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Abstract

Almost all the umbilical lymphocytes showed more extensive blast cell formation than that of their mother's lymphocytes with PHA. Pathological conditions of mother in pregnancy and labor such as anemia, gestational toxicosis, difficult labor and asphyxia of babies, inhibited the normal response of both maternal and umbilical lymphocytes to PHA.

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PHYTOHAEMAGGLUTININ ON MATERNAL AND UMBILICAL LEUCOCYTES

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Constituents in phytohaemagglutinin (PHA) that shows a mitogenic activity on human peripheral lymphocytes are protein, and lymphocytes stimulated with PHA produce gamma-globulin *in vitro*[2]. However, one cannot hastily conclude that this response is a specific immune response[2-5]. It might be realized that fetal and new-born babies have not been sensitized with beans as a component of their diet except the transplacental sensitization. In this connection, comparative examinations on fetal, umbilical and adult leucocytes were carried out[6] about their responsibility to PHA, but these materials had been employed from at-random persons.

From immunological point of view SMITH[7] pointed out that fetal and neonatal ones can show a quantitatively identical response to some antigen as in the case of adults.

This preliminary report presents the comparison of the blast cell formation between the maternal and her umbilical blood leucocytes after 72 hours' cultivation with PHA. Our special interest in this report is placed on the question whether maternal lymphocytes would be stimulated more significantly than her babie's umbilical lymphocytes and whether there would be any physiolgical conditions which influence the mitotic activity of PHA on leucocytes.

METHODS

Heparinized maternal blood was drawn at the second stage of the labor, on the other hand, heparinized umbilical blood was directly from the umbilical vessels immediatly after its cutting. To avoid any non-physiological procedure, both heparinized maternal and umbilical blood was kept at 37°C for 2 hours to allow red cell sedimentaion without addition of any substance. In the latter case a centrifugation was performed as a low sedimentation rate had been noticed. The leucocytes containing plama were separated, counted, followed by addition of PHA, 0.06 ml per 1 ml of each plasma. Both the experimental leucocytes and the control without PHA, were kept at 37°C for 10 min., then 2 ml of Medium 199 were added to each 1 ml of the plasma, transferred into culture

bottles (TD-50: Ikemoto Co.) and incubated at 37°C. After 72-hour cultivation, smears of the cell deposit in the cultures were stained with May-Giemsa stain and the proportion of blast-like cells was determined.

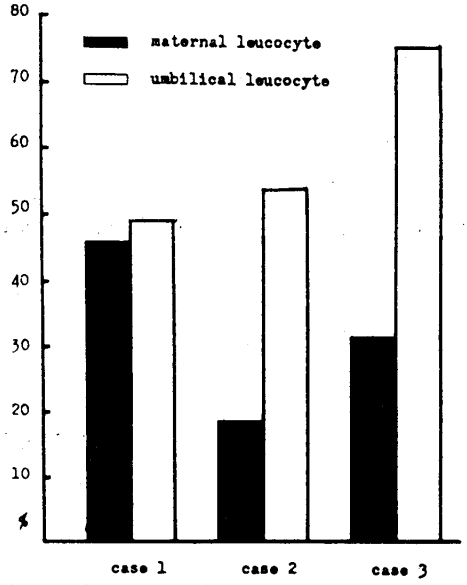

Fig. 1 Comparative blast-cell transformation of both maternal and umbilical leucocytes with P. H. A.

RESULTS

In 22 pairs of the specimens employed 3 pairs were calculated in blast cell formation, since quantitatively the same number of leucocytes was used in each pair of maternal and umbilical lymphocytes and no pathological findings were found throughout their pregnancies and labors (Fig. 1).

The per cent of blast cell formation from the umbilical lymphocytes were obviously higher than that of their mother's. The results arranged in their experiences during pregnancies and labors are shown in Fig. 2. It is presumed that any abnormal findings such as anemia, gestational

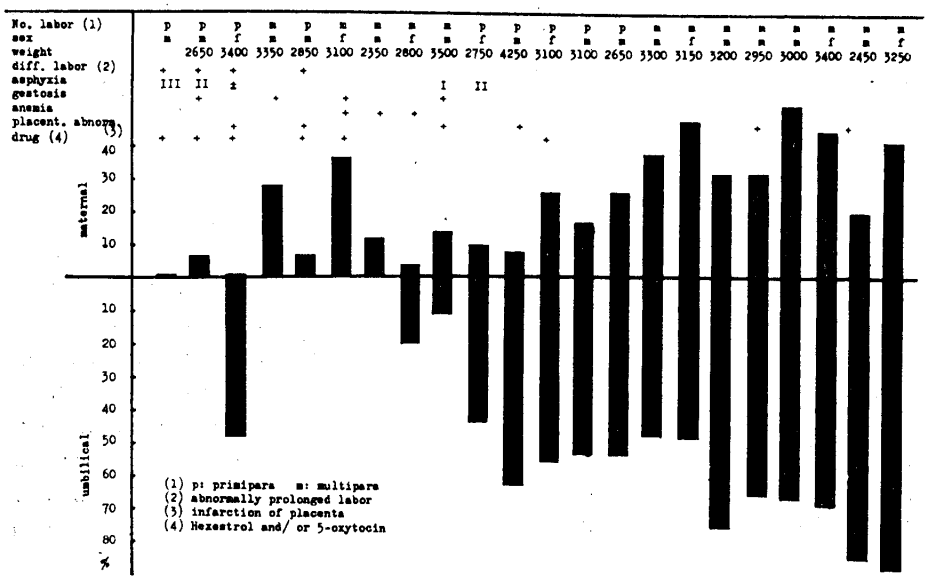

Fig. 2 Comparative blast-cell transformation of both maternal and umbilical leucocytes wiih P.H.A.

toxicosis, difficult labor and asphyxia had a much inhibitory effect on the normal response with PHA. No distinct relationship between the abnormal response to PHA and numbers of her labors, sex of new-bnrn babies, babie's weight, placental infarction and the drugs so far administered in her terminal gravidity was revealed.

DISCUSSION

Mechanism of the mitogenic action of PHA has been discussed mainly in two different ways, i. e., as the primary[6] or the secondary response[8-10] to the antigen correlated with the antibody formation, and non-immunological response[2-5].

In these, the response has been explained as delayed hypersensitivity[8,9]. If this is the case, the results of this report may correspond the experience that BCG is well taken by even new born babies.

On the contrary, one can suspect that human leucocytes have a genetically specific character of reacting to PHA, such as those animals that have been proved to show equally this response although they could not have eaten beans[9].

However, the possibility should not be neglected that some component(s) can transplacentally, sensitize the fetal lymphocytes, since the molecular weight of PHA is 128,000.

Another possibility may be pointed out that a small quantity of the mother's leucocytes having a responsibility to PHA would have passed through the placenta into fetal circulation and these small numbers of primed cells make the fetal lymphocytes sensitive[11,12].

No conceivable interpretation can be given about the fact that the umbilical lymphocytes respond to PHA more actively than mothet's lymphocytes, but it nevertheless should be noticed that umbilical lymphocytes have enough potency to react with some protein and become blast-like cells which are involved in the antibody formation if it is possible.

Furthermore, it should be emphasized that the abnormality of the pregnancy and the labor would be harmful to a new born life concerning not only with the immunological but with the trophic[13] defect of their lymphocytes.

SUMMARY

Almost all the umbilical lymphocytes showed more extensive blast cell formation than that of their mother's lymphocytes with PHA. Pathological conditions of mother in pregnancy and labor such as anemia, gestational toxicosis, difficult labor and asphyxia of babies, inhibited the normal response of both maternal and umbilical lymphocytes to PHA.

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