**Further Report on Relationship between Blood Platelet
Count of Lactating Mothers with Different
Arakawa's Reaction and Treatment
with Vitamin B.***

133rd Report of the Peroxidase Reaction.

By

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Introduction.

In the two preceding papers^{1) 2)} I stated that mothers secreting milk negative to Arakawa's reaction showed, as was formerly reported by J. Kimura,^{3) 4) 5)} an increase of blood platelet count, and that mothers taking vitamin B showed a less remarkable increase of the count than those with no vitamin intake. An increase of blood platelet count in beriberi cases has already been reported by Ido,⁶⁾ Kubo,⁷⁾ Nakamura⁸⁾ and Iijima.⁹⁾ That a high platelet count is a sign of avitaminosis B is evident from my own results¹⁻²⁾ too.

Now, J. Kimura⁵⁾ administered vitamin B to those mothers with weak or negative Arakawa's reaction and saw a decrease of the platelet count in 17 cases. I desire to report in the present paper of a

* Vitamin B₁, unless otherwise noted.

1) Sh. Kimura, Tohoku J. Exp. Med., 1939, **37**, 241.

2) Sh. Kimura, Tohoku J. Exp. Med., 1940, **38**, 210.

3) J. Kimura, Tohoku J. Ex. Med., 1934, **23**, 494.

4) J. Kimura, Tohoku J. Exp. Med., 1935, **27**, 360.

5) J. Kimura, Tokoku J. Exp. Med., 1935, **27**, 374.

6) Y. Ido, Fukuoka Ikwaigaigaku Zasshi, 1912, **6**, 217.

7) T. Kubo, Tokyo Iji Sinsi, 1921, 1417.

8) M. Nakamura, Nippon Naikwagakkwai Zasshi, 1925, **13**, 317.

9) R. Iijima, Rinsho Byori Ketsuekigakkwai Zasshi, 1935, **4**, 531.

similar clinical experiment in a much larger number of materials—62 cases in all—with 11 control cases.

Method of Experiment.

1. Materials. Blood was taken from healthy lactating mothers of breast-fed patients who visited our Dispensary. Blood taking took place twice or more than twice in each case. There were a few mothers who were taking a vitamin B preparation before visiting, although they were not suffering from beriberi.

2. Arakawa's reaction. Milk was examined with Arakawa's reagent in each case.

3. Platelet count. I used Lampert's¹⁰⁾ thrombocyte counting method. The ear lobe was cleaned with ether, and a cut was made with Francke's needle. Blood was taken into the "Athrombit" and diluted with Tyrode's solution. After shaking the pipette for a few minutes, the sixth drop of the contents was examined for blood platelets, waiting over 5 minutes after counting chamber was filled. Blood taking took place between 11 and 12 o'clock a.m., when mothers were in a fasting state.

4. Vitamin B preparations. Vitamin B preparations were used perorally or were injected subcutaneously as vitamin B complex or B₁.

Result of Experiment.

I examined a change of blood platelet count and Arakawa's reaction in 62 cases of lactating mothers treated with vitamin B. Blood-taking was performed 164 times. For control experiment I examined the change of blood platelet count and Arakawa's reaction in 11 cases of lactating mothers not subject to vitamin B treatment.

The results were as follows.

1. As will be seen from Table 1, 29 mother cases showed a parallelism between a decrease of the platelet count and an improvement of Arakawa's reaction, on an administration of vitamin B. In Cases Nos. 1, 3, 11, 13, 19, 20, 21, 22, 24, 25, 28 and 29 the detoxicating hormone of the liver, yakriton, was used for a better mobilization of vitamin B (Cf. Takamatsu's¹¹⁾ paper). In Cases Nos. 1, 2, 3, 4, 5, 6, 8, 17, 22 and 24 Arakawa's reaction improved and changed from nega-

10) H. Lampert, Verh. Dtsch. Ges. inn. Med., 1931, 43, 92.

11) A. Takamatsu, Tohoku J. Exp. Med., 1934, 23, 372.

TABLE

Group of lactating mothers, in whom a parallelism between a decrease of blood

Case No. and name	Age of mother (years) and age of infant (months)	Day of experiment	Blood platelet count (thousands) per emm.	Arakawa's reaction													
				Right (0')(1')(2')(3')(4')(5')						Left (0')(1')(2')(3')(4')(5')							
1 C. T.	32 2	15. IX 20. " 25. " 16. X	510 460 360 480	-	+	+	+	+	+	+	-	+	+	+	+	+	+
2 H. K.	35 9	16. III 27. "	430 230	±	+	+	+	+	+	+	±	+	+	+	+	+	+
3 S. H.	31 4	18. VIII 23. "	460 320	±	+	+	+	+	+	+	±	±	+	+	+	+	+
4 S. T.	38 13	23. X 30. "	570 330	±	+	+	+	+	+	+	-	±	±	±	±	+	+
5 K. Y.	22 14	9. VIII 20. "	380 290	-	+	+	+	+	+	+	-	±	+	+	+	+	+
6 K. C.	26 3	10. XII 20. " 30. "	470 410 350	+	+	+	+	+	+	+	-	±	+	+	+	+	+
7 R. F.	34 19	29. IX 5. X	570 420	-	-	±	+	+	+	+	-	±	±	+	+	+	+
8 Y. S.	32 16	30. V 5. VI 11. "	390 400 280	-	±	+	+	+	+	+	-	-	±	±	±	±	±
9 F. K.	36 10	5. VI 19. "	480 420	-	±	+	+	+	+	+	-	-	±	±	+	+	+
10 K. S.	35 2 5	19. IX 15. I	480 400	-	-	-	-	±	+	+	-	±	+	+	+	+	+
11 N. I.	23 9	7. I 17. " 21. "	520 490 400	-	-	±	+	+	+	+	-	-	±	+	+	+	+
12 I. M.	28 3	12. II 16. "	540 320	-	-	-	-	±	+	+	-	-	-	±	+	+	+
13 Y. I.	25 3	13. II 22. "	410 320	-	-	-	-	±	+	+	-	-	-	±	±	+	+
14 K. I.	31 13	13. VI 18. " 25. "	500 350 360	-	-	-	±	±	+	+	-	-	-	±	+	+	+

1.

platelet count and an improvement of Arakawa's reaction was seen.

Administration of vitamin B ¹²	Subcutaneous injection of yakriton
Beriberol 3 c.c. subcutaneously, daily	1/2 R.A.U. daily
" no	"
Oryzanin 30 c.c. perorally, daily	
Oryzanin fortior 1 c.c. subcutaneously, daily	1/2 R.A.U. daily
Paranutrin 3 c.c. subcutaneously, every other day	
Oryzanin 30 c.c. perorally, daily	
Oryzanin 30 c.c. perorally, daily	
"	
Oryzanin 30 c.c. perorally, daily	
Beriberol 30 c.c. perorally, daily	
"	
Beriberol 3 c.c. subcutaneously, every other day	
Had been taken vitamin B perorally Vitamin B preparation perorally, daily	
Had been taken oryzanin perorally, daily Oryzanin 20 c.c. perorally, daily	1/2 R.A.U. daily
"	"
Oryzanin 30 c.c. perorally, daily	
Oryzanin 30 c.c. perorally, daily	1/2 R.A.U. daily
Had been taken a vitamin B preparation Oryzanin 30 c.c. perorally, daily	
no	

Table 1. (Continued).

Case No. and name	Age of mother (years) and age of infant (months)	Day of experiment	Blood platelet count (thousands) per cmm.	Arakawa's reaction												
				Right						Left						
				(0')	(1')	(2')	(3')	(4')	(5')	(0')	(1')	(2')	(3')	(4')	(5')	
15 T. K.	29 2	15. XI	480	—	±	±	±	±	±	—	—	—	—	—	—	
		28. "	410	—	±	±	±	+	+	±	—	±	±	±	±	
		7. XII	310	±	±	±	±	±	±	±	—	+	±	±	±	±
16 H. K.	38 10	23. XII	480	—	—	—	±	±	±	—	—	—	—	—	—	
		13. I	300	—	±	±	+	+	±	±	—	±	±	±	+	±
17 T. S.	27 10	3. X	670	—	—	—	—	±	±	—	—	—	—	—	±	
		8. "	530	—	+	+	+	+	+	+	—	+	+	+	+	+
		12. "	370	±	±	±	±	±	±	±	—	+	+	+	±	±
18 N. I.	32 2	20. X	860	—	—	—	—	—	—	—	—	—	±	±	+	
		25. "	530	—	—	—	—	±	±	—	—	±	±	±	±	±
		5. XI	390	—	±	+	+	+	+	+	—	+	+	±	±	±
19 T. A.	28 8	17. I	640	—	—	—	±	±	±	—	—	—	—	—	—	
		24. "	620	—	—	±	+	+	+	+	—	—	—	±	±	+
		1. II	400	—	±	±	+	+	+	±	—	±	+	+	+	±
20 F. S.	25 1.5	12. II	890	—	—	—	—	±	±	—	—	—	—	—	—	
		17. "	710	—	±	±	±	±	±	—	—	±	±	±	±	±
		25. "	440	—	+	+	+	+	+	±	—	+	+	+	±	±
21 Y. N.	27 13	28. I	430	—	—	—	—	±	±	—	—	—	—	—	—	
		3. II	340	±	+	+	+	+	±	—	±	±	±	±	±	±
22 M. K.	32 10	10. VI	480							—	—	—	—	—	—	
		16. "	360								—	—	—	—	±	
		25. "	280								—	±	±	±	±	±
23 A. I.	34 9	3. VI	560	—	—	—	—	—	—	—	—	—	—	—	—	
		11. "	490	—	—	—	—	—	—	—	—	—	—	±	±	
		17. "	330	—	±	±	±	+	+	+	+	+	+	+	+	±
24 M. M.	25 4	12. VII	430	—	—	—	—	—	—	—	—	—	—	—	—	
		17. "	300	—	+	+	±	±	±	±	—	+	+	+	±	±
		8. VIII	280	—	±	±	±	±	±	±	—	±	±	±	±	±
25 Y. S.	39 15	23. XI	630	—	—	—	—	—	—	—	—	—	—	—	—	
		29. "	680	—	—	—	—	—	—	—	—	—	—	—	—	—
		6. "	480	—	+	+	+	+	+	+	—	±	+	+	±	±
26 M. K.	26 9	22. XI	590	—	—	—	—	—	—							
		2. XII	490	—	—	—	—	—	—							
		11. "	520	—	±	+	+	±	±	±						
27 K. O.	27 13	13. II	400	—	—	—	—	—	—	—	—	—	—	—	—	
		17. "	340	—	±	±	+	+	±	±	—	±	+	+	+	±
28 K. T.	27 1.5	6. I	490	—	—	—	—	—	—	—	—	—	—	—	—	
		11. "	430	—	—	—	—	—	—	—	—	—	—	—	—	—
		18. "	670	—	—	—	—	—	—	—	—	—	—	—	—	—
		24. "	400	—	—	—	±	±	±	+	—	—	—	±	±	±
29 K. T.	26 2	16. VII	480	—	—	—	—	—	—	—	—	—	—	—	—	
		23. "	310	—	—	—	—	—	—	—	—	—	—	—	—	—
		30. "	280	—	—	—	—	±	+	+	—	—	—	—	±	±
		6. IX	270	—	—	—	—	±	±	+	—	—	—	±	±	+

* International units of vitamin B preparations used are as follows:—"Injection contained in 1 cmm. 0.05 mg. and 0.5 mg. of B₁ crystals=333 international units.

Administration of vitamin B*	Subcutaneous injection of yakriton
Oryzanin 30 c.c. perorally, daily "	
Oryzanin 30 c.c. perorally, daily	
Beriberol 3 c.c. subcutaneously, daily "	
Oryzanin 20 c.c. perorally, daily Beriberol 5 c.c. subcutaneously, daily	
Had been taking a vitamin B preparation Oryzanin 30 c.c. perorally, daily "	1/2 R.A.U. daily "
Oryzanin 20 c.c. Beriberol 20 c.c. perorally, daily "	1/2 R.A.U. daily
Beriberol 20 c.c. Oryzanin 20 c.c. perorally, daily	1/2 R.A.U. daily
Beriberol 20 c.c. Oryzanin 20 c.c. perorally, daily "	1/2 R.A.U. every other day
Beriberol 20 c.c. Oryzanin 20 c.c. perorally, daily "	
Had been taking a vitamin B preparation for 20 days Paranutrin 3 c.c. subcutaneously, daily no	1/2 R.A.U. daily 1/2 R.A.U. every other day
Paranutrin 5 c.c. subcutaneously, daily and Oryzanin 50 c.c. perorally, daily	1/2 R.A.U. daily
Oryzanin 30 c.c. perorally, daily "	
Last year had taken a vitamin B preparation Beriberol 20 c.c. Paranutrin 20 c.c. perorally, daily	
Beriberol 2 c.c. subcutaneously, daily Oryzanin 2 c.c. subcutaneously, daily Oryzanin fortior 1 c.c. subcutaneously, daily	1/2 R.A.U. daily " "
Beriberol 3 c.c. subcutaneously for times Beriberol 3 c.c. subcutaneously, daily " "	1/2 R.A.U. daily " "

Oryzanin and "Injectio Oryzanin fortior" of Sankyo Co. are the vitamin B₁ prepara-
Liquor Oryzanin, Beriberol, Abery and Paranutrin; in 100 c.c. = 600, 102, 208 and 150 I.U.

TABLE
Group of lactating mother, in whom only a

Case No. and name	Age of mother (years) and age of infant (months)	Day of experiment	Blood platelet count (thousands) per cmm.	Arakawa's reaction											
				Right (0')(1')(2')(3')(4')(5')						Left (0')(1')(2')(3')(4')(5')					
1 T. F.	27 12	17. IX	660	±	+	++	++	++	+	—	±	±	+	+	+
		22. "	570	—	+	++	++	++	++	—	±	++	++	++	++
		29. "	530	—	+	++	++	++	++	—	—	±	+	+	+
		6. X	640	—	—	—	—	—	—	—	—	—	±	±	±
		12. "	480	—	±	+	+	++	++	—	—	±	±	+	++
2 M. T.	26 9	31. VII	540	—	±	+	+	+	+	—	±	+	+	+	+
		3. VIII	480	—	—	±	+	++	++	—	—	±	+	++	++
		10. "	340	—	±	+	++	++	++	—	±	+	++	++	++
3 Y. O.	24 19	24. X	610	—	—	—	±	±	±	±	+	++	++	++	++
		28. "	470	—	—	±	+	+	+	±	++	++	++	++	++
4 S. F.	31 4	6. I	650	—	—	±	±	±	±	—	±	+	+	++	++
		11. "	560	—	±	+	++	++	++	—	—	±	+	+	+
		17. "	430	—	±	+	++	++	++	—	—	±	+	++	++
5 K. Y.	34 7	13. I	550	—	—	±	±	+	+	—	++	+	+	+	++
		20. "	450	—	—	—	±	±	±	—	—	—	—	—	—
		27. "	270	—	—	—	—	±	±	±	±	+	++	++	++
6 M. M.	25 4	29. X	720	—	±	±	+	+	+	—	—	±	±	±	±
		6. "	630	—	±	+	++	++	++	—	±	+	++	++	++
		17. "	430	—	—	—	—	±	±	—	—	—	±	±	±
7 O. U.	30 10	12. II	480	—	—	±	+	+	+	—	—	—	±	+	+
		18. "	390	—	—	±	±	+	+	—	—	±	+	+	++
		25. "	300	—	—	+	+	++	++	—	—	±	+	+	++
8 J. O.	34 1	11. III	540	—	—	—	±	±	+	—	±	±	+	+	+
		15. "	590	—	—	—	—	—	—	—	—	—	—	—	—
		23. "	420	—	—	—	±	+	+	—	±	±	±	+	+
9 C. K.	33 8	28. III	590	—	—	±	±	±	±	—	—	—	±	±	±
		12. IV	470	—	+	+	+	++	++	—	+	+	+	++	++
		18. "	390	—	—	±	+	+	+	—	—	±	±	+	+
10 K. M.	33 4	22. XII	520	—	±	+	+	++	++	—	—	—	—	—	—
		26. "	470	—	—	—	—	—	—	—	—	—	—	—	—
11 W. S.	29 16	12. VII	530	—	—	—	—	—	—	—	—	±	±	+	+
		18. "	430	—	—	—	—	±	±	—	±	+	+	++	++
12 M. S.	27 9	9. I	800	—	—	—	—	—	—	—	—	±	±	±	±
		17. "	570	—	—	—	—	—	—	—	—	—	—	±	±
		23. "	440	—	—	±	±	±	±	—	—	—	±	±	±
13 K. M.	35 15	4. II	430	—	—	—	—	±	±	—	—	—	—	—	—
		12. "	260	—	—	±	±	+	+	—	—	—	—	—	—

2.

restoration of blood platelet count was seen.

Administration of vitamin B*	Subcutaneous injection of yakriton
Beriberol 20 c.c., Oryzanin 20 c.c. perorally, daily Oryzanin 1 c.c. subcutaneously, daily every other day "	1/2 R.A.U. daily "
Oryzanin fortior 1 c.c., Beriberol 5 c.c. subcutane- ously, daily [cutaneously, daily Oryzanin 30 c.c. perorally and Beriberol 5 c.c. sub-	1/2 R.A.U. daily
Avery 20 c.c. perorally, daily	
Paranutrin 3 c.c. subcutaneously, daily "	1/2 R.A.U. 14. I, 15. I, 16. I.
Oryzanin 20 c.c. and Beriberol 20 c.c. perorally, daily "	
Beriberol 20 c.c. perorally, daily Oryzanin fortior 1 c.c. subcutaneously, daily	1/2 R.A.U. daily
Oryzanin 30 c.c. perorally, daily "	1/2 R.A.U. daily
Oryzanin 30 c.c. Beriberol 30 c.c. perorally, daily "	
Beriberol 20 c.c. Oryzanin 20 c.c. perorally, daily "	
Beriberol 40 c.c. perorally, daily	
Paranutrin 3 c.c. subcutaneously daily	
Oryzanin 20 c.c. perorally, daily "	1/2 R.A.U. daily
Had been taking a vitamin B preparation for ten days Beriberol 40 c.c. perorally, daily	

Table 2. (Continued).

Case No. and name	Age of mother (years) and age of infant (months)	Day of experiment	Blood Platelet count (thousands) per cmm.	Arakawa's reaction											
				Right						Left					
				(0')	(1')	(2')	(3')	(4')	(5')	(0')	(1')	(2')	(3')	(4')	(5')
14 M. W.	24 1.5	11. VI	490	—	—	—	—	—	±	—	—	—	—	—	±
		17. „	510	—	—	—	—	—	—	—	—	—	—	—	—
		2. VII	400	—	—	—	—	—	—	—	—	—	—	—	—
		13. „	380	—	—	—	—	—	—	—	—	—	—	—	—
15 N. K.	25 5	12. VI	540	—	—	—	—	—	±	—	—	—	—	—	±
		21. „	440	—	—	—	—	—	—	—	—	—	—	—	—
16 Y. C.	25 5	18. V	480	—	—	—	—	—	—	—	—	—	—	—	±
		22. „	430	—	—	—	—	—	—	—	—	±	±	+	+
17 S. I.	23 3	16. XI	620	—	—	—	—	—	—	—	—	—	—	±	±
		20. „	600	—	—	—	—	—	—	—	—	—	—	—	—
		28. „	500	—	—	—	—	—	—	—	—	—	—	—	—
18 Y. I.	33 11	31. XII	400	—	—	—	—	—	—	—	—	—	—	—	—
		16. III	350	—	—	—	—	—	±	—	—	±	±	±	±
19 A. F.	22 0.5	10. II	470	—	—	—	—	—	—	—	—	—	—	—	—
		16. „	420	—	—	—	±	±	±	—	—	—	—	—	—
20 I. K.	26 5	27. I	470	—	—	—	—	—	—	—	—	—	—	—	—
		24. „	510	—	—	±	±	±	±	—	—	±	±	±	±
		1. II	400	—	—	—	—	—	±	—	—	—	—	—	—
21 N. S.	31 1	17. VI	460	—	—	—	—	—	—	—	—	—	—	—	—
		24. „	390	—	—	—	—	—	—	—	—	—	—	—	—
22 T. A.	21 3	18. XI	540	—	—	—	—	—	—	—	—	—	—	—	—
		27. „	490	—	—	—	—	—	—	—	—	—	—	—	—
23 H. O.	28 4	6. XII	590	—	—	—	—	—	—	—	—	—	—	—	—
		25. I	420	—	—	—	—	—	—	—	—	—	—	—	—

* Cf. Foot-note to Table 1.

tive to positive or to normal mostly within three weeks of the course, and the high blood platelet count decreased to a normal or physiological count (Cf. my preceding paper¹⁾). In Case No. 1 I found that by stopping an administration of vitamin B and yakriton the normal platelet count increased again to 480 thousands. In Case No. 7, the platelet count had not yet become normal, although Arakawa's reaction became normally positive. The decrease of the count however was striking.

In Cases Nos. 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 23, 25 and 26 Arakawa's reaction showed a considerable improvement, though the

Administration of vitamin B*	Subcutaneous injection of yakriton
Oryzanin 20 c.c. perorally, daily " "	1/2 R.A.U. every other day
Oryzanin 20 c.c. Beriberol 20 perorally, daily	
Oryzanin 30 c.c. perorally, daily	
Paranutrin 5 c.c. subcutaneously, daily " "	1/2 R.A.U. daily "
Used to take Avery " "	
Had been taking oryzanin Oryzanin 30 c.c. perorally, daily	
Had been taking a vitamin B preparation Paranutrin 5 c.c. subcutaneously, daily Paranutrin 3 c.c. subcutaneously, daily	1/2 R.A.U. daily
Beriberol 30 c.c. perorally, daily	
Beriberol 30 c.c. perorally, daily	
Oryzanin fortiro 1 c.c. 3 times and oryzanin 30 c.c. perorally, daily	

normal reaction was not attained. And in Cases Nos. 9, 20, 25 and 26 the platelet count did not come down to the normal value either. In Cases Nos. 19, 21, 27, 28 and 29, though the improvement of Arakawa's reaction was not very remarkable, the platelet count decreased to the normal value.

In Cases Nos. 10, 11, 14, 19, 24, 27 and 29 mothers had been taking a vitamin B preparation for some time already before the first blood examination (Cf. Table 1).

2. In 23 cases in Table 2, a restoration of blood platelet count due to an administration of vitamin B was indeed seen, but Araka-

TABLE

Group of lactating mothers, in whom neither a restoration of blood platelet

Case No. and name	Age of mother (years) and age of infant (months)	Day of experiment	Blood Platelet count (thousands) per cmm.	Arakawa's reaction														
				Right (0')(1')(2')(3')(4')(5')						Left (0')(1')(2')(3')(4')(5')								
1 K. K.	26 18	30. XI 6. XII 14. "	400	-	-	+	+	+	+	+	-	-	-	+	+	+	+	+
			420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			390	-	-	±	±	+	+	+	+	-	-	±	+	+	+	+
2 K. O.	30 6	19. III 12. IV 18. "	410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			530	-	-	-	-	±	±	±	-	-	-	-	±	±	±	±
			420	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3 T. S.	35 15	19. X 23. "	680	-	-	±	±	+	+	+	+	-	-	-	±	±	±	+
			760	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4 H. T.	30 10	10. VI 17. "	440	-	-	-	-	±	±	±	±	-	-	±	±	±	±	±
			410	-	-	-	±	±	±	±	-	-	-	±	±	±	±	±
5 Y. Y.	24 1	13. I 18. " 25. "	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			450	-	-	-	-	-	±	±	±	-	-	-	-	-	-	-
			530	-	-	-	-	-	±	+	+	-	-	-	-	±	+	+
6 T. M.	30 5	13. I 20. "	480	-	-	-	±	±	±	±	+	-	-	-	-	-	-	
			450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7 U. K.	26 1	3. VI 17. "	400	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	±
8 A. T.	26 3	12. VI 17. " 26. "	350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			370	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9 Y. H.	24 9	12. XI 18. "	460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10 K. Y.	27 2	16. XII 29. "	370	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
			360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Cf. Foot-note to Table 1.

wa's reaction did not show a remarkable improvement. In Cases Nos. 1, 2, 4, 5, 6, 7, 12, 14, 17 and 20, yakriton was also used. In Cases Nos. 13, 18, 19 and 20, mothers had been taking vitamin B before the event of my experiment. In Cases Nos. 2, 7, 9, 13, 14, 18, 20 and 21, the high platelet count decreased to the normal. In other Cases Nos. 1, 3, 4, 6, 8, 10, 11, 12, 15, 16, 17, 19, 22 and 23, the platelet count decreased too, but did not yet arrive at a normal value (Cf. Table 2 and Remarks).

3. Table 3 showed that, in 10 cases, neither a decrease of the platelet count nor an improvement of Arakawa's reaction was seen.

3.

count nor an improvement of Arakawa's reaction was seen.

Administration of vitamin B*	Subcutaneous injection of yakriton
Paranutrin 5 c.c. subcutaneously, daily	
Oryzanin 20 c.c. Beriberol 20 c.c. perorally, daily	
Oryzanin 1 c.c. subcutaneously every other day	
Beriberol 20 c.c. perorally, daily	
No administration	1/2 R.A.U. every other day
Oryzanin 30 c.c. perorally, daily	
Had been taking a vitamin B preparation Has taken a vitamin B preparation	
Oryzanin 20 c.c. Beiberi 20 c.c. perorally, daily "	1/2 R.A.U. 3 times
Spelzon 20 c.c. Perorally, daily	
Had been taking a vitamin B perorally and by injection Paranutrin 3 c.c. subcutaneously, daily	

But most of them did not show a remarkable high platelet count at the first examination; the count was even normal in Cases Nos. 1, 7, 8 and 10. Only in Cases Nos. 3 and 5, a remarkable count was seen. In Case No. 5, in whom vitamin B was not administered at all but who was injected with yakriton, a decrease of the platelet count occurred once, but the count increased again. In Cases Nos. 7 and 10 mothers who had previously been taking vitamin B, the platelet count was almost normal throughout the experiment (Cf. Table 3 and Remarks).

4. The relationship between blood platelet count and Araka-

TABLE 4.

Group of lactating mothers, untreated with vitamin B.

Case No. and name	Age of mother (years) and age of infant (months)	Day of experiment	Blood Platelet count (thousands) per cmm.	Arakawa's reaction											
				Right (0')(1')(2')(3')(4')(5')						Left (0')(1')(2')(3')(4')(5')					
1 I. S.	44 6	19. XII 12. I	380 400	++	##	##	##	##	##	++	##	##	##	##	##
2 N. O.	30 11	21. XII 27. „	380 430	±	++	##	##	##	##	±	++	##	##	##	##
3 Y. T.	30 21	11. III 16. „	360 360	±	++	++	##	##	##	+	++	++	##	##	##
4 M. H.	29 7	18. IX 1. X	600 520	±	±	+	+	+	+	±	±	+	+	+	+
5 E. O.	28 24	4. IV 12. „ 20. „	570 450 390	-	±	+	+	+	+	-	±	+	+	++	++
6 T. N.	25 10	2. VI 16. „	350 360	-	±	+	++	##	##	-	±	+	++	##	##
7 T. N.	25 10	24. II 29. „	590 570	-	+	+	++	##	##	-	±	±	±	±	±
8 M. Y.	29 17	26. XI 5. XII	520 530	-	±	±	±	±	±	-	±	+	++	++	++
9 M. A.	33 4	17. VI 24. „	560 620	±	-	-	±	±	±	-	±	±	+	++	++
10 J. T.	35 4	18. IX 24. „	540 490	-	-	±	+	+	+	-	-	±	+	++	++
11 T. K.	23 6	14. XII 19. „	500 530	±	±	±	+	+	+	±	+	+	++	++	##

wa's reaction in 11 mothers who were neither treated with vitamin B nor with yakriton is shown in Table 4. In these cases a marked change of blood platelet count and Arakawa's reaction were not seen, except for Case No. 5 (Cf. Table 4).

Of these control cases there were only 11 cases, while a larger number would have been desirable. As stated above, the present trial was a clinical experiment. And it is very difficult to leave mothers untreated for a long time, especially if their babies are very sick. A pediatrician will realize how difficult it was to collect even so small a number as 11 cases as in my own experiment.

Comment.

An increase of blood platelet count in beriberi was reported by Ido,⁶⁾ Kubo,⁷⁾ Nakamura⁸⁾ and Iijima⁹⁾. Nakamura⁸⁾ and Kōda¹²⁾ further observed a decrease of blood platelet count in cases of beriberi treated with vitamin B. A number of papers from our Laboratory stated that Arakawa-negative mothers or mothers with milk negative to Arakawa's reaction were more or less in a state of B-avitaminosis.

J. Kimura³⁻⁵⁾ and I^{1) 2)} reported that a high platelet count was seen in Arakawa-negative mothers. So it is with good reason to deduct than an increase of the platelet count in Arakawa-negative mothers in due to B-avitaminosis. In a preceding paper²⁾ I reported that lactating mothers with Arakawa-negative milk who had previously been taking vitamin B showed generally a lower value of the platelet count in comparison with those (with Arakawa-negative milk) who had not been taking the vitamin. This fact will also show that vitamin B had a platelet reducing effect in Arakawa-negative mothers.

Now, is vitamin B really effective in making the high platelet count seen in Arakawa-negative mothers decrease, if the increase of the count is due to B-avitaminosis?

52 Cases (90%) out of 58* mothers with a high platelet count showed a decrease of the count in the course of treatment with vitamin B (Cf. Tables 1, 2 and 3). The restoration even to the normal count occurred in 33 cases (57%). In the other 19 cases (33%), the platelet count was not completely restored to normal. However, it was not difficult to suppose that, if the treatment with vitamin B had continued longer, these 19 cases could also have shown a complete restoration of the count to the normal. In only 6 cases (11%) out of 58 mothers—Nos. 2, 3, 4, 5, 6 and 9 in Table 3—an effect of vitamin B upon blood platelet count was not seen, but it is possible that the treatment with vitamin B in these cases was insufficient. As regards this point see Remarks.

Arakawa's reaction improved in 29 cases (47%) out of 62 cases, and in 12 cases (19%) out of them the complete restoration to the normal occurred. It will thus be said that, in the case of Arakawa-negative mothers treated with vitamin B, the restoration of the platelet

12) S. Kōda, Zika Zassi, 1935, 607.

* 4 cases (Nos. 1, 7, 8 and 10) out of 62 cases, seen in Table 3, showed a normal count of platelets at the first.

count was more rapid than the improvement of Arakawa's reaction. This reminds me of what Takamatsu¹³⁾ said about the relation between Arakawa's reaction and the toxicity of human milk. His opinion is: Almost all B-avitaminotic mothers seen in daily practice are not acute cases, of course, and a daily administration of vitamin B in a not very large amount cannot easily make an Arakawa-negative case Arakawa-positive, but when mothers with Arakawa-negative milk are taking vitamin B, the milk is losing in its toxicity or its content in glyoxal-like substance, even if it still remains negative to Arakawa's reaction notwithstanding.

If I compare the above described result with that of the control experiment—11 mothers, most of them with negative Arakawa's reaction, not treated with vitamin B, it will be seen that the change described above was due to an administration of vitamin B. In these control cases a marked change of neither platelet count nor Arakawa's reaction was seen.

Thus it is indubitable that vitamin B had an effect to make a high blood platelet count decrease in the case of Arakawa-negative mothers, and this is an important evidence that an abnormal increase of the platelet count in Arakawa-negative mothers is due to B-avitaminosis.

Remarks.

Such a clinical experiment as the present one would have been more remarkable if Arakawa-negative mothers with non-diseased babies had been made objects of investigation. All the mothers in the present experiment were more or less anxious about the condition of their babies. And anxiety has a certain influence on Arakawa's reaction. We should bear this influence in mind when we consult the tables shown in the present paper.

Conclusions.

In the present paper I confirmed, in a still larger number of cases, what was previously reported by J. Kimura⁵⁾. Control cases were also shown. My own conclusions are:—

1. An abnormal high blood platelet count seen in mothers secreting milk negative to Arakawa's reaction was restored to the normal value, or decreased at least on an administration of vitamin B.

2. A high blood platelet count is an early sign of B-avitaminosis and mothers secreting milk negative to Arakawa's reaction are in a state of or on the brink of B-avitaminosis.

13) A. Takamatsu, Tohoku J. Exp. Med., 1934, 23, 46.