SHORT COMMUNICATION

MONOAMINE OXIDASE (MAO) ACTIVITY IN HUMAN SERUM

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Summary : The mean monoamine oxidase (MAO) level in 37 normal adult human sera was found to be 27.6 ± 6.3 units. The enzyme appeared to be stable at 4°C for 24 hrs. Decreased level of MAO activity was recorded in tuberculosis patients receiving INH.

Key Words : Monoamine oxidase, Serum MAO, isoniazid depression of MAO, MAO estimation

It was previously thought that human plasma contained no amine oxidase (1). But in 1963, McEwen and Cohen (3) documented the presence of monoamine oxidase (MOA) in human serum or plasma. Since then considerable progress has been made in understanding the physiological properties of the enzyme. Human serum MAO has been shown to actively oxidize benzylamine. Serum MAO is said to be different from classical mitochondrial MAO (2) as it does not deaminate sertonin, epinephrine and norepinephrine (4). Moreover, isoniazid (INH) inhibits serum MAO (4) while mitochondrial MAO is not affected by INH.

Human serum MAO has been reported to be considerably stable. Serum stored at -20°C up to 14 days has shown no loss of MAO activity (3). The present work was designed to evaluate the serum MAO activity in normal human adults.

MATERIALS AND METHODS

Thirtyseven apparently healthy adult individuals (31 males and 6 females) from the Institute Staff donated blood for this study. No blood sample was taken even during minor illnesses like common cold, sore throat etc. Four patients of tuberculosis receiving isoniazid (INH) therapy in the dosage of 300 *mg* daily were also included in this study.

Blood was collected from the anticubital vein and serum was separated within 2 hrs of collection for doing the enzyme estimation. In six samples, second estimation was done after storage at 4°C for 24 hrs.

Estimation of serum MAO was done according to the method described by McEwen and Cohen (3) using benzylamine as substrate in phosphate buffer of pH 7.2. Amount of serum used was 0.6 *ml* in each of the assay and control tubes. Extraction of the product (benzaldehyde) was done in cyclohexane following 3 hrs incubation. Readings were taken

in Beckman spectrophotometer at 242 mμ at 100 mm light path. Results were expressed in units as stated by McEwen and Cohen (3).

To assess the validity of the method before proceeding for this study, estimation of the enzyme was done at variable incubation periods, using different concentrations of serum, other conditions of the standard assay remained the same.

RESULTS

Oxidation of benzylamine by the serum was found to proceed in a linear fashion at least for 4 hrs (Fig.1) and the rate of benzaldehyde production was found to be directly proportional to the amount of serum incubated (Fig. 2)

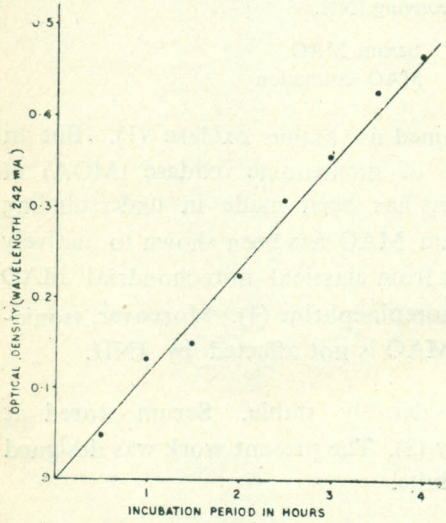

Fig. 1: Effect of variable incubation period on enzymatic oxidation of benzylamine. Other conditions of the standard assay were remaining same.

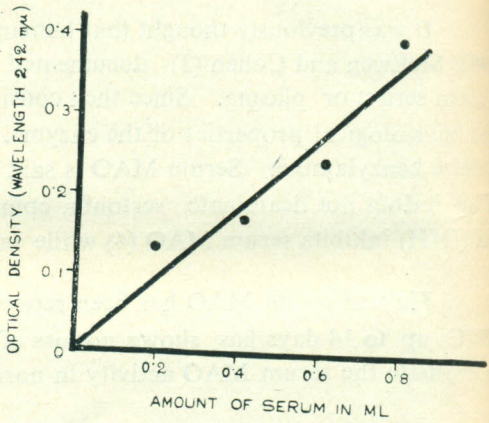

Fig. 2: Effect of enzyme concentration on reaction rate. Conditions were those of standard assay except the amount of serum incubated was varied but total volume incubated was same.

In 37 normal human adults (mean age=26 years), mean serum MAO was 27.6 ± 6.3 units. (Fig. 3) In this group, males and females had mean enzyme levels of 27.3 and 29.1 units respectively. These values were not significantly, different ($P > 0.05$) from each other.

The enzyme activity (Table I) in fresh sera (26.8 units) and stored sera (25.6 units) for 24 hrs at 4°C did not show significant difference ($P > 0.05$). The enzyme level of the patients receiving INH therapy (Table II) was significantly low ($P < 0.01$) in comparison to the normal value.

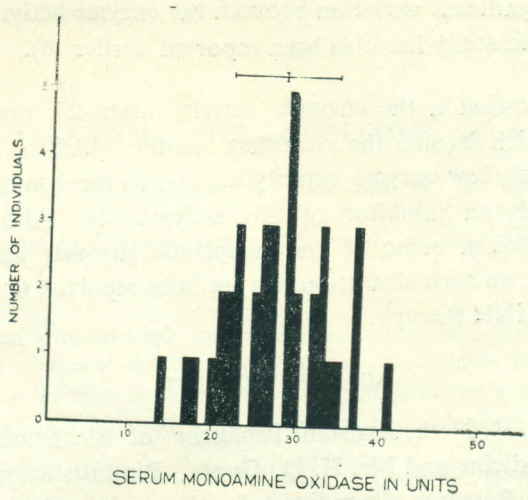

Fig. 3: Distribution of the enzyme in the group of normal individuals studied.

TABLE I: Levels of serum MAO in fresh samples and in stored samples at 40°C for 24 hrs.

	Age/sex	*MAO in units*	
		Fresh sample	*Stored sample*
S.D.	25m	17	20
P.C.B.	26m	32	28
N.	28m	28	27
D.K.	24m	32	29
V.K.	27m	23	26
R.S.	22m	29	24
		Mean 26.8	25.6

TABLE II : Serum MAO in patients receiving INH therapy.

	Age/sex	*Diagnosis*	*MAO units.*
B.S.	34 m	Alcoholic hepatitis with pulmonary T.B.	4.5
J.K.	40 f	Intestinal T.B.	6.0
G.S.	26 m	Pulmonary T.B.	8.5
P.G.	30 m	Pleurisy (T.B.)	8.0
		Mean =	6.7

M — Male f — Female T.B. — Tuberculosis

DISCUSSION

The normal level of serum MAO in this study corresponds favourably with earlier

reports (3,5,6). Lack of significant variation between the enzyme activities in male and female subjects as obtained in this study has also been reported earlier (6).

No significant alteration in the enzyme activity after 24 hrs storage at 4°C was observed in this study which favours the view that serum MAO is a stable enzyme (3). The presence of significantly low enzyme activity in patients receiving INH probably supports the observation that INH is an inhibitor of this enzyme (4). Although, the low enzyme levels have been documented in some of the neoplastic diseases and in patients receiving corticosteroid therapy (5), no such alteration has yet been reported in patients suffering from tuberculosis not receiving INH therapy.

ACKNOWLEDGEMENT

I am grateful to Dr. R. Nath, Assistant Professor of Biochemistry, Dr. D. V. Datta, Associate Professor of Medicine and Mr. H. D. Gupta, Biostatistician, Postgraduate Institute of Medical Education and Research, Chandigarh for their help and supervision.

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