

of liver is without effect on ducks, that ducks are less susceptible to depressor bases, and that a pressor effect is more likely, as in rabbits.

The ducks used were fairly uniform in size, weighing about 2 kilos each. Intravenous injections of liver extract (kindly furnished by the Connaught Laboratory) were made in doses ranging from 0.25 to 1 cc. The blood pressure was taken from the carotid artery by the usual method. Such injections are practically without effect on the blood pressure. Sometimes there is a slight rise, sometimes a slight fall (usually due to manipulations), but never the abrupt fall so characteristic of the depressor effect in mammals. As liver extract contains histamine and cholin, the conclusion is still further justified that it is these substances that are responsible for its depressor effect.

Incidentally, it may be stated that Miss Ruth Holzapfel finds radiation with ultraviolet light has no injurious effect on the depressor substance of liver. We know from Ellis and Newton³ that ultraviolet rays destroy the potency of insulin. It was thought the same might be true for liver extract, if the depressor substance was in the nature of an autocoid. This is a tentative statement as her experiments are yet too few to be conclusive.

¹ MacDonald, W. J., and Burnett, T. C., *Bost. Med. and Surg. J.*, 1926, cxciv, 381; Burnett, T. C., *Am. J. Physiol.*, 1926, lxxviii, 449.

² Hogben, L. T., *Quart. J. Exp. Physiol.*, 1926, xv, 155.

³ Ellis, M. M., and Newton, E. B., *Am. J. Physiol.*, 1925, lxxiii, 530.

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White Blood Cells of the Normal Guinea Pig.

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Investigators have long since realized the importance of the guinea pig as an experimental animal. A criterion of normality in the blood picture of this animal is a necessity to establish a standard for comparative research. Many studies of the differential count of guinea pig blood have been attempted, but, the variations have been so great that a generalization concerning the average count has been impossible. The cause of these divergences may have been due to the breed of the animal, to the physical condition of the animal,

to the morphological criteria used for classification, or to the fact that the experimental series were too small. It is our belief, for reasons to be brought out later, that the animals in certain cases were by no means normal, in other cases the morphological criteria were at fault, and in a particular thesis conclusions were drawn from an experimental series consisting of two animals.

The experiments under investigation suggest that the variability, in percentage cell counts, in a series of over one hundred counts, on 40 guinea pigs, is not as great as the differences in the total cell counts given by various investigators. The greatest differences in these observations occur in lymphocyte and neutrophile distributions, as is shown in the following tabulation of results:

	Lymphocytes per cent	Neutrophiles per cent	Eosinophiles per cent
1. Betancès ¹	30-35	40-50	1
2. S. H. Burnett ²	47.3	31.5	10.7
3. Kanthack and Hardy ³	24	62	2-3
4. Kurloff ⁴	30-35	40-50	10
5. V. Schilling ⁵	65-70	25-30	1-3

We have calculated statistically the normal distribution of cell types. Our data indicate that the lymphocyte count is between 70 to 80 per cent, the neutrophile between 12 to 18 per cent, and the eosinophile count between 1 to 2 per cent. We have also calculated the occurrence of Kurloff bodies in the mononuclears and find them to occur in approximately 1.5 per cent of the total cell count, while that type of cell which contains them averages between 5 to 7 per cent of the total cell count. It has been found that great variations from the central tendency of the statistical distribution may be considered as an indication of infection, since in acute infections the neutrophiles are increased depending upon the severity of the infection.

The investigator working with guinea pig's blood is also confronted with the problem concerning the nature and function of a large granular inclusion, known as the Kurloff body, which is found in certain of the mononuclear leucocytes. Haematologists have had great difficulty in explaining this structure. It, however, seems possible that the present available methods of study can be used successfully to explain its origin and formation.

Some of the more important theories which have been advanced concerning the formation and structure of the Kurloff body follow: Kurloff⁶ explained its presence by considering it a vacuole

filled with substance secreted by the cell; S. H. Burnett⁷ considered the vacuolated stage in the formation of the Kurloff body to be a degenerating mononuclear leucocyte; Weidenreich⁸ said that it was formed by aggregations of coalesced vacuoles; Ciaccio⁹ believed that the Kurloff body was caused by nuclear extrusions; Patella, Foa, and Carbona¹⁰ at one time considered it to be a symbiotic protozoan; Patella¹¹ later supported the view that the structure was superimposed on the cell and not contained within it.

The experiments indicate that the Kurloff bodies are the nuclei of phagocytized cells and not the accumulation of extra-nuclear material from the cell itself, since we have been able to follow the evolution of this structure through all of its stages both in supravitality and in fixed stained preparations. A detailed discussion of these investigations will be forthcoming at an early date.

¹ Betancès, L. M., *La Granulation Azurophile*, 1918.

² Burnett, S. H., *Clinical Pathology of the Blood of Domesticated Animals*, 1908.

³ *Ibid.*

⁴ *Ibid.*

⁵ Schilling, V., *Folia Haematologica*, 1909, vii, 225.

⁶ Weidenreich, F., *Leucocyten*, 1911.

⁷ Burnett, S. H., *Clinical Pathology of the Blood of Domesticated Animals*, 1908.

⁸ Weidenreich, F., *Leucocyten*, 1911.

⁹ *Ibid.*

¹⁰ *Ibid.*

¹¹ *Ibid.*

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Effects of Caffeine and of Paraldehyde Upon the Color of the Frog.

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Incidental to studies on caffeine tolerance in the frog, it was noticed that frogs placed in 1:3000 caffeine solution for 30 to 90 minutes became darker than the controls in water. To test the matter further, frogs were made pale by placing them in water, in glass jars, on a white background, before the window or a strong electric light, as described by Hogben.¹ Caffeine was then added to one jar to make a concentration of 1:3000, a second jar containing water was used for the control frogs. The frogs in caffeine always