

treated condition, holds them in a bundle at the pole of the mitotic spindle.

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Rate of Disappearance of Red Cells in Polythemic Rats.

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Rats made polycythemic by prolonged exposure to oxygen lack lose a large percentage of the "excess" red cells within 48 hours following the exposure.¹

In this experiment, rats were made polycythemic by either of 2 methods. (1) By exposure in glass chambers at an absolute atmospheric pressure of 400 mm. Hg. (2) By exposure in a large size incubator in which a suitable absorbent for CO₂ was placed, the oxygen lack being brought about by the animals themselves. In both methods, the exposure periods ranged from 2 to 15 days. The animals were supplied with sufficient food and water for the duration of the experiment.

The normal blood picture of each rat was determined before exposure. Numbered pipettes were assigned to each rat, and the usual precautions in making the blood counts were taken. Hemoglobin determinations were made after Heine and Bing.² Blood was obtained from the tail, excess bleeding being prevented by temporary ligation. Immediately following the exposure and at stated intervals thereafter the blood picture was again determined.

In order to ascertain the effect of more than one determination in one day, 3 blood counts were made on 11 unexposed rats. The first counts were made at 9 a. m. and considering these as normal, or 100%, the average of the second counts made 6 hours later was 96.2%. The average of the third counts one hour later was 95.5%. These rats served as "bleeding" controls.

Within a 6-hour period after the exposure almost 50% of the excess erythrocytes disappeared from circulation. Considering the count at "zero" hour as 100%, the average of the counts made 6 hours later was 88.7%. This is a significant difference as com-

¹ Tyler, D. B., and Baldwin, F. M., *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **31**, 823.

² Heine, R. W., and Bing, F. C., *J. Biol. Chem.*, 1933, **101**, 369.

pared with the bleeding controls. The trend in hemoglobin is similar. However, absolute reliance cannot be placed on the hemoglobin changes reported owing to the uncertain accuracy of the method in a study of this nature. Yet because of the limited blood volume of the rats, this method seems most suitable at present.

The length of time it takes for the excess erythrocytes to disappear from circulation varies so greatly in each individual that too great significance cannot be attached in computing the longevity of the erythrocytes by this method.³

The mass disappearance of 50% of the surplus blood cells does not warrant the assumption of the so-called "frictional factor" which supposedly increases the rate of fragmentation because of the greater blood cell volume.

In certain rats a disappearance in excess of the increase takes place. No explanation can be offered for this phenomenon at present.

There seem to be 3 possible explanations for the results reported here :

1. That the excess blood may be absorbed by some organ whose function is controlled directly or indirectly by the O₂ tension of the respired air.⁴

2. That the disappearance may be due to plasma dilution or expansion to compensate for the increased viscosity of the blood.⁵

3. That the animals exposed to low atmospheric pressures are made somewhat anhydremic. This may be due either to a drop in water intake and increased water loss or an alteration of water balance between tissues and blood. Experiments are now under way to test these points.

³ Escobar, R. A., and Baldwin, F. M., *Am. J. Physiol.*, 1934, **107**, 249.

⁴ Barcroft, J., Murray, C. D., Orahovats, D., Sands, J., and Weiss, R., *J. Physiol.*, 1925, **60**, 79.

⁵ Douglas, C. G., Haldane, J. S., Henderson, Y., and Schneider, E. C., *Phil. Tr. Roy. Soc., London*, Series B, 1913, **203**, 195.