Histochemical Studies on the Transplanted Tooth Germ in Brain.

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The histochemical demonstration of alkaline phosphatase by Takamatsu (1938) and Gomori (1939) has given much contributions to the progress of the modern histochemistry. Among the facts that this enzyme plays great roles in metabolic processes, there is an opinion that it is concerned with calcification in the body tissues. Prof. Takamatsu was of the view of denying the direct correlation between alkaline phosphatase activity and calcification, and his view was emphasized in his special lecture presented at the 40th Annual General Meeting of the Japanese Pathological Society.

Various investigations of this problem hitherto undertaken in many pathohistologic fields have tended to support the opinion of Takamatsu. This study was undertaken to contribute to the solution of this problem by making clear the influence of alkaline phosphatase upon calcification of normal bones and teeth, and also calcification in the tissues of various legions.

Experimental materials and methods are as follows. Well grown young rabbits were used. Tooth germs picked out from the lower jaw of the animals were transplanted into the brain. The animals were killed out at 24 hours to 80 days, and the subject tissues were fixed in acetone-alcohol, and then embedded in celloidin, if need require, after decalcification by means of our method using 5% EDTA solution (pH 6.5 to 7.0). The original method by Takamatsu (1938) and new method by Takamatsu and Nishi (1954) for demonstration of alkaline phosphatase and the method by Takamatsu, Ozawa and Izaki for acid phosphatase were employed.

Furthermore, authors observed glycogen reaction by Bauer's method and findings of metachromasia using Toluidine Blue in comparison with alkaline and acid phosphatase.

The experiments gave briefly the following results.

In the early stage (at 24 hours), it was found bleeding in the transplanted area and the formation of a matrix which was possibly produced by the
mesenchymal tissue of the pulp or odontoblasts. This matrix proliferated increasingly and was followed by calcification in its central region. Alkaline phosphatase was already demonstrated in the early stage, while calcification did not occur in the early stage, but in the later.

On the basis of our observations, it is suggested that alkaline phosphatase has directly no relation with calcification. Prof. Takamatsu\(^3\)) indicated the following in connection with the matter.

1. The activity of alkaline phosphatase has no relation with the existence of calcium ion in the solution.

2. There is no reliable basis that the enzyme in bones and teeth is not identical with that in the other tissues.

3. In rachitis, though it is demonstrated a great deal of the enzyme, calcification is incomplete.

Plate 1.

Plate 2.
4. In calcification of costal cartilage as senile change, the enzyme is little proved.

5. In osteogenic sarcoma, sarcoma cells contain a great deal of alkaline phosphatase. However, no calcifications occur before osteoid tissue is formed.

6. There is also no relationship between calcification in lesions of many others and activity of alkaline phosphatase.

The results of my observations were agree with the Takamatsu's work.

**Explanation of the Plate**

1) Tooth germ transplanted in brain tissue of a rabbit. Seven days after the transplantation. Germ tissue is alive and homogenous substance is seen in the central area. Hemorrhagic and edematous brain tissue is around the foci.
2) Alkaline phosphatase reaction intensively positive at the site of the transplanted tooth germ. Sevendays after the transplantation.
3) Fourteendays after the transplantation. Characteristic arrangement of the odontoblasts is seen, and matrix excretion is apparent.
4) Twenty days after the transplantation. Alkaline phosphatase reaction is seen entirely in matrix but the calcification is occured only in a small central part.

References

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Histochemical Studies of Adamantinoma
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Introduction

Histopathological and clinical studies on ameloblastoma have been done by many investigators, however, there have been no reports concerning the enzymatic histochemistry of ameloblastoma. On our previous reports, we noted the distribution of polysaccharide, nucleic acids, phosphatase, nucleotidase, succinic dehydrogenase, etc., in adamantinoma. In the present studies, we believed that it was of interest to report on the distribution and localization and the interrelation between hydrolytic enzymes and dehydrogenases.

Materials and Histochemical Methods

The specimens were obtained from 7 patients who underwent surgical operation for the treatment of adamantinoma. The materials for histochemical and pathological studies were as follows: 2 cases of plexiform type obtained from (25 and 29 year old men), follicular type (45 year old woman), 3 cases of acanthoma type (30 and 32 year old men and 34 year old woman) and