The Complement Activity in Allergic Skin Diseases

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There are still many points unknown in regard to the problem of complement. Especially in regard to skin diseases there is hardly any observation, there being only the report by Watanabe¹⁾ that by studying a case each of urticaria and dermatitis medicamentosa and several cases of latent syphilis there were observed no changes. In order to learn about the behavior of the complement during allergic skin diseases the author made the following observations.

EXPERIMENTAL

Material and Method

As a rule the serum to be tested was obtained once a week from the time of the first examination but in a few cases, as specially mentioned in the table, this rule was not followed. The material was preserved in an ice box immediately after obtaining the blood and was used in the experiment within 24 hours. The hemolytic system was 5 units per 0.25 cc. of 2% suspension prepared according to Ogata's²⁾ method.

The process of determination of the complement activity was as follows: as a preliminary experiment to determine the degree of dilution, in the case when using 10 test tubes, in order to obtain the degree of dilution where complete hemolysis is seen in the 5th to 8th test tube, tests were made on 1:5, 1:10, 1:20 and 1:30 diluted normal human sera. The 1:20 dilution is thought as being the suitable dilution this dilution was used in the experiments below. First, the serum was diluted 1:20 with magnesium saline solution (0.167 gm. of Magnesium chloride contained in 1,000 cc. of physiologic saline). This diluted serum was divided into 10 test tubes and to these tubes sensitized cells and magnesium saline solution were added, mixed and put in an incubator at 37°C, shaking occasionally, and the result was read 30 minutes later.

According to the degree of hemolysis this result was divided and recorded into the following 7 gradations: (3) Complete hemolysis—the occurrence of complete hemolysis, the solution being transparent like a red ink; (3') Signifies the occurrence of hemolysis almost completely but there is a little turbidity, the electric light appearing obscure; (2) Strong hemolysis—the hemolysis is fairly strong, the objects on the opposite side appearing vaguely through the solution; (2') Moderate hemolysis—the solution shows a fairly red color but the objects on the opposite side can not be seen at all; (1) Weak hemolysis—the blood is opaque but shows a redder color than that which is completely opaque; (1') That with a hemolysis weaker than in (1); (0) Non hemolytic—that in which it is completely non hemolytic and the supernatant is completely colorless. The number of the test tube described in the following means that of Complete hemolysis (3).

Results

1) *Observation of the Normal human adult complement activity over a long period.* The complement activity was measured on 20 normal adults for one year, once weekly the first two months and thereafter once monthly. Of the total of 337 examinations, the case in which 3) corresponds to the 7th test tube (0.2 cc. of 1:20 dilution) was recorded 178 times, to the 6th test tube (0.25 cc. of 1:20 dilution) 124 times, to the 8th test tube (0.15 cc. of 1:20 dilution) 28 times, and to the 5th test tube (0.3 cc. of 1:20 dilution) 7 times. In regard to the fluctuation of the complement activity in individuals, in 2 persons it varied between test tubes 5th and 7th, in 12 persons between 6th and 7th, in 2 persons it remained always at the 7th test tube, and in 4 persons it varied between the 6th and the 8th, the complement activity of 18 of 20 persons fluctuating between the interval of 1 or 2 test tubes and that of the other 2 persons remaining always constant. As described above, although there are some individual differences, the complement activity of normal adults lies between test tube 5th–8th and furthermore the majority is between test tubes 6th–7th, there being recognized no seasonal influence on the complement activity.

2) *Behavior of the complement activity in non-allergic skin diseases.* There was recognized no abnormal fluctuation in all cases of dermatitis seborrhoides, lichen Vidal, parakeratosis variegata, parapsoriasis guttata, trichophytia pompholyticiformis, pernio, combustio bullosa, pruritus cutaneus, alopecia areata and vitiligo vulgaris.

3) *Behavior of the complement activity in allergic skin diseases.* a) Diseases with no fluctuation of complement activity. No fluctuation of the complement activity was observed in purpura simplex (2 cases), contact dermatitis (5 cases), prurigo Besnier (1 case), lichen urticatus (4 cases), and erythema annulare centrifugum Darier (1 case).

b) Diseases with decrease of complement activity. Of the 12 cases of urticaria acuta (Table I), in 10 cases of dietary urticaria the complement activity during eruption was low showing, respectively, a hemolysis up to below test tube 1st, below test tube 1st, 1st, 2nd, 2nd, 3rd, 3rd, 5th, 4th and 5th, but it returns to normal with healing or prior to healing. In the remaining 2 cases of unknown cause no special changes are recognizable. In 2 of the 4 cases of urticaria chronica (Table II) the complement activity was somewhat low during eruption and in the remaining 2 cases it was, respectively, below test tube 1st and test tube 3rd, showing clearly a low activity during eruption. In one of 2 cases of acute eczema (Table III) the complement activity was somewhat low remaining as test tube 5th and in the remaining one case of generalized eczema there was no change. In 2 of the 6 cases of eczema chronicum the complement activity was somewhat low during exacerbation and the other 4 cases were within normal range value. In the 3 cases of dietary toxicodermia (Table IV) the complement activity showed values of the 5th, 5th, and 5th test tube, respectively, during eruption and returned to the normal value of the 7th, 7th, and 6th test tube, respectively, with the disappearance of the eruption. Of the 3 cases of drug rashes (Table IV), in the one case of penicillin rash the complement activity was low, being below the 1st test tube, during eruption but during the interval of six examinations the value gradually increased, returning to normal with recovery. In the one case of tetanus serum rash the complement activity was low, being below the 1st test tube, during the acme of the eruption but it gradually increased with the disappearance of the eruption. In the one case of streptomycin rash, though it was a mild form, there was no change recognized in the complement activity. In the 5 cases of tuberculosis cutis indurative Bazin (Table V), the complement activity at the time of the first examination was, respectively, below the 1st, below the 1st, 1st, 2nd, and 4th test tube, all cases showing a markedly low value but it increased gradually according to the improvement of the symptoms, the complement activity returning to normal in 4 cases with the amelioration of the diseases. In one of the 3 cases of erythema nodosum (Table VI), the complement activity was zero, showing the disappearance of the complement, but with the improvement of the symptoms hemolytic reaction reappeared, finally returning to the normal value. In the other 2 cases also the complement activity was low at the beginning of the disease. In one of the 3 cases of erythema exsudativum multiforme (Table VI) the complement activity was within normal range and in the other 2 cases it was low during the eruption. In both cases of erythematodes (Table VI) the complement activity was low and in one case of chronic discoid type it was as low as at the 4th test tube at the beginning of the disease but it increased gradually parallel with the

TABLE
Urticaria

Name, (Sex), Age, (Cause)	No. of test tubes Amount of serum (c.c.) No. of examination	I	II	III	IV	V
		0.5	0.45	0.4	0.35	0.3
F. C. (m) 30 (due to mackerel)	I II III	3 3 3	3 3 3	3 3 3	2 3 3	2 3 3
O. T. (m) 23 (due to lobster)	I II III	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3
K. Y. (f) 6 (due to whale flesh)	I II III	3 3 3	3 3 3	3 3 3	3 3 3	2 2 3
M. S. (f) 33 (due to fried oyster)	I II III	3 3 3	2 3 3	2 2 3	2 2 3	1 1 3
T. M. (f) 12 (due to mackerel)	I II	1 3	0 3	0 3	0 3	0 3
Y. Y. (f) 23 (due to fried oyster)	I II III	2 3 3	2 3 3	1 2 3	1 2 3	1 2 3
I. T. (f) 28 (due to cuttlefish)	I II III IV V	3 3 3 3 3	3 3 3 3 3	3 3 3 3 3	3 3' 3 3 3	3' 2 3 3 3
H. T. (f) 37 (due to flesh)	I II	3 3	3 3	3' 3	3' 3	2 3
I. H. (m) 8 (due to whale flesh)	I II III	3 3 3	3 3 3	3 3 3	3' 3 3	2 3 3
F. K. (f) 16 (due to cuttlefish)	I II III IV V	3 3 3 3 3	3 3 3 3 3	2 2 3 3 3	2 2 3 3 3	2 2 3 3 3
S. Y. (m) 34 (cause unknown)	I II III	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3
H. C. (f) 26 (cause unknown)	I II III	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3

I

Acuta

VI	VII	VIII	IX	X	XI	Remarks
0.25	0.2	0.15	0.1	0.05	Control	
2	1	1	0	0	0	Plenty of wheals
3	3	2	1	0	0	Plenty of wheals (after 1 day)
3	3	2	1	0	0	Healed (after 1 day)
2	2	2	1	0	0	Plenty of wheals
3	3'	2	1	0	0	Wheals reduced (after 1 day)
3	3	2	1	0	0	Healed (after 1 day)
2	1	1	1	0	0	Plenty of wheals
2	1	1	1	0	0	Wheals almost disappeared
3	3'	2	1	0	0	Healed
1	0	0	0	0	0	Plenty of wheals
1	0	0	0	0	0	Plenty of wheals (after 1 day)
3	2	2	1	0	0	Wheals almost disappeared (after 1 day)
0	0	0	0	0	0	Plenty of wheals
3	3'	2	1	0	0	Healed
1	1	0	0	0	0	Plenty of wheals
1	1	1	0	0	0	Wheals rather reduced (after 1 day)
3	3'	2	1	0	0	Healed (after 2 days)
2	2	1	0	0	0	Plenty of wheals
2	2	1	0	0	0	Eruptions sometimes appeared, sometimes vanished
3'	2	2	1	0	0	Wheals almost vanished
3	3	2	1	0	0	Healed
3	3'	2	1	0	0	Healed
2	2	2	1	0	0	Plenty of wheals
3	3	2	1	0	0	After one day (healed)
2	1	1	0	0	0	Plenty of wheals
3	3	2	1	0	0	Wheals almost disappeared
3	3	2	1	0	0	Healed
1	1	1	0	0	0	Plenty of wheals
2	1	1	0	0	0	After 2 days apparently healed
2	2	2	1	0	0	Wheals appeared again
3	2	2	1	0	0	After 1 day wheals almost disappeared
3	3'	2	1	0	0	After 2 days healed
3	2	2	1	0	0	Plenty of wheals
3	2	2	1	0	0	Wheals sometimes appeared, sometimes vanished
3	3'	2	1	0	0	Healed
3	3	3	2	1	0	Plenty of wheals
3	3	3'	2'	0	0	After 3 days wheals almost disappeared
3	3	3'	1	0	0	After 5 days of interval healed

TABLE
Urticaria

Name, (Sex), Age	No. of test tubes Amount of serum (c.c.) No. of examination	I	II	III	IV	V
		0.5	0.45	0.4	0.35	0.3
K. T. (f) 36	I	3	3	3	3	3
	II	3	3	3	3	3
U. H. (m) 18	I	3	3	3	3	3
	II	3	3	3	3	3
	III	3	3	3	3	3
T. T. (f) 55	I	3	3	3	3'	2
	II	3	3	3	3	2
H. S. (m) 18	I	0	0	0	0	0
	II	3	3	3	3'	2

improvement of the symptoms, returning to normal with recovery. However, in the one case of acute disseminated type it remained at below the 1st test tube.

SUMMARY AND DISCUSSION

In summarizing and comparing the results obtained by the author with those by the predecessors, it is as follows: There is hardly any seasonal fluctuation of the complement activity in normal person, a fact coinciding with the results by Schuchardt³⁾, Traub⁴⁾, Watanabe¹⁾. Of the skin diseases, in the non-allergic skin diseases the complement activity was normal in all cases. However, it is different in the case of allergic skin diseases. Those showing decrease of complement activity in all or in the majority of the cases tested were: All 10 toxic cases of acute urticaria, all cases of chronic urticaria during eruption, all cases of dietary toxicodermia, 2 of 3 cases of drug rashes, all cases of tuberculosis cutis indurativa Bazin, erythema nodosum, and erythematodes, 2 of 3 cases of erythema exsudativum multiforme. In these cases the complement activity decreased during the acme of the disease and returned to normal with the improvement of the symptoms. In acute and chronic eczema the fluctuation of the complement activity was inconstant but in purpura simplex, acute urticaria of unknown cause, lichen urticatus, contact dermatitis, prurigo Besnier, erythema annulare centrifugum Darier such findings could not be observed. In other words, the author believes that the accompaniment of the fluctuation of the complement activity in some of the allergic skin diseases is an unquestionable fact even from the fact that the course of the disease coincides with the fluctuation of the complement activity.

II

Chronica

VI	VII	VIII	IX	X	XI	Remarks
0.25	0.2	0.15	0.1	0.05	Control	
3	2	2	1	0	0	
3'	2	2	1	0	0	
3	3	2	1	0	0	Plenty of wheals
2	2	1	1	0	0	
3	3	2	1	0	0	
2	1	1	0	0	0	Plenty of wheals
2	2	1	0	0	0	"
0	0	0	0	0	0	Plenty of wheals, (3) at the 3rd test tube by 10× diluted serum
2	2	2	1	0	0	Improved

Generally speaking, in the allergic skin diseases as a whole the behavior of the complement can be said to be inconstant but all of the above skin diseases, showing a decrease of complement activity, are only those which should be considered as exerting a general influence. However, belonging to the group with no fluctuation are also those like purpura simplex in which the general influence should be considered, and, furthermore, as the number of cases under observation is small, in regard to the individual diseases it is premature to come to a conclusion that this relation exists.

At any rate, in judging from the above results the relation between the allergic skin diseases and the complement activity is not specific, is might be a non-specific one. Even in studying the results of the predecessors, as opposed to the first experimental results by Ecker *et al.*,⁵⁾ it was stressed (Doerr⁸⁾) that the decrease of the complement activity in, for example, vitamin C deficiency was caused by the lack of protein or lack of essential amino acid (Rose⁶⁾), or by insufficient nutrition over a long duration (Cannon⁷⁾). Furthermore, it has been proved already by many authors that the disturbance of the liver function due to toxin causes a decrease of complement activity (Boyd⁹⁾). Together with the consideration that the fact that the diseases above mentioned are often accompanied by a decrease of liver function (Iwama¹⁰⁾), should not the author's inference be considered as being appropriate.

However, at present when it can not be concluded that the organ where the complement is produced is the liver there might be room yet for further consideration in immediately relating the liver function to the amount of the complement production (Doerr¹¹⁾, Schmidt¹²⁾). However, in the case of the allergic skin diseases which exerts a general influence on the

TABLE
Eczema

Diseases	No. of test tubes		I	II	III	IV	V
	Name, (Sex), Age	Amount of serum (c.c.) No. of examination					
Eczema acutum	K. K. (f) 37	I II	3 3	3 3	3 3	3 3	3 3
	N. M. (m) 55	I II	3 3	3 3	3 3	3 3	3 3
Eczema chronicum	M. D. (m) 41	I II	3 3	3 3	3 3	3 3	3 3
	T. S. (m) 65	I II	3 3	3 3	3 3	3 3	3 3
	M. K. (m) 34	I II	3 3	3 3	3 3	3 3	3 3
	T. I. (m) 69	I II III	3 3 3	3 3 3	3 3 3	3 3 3	3 3 3
	I. F. (m) 56	I	3	3	3	3	3
		II	3	3	3	3	3
		III	3	3	3	3	3
		IV	3	3	3	3	3
		V	3	3	3	3	3
		VI	3	3	3	3	3
	I. K. (f) 11	I	3	3	3	3	3
		II	3	3	3	3	3
		III	3	3	3	3	3
		IV	3	3	3	3	3
		V	3	3	3	3	3

body, it is an unmistakable fact that in most cases there is a decrease of complement activity which returns to normal with the improvement of the symptoms and the author has been able to prove that the anticipation that the increase and decrease of the complement activity may be related to the prognosis of the disease (Inoue¹³). Furthermore, the author wishes to infer that the reason for this phenomenon is related to the general attack of the body, especially to the liver function.

CONCLUSION

1. The serum complement activity of normal person is almost constant and there is observed no seasonal fluctuation.
2. There is no accompaniment of the fluctuation of the complement

III

VI	VII	VIII	IX	X	XI	Remarks
0.25	0.2	0.15	0.1	0.05	Control	
2 3	2 2	2' 2	1 1	0 0	0 0	Localized on face Itching reduced
3 3	3 3	3 2	2' 1	0 0	0 0	Generalized eczema
3 3	3 3	2 2	1 1	0 0	0 0	Forehead and left cheek Improved
3 3	3 3	2 2	1 1	0 0	0 0	Left thigh Improved
3 3	3' 2	2 2	1 1	0 0	0 0	Extremities and back
3' 3 3	2 3' 2	2 2 2	1 1 1	0 0 0	0 0 0	Face and forearms
3 3 3	3 3 3	3 2 2	2' 1 1	0 0 0	0 0 0	Generalized form with thickening of skin
3 3 3	3 3 3	3' 2 3	2' 1 0	0 0 0	0 0 0	Back sides of hands and feet a little softened Severe itching
3 3 3	3 3 3	3 2 3	2' 1 0	0 0 0	0 0 0	Infiltration and thickening of skin of forearms improved
2 3 3 3 3	2 2 3' 3' 2	1 2 2 2 2	1 1 1 1 1	0 0 0 0 0	0 0 0 0 0	Plenty of eruptions on the back sides of thighs A little better Eruptions appeared again on the back side of the hands and legs

activity in the non-allergic skin diseases as dermatitis seborrhoides, lichen Vidal, parakeratosis variegata, parapsoriasis guttata, pruritus cutaneus, trichophytia pompholyticiformis, pernio, combustio bullosa, alopecia areata, and vitiligo vulgaris.

3. Although the number of cases tested was small, there was observed no fluctuation of the complement activity in purpura simplex, contact dermatitis, prurigo Besnier, lichen urticatus, and erythema annulare centrifugum Darier.

4. A decrease of complement activity was demonstrated in the majority of the cases of acute and chronic urticarias, acute and chronic eczemas, dietary toxicodermia and drug rashes, tuberculosis cutis indurativa Bazin, erythema nodosum, erythema exsudativum multiforme, and

TABLE
Toxico-

Diseases	Name, (Sex), Age, (Cause)	No. of examination	No. of test tubes		I	II	III	IV	V
			Amount of serum (c.c.)						
					0.5	0.45	0.4	0.35	0.3
Toxicodermia due to diet	K. T. (m) 57 (due to salmon)	I II			3 3	3 3	3 3	3 3	3 3
	Y. M. (m) 11 (due to mackerel)	I II			3 3	3 3	3 3	3 3	3 3
	J. T. (f) 30 (due to croquette)	I II			3 3	3 3	3 3	3 3	3 3
Drug eruptions	I. S. (f) 58 (due to penicillin)	I			2	2	2	2	2
		II			3	2	2	2	2
		III			3	3	3	3	2
		IV			3	3	3	3	3
		V			3	3	3	3	3
		VI			3	3	3	3	3
	H. Y. (f) 10 (due to tetanus-serum)	I			0	0	0	0	0
		II			3	3	3'	2	2
		III			3	3	3	2	2
Y. K. (f) 29 (due to streptomycin)	I			3	3	3	3	3	
	II			3	3	3	3	3	
	III			3	3	3	3	3	

acute and chronic erythematodes and the author was able to follow the complement activity returning to normal with the improvement of the symptoms.

5. The author considers the decrease of the complement activity to be a phenomenon accompanying the general attack on the body by the above diseases, and to be non-specific.

References

- 1) Watanabe, Nihon Univ. Med. J. (Jap.), 1953, **12**, 228.
- 2) Ogata, Baidoku no Atarashii Kesseigaku-teki Shindan-ho (A New Serological Laboratory Method for Syphilis), Ed. I, Nanzando, Tokyo, 1951.
- 3) Schuchardt, Z. Immunit.-Forsch., 1940, **97**, 1.
- 4) Traub, J. Path. & Bact., 1943, **55**, 447.
- 5) Ecker, Pillemer, Wertheimer & Gradis, J. Immunol., 1938, **34**, 19.
- 6) Rose, Physiol. Rev., 1938, **18**, 109.
- 7) Cannon, J. Immunol., 1942, **44**, 107.
- 8) Doerr, Die Immunitätsforsch., Vol. II, Julius Springer, Wien, 1947, p. 45.
- 9) Boyd, Fundamentals of Immunology, Interscience Publishers Inc., New York, 1943, p. 252.

IV

dermia

VI	VII	VIII	IX	X	XI	Remarks
0.25	0.2	0.15	0.1	0.05	Control	
3'	2	2	1	0	0	Plenty of eruptions Eruptions almost disappeared
3	3	2	1	0	0	
2	2	2	1	0	0	Plenty of eruptions Healed
3	3	3'	1	0	0	
2	2	1	0	0	0	Plenty of eruptions Healed
3	3'	2	1	0	0	
1	1	1	0	0	0	Plenty of eruptions "
1	1	1	0	0	0	
2	2	1	1	0	0	Eruptions almost disappeared Healed
2	2	1	1	0	0	
3'	2	1	0	0	0	
3	3'	2	1	0	0	
0	0	0	0	0	0	Plenty of eruptions, (3) at the 1st test tube by 10× dilution. Eruptions almost disappeared Healed
1	1	1	0	0	0	
2	2	1	1	0	0	
3	3	2	1	0	0	Plenty of eruptions
3	3'	2	1	0	0	
3	3'	2	1	0	0	

10) Iwama, Jap. J. of Dermat., 1938, **44**, 254 ; 1940, **47**, 26.

11) Doerr, Die Immunitätsforsch., Vol. II, Julius Springer, Wien, 1947, p. 54.

12) Schmidt, Fortschritt d. Serologie, Verlag von Dr. Steinkopff, Darmstadt, 1953, p. 542-3.

13) Inoue, Jap. J. Dermat., 1944, **55**, 229.

TABLE
Tuberculosis Cutis

Name, (Sex), Age	No. of test tubes Amount of serum (c.c.) No. of examination	I	II	III	IV	V
		0.5	0.45	0.4	0.35	0.3
O. K. (f) 61	I	0	0	0	0	0
	II	3	3	3	2	2
	III	0	0	0	0	0
	IV	0	0	0	0	0
I. K. (f) 33	I	1	1	0	0	0
	II	3	2	2	2	2
	III	3	2	2	2	2
	IV	3	3	3	3	3
S. Y. (f) 18	I	3	3	2	2	2
	II	3	3	3	3	3
	III	3	3	3	3	3
	IV	3	3	3	3	3
I. K. (f) 44	I	3	3	3	3	2
	II	3	3	3	3	3
	III	3	3	3	3	3
T. Y. (f) 24	I	3	3	2	2	2
	II	3	3	3	3	3
	III	3	3	3	3	3

V

Indurativa Bazin

VI	VII	VIII	IX	X	XI	Remarks
0.25	0.2	0.15	0.1	0.05	Control	
0	0	0	0	0	0	(3) the at 1st test tube by 10× dilution Improved
2	2	1	1	0	0	Eruptions newly appeared, (3) at the 1st tube by 10× dilution (3) at the 1st tube by 10× dilution
0	0	0	0	0	0	
0	0	0	0	0	0	
0	0	0	0	0	0	
2	1	1	0	0	0	
2	1	1	0	0	0	
3	3'	2	1	0	0	
2	1	1	0	0	0	Nodules became small, tenderness reduced. No pain by pressing
3	3'	2	1	0	0	
3	3'	2	1	0	0	
3	2	2	1	0	0	
2	2	1	1	0	0	Nodules became smaller Pain reduced
3'	2	2	1	0	0	
3	3	3'	1	0	0	
1	1	1	0	0	0	Tenderness reduced Nodules not proven
3	3	3	2	0	0	
3	3	3'	2	0	0	

TABLE
Erythema

Diseases	No. of test tubes		I	II	III	IV	V
	Name, (Sex), Age	Amount of serum (c.c.) No. of examination					
			0.5	0.45	0.4	0.35	0.3
Erythema nodosum	C. S. (m) 56	I	0	0	0	0	0
		II	0	0	0	0	0
		III	0	0	0	0	0
		IV	3	3	3	3	3
		V	3	3	3	3	3
		VI	3	3	3	3	3
	S. K. (m) 49	I	3	3	3	3	2
		II	3	3	3	3	3
		III	3	3	3	3	3
	K. H. (m) 24	I	3	3	3	3	2
		II	3	3	3	3	3
		III	3	3	3	3	3
Erythema exsudativum multiforme	S. H. (m) 51	I	3	3	3	3	3
		II	3	3	3	3	3
	S. N. (m) 23	I	3	3	3	3	3
		II	3	3	3	3	3
		III	3	3	3	3	3
	M. S. (f) 16	I	3	3	3	3	3
II	3	3	3	3	3		
Erythematodes	T. T. (f) 50 Chronic discoid type	I	3	3	3	3	3'
		II	3	3	3	3	3
		III	3	3	3	3	3'
		IV	3	3	3	3	3'
		V	3	3	3	3	3
		VI	3	3	3	3	3
		VII	3	3	3	3	3
		VIII	3	3	3	3	3
		IX	3	3	3	3	3
	U. T. (m) 42 Acute type	I	0	0	0	0	0
		II	0	0	0	0	0

VI

Group

VI	VII	VIII	IX	X	XI	Remarks
0.25	0.2	0.15	0.1	0.05	Control	
0	0	0	0	0	0	0 at the 1st tube by not diluted serum
0	0	0	0	0	0	Plenty of nodules on legs
0	0	0	0	0	0	"
2	2	1	1	0	0	(1) at the 1st tube by not diluted serum
3	3'	2	1	0	0	Improved
3	3'	2	1	0	0	Pain reduced
						Nodules almost vanished
2	2	1	1	0	0	Healed
3	3	3'	2	1	0	
3	3	3	2	0	0	
2	2	1	1	0	0	Pain reduced Nodules almost vanished
3	3'	2	1	0	0	
3	3	3	1	0	0	
3	3	3	3'	2	0	Plenty of eruptions Healed
3	3	3	2'	0	0	
2	2	2	1	0	0	Plenty of eruptions
3	3'	2	1	0	0	
3	3	3'	2	0	0	Healed
2	2	2	1	0	0	Plenty of eruptions Eruptions almost disappeared
3	3	3	1	0	0	
2	2	1	0	0	0	A fingertip-big site near medial corner of right eye
2	2	1	0	0	0	
2	2	1	0	0	0	After 40 days
2	2	1	1	0	0	
3	3'	2	1	0	0	After 11 days, improved
3	2	1	1	0	0	
3	3	3'	1	0	0	After 11 days
3	3	2	1	0	0	After 24 days
3	3	2	1	0	0	After 28 days
3	3	2	1	0	0	
0	0	0	0	0	0	(1) at the 1st tube by 10× dilution
0	0	0	0	0	0	"