amounts to give a clear tyrosinase inhibition when extracts of roughly equal amounts of black and white tissue are mixed (lines 6, 7, 13, 14). (4) Five percent ethyl urethane seems to accelerate and perhaps intensify the tyrosinase action of feather germ extracts: positive reactions in the presence of urethane appeared at 5-18 hours; without urethane, at 20-40 hours. This effect may come about by blocking out certain reducing systems involving dehydrogenases.

The variability of results is perhaps explained by the morphological aspect of pigment formation in feather germs. The melanophores in which the melanin seems to be produced are only a small part of the barb tissue. They are fully active, possibly, only in a narrow circumferential band at the base of the germ. If these cells alone contain an appreciable amount of tyrosinase, extract of 100 mg of barb would represent only a few mg of tyrosinase-containing tissue. It might be expected that much or all of the enzyme would sometimes be destroyed during extraction.

Summary. Extracts of black chicken feather germs show a cyanide-sensitive, heat-labile tyrosinase activity, forming melanin from tyrosine without added peroxide, in about 80% of trials when one cc of the reaction mixture contains extract of 50-750 mg of young barb tissue. Extracts of red feather germs show a similar activity in about 60% of cases, forming black rather than red pigment. Extracts of White Leghorn germs do not inhibit the tyrosinase from roughly equivalent amounts of black germ.

11094 P

Inhibition of Experimental Dental Caries by Fluorine in the Absence of Saliva.*

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Although the inhibition of dental caries by fluorine has been demonstrated in endemic areas[1, 2] and in laboratory rats fed on a

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† The author wishes to thank Drs. Harold C. Hodge and Sidney B. Finn for their kind cooperation in this experiment.

1 Black, G. V., and McKay, F. S., *D. Cosmos*, 1916, **58**, 129.

2 Dean, H. T., *Pub. Health Rep.*, 1938, **53**, 1443.

caries-producing diet[3, 4] the mechanism by which the action takes place has not yet been adequately demonstrated. Armstrong and Brekhus[5] found a higher fluorine content of sound enamel than in carious and offered the hypothesis that this may be the factor responsible for the inhibition. In this report we have attempted a further investigation of this mechanism. Since the enamel of the molar teeth of the animals used was fully formed before fluorine was applied it would appear that the action of fluorine must be due to its being held in the region of the tooth surface or, as far as the dentin is concerned, to the possibility of fluorine reaching it through the circulation.

Previous studies are inclined to disregard the ability of fluorine becoming incorporated into the tooth surface after formation and thus causing an increased resistance to the mechanism responsible for decalcification because the rôle exerted by saliva could not be accurately determined. By using rats in which all the principal salivary glands had been removed[6] we have practically eliminated the possibility of fluorine acting through the saliva. Further, since the fluorine was administered as potassium fluoride in a drop of water in our experiments it is not likely that the fluorine would remain in the mouth in this form sufficiently long to have a prolonged effect. However, evidence is presented that fluorine administered in this way can decrease the incidence of caries in spite of the interference with the salivary secretions or mode of administration.

Experiments and Results. A total of 76 rats were selected from the same Wistar breeding stock at weaning. At 22 days of age the salivary glands were removed from 32 of the animals. On the 31st day all animals were placed upon a caries-producing diet[7] and an aqueous dosage of 3 mg of fluorine was administered to 12 of the operated animals. The food and distilled water were given *ad lib.* Weights were taken every 4 days. After 200 days on the diet, the animals were chloroformed, the jaws separated, and all molar teeth examined by means of a fine-pointed explorer under a binocular microscope, magnification 30×. An attempt was made to classify lesions into simple fractures and carious cavities. Male and female differences were not sufficiently significant to warrant independent consideration.

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[3] Miller, B. F., PROC. SOC. EXP. BIOL. AND MED., 1938, **39**, 389.

[4] Hodge, H. C., and Finn, S. B., PROC. SOC. EXP. BIOL. AND MED., 1939, **42**, 318.

[5] Armstrong, W. D., and Brekhus, P. J., *J. D. Res.*, 1938, **17**, 393.

[6] Cheyne, V. D., *J. D. Res.*, 1939, **18**, 457.

[7] Hoppert, C. A., Webber, P. A., and Canniff, T. L., *J. D. Res.*, 1932, **12**, 161.

TABLE I.

Group	Condition of animal	No. of animals	No. of molar teeth examined	No. fractured cusps per animal	No. carious cuspal involvements per animal	No. carious teeth per animal	No. whole teeth destroyed per animal
I	Normal	44	528	1.6	9.1	3.5	0.8
II	Extirpated salivary glands	20	240	0.2	40.0	10.5	6.7
III	Extirpated salivary glands (plus 3 mg fluorine per day)	12	144	4.3	6.0	2.3	0.3

As may be noted from Table I, the reduction of saliva greatly increases the incidence of rat caries. This is in accord with a previous demonstration by us.[8] Normal animals on the caries-producing diet average 9.1 cuspal involvements and 3.5 carious teeth per animal; those with salivary glands extirpated average 40.0 cuspal involvements and 10.5 carious teeth per animal; and desalivated rats receiving 3 mg of fluorine per day average 6.0 cuspal involvements and 2.3 carious teeth per animal. In all the rats the lower teeth were more involved than the upper. Since the average number of carious teeth in the last group is lower than normal it seems that the beneficial effect of fluorine is more potent than that of the saliva acting independently. Likewise, a reduction of 80 to 85% of these carious afflictions in these desalivated rats receiving fluorine (Group III, Table I), shows that the fluorine has a caries-inhibiting effect even when oral secretions are at a minimum. The relative frequency of occurrence of fractures and advanced cavities in the control and fluorine groups suggests that while the fluorine does not prevent the initial fracture of the teeth it does prevent the subsequent progressive destruction. These findings indicate that the fluorine has a direct and persistent action on the tooth or in the region where food and bacteria come in contact with the tooth surface and in this way retards the progress of decay.

11095 P

Degeneration of the Infundibular Nerve Fibers Without Precipitating Diabetes Insipidus.*†

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In a previous report[1] we demonstrated that the denervation theory can not hold rigidly in explaining the causation of d. i. providing the elaboration of the antidiuretic principle is confined solely to hypophysial tissue. Our experiment does not invalidate the denervation theory if hypothalamic tissue possess antidiuretic secretory powers.

8 Cheyne, V. D., PROC. SOC. EXP. BIOL. AND MED., 1939, **42**, 587.

* Aided by a grant from the Rockefeller Foundation.

† Pars nervosa is used as synonymous to Wislocki's[7] usage of neurohypophysis.

1 Keller, A. D., and Hamilton, J. W., *Arch. Surg.*, 1938, **37**, 760.