The Leech Method of Blood Analysis; A New Micro-Method*

4. Determination of Blood Chlorine.

By

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The leech method has been successfully used for cholesterol,¹⁾ potassium,²⁾ sodium,³⁾ urea⁴⁾ and calcium.⁵⁾ The present paper is for blood chlorine.

Leeches which had been plump with sucked blood were fixed to a piece of wood with needles and the body was cut with scissors. The blood flowing out was received into a test tube for determination. The method used was that of Koranyi-Rusznák.⁶⁾

Result.

TABLE I.

Difference of blood chloride figures between the direct (auricular) method and the indirect (the leech method).

(0.1 c.c. blood used for each sample for the determination of NaCl)

Nos. of rabbits (body weight in kilos)	Blood NaCl in rabbit's blood, mgrms %	Blood NaCl in leech's blood, mgrms %		Difference (%)
		Nos. of leeches	Nos. of samples	
No. 1 (2.50)	567	No. 1	No. 1 550	— 3.1
			No. 2 546	— 3.7
		No. 2	No. 1 549	— 3.2
			No. 2 540	— 4.8
			No. 3 550	— 3.1

* 16th Report on Micro Method.

1) T. Sato, Tohoku J. Exp. Med., 1932, 19, 162.

2) Y. Uga, Tohoku J. Exp. Med., 1932, 19, 165.

3) Y. Uga, to be published in this journal.

4) M. Hasegawa, to be published later in this journal.

5) M. Yoshida, Tohoku J. Exp. Med., 1933, 22, 467.

6) L. Pincussen, Micromethodik, 1930 Leipzig.

Nos. of rabbits (body weight in kilos)	Blood NaCl in rabbit's blood, mgrms %	Blood NaCl in leech's blood, mgrms %		Difference (%)
		Nos. of leeches	Nos. of samples	
No. 2 (2.00)	546	No. 3	No. 1 518	— 4.8
			No. 2 459	—15.8
			No. 3 463	—15.4
		No. 4	No. 1 532	— 2.7
No. 2 537	— 1.8			
No. 3 (1.77)	547	No. 5	No. 1 540	— 1.3
			No. 2 535	— 2.2
		No 6.	No. 1 475	—13.3
			No. 2 475	—13.3
No. 3 463	—13.5			
No. 4 (2.45)	550	No. 7	No. 1 510	— 7.3
			No. 2 532	— 3.3
			No. 3 531	— 3.5
Average				— 6.5%

TABLE II.

*Difference of blood chloride figures between the direct (auricular)
method and the indirect (the leech method).*

(0.13 c.c. blood used for each sample for the determination of NaCl)

Nos. of rabbits (body weight in kilos)	Blood NaCl in rabbit's blood (standard), mgrms %	Blood NaCl in leech's blood, mgrms %		Difference (%)
		Nos. of leeches	Nos. of samples	
No. 1 (2.685)	506	No. 1	No. 1 499	- 1.4
			No. 2 504	- 0.4
			No. 3 495	- 2.2
		No. 2	No. 1 499	- 1.4
			No. 2 509	+ 0.6*
			No. 3 486	- 3.9
No. 2 (2.685)	486	No. 3	No. 1 468	- 3.7
			No. 2 482	- 0.8
			No. 3 466	- 4.1
No. 3 (2.160)	483	No. 4	No. 1 432	-10.1
			No. 2 468	- 3.1
			No. 3 459	- 4.9
			No. 4 462	- 4.9
			No. 5 464	- 3.9
		No. 5	No. 1 464	- 3.9
		No. 6	No. 1 473	- 2.1
			No. 2 486	+ 0.6*
			No. 3 468	- 3.1

Nos. of rabbits (body weight in kilos)	Blood NaCl in rabbit's blood (standard), mgrms %	Blood NaCl in leech's blood, mgrms %		Difference (%)
		Nos. of leeches	Nos. of samples	
No. 4 (1.950)	473	No. 7	No. 1 486	— 3.1
			No. 2 482	— 1.7
			No. 3 446	— 5.7
		No. 8	No. 1 441	— 6.8
			No. 2 450	— 4.9
			No. 3 446	— 5.7
		No. 9	No. 1 423	—10.1
			No. 2 428	— 9.5
		No. 10	No. 1 410	—13.6
			No. 2 428	— 9.5
			No. 3 432	— 8.7
		Average		± 4.6%

Tables I and II give the comparison of the blood chlorine content of rabbits' blood between the direct and the indirect (leech) method.

A glance at these two tables will show that the error was almost exclusively in the negative sense (Cf. Table II* and III). Table III shows the same fact.

TABLE III.

Application of the leech method to clinical cases.

(0.13 c.c. blood used for each sample for the determination of NaCl)

Cases	Diagnosis (Age)	Blood NaCl content in mgrms %			Difference (%)
		Direct method (auricular)	Indirect method		
			Nos. of leeches	Nos. of samples	
No. 1	Hydrocephalus internus (13 years)	442	No. 1	No. 1 446 No. 2 lost	+0.4*
			No. 2	No. 1 437 No. 2 428	-1.1 -3.2
No. 2	Jaundice (hepato-lienal disease (12 years)	458	No. 3	No. 1 423	-7.6
				No. 2 437	-4.6
				No. 3 455	-0.3
				No. 4 446	-2.6
				No. 5 423	-7.6
No. 3	Pericarditis (15 years)	456	No. 4	No. 1 441	-3.3
				No. 2 432	-5.3
				No. 3 414	-9.2
				No. 4 428	-6.1
				No. 5 432	-5.3

Cases	Diagnosis (Age)	Blood NaCl content in mgrms %			Difference (%)
		Direct method (auricular)	Indirect method		
			Nos. of leeches	Nos. of samples	
No. 4	Typhoid fever (10 years)	453	No. 5	No. 1 468	+1.1*
				No. 2 410	—9.5
				No. 3 437	—3.5
			No. 6	No. 1 419	—7.5
				No. 2 410	—9.5
				No. 3 437	—3.5
			No. 7	No. 1 419	—7.5
				No. 2 432	—4.6
				No. 3 419	—7.5
			No. 8	No. 1 428	—5.5
				No. 2 437	—3.5
				No. 3 432	—6.6
Average					±5.3%

Conclusion.

The leech method for the purpose of micro-analysis can be applied to blood chloride also. Here the error is mostly in the negative sense.