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Determination of AB0(H) Blood Group Substances from Finger and Toe Nails

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Summary. Thirty-six finger and toe nails were analyzed for AB0(H) blood group substances by the modified absorption elution method. The blood groups from nails were successfully determined in all the samples.

Key words: Nails, finger and toe – AB0(H) blood group substances, absorption elution method

Zusammenfassung. Mittels einer modifizierten Absorptions-Elutionsmethode wurden die AB0(H)-Blutgruppensubstanzen bei 36 Proben von Finger- und Zehennägeln untersucht. In allen Fällen wurde die richtige Blutgruppe ermittelt.

Schlüsselwörter: Nägel, von Fingern und Zehen – AB0(H)-Blutgruppensubstanzen, Absorptions-Elutionsmethode

Introduction

The detection of AB0(H) blood group-specific substances from finger and toe nails, bones, hairs, teeth and muscles can obviously be used in the identification of an individual in cases of dismembered murdered victims, disasters and kidnapping. The nail fragments may also be found in sexual assault cases. Hence the determination of AB0(H) blood group substances could help in establishing the identity of the individual. Few workers have reported the detection of blood groups from finger and toe nails (Thoma 1955; Outteridge 1963; Yada et al. 1966, 1968, 1969; Garg 1983).

In the present study, an attempt has been made to determine the blood groups from finger and toe nails of the same individual.

Material and Method

Thirty-six finger and toe nails were collected from the same individuals along with a few drops of fresh blood separately in test tubes containing normal saline by finger prick method. The

Table 1. Blood group from finger and toe nails

Blood group of the donor	Number tested	Number of finger and toe nails tested	Finger nails		Toe nails	
			No. of positive results	No. of negative results	No. of positive results	No. of negative results
A	9	9	9	–	9	–
B	13	13	13	–	13	–
0(H)	11	11	11	–	11	–
AB	3	3	3	–	3	–

name, age, sex, caste and date of collection of the samples were also recorded. The blood samples were analysed by the slide technique according to Dunsford and Bowley (1967). The finger and toe nails were kept in serially marked envelopes till they were analysed. The nail fragments were examined for their AB0(H) blood group-specific substances on the day after their collection according to Outteridge (1963) but with slight modifications.

The finger and toe nails were kept in normal saline for a minimum period of 2 h before analysis to remove any adhering material present on the nails and then dried at room temperature for 2 h at least. The dried finger and toe nails were cut into equal sizes (wt. 24–30 mg) and placed into three different test tubes marked separately for finger and toe nails. Then an excess of appropriate antiserum was added to each test tube to keep the nail fragment submerged, i.e. anti-A to the first, anti-B to the second and anti-H to the third test tube. The nail fragments were allowed to absorb the respective antisera in the refrigerator (4°C) for a minimum period of 30 h. After absorption, the excess of antiserum from each tube was pipetted out, and the nail fragments were washed with the excess of chilled saline at least six times. The tubes were filled with saline and left standing at room temperature for 15–20 min after each wash. Care was taken to remove all of the saline solution especially after the last wash. Then two drops of low ionic strength solution (2% glycine in 0.5% of human albumin) as reported by Sagisaka et al. (1980) was added to each of the test tubes for elution of the absorbed antibodies. The tubes were covered and placed in a water bath at 56°C for 10–15 min. The tubes were then removed from the water bath and the nail fragments were quickly removed from each of the test tubes. Then a drop of 0.5–1% of appropriate indicator cells suspended in already prepared low ionic strength solution was added to the eluate of each test tube. The tubes were again kept in the refrigerator for 0.5 h after which the results were declared macroscopically as well as microscopically.

Adequate controls of finger and toe nails and blood of known individuals of A, B and 0(H) were kept. The anti-A and anti-B were obtained from the Haffkeine Institute, Bombay, and anti-H was prepared from Ulex europaeus seeds in the laboratory.

Results and Discussion

The results of blood grouping from finger and toe nails are given in Table 1. It has been observed that in all the samples of finger and toe nails, without exception, the blood groups were determined correctly and matched well with the corresponding blood group of the individual. Most of the reactions were macroscopical and easily visible to the unaided eyes, though microscopical examination was also performed to further confirm the results. However, the intensity of reaction was found to be lower in case of '0' individuals as compared to the A and B individuals. It can be said that the blood group of the finger and toe nail can be

successfully determined. Thus, the determination of blood group substances from finger and toe nails will help in elimination as well corroboration of the evidence in rape, murder, fights, etc.

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