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Effect of Adrenalin on Rate of Blood Transfer in Parabiatic Rats.

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In work with parabiatic rats it becomes necessary to know something of the extent of blood transfer from one animal to its parabiatic. Several authors (Martins,¹ Kallas,² Kawashima,³ and others) have proven blood exchange through physiological or chemical tests, none of which, however, seem quantitative. The author⁴ found much variation in different pairs and in the same pair at different times. The present work is an attempt to discover possible factors involved in such variations.

The dye, 1% Brilliant Vital Red (Evans), was used in Locke's solution. The adrenalin (hydrochloride compound of 1:1000 strength, preserved in 1% chloretone) was furnished gratis by the Parke, Davis and Company Research Laboratories. Chloretone was removed prior to use. The volume of adrenalin injected was 0.025 cc. and of dye 0.2 cc.

Control tests were run on each pair of rats by the method previously described (loc. cit.). The percentages expressed in this paper are based on the relative amounts of dye in each of the 2 animals at the end of one hour.

Experiment I. Dye and adrenalin were injected simultaneously in the tail vein of the left twin (all injections made directly into the tail vein). Immediately afterward adrenalin alone was injected in the right animal.

Experiment II. The right animal of each pair was not injected

¹ Martins, Th., *Compt. Rend. Soc. Biol.*, 1929, **102**, 614.

² Kallas, H., *Compt. Rend. Soc. Biol.*, 1929, **102**, 280.

³ Kawashima, Hiroshi, *J. Fac. Science, U. of Tokyo*, 1931, **2**, 141.

⁴ Hill, Robert T., *Proc. Soc. Exp. Biol. and Med.*, 1931, **28**, 592.

at all. Adrenalin mixed with dye was injected into the left member.

Experiment III. Adrenalin was injected in the right animal, the left twin receiving dye solution only.

Experiment IV. Dye was injected into the left twin at an interval of one minute after the same animal had received adrenalin. The right animal was not injected at all. The results of these experiments are expressed in Table I.

TABLE I.
Percentage of Dye in the Uninjected Animal at the End of One Hour.

Control No Adr.	Adr. to both	Adr. to left	Adr. to right	Adr. to left 1 min. before dye	
%	%	%	%	%	
27.1	12.9	11.8	5.1	10.9	
29.1	5.3	7.3	5.7	6.8	
20.8	9.3	9.3	9.6	7.1	
27.7	5.4	6.7	4.9	8.3	
32.2	8.8	10.3	8.5	6.4	
31.1	8.3	9.7	7.4	10.1	
24.3	15.8	11.2	10.5	died	
25.0	10.9	9.9	10.7	10.8	
28.2	11.0	9.0	8.4	12.9	
	9.8	3.7	4.3		
32.8	9.8	11.3	12.9	8.7	
28.2	9.3	4.2	2.2	7.0	
21.9	6.3	6.2	2.5		
21.5	11.7	8.7	8.5	9.6	
17.3	6.0	13.3	15.0		
Average:	26.4	9.1	8.9	7.8	8.6

Note: Average of all tests combined is 8.6% (with adrenalin) which is 32.2% of the average of control tests.

The results of these blood transfer tests made with the use of adrenalin, regardless of whether the adrenalin is given to one or both members of a pair, all show a very close correlation. The average of the readings from any one experiment does not differ greatly from the average of any other set of experiments. However, the average of the combined results of the adrenalin tests is only about 33% of the average of the control measurements. From the closer correlation in the results obtained in this set of experiments than in those of the control set or of previous tests, it becomes quite apparent that the rate of blood exchange seems, under normal conditions, controlled more or less by reason of a greater or lesser amount of adrenalin being released into the blood stream during and immediately previous to the experiment. Individual differences in excitability of the animals may play an important part in the amount of adrenalin released. This reduction in the rate of transfer with the use of adrenalin seems very significant.