Emerging Concepts in Fluorosis Research by A. K. Susheela, Kamal Sharma and T. K. Das, *Department of Anatomy, All India Institute of Medical Sciences, New Delhi 110 029, India.*

Dental and skeletal fluorosis is a serious health problem in 13 states of India. The main cause of the health problem being ingestion/inhalation of fluoride in excess through water, food, toothpaste, drugs and air (in industrial environment).

In dental fluorosis, the teeth get discoloured, culminate in brown and black teeth with pitting, perforation and get chipped off. Dental fluorosis is known to cause cosmetic and social problems. In skeletal fluorosis, the clinical manifestations begin with pain in the neck, back-bone, hip region, joints and culminate in stiff, immobile and painful joints. Paralysis is common occurrence in late stages and those afflicted have no alternative but to lead a vegetative life.

The pathological changes observed in the bone and dental tissues of fluorosed human patients have been explained at least partly by alterations in the organic matrix of these tissues. These alterations include increased ratio of iduronic acid to glucuronic acid containing sulphated isomers of glycosaminoglycans, reduction in their molecular weight and increased charge density. This, along with reduced cortisol levels leading to abnormal calcium metabolism have been implicated in causing cartilagenous (demineralized) loci formation in bone, mottling and pitting in dental tissues.

Susceptability to fluorosis is known to vary; it has been found to be determined by pre-existing inflammation, marked by increased serum haptoglobin levels. Those afflicted with skeletal fluorosis have high haptoglobin levels. Those who are residing in endemic areas for fluorosis and ingesting water with high fluoride content viz. 22.5 ppm (1.5 ppm is the maximum permissible limit) and asymptomatic has very low circulating levels of haptoglobin.

The observations emerging from the studies on sulphated glycosaminoglycans, cortisol and haptoglobin have provided valuable information in understanding the pathogenesis of the disease and the nature of its affliction.