China. The total number of participants was 196 to observing the changes in gene and protein expression of PTH/PKA/AP1 signalling pathway. A total of 90 weaned specific-phenotype-free SD rats were randomly assigned to a group to explore the role of PTH-cAMP-PKA signalling pathway on bone toxicity of rats exposed to fluoride and arsenic.

RESULTS
Fluoride can increase the expression levels of PTH, PKA, and AP1, but arsenic can only affect the expression of AP1; fluoride and arsenic have an interaction on the expression of AP1, c-fos and Runx2. Fluoride exposure can affect the metabolism of collagen and bone resorption, and arsenic exposure main affect bone resorption, fluoride and arsenic co-exposure have a more significant effect on bone resorption.

CONCLUSION
PTH-PKA-AP1 and PTH-cAMP-PKA signalling pathway may play an important role in fluoride toxicity of fluoride. Arsenic can affect the expression of c-fos and Runx2, thereby affecting the expression of transcription factor AP1, MMP-9, RANKL and Osterix, indirectly involved in fluoride induced bone toxicity. The main sign of bone damage under the exposure level of the study is osteosclerosis and main combined bone toxicity of fluoride and arsenic showed antagonistic effects.