

time by the radial immunodiffusion method and by the radio-immunological technique. In these cases the coefficient of correlation between the two methods was:  $r=0.593$  and  $p<0.0005$ .

The authors conclude that the radial immunodiffusion test is particularly precise for the evaluation of HPL in the serum when it is between 3 and 9  $\mu\text{g/ml}$ , but for values less than 3  $\mu\text{g/ml}$  or more than 9  $\mu\text{g/ml}$  the radio-immunological method is more exact.

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## Variations in acetylcholine esterase in relation to gestational age

by

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Acetylcholine esterase is undoubtedly one of the enzymes most studied with regard to its specificity and its physiological role. Various acetylcholine esterases exist, of different derivation, which differ from one another in their kinetic properties and their sensitivity to some inhibitors. There are « true » acetylcholine esterases, that have the well known physiological action of hydrolysing « non-specific » acetylcholine esterases (pseudo-cholinesterases, physostigmine-sensitive acetylcholine esterases). In order to obtain a correct determination of acetylcholine esterase activity, the esters of choline should be used as substrates and in addition sensitivity to physostigmine should be tested.

12-13 isoenzymes have been demonstrated in human serum, of which one fraction (ChE<sub>7</sub>) constitutes approximately 80% of the total activity (<sup>1</sup>). These isoenzymes are differentiated by their molecular weight and probably by the number of similar substrates.

The acetylcholine esterases belong to the group of enzymes already secreted in physiological conditions in the plasma, even though their biological function has not yet been identified. Recently it has been claimed by Chary *et al.* (<sup>3</sup>) that this enzyme has an important part to play in the metabolism of choline and indirectly in that of lecithin.

It has long been known that the diminution of acetylcholine esterase activity in the serum has the clinical significance of insufficient liver function; however, the blood level does not always reflect the capacity for hepatic synthesis. The normal

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values are very variable from one subject to another and differences have not always been found between the two sexes (<sup>4</sup>).

## MATERIAL AND METHODS

This investigation involved a total of 304 patients. They were followed up throughout pregnancy, and showed no deviations from the norm on clinical examination. Both pregnancy and delivery followed a normal course.

As controls, 56 women were selected from the same age-group.

Acetylcholine esterase was determined using acetylcholine as substrate, and the rate of liberation of thiocholine was determined by the method of Ellmann *et al.* (<sup>5</sup>).

The results were calculated statistically by means of an electronic calculator.

## RESULTS

The results of the investigation are reproduced in the table. The levels of activity of acetylcholine esterase were shown to be lower than normal throughout pregnancy, reaching a highly significant diminution from the 5th to the 8th month.

*Serum Acetylcholine esterase in pregnancy (mU/ml) mean/standard deviation \**

not pregnant	2030 ± 437
2nd month	1824 ± 302
3rd month	1864 ± 351
4th month	1757 ± 308
5th month	1684 ± 224
6th month	1582 ± 271
7th month	1646 ± 345
8th month	1675 ± 339
9th month	1758 ± 390

\* The mean errors of probability were between 0.01 and 0.0005.

## DISCUSSION AND CONCLUSIONS

There have been a number of investigations into the behaviour of acetylcholine esterase in pregnancy. Tourtelotte *et al.* (<sup>1</sup>) found that during pregnancy the enzyme activity in the serum was lower than that of adult, non-menstruating women; in the presence of toxæmic pregnancy a further diminution was observed.

According to Barnes & Epperson (<sup>6</sup>) there is no difference in the serum levels of acetylcholine esterase between men and women, nor are there any cyclic variations to the menstrual cycle. Men treated with oestrogens show a slight diminution in the level of acetylcholine esterase. During pregnancy there is a marked fall in the enzyme; in the puerperium the level is restored to normal within 6 weeks. There is no parallelism between the enzyme and the oestrogens. Pritchard (<sup>7</sup>) claims that there is a reduction in the enzyme during the second and third weeks of pregnancy during the normal course of development, and a return to normality occurs after the sixth week of the puerperium.

Other authors arrived at analogous results (<sup>8,9,10</sup>). In general they attributed the diminution of acetylcholine esterase to haemodilution or to specific inhibition of the enzyme itself, or to different functional involvement of the hepatocyte, especially in the case of toxæmia.

However, interesting vistas have been opened by the work of Willgerodt *et al.* <sup>(1)</sup> regarding serum acetylcholine esterase in women before and after treatment with oestrogens and progestogens. These authors observed, in some of the women, a considerable fall of choline esterase activity, but in the majority of cases the values did not reach pathological limits. However, the values encountered were always less than those obtained before treatment. These authors attributed this phenomenon to possible interference at hormonal level. It is also known that the oestrogens have an anticholinesterase activity *in vitro*, even if it is not possible to demonstrate this with any certainty *in vivo* <sup>(8)</sup>. It may, therefore, be concluded that the synthesis of acetylcholinesterase in the liver, as shown by the plasma concentration, is diminished during pregnancy probably due to hormonal causes, without reaching a true state of liver dysfunction, in which this phenomenon becomes more evident.

### SUMMARY

The serum concentration of acetylcholine esterase was studied at various gestational ages; a significant diminution, particularly from the 5th to the 8th month of pregnancy, is attributed to hormonal causes that regulate biosynthesis of the enzyme in the liver.

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## The problem of foetal maturity during iso-immunization due to the Rh factor

by

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We carried out an investigation with a view to assessing the practical significance of the ordinary tests for foetal maturity, in the presence of a moderately or highly serious situation of materno-foetal iso-immunization due to the Rh factor.

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