Further Experiments upon the Blood Volume of Mammals and its Relation to the Surface Area of the Body.

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(Abstract.)

In a previous paper* dealing with the blood volume of mammals kept in captivity, such as tame rabbits, guinea-pigs, and mice, we have shown that the blood volume is a function of the surface, and can be expressed by the formula $B = W^{\frac{2}{3}}/k$, where B is the blood volume in cubic centimetres, W the weight of the animal in grammes, and k a constant calculated from the experiments, and varying for each species of animal.

In the present paper we have extended our observations upon the blood volume to animals living a natural life in the wild condition, such as hares, wild rabbits, and wild rats. The technique employed was exactly the same as in our previous paper.

The results obtained are in complete accord with our previous experiments, in that the blood volume of each of the wild animals in question is a function of the surface. The constant, determined from the experiments, and from which the blood volume of these animals can be calculated according to the formula $B = W^{\frac{2}{3}}/k$, is for—

Hare.....	0·94	New series.	Tame rabbit...	1·58	Old series.
Wild rabbit...	2·04		Guinea-pig ...	3·30	
Wild rat	3·05		Mouse	6·70	

For all experimental work where the blood volume is concerned, it is necessary to know, not only what the absolute blood volume is, but also, what is equally important, the magnitude of the deviations from the average which may be met with in normal and healthy individuals, since otherwise it is impossible to decide whether the blood volume found by experiment is to be considered normal or abnormal.

Calculating from the total number of *our* experiments by the method of least squares, the mean deviation is found to be about 6 per cent. This

* Dreyer, Georges, and Ray, William, 'Phil. Trans.,' 1910, B, vol. 201, pp. 133—160.

indicates that if an animal is found by a reliable experimental method to contain 12 per cent. more or less blood than is deduced by calculation from the surface, the average constant of the species being used, it is *probable* that the blood volume of the animal is abnormal, whilst, if it is 20 per cent. smaller or larger, it is *almost certain* that the blood volume is abnormally small or large.

It may be pointed out, however, that if the blood volume were expressed as a percentage of the weight, it would only be possible to say with the same degree of certainty that the blood volume of an animal was abnormal when it differed by at least 40 per cent. from the calculated figure.

The Origin and Destiny of Cholesterol in the Animal Organism. Part VIII.—*On the Cholesterol Content of the Liver of Rabbits under Various Diets and during Inanition.*

By G. W. Ellis and J. A. Gardner.

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(From the Physiological Laboratory of the University of London, South Kensington.)

In Parts V* and VII† of this series of papers evidence was brought forward to show that when cholesterol, free and in the form of esters, is given with the food of rabbits, some is absorbed and finds its way into the blood stream, and that an increase of both free cholesterol and cholesterol esters takes place in the blood.

This result affords support to the working hypothesis with regard to the origin and destiny of cholesterol in the animal organism, which we were led to formulate in an earlier paper,‡ viz., that cholesterol is a constituent constantly present in all cells, and when these cells are broken down in the life process the cholesterol is not excreted as a waste product but is utilised in the formation of new cells. A function of the liver is to break down dead cells, *e.g.*, blood corpuscles, and eliminate their cholesterol in the bile. After the bile has been poured into the intestine in the processes of digestion, the

* 'Roy. Soc. Proc.,' 1909, B, vol. 81, pp. 230—247.

† 'Roy. Soc. Proc.,' 1910, B, vol. 82, pp. 559—568; see also Pribram, 'Biochem. Zeit.,' 1906, vol. 1, p. 413.

‡ 'Roy. Soc. Proc.,' 1908, B, vol. 81, pp. 110—128.