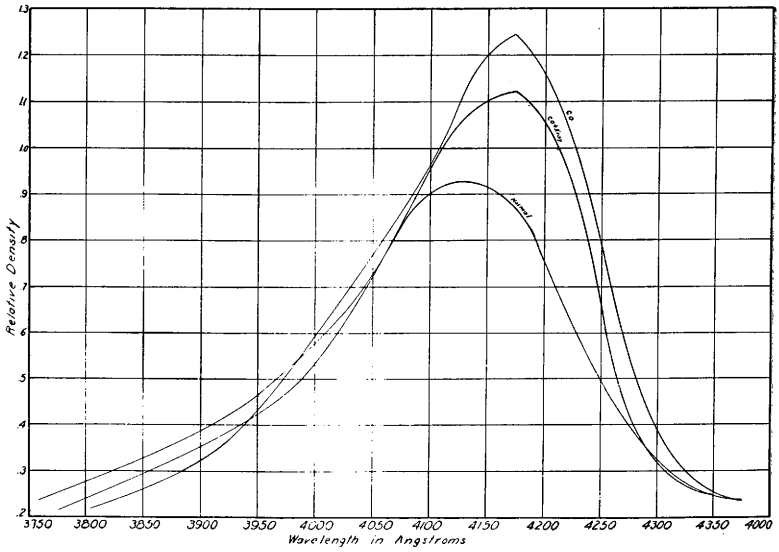

FIG. 1.

the combined effects of (1) X-ray dissociation of CO from blood cells; (2) deeper and more effective ventilation during X-ray exposure; (3) release of additional red cells into the blood stream due to X-ray effects.

12063

Distribution of Cholesterol Between Blood Cells and Plasma in Rabbit and Man.

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Sperry and Schoenheimer[1] have shown that oxalated blood plasma of humans contained significantly smaller amounts of cholesterol than serum from the same blood sample. Schmidt[2] had previously recorded the same observtion for the phospholipids and had ascribed the difference to the fact that oxalate increased the plasma volume by abstracting water from the blood cells. As will be seen later, our observations confirm those of Sperry and Schoenheimer[1] but fail to agree with those of Chamberlain,[3] who maintained that in human

1 Sperry, W. M., and Schoenheimer, R., *J. Biol. Chem.*, 1935, **110**, 655.

2 Schmidt, L. H., *J. Biol. Chem.*, 1935, **109**, 449.

3 Chamberlain, E. N., *J. Physiol.*, 1928, **66**, 249.

blood the amount of cholesterol present in serum and whole blood were approximately equal.

Our interest in this problem was stimulated by the finding that in normal rabbits the cholesterol content of the serum was distinctly lower than that of oxalated whole blood, whereas the opposite was true for the cholesterol-fed rabbit. These observations confirm the results obtained by Dewey[4] and Chamberlain[3] for the normal rabbit but disagree with the finding of Dewey[4] that the cholesterol-fed rabbit behaves like the normal rabbit as regards the concentration of cholesterol in whole blood and serum.

Three types of experiments were carried out. In the first of these, 14 normal, healthy rabbits were used as controls. Blood was drawn from the ear vein and divided into two portions. One portion was allowed to clot spontaneously, while the other was treated with an amount of potassium oxalate just sufficient to prevent coagulation. In the second experiment, 28 rabbits were fed 3 g of cholesterol per week for 6 to 10 weeks. Blood samples removed at the termination of the cholesterol feeding were divided into two portions as described above for the control group. In the third series, oxalated whole blood, plasma and serum were obtained from 8 human subjects and the cholesterol content of each determined. In each instance, hematocrit determinations were also made and the cholesterol content of the blood cells calculated. A modified Sackett[5, 6] procedure for the determination of cholesterol was used throughout.

Table I indicates the results obtained.

Summary. In normal rabbits, the cholesterol content of whole blood is distinctly higher than that of serum or oxalated plasma prepared from the same blood sample. The blood cells of normal rabbits contain almost 2½ times as much cholesterol as an equal volume of plasma. In cholesterol-fed rabbits, the cholesterol content of whole blood is definitely lower than that of serum or oxalated

TABLE I.

Experiment	No.	Mean cholesterol (mg/100 ml) Whole blood	Plasma	Serum	Blood Cells*	Mean Hematocrit, %
Normal rabbits	14	121	87	82	194	32
Cholesterol-fed rabbits	28	514	628	694	189	26
Humans	8	212	227	279	193	43

*Calculated.

[4] Dewey, K., *Arch. Int. Med.*, 1916, **17**, 757.

[5] Sackett, G. E., *J. Biol. Chem.*, 1925, **64**, 203.

[6] Mirsky, I. A., and Bruger, M., *J. Lab. and Clin. Med.*, 1932, **18**, 304.

plasma. Cholesterol feeding does not influence the cholesterol content of the blood cells. Humans are unlike normal rabbits but simulate cholesterol-fed rabbits in the distribution of this sterol between cells and plasma. Cholesterol feeding produces an anemia in rabbits, an observation previously noted in the guinea pig by Okey and Greaves.[7]

12064

Bone Development in the Albino Rat on a Low Manganese Diet.

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Studies by Norris and coworkers[1, 2, 3] have demonstrated the importance of manganese for the normal development of bone in the chick. The present study was undertaken to ascertain whether any similar bone abnormality could be noted in the rat. The low manganese diet used was the one employed by Daniels and Everson[4] with the exception that pasteurized milk was used instead of boiled milk and that cod liver oil was given separately once a week.

Sixteen females and 5 males raised from 21 days of age on this diet have shown as good growth as control animals on our stock diet. X-ray pictures of the right hind legs of these animals have been taken at regular intervals. No abnormalities have been observed in the tibias and no significant difference has been demonstrated between the growth of these tibias, as measured from X-ray photographs taken at intervals, and of the tibias of rats on the stock diet.

Five of the females raised on the low manganese diet were bred, using males reared on our stock diet. In the course of the next few months these females bore 57 living and many dead young. As would be expected from the work of others[4, 5] we were able to rear

7 Okey, R., and Greaves, V., *J. Biol. Chem.*, 1939, **128**, lxxvi.

1 Wilgus, H. S., Jr., Norris, L. C., and Heuser, G. F., *J. Nutrition*, 1937, **14**, 155.

2 Caskey, C. D., and Norris, L. C., PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 590.

3 Caskey, C. D., Gallup, W. D., and Norris, L. C., *J. Nutrition*, 1939, **17**, 407.

4 Daniels, Amy L., and Everson, Gladys J., *J. Nutrition*, 1935, **9**, 191.

5 Orent, E. R., and McCollum, E. V., *J. Biol. Chem.*, 1931, **92**, 651.