

BIOCHEMICAL CHANGES IN THE BLOOD OF DONORS GIVING BLOOD
FOR A PROTRACTED LENGTH OF TIME

COMMUNICATION I

INVESTIGATION OF THE PROTEIN AND γ -GLOBULIN CONCENTRATION IN THE BLOOD SERUM OF DONORS

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In the present communication are presented the composite results of investigations of the protein and γ -globulin concentration in the blood serum of practically healthy human donors.

It is known that the majority of antibodies is found, in immune plasma, in the crudely dispersed γ -globulin fraction, whose quantitative content determines the efficacy of therapeutic measures.

Enders and his co-workers [9] proved the presence of antibodies to 60 different infective agents in the γ -globulin fraction.

In this connection, the study of γ -globulin in the blood serum of donors presents considerable interest.

We studied 997 donors; about 25 % of them were giving blood for the first time, about 50%, for the second to ninth time; 25%, from the 10th to 23rd time.

42 donors were between the ages of 18-20, 800 donors — 21-40, 128 donors — 41-47, 27 donors — 48-52.

Consequently, 80% of all the donors were between 21 and 40 years of age. Among the subjects were 92 men, the remainder being women.

In all, 1770 samples of blood were analyzed for the concentration of total blood serum protein (with the help of Pulfrich's refractometer).

The data obtained are presented in Table 1, together with the limits of their variation.

As is evident from the data in Table 1, the majority of the values obtained lie within normal limits, i.e., from 6.5% and up (1,656 sera of 1,770, i.e. 93.6%). This indicates the good condition of the donors. Our data for proteins correspond with the data in the literature [2, 3, 5, 7].

We analyzed 1,175 samples of the sera γ -globulin content. The determinations were carried out by the method of Wolfson and co-workers [10], based on the precipitation of protein with ammonium sulfate, with subsequent colorimetry of the color arising during the biuret reaction.

TABLE 1

Distribution of the Analyzed Sera by Their Protein Content

| Limits of the variation of protein content (in g%) | Number of samples | |
|--|-------------------|--------------------|
| | Absolute | Percent of samples |
| 5.2 -6.0 | 20 | 1.1 |
| 6.12-6.15 | 94 | 5.3 |
| 6.55-6.99 | 431 | 24.4 |
| 7.0 -8.0 | 1093 | 61.8 |
| 8.06-8.49 | 119 | 6.7 |
| 8.5 -9.0 | 13 | 0.7 |

TABLE 3

Distribution of the Analyzed Sera by Their γ -Globulin Content

| Limits of the variation of γ -globulin content (in g%) | Number of samples | |
|---|-------------------|--------------------|
| | Absolute | Percent of samples |
| 0.8 -0.9 | 16 | 1.4 |
| 0.91-1.0 | 158 | 13.5 |
| 1.01-1.2 | 905 | 77.0 |
| 1.21-1.34 | 96 | 8.2 |

The amount of γ -globulin varies between 0.8 and 1.34 g% [Table 3], while the values above 1 g% were obtained in 1001 cases, constituting 85.2% of the total number of analyzed samples of serum.

The problem of the extreme time limits for blood donations by donors has not been clarified in the literature, yet it is of great importance.

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TABLE 2

Distribution of the Analyzed Sera by Their γ -Globulin Content

| Limits of the variation of γ -globulin content (in g%) | Number of samples | |
|---|-------------------|--------------------|
| | Absolute | Percent of samples |
| 11.0-11.9 | 19 | 1.6 |
| 12.0-12.9 | 64 | 5.5 |
| 13.0-13.9 | 151 | 12.8 |
| 14.0-14.9 | 275 | 23.4 |
| 15.0-15.99 | 346 | 29.4 |
| 16.0-16.99 | 223 | 19.0 |
| 17.0-17.99 | 62 | 5.3 |
| 18.0-18.99 | 33 | 2.8 |
| 19.0-19.7 | 2 | 0.2 |

The data obtained and the limits of their variations are presented in Table 2.

As is apparent from the data in Table 2, the γ -globulin content varied between 11 and 19.7% of the total serum protein, while the majority of the analyses (1057) gave values of from 13 to 18%.

Our data coincide with those in the literature in the majority of cases as regards relative percentages [1, 4, 6, 8].