

Serum Lysozyme Activity in the Small-for-Dates Newborn

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Serum lysozyme activity was determined in 30 small-for-dates and 32 normal newborns. In the former, a statistically significant decrease of serum lysozyme activity was observed as compared to the activity in normal newborns. Dilution of the serum was found to cause an increase in lysozyme activity in both groups of newborns. The obtained results are discussed with respect to the increased susceptibility to infections of small-for-dates.

Lysozyme, the enzyme discovered by FLEMING [3], is defined as muramidase EC 3.2.1.17. Lysozyme breaks down the membrane of some bacteria by hydrolysing the beta-1,4 links between n-acetylmuramic acid and N-acetylglucosamine [4, 9], and converts killed bacteria to spheroplasts or protoplasts, which are almost devoid of cell wall material. The enzyme exists exclusively in the neutrophilic granulocytes and monocytes and tissue macrophages [2, 4, 6].

Lysozyme activity in the normal adult human serum ranges from 5 to 20 $\mu\text{g/ml}$ [4, 6], which corresponds to 100–400 IU/ml [13, 14]. Muramidase was found to be present as early as in the 9–12 week embryo [5].

It is generally known that small-for-dates newborns are more susceptible to infection than full-term newborns [11, 18, 20] but the factors responsible for the increased susceptibility are not quite known.

From the clinical point of view it

seemed to be of interest to estimate the serum lysozyme activity in small-for-dates newborns in view of their being high risk cases.

MATERIAL AND METHODS

A total of 30 small-for-dates and 32 normal newborns were involved in the studies. They were all born at term, according to the classification of the Expert Committee on Maternal and Child Health. Lysozyme activity was determined according to the method of SMOLELIS and HARTSELL [16] with *Micrococcus lysodeiaticus* as the substrate. Sera were tested undiluted and diluted 1 to 10 in Sørensen buffer.

Blood immediately after collection was centrifuged and the serum was stored at -20°C until assay. Lysozyme activity was tested at 0 and 10 minutes and then calculated in IU/ml/min.

RESULTS

Results are presented in Fig. 1. Serum lysozyme activity in the small-for-dates was in the range of 75–600 IU/ml, mean 382 IU/ml. Serum diluted

1 : 10 showed a broad range of activity, 75—900 IU/ml, with a mean of 453 IU/ml.

In the normal newborns the following data were obtained. In the undiluted sera the range was 250 to 750 IU/ml, mean 488 IU/ml, while in the diluted sera lysozyme activity ranged from 200 to 2400 IU/ml, with a mean of 631 IU/ml.

Statistical evaluation of these data is illustrated in Table I. The differences in lysozyme activity of undiluted and diluted sera between small-for-dates and normal newborns were significant statistically, $p < 0.001$.

DISCUSSION

Several authors [1, 19] have shown the role of lysozyme as a factor par-

ticipating in cellular and humoral immunity.

The present findings indicated a statistically significant decrease of lysozyme activity in both diluted and undiluted samples of serum in small-for-dates newborns as compared to normal ones. The depressed lysozyme activity may be in connection with the low neutrophilic granulocyte count noted in the small-for-dates [7], in view of the relationship between the leukocyte count and serum lysozyme activity [6, 8, 17].

The observed increase in lysozyme activity in diluted sera may be interpreted as a result of the blocking of the lysozyme inhibitor by dilution. The presence of such inhibitors has been postulated by several authors

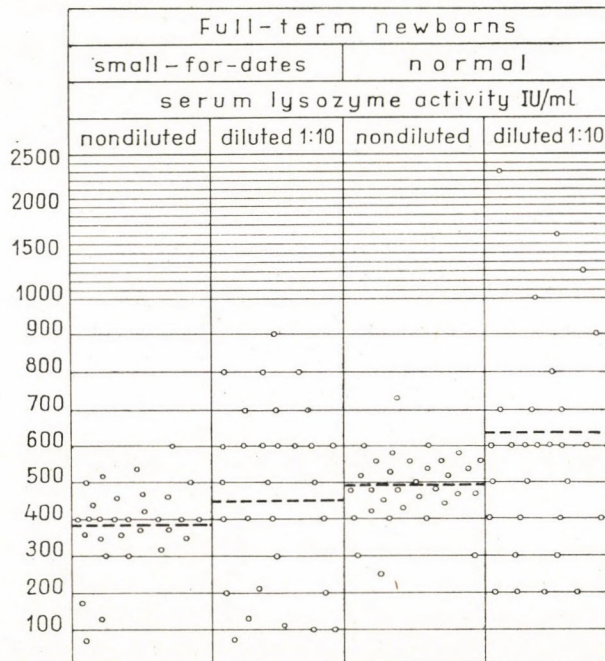


FIG. 1. Serum lysozyme activity in small-for-dates newborns

TABLE I
Statistical evaluation of data

		Serum lysozyme activity IU/ml	
		undiluted	diluted 1:10
M. V.	normal	488	631
	small-for-dates	382	453
e	normal	17.40	19.31
	small-for-dates	20.60	45.60
t		3.96	3.60
P		<0.001	<0.001
S. D.	normal	97.00	109.30
	small-for-dates	112.90	249.70

[10, 15]. Special attention should be paid also to the presence of heparin and DNA; these substances and especially DNA occur in abundant amounts in the leukocytes.

Lysozyme is well-known to possess several biological activities closely connected with the mechanisms protecting the organism from infections. Thus, lysozyme stimulates phagocytosis [1] and granulopoiesis [12]. In this way, the low serum lysozyme activity in small-for-dates newborns may at least partly be responsible for their increased susceptibility to infections.

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