

daries. In this connection a striking example observed by Michaelis and by Nelson and Griffin³ demonstrates how an enzyme, invertase, although adsorbed at an inert phase boundary, may still retain its complete activity.

4462

Differential Cell Count of the Peritoneal Fluid from the Normal Guinea Pig.

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In carrying out studies on the cellular reactions provoked in the guinea pigs' peritoneal cavity by the injection of tubercle bacilli, differential cell counts were made upon a series of peritoneal fluids previous to the inoculations. This has furnished such a large number of counts upon the normal peritoneal fluid that it has seemed worth while to collect and report the figures, particularly since there is no general uniformity in the results published by other writers.^{1, 2, 3, 4, 5, 6} Peritoneal fluids from 237 apparently healthy guinea pigs have been examined, and as no effort was made to select a particular type of animal, this group probably represents a fair average of any laboratory stock. The observations have been carried on over a period of several years during both winter and summer months. Therefore any effects attributable to seasonal or dietary conditions may be assumed to have been comprehended. The majority of the animals were purchased from 4 different sources; a few were raised in the laboratory. They were of both sexes, of many colors, and they varied in age from a few days to several years.

Without previous injection of salt solution or other liquid, samples of peritoneal fluid were withdrawn through sterile capillary pipettes and supravital preparations with neutral red or neutral red-Janus green were made. Differential cell counts were done on 200

¹ Michaelis, L., *Z. f. physiol. Chemie.*, 1926, clii, 183; *Biochem. Z.*, 1921, cxv, 18. See also Nelson, J. M., and Griffin, E. G., *J. Am. Chem. Soc.*, 1916, xxxviii, 1109.

² Szecsi, St., and Ewald, O., *Folia Haematol.*, 1913, xvii, 167.

³ Lucia, S. P., *PROC. SOC. EXP. BIOL. AND MED.*, 1926, xxiv, 133.

⁴ Manwaring and Bronfenbrenner, *J. Exp. Med.*, 1913, xviii, 601.

⁵ Kamiya, H., *Beit. z. path. Anat. u. allg. Path.*, 1924, lxxii, 761.

⁶ Briscoe, J. C., *Festschr. f. Orth.*, Berlin, 1903, 396.

⁶ Cunningham, R. S., *Am. J. Physiol.*, 1922, lix, 1.

living cells after 5 or 10 minutes' incubation in the warm box. At first as many as 1,000 cells were counted, but this was found to be unnecessary as the distribution of cells in the fluid from the normal peritoneum is very uniform if the preparations are properly made. The serosal cells were not tabulated as their occurrence is probably more or less accidental.

TABLE I.

	Grand average 233 animals		Average 150 "Mono- cyte" animals		Average 83 "Lymph- ocyte" animals	
	%	-limits	%	-limits	%	-limits
Polynuclears	0.12	0-2	0.13	0-2	0.10	0-2
Lymphocytes	17.75	9-75	5.37	0-15	40.10	15-75
Monocytes	67.30	25-95	73.95	25-95	55.70	25-75
Eosinophiles	14.80	0-53	20.60	0-53	4.30	0-25.5

In compiling the results, the counts on 4 animals were discarded because of the presence of acute endemic pneumonia discovered subsequently; they showed from 8.5 to 31.5% of polynuclear leucocytes in the peritoneal fluid. The first column in Table I shows the grand average of the percentages in the remaining 233 animals. In the columns headed "limits" are found the limits of variation for each type of cell and it will be noted that these are extreme. Polynuclear leucocytes are very rare. The monocyte is the most frequently encountered cell and the others are variable.

Further analysis showed that in certain animals the relative number of lymphocytes exceeded that of the monocytes. Because the work on tuberculosis has centered about the lymphocyte-monocyte ratio, the original group was subdivided into one lot in which monocytes predominated, consisting of 150 animals, and another of 83, in which the lymphocyte was the chief cell. A natural point of division seemed to be at 15% of lymphocytes. The differential counts for these sub-groups are tabulated in the second and third columns of the table. It can be demonstrated that for any given animal the monocyte-lymphocyte ratio remains relatively constant unless infection supervenes. For example, 19 of 27 normal animals counted at intervals over a period of 5 months showed less than a 4% variation in these cells. Eosinophiles, on the other hand, are extremely erratic, and in the same animal their relative number changes from day to day.

A complete explanation for the differences in the peritoneal cells is lacking, but certain factors appear to influence the picture. An increase of polynuclears begins to develop within 5 minutes after

the injection of any fluid, and of course these cells are already present where acute infection has occurred either in the peritoneum or thorax. The cause of the variable eosinophilia which is apparently not reflected in the cells of the blood might possibly be a local response to a host of protozoan organisms in the nearby intestinal tract. With direct inoculation of tubercle bacilli, the eosinophiles completely disappear from the peritoneal fluid. With regard to monocytes and lymphocytes, the animal showing a majority of monocytes has been considered the "normal" type as 65% of the entire group show this picture. Where lymphocytes are in excess, it has frequently happened that subsequent autopsy has demonstrated the presence of a healing or healed infection at some other point in the body, *e. g.*, otitis media, cholecystitis, organized pneumonia, or enlarged mesenteric lymph nodes possibly associated with a paratyphoid infection. This view is supported by the experience with tuberculous infection, since it has been noted that in a given animal there is always a sudden reversal of the lymphocyte-monocyte ratio which occurs a day or so before the skin becomes sensitive to tuberculin. It is possible that this relationship may also apply to other infections and that a peritoneal lymphocytosis is merely a manifestation of the allergic state. Attempts to explain the differences observed on any other basis have proved unsuccessful. Tabulations of the counts in relation to age, sex, color, diet and meteorological conditions have been unfruitful.

As a result of this analysis it is believed that a differential count of the cells from the "normal" guinea pig is represented by the figures in the second column of Table I.

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Effect of Daily Transplants of Anterior Lobe of Pituitary on Reproduction of Frog (*Rana pipiens* Shreber).

OPAL MARIE WOLF. (Introduced by Frederick L. Hisaw.)

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Smith and Engle¹ first showed that daily transplants of the anterior lobe of the pituitary induced precocious sexual maturity in immature female rats and mice and caused superovulation in these animals as well as those sexually mature. However, Riddle and

¹ Smith, P. E., and Engle, E. T., *Am. J. Anat.*, 1927, xl, 159.