DETERMINATION OF PGM, EsD, GLO (1) AND EAP POLYMORPHS FROM HUMAN DENTAL PULP

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INTRODUCTION

Genetic manifestations (blood groups, polymorphic enzymes) in biological evidences have extensively been utilized in forensic investigations. The last decade or so has witnessed a large amount of research work especially on the stability studies from blood stains. But the literature is sparse so far as the studies on enzyme typing in human dental pulp is concerned (Petersen and Heide, 1974; Turowska and Trela, 1977; Whittaker and Rothwell 1981; Henke et al., 1982 and Imai et al., 1984). The studies especially when the dental evidence could be used assume considerable significance in case of mass disasters, bride burning and general cases of arson where bodies are received either burnt, charred or badly mutilated and need to be identified. Whittaker and Rothwell (1981) observed that in some air disasters dental evidence alone has been responsible for the identification upto 40 percent of victims. Further, when a dead body is in advance stage of decomposition and only skeleton is left, teeth (with pulp) can still serve as a standard in place of blood (Petersen and Heide, 1974 and Lele et al., 1977).

MATERIALS AND METHODS

All types of teeth namely incisors, canines and molars were collected from fresh extractions carried out in the dental clinics alongwith the donors blood. However, only complete or intact teeth were selected for analysing genetic markers. At the same time, blood stains were made on cotton cloth pieces. These were put into separate envelopes, and stored at room temperature during different ambient conditions. Haemolystates were prepared and treated with an equal volume of β-mercaptoethanol (diluted 1:40 with distilled water) for PGM, GLO (1) typing and 0.05M Cleland's reagent for EsD and EAP typing.

Human teeth samples were broken and dental pulp picked up with the help of forceps in each case and treated like lysates before being applied on to origin slits already made in the gel (Sharma et al., 1988). Further, these samples were analysed for different enzyme systems as per earlier reports: PGM, EsD (Wraxall and Stolorow, 1978), GLO (1) (Scott. and Fowler, 1982) and EAP (Wraxall and Emes, 1976).

RESULTS AND DISCUSSIONS

The results of various polymorphic forms observed in human teeth are given in table (1)

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All teeth samples tested for phosphoglucomutase variants gave positive results. All the three common polymorpohic forms were detected and there was a complete agreement between the phenotypes expressed in blood and dental pulp. The zymogram revealed intense band patterns in dental phenotypes. The stability studies carried out in the months of (April-July) showed that human teeth could be typed up to three months whereas the enzymatic activity in blood stains lasted for 14-16 days only under similar conditions.

Three common occurring polymorphic forms of glyoxalase 1 enzyme were detected. The zymogram demonstrated better resolution of bands in some heterozygous samples where three distinct bands were seen. The intensity of band patterns in human dental pulp was found to be similar to that in blood indicating thus a good amount of enzyme activity. Stability studies showed that the teeth samples could be typed up to 5 months (Oct. to Feb.) and against this typability of blood stains was restricted upto 6-7 weeks only.

Esterase D Phenotypes observed in dental pulp matched completely with donors lysates. However, heterozygous samples showed three distinct bands in zymogram. When subjected to identifical conditions of storage, dental pulp showed typable activity upto 2 months in summer periods (May & June) and blood stains remained typable for 6-7 days only.

Tests for erythrocyte acid Phosphatase isozymes showed its presence in dental pulp. Although, the zymogram obtained did not show intense band patterns, this could not be improved either on applying greater quantity of dental pulp. Apparently, there seems to be less quantity of enzymatically active material associated with dental pulp tissue. Hence, stability studies were not performed on this enzyme system.

Table-1. Distribution patterns of Isoenzymes in Human Blood lysates and Dental Pulp

Sr. No.	Name of Enzyme system	Phenotypes	Haemolysate	Dental Pulp
1.	PGM	1-1	46	46
		2-1	36	36
		2-2	10	10
2.	EsD	1-1	78	78
		2-1	36	36
		2-2	4	4
3.	GLO (1)	1-1	6	6
		2-1	53	53
		2-2	47	47
4.	EAP	A	3	3
		BA	10	10
		B	35	35

The studies undertaken are indicative of the findings that the genetic markers

detected in dental pulp and the donors blood are alike. However, considerable difference exists in their typable time limits. Since factors like heat humidity and bacterial contamination has bearing on stability of genetic markers but are unable to affect directly the dental pulp (by virtue of its insitu position) thus could be the reason for prolonged typable activity. With the rise in periods of storage, steady decrease in enzyme activity was observed in both cases.

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