

Biochemical and Scanning Electron Microscopic Study on the Development of Fetal Rat of Enamel Surface following a Ingestion of Fluoride

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The response of ameloblast to long term(3 weeks) exposure to fluoride was examined in continuously erupting mandibular incisors of pregnancy rats as compared to control rats receiving a similar diet but no sodium fluoride in there drinking water. Rats were started on water containing 0ppm, 100ppm, 150ppm, 200ppm, 250ppm, 300ppm NaF at the beginning of pregnancy. Animals were perfused intravascularly with glutaraldehyde and the incisors were removed. The enamel surfaces of incisor were examined under scanning electron microscopy. Changes in the protein composition of the secretory and maturation enamel were investigated by means of polyacrylamide gel electrophoresis.

The results indicated that rat incisors expressed two major changes in normal amelogenesis that could be attributed to chronic fluoride treatment. First, the scanning electron micrographs revealed hypoplastic, tough, uneven, pitted and cracked enamel surface covered with significantly granular deposits. Second, amelogenins of secretory enamel in control were detected more quantities than experimental group. The enamelin presence in maturation enamel of experimental rats was obtained more quantities than control enamel with an increase in fluoride concentration in the drinking water.

This experimental data suggested that exposure prolonged of animal to high level of fluoride appears to induce a few dramatic changes in the normal appositional growth and initial mineralization of enamel created during amelogenesis.