# ESTIMATION OF 5-HYDROXYTRYPTAMINE IN NORMAL HUMAN PREGNANCY

*By*

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The physiological role of 5-Hydroxytryptamine (5-HT) has not yet been established properly. Emphasis is now-a-days being laid more towards the role of 5-HT in blood coagulability, capillary permeability, instestinal peristalsis, conduction of nerve impulse at the central synapses, immune reactions and obstetrical conditions.

It is interesting to note that histaminase activity increases during pregnancy (1). Since histaminase destroys histamine and the level of histamine does not fall during pregnancy, it is an indirect proof that histamine rise occurs during pregnancy. Histamine and 5-HT are liberated together in antigen-antibody reaction (2), and in pin-pricking (8). There could be a similar co-existant increase of histamine and 5-HT in normal pregnanacy. Very few data are available in India and outside regarding the level of 5-HT in normal pregnancy. Looking to the possibility of a change in 5-HT level during pregnancy, it was decided to substantiate the data about the level of 5-HT in non-pregnant and normal pregnant females and to find out what change occurs in 5-HT level in normal pregnancy.

## MATERIALS AND HETHODS

The cases studied were devided into two groups —

Group 1—Non pregnant females during child bearing age (14 cases).

Group 2—Normal pregnant females in —

(a) Second trimester of pregnancy (5 cases).

(b) Third trimester of pregnancy (15 cases).

About 2 ml. of blood was obtained from each patient and was kept in sterile non-oxalated bottle and allowed to clot completely after which it was placed over-night in refrigerator and serum separated next morning.

Serum 5-HT was assayed biologically against the isolated rat stomach strip preparation as described by Vane (7). Bathing fluid used was Tyrode's solution. Oxygen was continuously passed in the bath. The temperature of the bath was kept constant at 37° C. Atropine in $10^{-7}$ concentration was always added as a routine to the bathing fluid so that low concentrations of 5-HT could be assayed without being interfered with acetylcholine and histamine in small doses (7). Starting with the known concentrations of 5-HT, contractions by 0.1 c.c. of serum were recorded. Doses of known 5-HT concentration and 0.1 c.c. of serum were alternately added till the response obtained by 0.1 c.c. of serum directly matched with the response obtained by known concentrations

of 5-HT solution. The effect of 5-HT was identified as 5-HT by seeing the blocking effect of Cyproheptadine in doses of one $\mu$g/ml. of the bath.

## RESULTS

Table—I shows the level of serum 5-HT in non-pregnant females during child bearing age.

TABLE I

*Level of serum 5-HT in Non-pregnant females during child bearing age*

| No. | Name | Age in years | Blood pressure in *mm.* of Hg. | Level of serum 5-HT in *ngs./ml.* |
|---|---|---|---|---|
| 1 | D.M. | 20 | 110/70 | 37 |
| 2 | V.H. | 25 | 105/70 | 24 |
| 3 | S.M. | 28 | 110/74 | 28 |
| 4 | M.C. | 25 | 115/75 | 30 |
| 5 | C.P. | 30 | 110/72 | 4.5 |
| 6 | S.S. | 19 | 112/70 | 20 |
| 7 | S.N. | 27 | 114/65 | 14 |
| 8 | S.C. | 20 | 103/68 | 3 |
| 9 | S.B. | 18 | 114/74 | 32 |
| 10 | M.K. | 20 | 105/70 | 6 |
| 11 | Y.B. | 32 | 115/70 | 18 |
| 12 | K.R. | 27 | 102/68 | 15 |
| 13 | G.S. | 23 | 98/60 | 22 |
| 14 | R.G. | 27 | 110/70 | 25 |

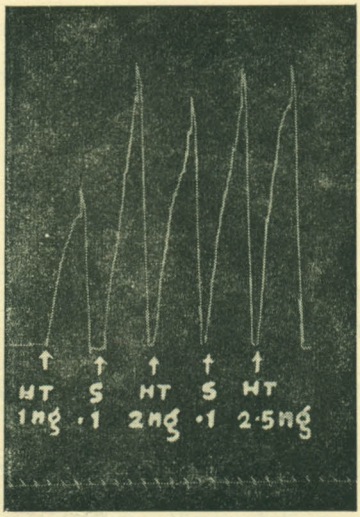


Fig. 1. Assay of the serum of the patient No. 14 (Table-I) on contractile response of rat stomach. 'HT' stands for 5-HT and 'S' stands for serum (Time interval—30 seconds)

Fourteen cases were studied in Group 1 of non-pregnant females during child bearing age (Fig. 1). The mean level of serum 5-HT was found to be 19.89 ± 10.63 (*ngs./ml.*). Individual variations were very marked.

Table—II show the level of serum 5-HT in normal pregnant females in second trimester of pregnancy.

TABLE II

*Level of serum 5-HT in normal pregnant females in second trimester of pregnancy*

| No. | Name | Age in years | Blood pressure in mm. of Hg. | Period of gestation in weeks | Level of serum 5-HT in nanograms per ml. |
|---|---|---|---|---|---|
| 1 | T.T. | 35 | 108/70 | 18 | 55 |
| 2 | D.S. | 18 | 120/70 | 24 | 5 |
| 3 | S.S. | 32 | 115/75 | 20 | 26 |
| 4 | L.Y. | 20 | 110/60 | 24 | 12 |
| 5 | L.R. | 18 | 120/75 | 16 | 43 |

Five cases were studied in second trimester of pregnancy (Fig. 2). Individual variations were quite marked. Mean level of serum 5-HT was 28.2±20.87 *ngs./ml.* which

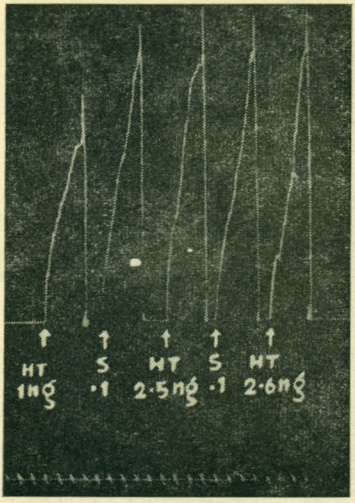


Fig. 2. Assay of the serum of the patient No. 3 (Table-II) on contractile response of rat stomach. 'HT' stands for 5-HT and 'S' stands for serum. (Time interval—30 seconds).

when compared to the mean level of serum 5-HT in non-pregnant females (19.89±10.63 *ngs./ml.*) shows an obvious rise. This rise is insignificant statistically at P=0.05.

Table--III shows the level of serum 5-HT in normal pregnant females in third trimester of pregnancy.

TABLE III

*Level of seram 5-HT in normal pregnant females in third trimester of pregnancy*

| No. | Name | Age in years | Blood pressure in mm. of Hg. | Period of gestation in weeks | Level of serum 5-HT in nanograms per ml. |
|---|---|---|---|---|---|
| 1 | H.R. | 35 | 110/70 | 36 | 32 |
| 2 | S.P. | 26 | 110/70 | 32 | 25 |
| 3 | S.D. | 32 | 105/65 | 36 | 35 |
| 4 | M.M. | 30 | 112/74 | 28 | 45 |
| 5 | P.S. | 28 | 120/70 | 28 | 13.5 |
| 6 | L.D. | 22 | 110/68 | 36 | 45 |
| 7 | A.B. | 35 | 115/76 | 36 | 42 |
| 8 | A.R. | 32 | 100/72 | 30 | 22.5 |
| 9 | T.B. | 30 | 108/75 | 32 | 5 |
| 10 | S.B. | 30 | 102/64 | 26 | 28 |
| 11 | S.R. | 18 | 120/75 | 34 | 22 |
| 12 | J.M. | 30 | 120/80 | 28 | 23 |
| 13 | T.N. | 35 | 125/80 | 32 | 30 |
| 14 | S.G. | 20 | 110/80 | 34 | 12 |
| 15 | S.K. | 19 | 105/70 | 30 | 7 |

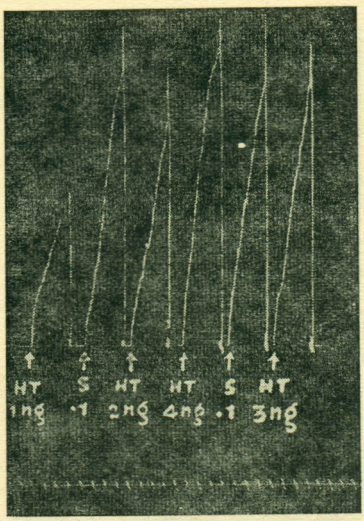


Fig. 3. Assay of the serum of the patient No. 13 (Table-III) on contractile response of rat stomach. 'HT' stands for 5-HT and 'S' stands for serum (Time interval—30 seconds).

Fifteen cases were studied during third trimester of pregnancy (Fig. 3). Individual variations were present. Level of serum 5-HT in this group was 25.8±12.83 *ngs./ml.* When compared to the level of serum 5-HT in non-pregnant females (19.89±10.63 *ngs./ml.*), it shows an obvious rise. The rise is insignificant statistically at P=0.05.

## DISCUSSION

It is obvious from our results that there is an apparant increase in 5-HT content in serum during normal pregnancy. When the results are scrutinised with the help of statistical methods it is found that the increase is insignificant.

Our findings agree with those of Krupp and Krupp (3), who also did not get an increase in the 5-HT content in plasma during pregnancy. Schmidt and Pokorny (6) found an increased excretion of serotonin (5-HT) in second and seventh month of pregnancy. Parikh and Bellare (4) have shown an increased urinary excretion of 5-Hydroxy-Indole-Acetic-Acid (which is an important metabolite of 5-HT) in pregnant women in third trimester of pregnancy. Pigeaud *et al.* (5) also found an increased excretion of 5-Hydroxy-Indole-Acetic-Acid (5-HIAA) in the course of pregnancy. If there is increased urinary excretion of 5-HIAA with the serum 5-HT remaining the same, then it can be inferred that during normal pregnancy there is increased production of 5-HT either from the mother or from foetus. If this increased production is not combated physiologically then there will be every chance of precipitation of certain disturbances in pregnancy. But normally the level of circulating 5-HT is kept constant by increasing its metabolism when its production increases. As a result the excretion of 5-HIAA in urine would increase when the production of 5-HT rises ; while the level of serum 5-HT remaining constant.

If increased production of 5-HT in normal pregnancy is established, we may confirm a correlation of histamine and 5-HT in pregnancy also.

## SUMMARY AND CONCLUSIONS

Serum 5-Hydroxytayptamine (5-HT) has been assayed biologically against isolated rat stomach strip preparation in non-pregnant and normal pregnant females. There is an apparant increase in the level of serum 5-HT in normal pregnancy. This increase is insignificant statistically at P=0 05. The latter does not rule out an increased production of 5-HT in serum in normal pregnancy. If the metabolism of 5-HT increases then the level of serum 5-HT may remain constant even in the presence of increased production of 5-HT.

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