

The accompanying table shows the degree of the antistreptolysin titre* of the serum 6-57 days after the onset of acute glomerular nephritis in 22 unselected cases. A throat or upper respiratory infection preceded the onset of acute nephritis in 21 of these patients. Fifteen of these infections were associated with the presence of the hemolytic streptococcus in the pharynx.

Twenty of the 22 serums from this group of cases contain a sufficiently high antistreptolysin titre to be indicative of a recent hemolytic streptococcus infection. The remaining 2 serums contain 100 units each of the antibody. These data offer strong additional evidence to the concept that acute glomerular nephritis in New York City is chiefly related to a preceding hemolytic streptococcus infection.

7064 P

Blood Cytology of Normal Rabbits as an Index of Their Reaction to Experimental Syphilis.

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The possibility that the blood cytology might furnish indices of resistance and susceptibility to disease has been considered in the studies on the blood of rabbits carried out in this laboratory. The procedure has been to make a series of blood counts on groups of young adult male rabbits over a period of weeks or months; the animals were then inoculated with some pathogenic agent, or were kept under observation until a spontaneous disease, such as snuffles, developed. Upon the basis of careful clinical and postmortem examinations, the severity of the disease in each rabbit was quantitatively estimated. An attempt was then made to ascertain whether any relationship existed between the conditions found in the blood before inoculation and the severity of the disease which developed. For these analyses, the mean preinoculation blood cell values for each animal were used. In the case of a transmissible malignant tumor, certain definite relationships were found, some of which have been

* All the streptolysin determinations were made through the kindness of Miss Ruth H. Pauli.

reported.¹ The present communication is concerned with results obtained in experimental syphilis.²

Observations were made on 85 rabbits, comprising 9 experimental groups. Each animal was inoculated in one testicle with the Nichols' strain of *Tr. pallidum*. In each instance, lesions of the inoculated testicle developed, and in the majority of cases, of the uninoculated testicle also; of the 85 animals 46 developed and 39 failed to develop clinically recognizable bone or skin lesions during the 3 months' observation period. Upon the basis of the occurrence of these generalized lesions, the rabbits were classified as 39 resistant and 46 susceptible animals.

The resistant animals had before inoculation significantly higher hemoglobin, lower lymphocytes both per cmm. and in per cent, lower total white blood cells and higher neutrophiles in per cent than the susceptible animals. There were no statistically significant differences in the preinoculation mean values between the susceptible and resistant rabbits for the following blood factors: Total number of red blood cells and blood platelets, neutrophiles per cmm., and both relative and absolute numbers of basophiles, eosinophiles, and monocytes. (R.B.C., $+108,000 \pm 105,000$; hb., $+7.3 \pm 2.05$, $t = 3.58$, $P = 0.01$; platelets, $-29,800 \pm 40,000$, $n = 40$; w.b.c., -980 ± 458 , $t = 2.14$, $P = 0.035$; neut. per cmm., -124 ± 234 ; baso. per cmm., $+50 \pm 115$; eosino. per cmm., -34 ± 26 ; lymph. per cmm., -774 ± 152 , $t = 5.09$, $P = 0.01$ —; mono. per cmm., -76 ± 106 ; neut. %, $+4.6 \pm 1.5$, $t = 3.00$, $P = 0.01$ —; baso %, $+1.0 \pm 1.0$; eosino. %, -0.16 ± 0.27 ; lymph. %, -5.9 ± 1.36 , $t = 4.33$, $n = 83$, $P = 0.01$ —; mono. %, -0.39 ± 0.78 , $n = 83$).

From the standpoint of the variance, or the scatter about the mean, the resistant animals had significantly larger values than the susceptible animals with respect to total white blood cells, neutrophiles and monocytes per cmm., and basophiles both per cmm. and in per cent, while a significantly lower value obtained for red blood cells. (W.B.C., $z = +0.3738 \pm 0.1557$, $n = 83$, $P = 0.02$; baso. %, $z = +0.4278 \pm 0.1557$, $n = 83$, $P = 0.01$ —; neut. per cmm., $z = +0.3381 \pm 0.1557$, $n = 83$, $P = 0.03$; baso. per cmm., $z = 0.4673 \pm 0.1557$, $n = 83$, $P = 0.01$; mono. per cmm., $z = +0.3628 \pm 0.1557$, $n = 83$, $P = 0.02$; r.b.c. per cmm., $z = -0.3876 \pm 0.1557$, $n = 83$, $P = 0.015$). No differences between the resistant and susceptible animals were noted as to the variance for hemoglobin, blood platelets, eosinophiles and lymphocytes both per cmm. and in

¹ Casey, A. E., and Pearce, L., *J. Exp. Med.*, 1931, **54**, 475.

² Casey, A. E., *Proc. Soc. Exp. Biol. and Med.*, 1929, **26**, 670.

per cent, and for neutrophiles and monocytes in per cent ($P = 0.05+$).

When the relation of each blood factor to the severity of disease was plotted on a correlation table, the resulting relationships were strikingly non-linear, consisting of symmetrical and asymmetrical S, M, and U shaped curves. The red blood cells, the hemoglobin, the platelets, the total white blood cells, the neutrophiles, the basophiles, the lymphocytes, and possibly also the monocytes and the eosinophiles were all related in various degrees with the reaction of the host to experimental syphilis. In addition, no 2 blood elements had exactly the same relationship. These results indicate that the simple analysis by difference of the means and difference of the variance was not the most appropriate method of recording the degrees of relationship. The significant values obtained are, therefore, all the more remarkable in that the non-linearity was not taken into account.

It should be pointed out that all blood values observed in these experiments fall within the limits for normal rabbits. All animals appeared to be free from intercurrent disease and this feature determined their selection for these experiments. It would appear, therefore, that the hemocytological constitution as measured by pre-inoculation values has a statistically significant relation to the reaction of the rabbit host to experimental syphilitic infection.

7065 P

Strain Differences in Susceptibility to Tar-Induced Skin Tumors in Mice.

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We have already shown that certain strains of mice are more susceptible than others to tumors of the lung, both spontaneous and tar-induced. There is evidence also that these differences in susceptibility segregate out in appropriate crosses as would be expected if they were dependent upon Mendelian units. The present report concerns tar-induced tumors of the skin in mice.

The technique was the one usually employed in such experiments.¹

¹ *J. Exp. Med.*, 1925, **17**, 829.