PROCEEDINGS

OF THE

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

VOL. 32. OCTOBER, 1934. No. 1.

# Illinois Section.

*University of Chicago, June 5, 1934.*

## 7531 P

## Injections of Sodium Fluoride on Enamel and Dentin of the Incisor of the Rat.*

I. SCHOUR AND M. C. SMITH. (Introduced by W. H. Welker.)

*From the Department of Histology, University of Illinois, College of Dentistry, and Department of Nutrition, Agricultural Experiment Station, University of Arizona.*

The microscopic anatomy of the incisors was studied in 3 groups of rats:

A. 12 rats that were given 2 to 8 injections of .3 cc. of 2.5% sodium fluoride 24 or 48 hours apart. Age: 90-270 days.

B. 20 rats that were given single injections of .3 cc. of 2.5% sodium fluoride and allowed to live 1 to 48 hours after the administration. Age: 90-270 days.

C. 16 controls. Most of these were littermate controls.

Significant alterations were observed only in Groups A and B. The histologic changes in group A were:

1. Both the enamel and dentin show a pair of light (disturbed) and dark (recovery) incremental layers for each injection of so-

* Technical bulletin No. 52 of the University of Arizona Agricultural Station gives a more complete description of some of the phases of this report.

dium fluoride. The width of each pair is approximately 32$\mu$ for injections given 48 hours apart and approximately 16$\mu$ for injections given 24 hours apart.

2. The light layers represent the immediate response to the injections and are imperfect in formation and calcification.

3. The dark layers represent a recovery response and are normal in formation and normal or excessive in calcification.

4. This incremental pattern is a constant finding but shows disturbances when the administration is continued for more than 5 injections at 24-hour intervals.

The histologic changes in group B varied with the time interval between the injection and death:

1. 48-hour interval. One pair of light and dark incremental layers in the enamel and dentin.

2. 12 to 24-hour interval: a. the incremental surface of the organic enamel matrix lacks its normal arrangement and is covered with hemispherical globules that stain deeply with hematoxylin; b. an abnormal character and distribution of globules within the ganoblastic layer situated in the posterior portion of the incisor.

3. 1-6-hour intervals. Abnormal character and distribution of globules within the ganoblastic layer of the posterior and formative portion of the incisor.

The injection of fluorine offers an accurate and easy method of measuring the rate of growth of the enamel and dentin in continuously growing teeth.

It is believed that fluorine exerts a direct local action on the enamel-forming cells and that the changes observed in the enamel and dentin are not produced primarily by changes in blood calcium and phosphorus. The nature of the cytologic disturbances is being investigated further.