

incorporated in the diet in various known proportions. 119 animals were used in the experiments on cod liver oil, 54 on butter, and 103 on alfalfa and spinach. In testing for vitamin A the growth method of Drummond and Coward³ and the curative method of Steenbock and Coward⁴ were employed. The results may be summarized as follows:

In cod liver oil, treatment with sulphur dioxide for as short a time as 15 minutes at room temperature was sufficient to cause a complete loss of the growth-promoting, anti-xerophthalmic activity. The destruction was complete as indicated by feeding the treated oil over a wide range (0.25 to 5% of the whole ration). Under fairly similar conditions (1 hour at 60°) the destruction of vitamin A in alfalfa extracts was inappreciable. Butter occupied a somewhat similar position. Though treated for 2 hours at 60° and fed at a level of 5%, the extract continued to show marked vitamin A activity. Even after 22 hours of treatment much of the activity remained. When fed at the lower level of 2%, partial destruction of the vitamin became evident.

In conclusion, the vitamin A activity of cod liver oil is to be regarded as the property of a substance or substances not contained in significant quantities in butter and extracts of alfalfa, or else vitamin A of plant origin is associated with a protective substance not found in cod liver oil. These alternative explanations will be discussed in the final report with the assistance of additional experimental data on the inactivation of vitamin A.

We wish to acknowledge the interest of Professor R. E. Swain, by whom the problem was suggested.

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Effect of Adrenalin and Asphyxia on Blood Sugar of Amytalized Dogs.

GEORGE GIRAGOSSINTZ AND J. M. D. OLMSTED.

From the Division of Physiology, University of California, Berkeley.

Recent work has thrown doubt on the presumption that use of amytal (isoamyl ethyl barbituric acid) as an anesthetic is without interference to blood sugar regulation.¹ In spite of the finding of

³ Drummond, J. C., and Coward, K. H., *Biochem. J.*, 1920, xiv, 668.

⁴ Steenbock, H., and Coward, K. H., *J. Biol. Chem.*, 1927, lxxii, 765.

¹ Olmsted and Giragossintz, *Proc. Soc. Exp. Biol. and Med.*, 1929, xxvii, 103.

Page² that amyralized rabbits and dogs show normal rise in blood sugar upon splanchnic stimulation, it seemed advisable to determine whether other methods of provoking hyperglycemia would produce normal results. The dosage of amyral employed in our experiments was 50-60 mgm. per kilo intraperitoneally.

The first method tried was intravenous injection of adrenalin. To test our sample of adrenalin 0.5 cc. of a 1:1000 solution was in-

TABLE I.
Blood Sugar after Asphyxia.

	Before Amytal	After Amytal				After Asphyxia				
		½ hr.	1 hr.	2 hrs.	3 hrs.	5 min.	15 min.	30 min.	45 min.	1 hr.
No. 1 Normal dog	87					152				
No. 2 " "	95					182				
No. 3 Amytalized dog	95	100	100	96	100	102	149	125	111	111
No. 4 " "	100	100	105	96	85	85				
No. 5 " "	125	121	125	120	120	119				
No. 6 " "	100					110	107	103		98

² Page, *J. Lab. and Clin. Med.*, 1923, ix, 194.

jected into a 16 kilo normal dog, whose post absorptive blood sugar was 0.080. There was no change in 5 minutes, but 30 minutes later the blood sugar had risen to 0.160. In a 21 kilo amytalized dog 1 cc. of 1:1000 adrenalin caused a rise of blood sugar from 0.105 to 0.190 within 5 minutes, 30 minutes later it was 0.185. In an 11 kilo amytalized dog 0.5 cc. 1:1000 adrenalin caused a rise from 0.100 to 0.200 in 5 minutes and 30 minutes later it was 0.192. Injection of adrenalin produces normal hyperglycemia in amytalized dogs.

The second method used was asphyxia. A sheet of rubber dam was wrapped about the dog's muzzle and its air supply entirely cut off for exactly 2 minutes. The dogs' tongues were found to be cyanosed when the bandage was removed. The results are given in the accompanying table.

In none of the amytalized dogs did asphyxia produce the customary rise in blood sugar. Dog 6 was so severely asphyxiated that 5 minutes artificial respiration was necessary before it would breathe on its own. Even this degree of asphyxia produced no significant change in blood sugar. It was noted that the rapid breathing which normally follows asphyxia was absent in the amytalized dogs.