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Effect of Splenectomy on Production of Cobalt Polycythemia.*

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Berwald, Arseneau, and Dooley¹ reported the preliminary results of an experiment to determine the effect of splenectomy on the production of cobalt polycythemia. Although no direct statement of the conclusions derived from their data was made, one gains the impression that the removal of the spleen of the adult rat prevents the rise in erythrocytes obtained in normal animals after cobalt administration. Such an impression, however, is not justified in view of the incompleteness of the data presented. Attention is also directed to the fact that these authors refer incorrectly to an article by Orten, Underhill, Mugrage, and Lewis² as having "ashed the organs, finding the largest amounts of cobalt in the liver, pancreas and spleen, and minute quantities in the bone marrow." The paper referred to contained no data of this kind.

In the present communication are presented the preliminary results of an experiment to determine the effect of splenectomy on the hematopoietic potency of cobalt. Male albino rats weighing from 40 to 50 gm. at weaning (21 days of age) were placed on a diet consisting of dried, whole cow's milk (Klim) supplemented by 0.5 mg. of iron as purified ferric chloride and 0.025 mg. of copper as copper sulfate daily. At 25 days of age, the animals were divided into 3 groups. One group (10 rats) was continued on the milk-iron-copper diet as controls. Laparotomies and splenectomies were performed on the animals of the other 2 groups of 12 and 5 rats, respectively, and they were continued on the basal, milk-iron-copper ration; when they were 40 days of age, cobalt feeding, at a level of 0.5 mg. of cobalt as cobalt chloride daily, was started. Weekly weight and bi-weekly erythrocyte and hemoglobin determinations were made by procedures previously described.³

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† Alexander Brown Coxe Fellow in Physiological Chemistry, Yale University, 1932-33.

¹ Berwald, W. P. E., Arseneau, J. H., and Dooley, M. S., *PROC. SOC. EXP. BIOL. AND MED.*, 1934, **32**, 420.

² Orten, J. M., Underhill, F. A., Mugrage, E. R., and Lewis, R. C., *PROC. SOC. EXP. BIOL. AND MED.*, 1931, **29**, 174.

³ Orten, J. M., and Smith, A. H., *Am. J. Physiol.*, 1934, **108**, 66.

TABLE I.
Hemoglobin and Erythrocytes in the Blood of Control and Splenectomized Rats.

Weeks on Diet	Milk-Fe-Cu Control		Milk-Fe-Cu-Co Control		Milk-Fe-Cu-Co Splenectomized		Milk-Fe-Cu-Co Splenectomized	
	Hemoglobin gm./100 cc.	Erythrocytes M/cmm.	Ave.	Range	Hemoglobin gm./100 cc.	Erythrocytes M/cmm.	Hemoglobin gm./100 cc.	Erythrocytes M/cmm.
0	10.6	6.5	10.5	8.1-12.3	10.2	6.3	9.3-11.6	6.3
2	13.1	6.7	14.4	11.4-16.3	10.6	7.1	7.2-14.3	4.4
4	13.1	7.1	17.3	16.3-18.9	15.2	8.4	11.7-18.8	6.4
6	13.9	7.7	18.5	15.9-21.6	17.2	9.8	16.4-18.0	8.2
8	14.2	7.7	18.7	16.4-20.7	17.8	9.7	16.2-19.1	9.0
10-12	14.7	8.4	20.2	16.6-24.2	17.4	10.2	16.8-17.9	9.9
20	13.2	8.0	18.8	15.7-22.0	18.1	10.7	17.3-19.8	10.1

The average and minimum and maximum hemoglobin and erythrocyte values obtained on the animals of the various groups for a 20-week period are given in the accompanying table. During the entire experiment, the erythrocyte and pigment values of the milk-iron-copper controls were within the lower limits found in normal stock rats of the same age,³ whereas those of the cobalt-treated, laparotomy controls showed the characteristic increase to high levels. During the first few weeks of the experiment, 3 of the cobalt-treated, splenectomized animals developed a severe anemia; subsequently, however, the erythrocyte and hemoglobin values of these animals, like those of the other members of the group, slowly increased and finally attained levels decidedly higher than those of the untreated controls and differing but little from those of the cobalt-treated, laparotomy controls.

It is possible that the marked decrease in erythrocytes and pigment observed during the early part of the experiment in several of the splenectomized animals may have been a manifestation of "Bartonella anemia," inasmuch as small bodies, resembling "Bartonella bodies,"⁴ were found in the erythrocytes of blood smears stained with Giemsa's stain. Further studies are planned to determine the possible effect of Bartonella infection on the results herein reported.

Conclusion. From the foregoing data, the tentative conclusion is drawn that the removal of the spleen of the young rat may delay but does not prevent the production of polycythemia by cobalt.

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Relation of Calcium to Blood Formation.*

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Previous investigations in this laboratory have shown that young albino rats maintained on a diet deficient in inorganic salts fail to grow normally and develop unique hematological abnormalities, including a marked polycythemia and a concurrent, chronic anemia.^{1, 2}

⁴ Ford, W. W., and Eliot, C. P., *J. Exp. Med.*, 1928, **48**, 475.

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† National Research Council Fellow in Medicine, 1933-34; Alexander Brown Coxe Fellow, Yale University, 1934-35.

¹ Swanson, P. P., and Smith, A. H., *J. Biol. Chem.*, 1932, **98**, 479.

² Orten, J. M., and Smith, A. H., *J. Biol. Chem.*, 1934, **105**, 181.