

the level found in dogs following hypophysectomy and pancreatectomy. One animal failed to eat part of the time (probably due to a respiratory infection) and under these circumstances no glycosuria was present. In 2 dogs the pancreas was removed first and the animals put on a constant diet with insulin twice daily. Later, one adrenal was removed and in one case the quantity of insulin necessary to maintain the same degree of slight glycosuria was approximately one-half as great as before the adrenalectomy. In the other animal insulin was stopped after the removal of one adrenal and the glycosuria was only mild. The animals are gradually losing weight and becoming weaker, although they apparently feel well and have good appetites. The fasting (overnight) blood sugar of these animals varied from 82 to 290 mg. per 100 cc.

Four other animals from which one adrenal had been removed were injected subcutaneously with 0.5 units of insulin per kg. Three of these animals showed convulsions within  $3\frac{1}{2}$  hours. They were soon relieved after the oral administration of glucose. The fourth animal and a normal control which received 1 unit per kg. showed no external symptoms of hypoglycemia.

These results, although not extensive enough to draw conclusions, are similar to what is found after hypophysectomy. The experiments are being continued to see the effects of loss of more adrenal tissue, to test the possibility of the pituitary exerting its influence through the adrenals, and to study other related problems.

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### Heterotopic Formation of Dentine and Enamel by Transplantation of Epithelium and Pulp Tissue.

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Epithelium surrounding the base of the permanent cuspid teeth, and pulp tissue in 18 young dogs were transplanted to the fascia of the abdominal wall as an autogenous graft, and after 9 to 31 days there was found newly formed enamel, dentine, cementum and bone.

*Method.* The epithelium was obtained in the following way: Under ether anesthesia a cuneiform osteotomy of the mandible, including the deciduous cuspid tooth was made in dogs of between 3 and 6 weeks of age and this allowed access to the permanent

cuspid tooth, which was removed. A circular incision was made equatorially allowing the dental epithelium and pulp to be removed en masse from the calcified tooth shell. The tooth shell itself was always discarded. The soft tissues were gently wiped with moist gauze, were X-rayed, and a section was removed for histological control. The calcium-free material was then transplanted to a pocket between the lateral abdominal muscles, with aseptic precautions, and the incision closed with silk.

It was found easy to separate (a) the sheet of ameloblasts with the subjacent vascular connective tissue parietes, hereafter called the ameloblast layer from (b) the odontoblasts and their underlying pulp cells, in this paper called the odontoblast layer. In some experiments the ameloblast and odontoblast layers were separately transplanted, and in others they were transplanted together.

*Results.* In all cases calcified tissue was found in the transplant after 9 days. When the ameloblast and odontoblast layers were transplanted together in a nearly normal relationship, enamel and dentine were found between the 2 layers and the ameloblasts were present in a normal cylindrical form, as in the original tissue.

When the ameloblast layer was transplanted alone the cylindrical form of the epithelium was mostly lost, and bundles of enamel rods in large numbers were found scattered through large masses of stratified squamous epithelium resembling gingival epithelium. When the odontoblast layer was transplanted alone, masses of dentine were always found. These in the histological sections cut at  $12\mu$  appeared as plaque and circular forms. The circular form was lined inside and out with cells resembling the odontoblasts. In addition there was found in these sections masses of bone, dentine, and of various gradations between dentine and bone, that is atypical dentine and atypical bone.

This effect whereby dentine and enamel are produced after the transplantation of epithelium seems to be similar to the production of bone<sup>1</sup> following transplantation of urinary tract epithelium to the abdominal wall.

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<sup>1</sup> Huggins, C. B., *PROC. SOC. EXP. BIOL. AND MED.*, 1930, **27**, 349.