**The Variation of the Diastase Content in Lactating
Mothers' Urine and Arakawa's Reaction of
Mothers' Milk on Administration of
Vitamin B* and Yakriton.**

131st Report of the Peroxidase Reaction.

By

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Introduction.

In a preceding paper,¹⁾ I experienced that the diastase content in lactating mothers' urine is small in Arakawa-negative cases and large in Arakawa-positive cases. So it may be easily considered that if vitamin B is administered for Arakawa-negative mothers, the urine diastase content of these cases will begin to increase. I used yakriton too in combination with vitamin B, because yakriton will mobilize† vitamin B in the body, though I experimented on the sole use of the hormone without the use of vitamin B in one case.

Method and Materials.

Method:—Fischer's²⁾ colorimetric method.

Materials:—I used the urine of mothers who visited our Out-patient Department on account of their sick infants. Of course it was

* B₁ is meant throughout the article.

† Cf. M. Ciba and J. Abe, *Jika Zassi*, 1931, 1431.
A. Takamatsu, *Tohoku J. Exp. Med.*, 1934, **23**, 327.
J. Kimura, *Tohoku J. Exp. Med.*, 1936, **28**, 55.

1) Sh. Sato, *Tohoku J. Exp. Med.*, 1939, **37**, 392.

2) O. Fischer, *Klin. Wochenschr.*, 1936, 791.

impossible to collect one whole day's urine. But urine was obtained in the morning between 9 a.m. and 11 a.m. A certain comparison of the diastase content may be made.

Vitamin B:—I used Injectio oryzain (Sankyo) and Injectio metabolin (Takeda).

Results.

In case 1 in Table 1, the very large content of the diastase decreased on an administration of vitamin B (Cf. Case 1 in Table 1).

In Case 1 in Table 3, the diastase content in mothers' urine showed no remarkable variation even by combined use of vitamin B and yakriton (Cf. Case 1 in Table 3).

TABLE 1.

The variation of the diastase content in urine of mothers with Arakawa-negative milk, on an administration of vitamin B.

No. of exp.	Diagnosis and age of infant	Date	Arakawa's reaction	Vitamin B ₁ (mgrms.)	Diastase content (Units per minute and per 100 c.c.)
1	Eutrophy and pharyngitis (4 months)	23. XII	-----	—	3000
		7. I	- ± + + + + - ± + + + +	After 2 injections of 0.5	1600
		16. I	----- ±	After 2 injections of 0.5	2650
		23. I	-----	After 5 injections of 0.5	1950
		5. II	-----	After 3 injections of 0.5	2150
2	Delicate infant (17 days)	28. XII	-----	—	900
		31. XII	-----	After 2 injections of 0.5	650
		4. I	-----	After 2 injections of 0.5	1000
		6. I	----- ± ----- ± ±	After an injection of 0.5	1150
		7. I	-----	Ditto	1150

No. of exp.	Diagnosis and age of infant	Date	Arakawa's reaction	Vitamin B ₁ (mgrms.)	Diastase content (Units per minute and per 100 c.c.)
3	Infantile preberiberi and hypotrophy (2 months)	2. II	--±±++ --±±++	—	600
		7. II	-++++ -±±++	Pulv. oryzanin 5 grms. per os daily	850
		14. II	-++++ -±±++	Ditto	1250
		19. II	-++++ -±±++	Ditto	1300
4	Acute dyspepsia and eczema (5 months)	28. II	----- -----	—	750
		2. III	----- -----	Since 28. II, an injection of 0.5 daily	1000
		4. III	----- -----	Ditto	1600
		8. III	-++++ -----	Ditto	1450
5	B-avitaminotic dyspepsia (a month)	4. II	----- -----	—	1600
		8. II	----- -----	After 2 injections of 0.1	1950

TABLE 2.

The variation of the diastase content in urine of mothers with Arakawa negative milk, on an administration of yakriton.

Diagnosis and age of infant	Date	Arakawa's reaction	Yakriton (R.A.U.)*	Diastase content (Units per minute and per 100 c.c.)
Emphyema and hereditary syphilis (7 months)	2. III	--±±++ --±±++	—	1250
	4. III	++++ -++++	—	900
	6. III	-++++ -----±+	After 2 injections of 1/2	1250
	23. III	++++ ±+ +++++	After 7 injections of 1/2	1600
	26. III	++++ -±±++	After 2 injections of 1/2	2150

* R.A.U.=Rabbit Ammonia Units.

TABLE 3.

The variation of the diastase content in urine of mothers with Arakawa-negative milk, on an administration of vitamin B₁ and yakriton.

No. of exp.	Diagnosis and age of infant	Date	Arakawa's reaction	Vitamin B ₁ (mgrms.)	Yakriton (R.A.U.)	Diastase content (Units per minute & per 100 c.c.)
1	Infantile per-beriberi (2 months)	18. XII	-----	—	—	1000
		21. XII	---±±±	After 2 injections of 0.1	—	400
		31. XII	---±±++ ---±±++	After 4 injections of 0.1	3 injections of 1/2	900
		8. I	---±±++ ---±±++	After 6 injections of 0.1	After 2 injections of 1/2	900
2	Atrophy (7 months)	13. I	---±±± ---±±±	—	—	550
		18. I	---±++	After 4 injections of 0.1	—	900
		23. I	---±±± ---±±++	After 2 injections of 0.1	After 2 injections of 1/2	1450
		27. I	---±±++ ---±±++	Ditto	Ditto	1250
		4. II	---±±++ ---±++	After 3 injections of 0.1	After 3 injections of 1/2	1950
3	B-avitaminotic dyspepsia (2 months)	29. I	---±±±± ---±	—	—	750
		3. II	---±±±	After 2 injections of 0.05	—	550
		8. II	-----	—	After 2 injections of 1/2	550
		13. II	---±++	—	Ditto	900
		18. II	-----	—	Ditto	1150
4	Pharyngitis (7 months)	4. III	++++	—	—	1250
		11. III	-----	Since 10. III, liq. oryzanin 20 c.c. per os daily	—	1250
		16. III	-----		After an injection of 1/2	2150

No. of exp.	Diagnosis and age of infant	Date	Arakawa's reaction	Vitamin B ₁ (mgrms.)	Yakriton (R. A. U.)	Diastase content (Units per minute & per 100 c.c.)
5	Infantile beriberi (2 months)	2. II	----- ----- ± ± ±	—	—	630
		4. II	----- -----	After 2 injections of 0.5	After 2 injections of 1/2	450
		7. II	----- ----- ±	After 2 injections of 1.0	Ditto	600
		9. II	----- ----- ±	Ditto	Ditto	730
		12. II	-- ± + + + -- -- ± ± +	After 3 injections of 1.0	After 3 injections of 1/2	975
		17. II	-- + + + + + -- ± + + + +	Ditto	Ditto	1300

And in all the other cases, the diastase content increased gradually but did not amount to far over 2 000 units. Some of them showed an initial temporary decrease (Cf. Case 2 in Table 1, Table 2 and Cases 3 and 5 in Table 3).

Comment.

The small value of the diastase content in urine of mothers who secreted Arakawa-negative milk increased in most cases on an administration of vitamin B, yakriton, or vitamin B and yakriton, though an initial temporary decrease of the content was seen. But in the present examination, I could not find a remarkable difference of effect in each three above-mentioned methods of administration as in the case of the methyl glyoxal-like substance in mothers' milk in my preceding work.³⁾ Arakawa's reaction did not always improve, though it was not difficult to presume a gradual decrease of the methyl glyoxal-like substance. It is very interesting that, in Case 1 in Table 1, the enormous value of diastase content decreased instead of increasing on an administration of vitamin B, and came to a normal value (Cf. Table 1 in a preceding paper¹⁾ of mine). I assumed in that paper, that an enormous value of the diastase content in urine may also be pathological, just as a small value of it is pathological. In this respect, the experiment of Groebbels⁴⁾ is noteworthy, who states that in B-

3) Sh. Sato, Tohoku J. Exp. Med., 1939, 37, 230.

4) F. Groebbels, Hoppe-Seylers Zeitschr., 1922, 122, 104.

avitaminotic rat, carbohydrate metabolism rises temporarily in the initial period, then in order to fall gradually.

Hereupon I tried the following hypothesis as the relation between Arakawa's reaction and vitamin B. In the beginning of avitaminosis B, Arakawa's reaction and some elements in the milk or urine may possibly show an apparent vitamin B-rich condition—for instance, an increase of the diastase content in urine. Then in the beginning of the administration of vitamin B (or yakriton, or vitamin B and yakriton) to Arakawa-negative case, Arakawa's reaction and some elements in the milk may possibly show an apparent state inclined to B-avitaminosis, instead of improvement,—for instance, the initial temporary decrease of the diastase content in urine and the weakening of Arakawa's reaction due to an initial³⁾ temporary increase of the methyl glyoxal-like substance in milk.

Conclusions.

In a preceding paper the diastase content of the urine of mothers with human milk negative to Arakawa's reaction is generally small, while in Arakawa-positive mothers it is generally large.

The poor value of the diastase content in urine of mothers with Arakawa-negative milk will become larger to a value seen in Arakawa-positive cases on an administration of vitamin B, yakriton, or vitamin B and yakriton.

It is thus probable that Arakawa-negative mothers are generally in a state of B-avitaminosis.