

Comparison of RBC Counts in Central and Peripheral Blood in Various Laboratory Animals.*

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The observation that red cell counts of blood from the tail of the rat were higher than counts of blood from the larger vessels and heart was reported by Jolly.¹ Reichel and Monasterio² listed several authors who had found no difference between human arterial and venous red cell counts, nor between venous, ear, and finger samples. Haden and Neff³ reported higher counts in peripheral than in longitudinal sinus blood of infants, but Lucas *et al.*⁴ reported the opposite in the newborn.

Materials and methods. Two samples from each animal were taken with the same pipette, and each was counted in duplicate in a Neubauer-type hemacytometer. Hayem's solution was used as a diluting fluid. The significance of differences between central and peripheral counts was tested by Fisher's⁵ "t" method of statistical treatment. All results are given in Table I.

Experiments and results. A total of 175 rats from 1 to 99 days of age was used. Tail vessels were dilated by warming at about 43°C for 30 seconds or less, and blood obtained by a transverse cut an inch or so from the distal end, following which a ligature was

applied to stop bleeding. Central blood was procured by decapitation approximately one hour later. Averages of results indicate that peripheral blood had a higher red cell count than blood obtained by decapitation. However, statistical treatment indicates that this difference is not highly significant.

Thirty adult mice were sampled in the same way as rats. Warming the tail was omitted in 24 mice to determine whether this influenced red cell count, but no change was apparent. Tail and head samples did not differ significantly in red cell count in these animals.

Red cell counts in 13 Golden Syrian hamsters were made as described for mice. The difference between tail and head counts was found not statistically significant.

Twenty adult rabbits were anesthetized with 35 mg/kg sodium pentobarbital intravenously at least 30 minutes before sampling. Peripheral blood was obtained by nicking the ear margin, avoiding the larger vessels, and central blood secured about 20 minutes later by cardiac puncture. The order of sampling was reversed in half the animals. No significant difference between the red cell counts of the two samples was found.

The peripheral blood of 20 unanesthetized guinea pigs was obtained by nicking the ear after it had been warmed slightly under a lamp, and the central blood collected by cardiac puncture about an hour later. Red cell counts of ear and heart blood did not differ significantly.

Twenty adult dogs were anesthetized with 32.5 mg/kg sodium pentobarbital intraperitoneally at least 30 minutes before sampling. This interval permitted splenic engorgement, which influences blood concentration during this type of anesthesia, according to Carr and Essex.⁶ Blood was taken from the tail and

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¹ Jolly, M. J., *Compt. rend. soc. de biol.*, 1906, **60**, 564.

² Reichel, J., and Monasterio, G., *Klin. Wchschr.*, 1929, **8**, 1712.

³ Haden, R. L., and Neff, F. C., *Am. J. Dis. Child.*, 1924, **28**, 458.

⁴ Lucas, W. P., Dearing, B. F., Hoobler, H. R., Cox, A., Jones, M. R., and Smyth, F. C., *Am. J. Dis. Child.*, 1921, **22**, 525.

⁵ Fisher, R. A., *Statistical Methods for Research Workers*, 2nd edition, London, Oliver and Boyd, 1932, p. 151.

TABLE I.
Summary of RBC Counts of Central and Peripheral Blood in Various Laboratory Animals.

Animal	Age	No. of counts		Avg RBC count of central blood, $\times 1000$	Avg RBC count of peripheral blood, $\times 1000$	Probability
		♂	♀			
Rat	1-99 Days	64	101	5,297	5,729	.1-.05
Mouse	Adult	15	15	9,648	10,571	.1-.05
Guinea pig	"	12	8	6,422	6,160	.4-.5
Hamster	"	5	8	8,283	9,388	.1-.05
Rabbit	"	11	9	6,265	6,396	.6-.5
Dog	1 day	3	7	4,864	5,166	.6-.5
	Adult	6	14	6,284	6,529	.5-.4

heart, with about 15 minutes elapsing between samples. The order of sampling was reversed in about half the dogs in order to minimize the effect of splenic engorgement.

Peripheral and central red cell counts were also made in 10 newborn dogs at 1 day of age. No significant difference between central and peripheral red cell counts was found in young or adult dogs.

Discussion. In the study of central and peripheral red cell counts in 6 species, only the rat, mouse and hamster showed a differ-

ence between the two samples that approached significance. The statistical method used indicated, however, that the differences found in the averages could have been due to chance, since the probability factor was between 0.1 and 0.05, whereas a factor of 0.05 to 0.01 is necessary to demonstrate a high significance.

Summary. Red cell counts of blood secured from peripheral vessels were compared to counts from the heart or large vessels in the rat, mouse, hamster, rabbit, guinea pig, and dog. In none of these was a statistically significant difference found.

6 Carr, D. T., and Essex, H., *Am. J. Physiol.*, 1944, 142, 40.

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Attempt at Percutaneous Introduction of d-Tubocurarine with a Direct Current into Muscles of Rabbits.*

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Curare affords a possible indicator to gauge the depth of penetration of positive ions through the skin under the action of a galvanic current (electrophoresis, iontophoresis), since 1) its physiological action is solely on muscle and can easily be detected, 2) it is active in small amounts, 3) it is dissociated, at least in acidic solutions, into positive ions

suitable for transfer at the positive pole. Previous work on the depth of penetration using dyes (Harpuder,¹ Harpuder and Rein²) have shown visible dye only in the epidermis in humans, and in dogs and rabbits only a faint coloration of the superficial muscle layers under extreme conditions. The possibility remains, however, that in deeper layers the dye was decolorized or otherwise made undetectable as rapidly as it entered them.

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¹ Harpuder, K., *Arch. Phys. Ther.*, 1937, 18, 221.

² Rein, H., *Z. f. Biol.*, 1926, 84, 41.