

tionships between animal sera. Further studies are in progress in this field.

It was also observed that salt concentrations between 2% and 8% NaCl stabilized the Kahn reaction obtained with syphilitic sera by preventing fading. The sensitivity of these reactions was increased from 2 to 4 times that of the standard Kahn reaction in which 0.9% NaCl is used. The practical

application of this finding is being further investigated.†

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Selective Filtration of Vitamin C by the Placenta.

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That the concentration of vitamin C is higher in cord than in maternal blood has been established.¹ The mechanism responsible for this phenomenon has been under dispute. Giroud² and his coworkers attributed it to the ability of the fetus to synthesize vitamin C. Others held that the depressing effects of exercise and sweating of labor³ and of anesthesia, lead to the loss of vitamin C by the maternal organism. Manahan and Eastman⁴ have established that this discrepancy can be explained by the selective action of the placenta.

We are presenting herein studies of 7 patients observed in the ante-natal clinic and the obstetrical ward of the Bonne Bay Cottage Hospital of Norris Point, Newfoundland. These patients were encountered in the course of a nutritional survey, a comprehensive report of which is in preparation.

Method. Blood plasma vitamin C determinations were carried out on nonfasting bloods, following the technic of Farmer and

Abt.⁵ Dietary histories were obtained to establish types of food ingested though no attempt was made to estimate caloric intake. Maternal vitamin C status was established before delivery by repeated blood plasma determinations. In 5 instances a sample of blood was obtained just prior to delivery. In 6 of the 7 patients, blood samples were also taken within 6 hr after parturition. Blood was collected from the umbilical stump in each instance at the time of delivery. All readings were made in triplicate.

Results. In all 7 instances, the vitamin C levels in the cord blood plasma were higher than in the maternal blood. As noted in Table I, patients No. 1 and 3, who had been receiving vitamin C therapy and whose blood levels were in the zone indicating saturation, showed proportional increase in vitamin C levels of the cord. Although patient No. 2 had been on a diet low in vitamin C, the cord blood was at the level of saturation. Patients No. 4 and 5 had been on diets in which the vitamin C content was negligible. The readings of the cord blood levels of patient No. 4 suggest the possibility of latent scurvy at birth, contrary to the implication of Braestrup.¹ Patient No. 5 was given one gram

¹ Baestrup, P. W., *Acta Paediat.*, 1937, **2**, 328.

² Giroud, A., *Compt. Rend. Soc. de Biol.*, 1936, **121**, 1062.

³ Smith, S., *The Vitamins*, Am. Med. Assn., 1939, **21**, 389.

⁴ Manahan, C. P., and Eastman, N. J., *Johns Hopkins Hosp. Bull.*, 1938, **62**, 478.

⁵ Farmer, C. J., and Abt, A. F., *Proc. Soc. Exp. Biol. and Med.*, 1936, **34**, 146.

TABLE I.

Patient 1		Patient 2		Patient 3		Patient 4		Patient 5		Patient 6		Patient 7	
Date	Vit. C mg%	Date	Vit. C mg%	Date	Vit. C mg%	Date	Vit. C mg%	Date	Vit. C mg%	Date	Vit. C mg%	Date	Vit. C mg%
1/31	0.31	12/ 4	.60	11/ 6	.39	3/31	.13	4/25	.13	10/10	.84	5/14	.31
2/11	0.87	18	.63	27	.62	4/16	.18	5/ 1	.18	11/20	.78	29	.31
21	1.10	1/ 8	.36	12/11	.60	20	.06			12/11	.89	6/ 3	.56
		22	.23	1/15	.00	23	.06			1/22	.69		
		2/ 5	.37	22	.17					2/12	.50		
		12	.31	2/ 6	.34					4/ 2	.37		
		19	.33							5/11	.43		
2/21/42		2/21/42		2/14/42		4/24/42		5/1/42		5/15/42		6/10/42	
				10 A.M.									
Cord				Ante-		Cord							
Blood	1.90		1.30	Natal	1.43	Blood	.33		.68		1.32		.93
				Cord									
				Blood	2.21								
Post-				3 P.M.									
Natal	0.63		0.27		1.75		.06		.19		0.48		.33
Vit. C therapy				Vit. 2/6/42.				1 g crystalline					
begun 2/2/42.				3400 mg				Vit. C for sat-					
12000 mg				divided doses				uration test					
divided doses.								4/25/42.					
								225.4 mg re-					
								turned in 5 hr.					

of crystalline vitamin C during a 5-hr saturation test which, while not changing appreciably the maternal blood level, probably contributed to the elevation of the cord blood in this instance. Patients No. 6 and 7 were on diets containing amounts of vitamin C above the average for the community.

Discussion. Since the maternal blood levels established before delivery by repeated determinations were essentially unchanged at delivery, it is evident that the discrepancy between the maternal and the cord bloods is not due to the depression of the maternal level by the exercise of labor or anesthesia.

The results of these studies demonstrate that the vitamin C supply for the fetus is secured by the placenta. Patient No. 4 is of particular interest since, with an extremely low maternal blood level (0.06 mg %) based on prolonged deprivation, the level of

vitamin C in the cord blood was found to be elevated to only 0.33 mg %. In locales where adequate intake of vitamin C is impossible over long periods of time, it is important that some means should be undertaken to supplement the maternal dietary regime. The problem of latent scurvy at birth must be considered a very real one in many countries today.

Summary. 1. Additional data are presented to demonstrate the selective action of the placenta in filtering vitamin C from the maternal body. 2. Although this selectivity tends to take place at all levels of deficiency or saturation, latent scurvy may be present at birth, as the level of vitamin C in the placenta is, in the final analysis, dependent upon the maternal reserves of this substance.

The vitamin C used in these studies was Cebione, supplied through the courtesy of Merek and Company, Rahway, New Jersey.