

## 82 (2605)

## The effect of insulin on the morphological blood picture.

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We have studied the blood picture in rabbits after insulin treatment, and have found that the injection of this hormone produces a rise in the number of erythrocytes per cubic millimeter, and also in the number of leucocytes. The fact that both red and white cells increase simultaneously is strongly indicative of the existence of anhydremia. This condition Drabkin and Edwards<sup>1</sup> have postulated from the increased hemoglobin content following the subcutaneous administration of insulin to dogs. The increase in the red and in the white cells argues more favorably for the existence of a state of anhydremia than the increase in hemoglobin or in the red cells.

Nitzescu and Mangiucca<sup>2</sup> have recently reported the occurrence under the influence of insulin of a leucopenia followed by leucocytosis. In our experiments, and under the conditions with which we have worked, no leucopenia was ever encountered.

The increase in the white was always greater than in the red count. From this observation we believe that the mild leucocytosis is due partly to the increase in the blood concentration, and partly to the presence of protein and other substances in the insulin preparation. The rise in the number of cell components of the blood was proportional to the fall in blood sugar. The greater the fall in the sugar content of the blood, the greater was the anhydremia. There was apparently no relation between the size of the insulin dose and the degree of anhydremia. As the anhydremia progressed the blood drawn increased in viscosity, and sometimes difficulty was experienced in obtaining for analysis the desired quantity of blood from the ear. This difficulty was probably not due to an increased tendency of the blood

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<sup>1</sup> Drabkin, D. L., and Edwards, D. J.: *Am. J. Physiol.*, 1924, lxx, 273.

<sup>2</sup> Nitzescu, I. I., and Mangiucca, I.: *Compt. rend. soc. biol.*, 1924, xe, 1347.

to clot, for J. la Barre<sup>3</sup> found that American insulin does not effect coagulability.

We have made differential counts, and find no appreciable changes in the relative distribution of the various types of white cells.

### 83 (2606)

#### Flocculation reactions with hemolytic immune sera.

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As mentioned in the proceedings of the last meeting of this Society, the hemolytic action of the immune sera prepared by injection of alcoholic blood extracts is inhibited by the addition of these same extracts. In analogy to the Forssman heterogenetic antibodies (Sordelli and Pico, Sachs and Guth) these sera were found to give a very distinct flocculation reaction with an emulsion of the extract. The technique is similar to the one used by the authors named with the exception of the omission of cholesterol. The washed sediment of one part blood was extracted with  $2\frac{1}{2}$  volumes and again with one volume of alcohol overnight at room temperature, and the mixed alcoholic extracts evaporated to one-half of the original blood volume. To 1 cc. of this fluid 5 cc. of saline were added drop by drop with constant shaking, a homogenous stable emulsion being formed. Mixture of equal parts of the emulsion and diluted ( $\frac{1}{2}$  to  $\frac{1}{16}$ ) immune serum were allowed to stand in the incubator for 20 hours.

Similar reactions though with less regularity and intensity were also obtained with anti-horse blood immune sera prepared in the ordinary way, namely, by injections with washed horse blood. Control tests with 22 heterologous hemolytic sera gave a weak reaction in two instances only. The reaction, therefore, has a marked degree of specificity.

Analogous reactions were found with immune sera for other kinds of erythrocytes but their specificity must still be investigated.

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<sup>3</sup> la Barre, J.: *Compt. rend, soc. biol.*, 1924, xc, 1038.