77. *Frequencies of Rh and Kidd Blood Types and Private and Public Antigens among the Japanese*

By Tanemoto FURUHATA,^{*)} M.J.A., Hachiro NAKAJIMA,^{**)}
Shigenori IKEMOTO,^{*)} and Hideo NAGATA^{*)}

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Up to date, more than thirty different blood groups have been discovered; but, aside from the ABO, MN, and Q groups, and the secretor character, few studies have been made on the frequencies of these groups among Japanese people. On the Kidd blood groups, we have only one report made by Nakajima (1961),¹⁾ but none on the public or private antigens, Vel, I, Wr^a, and Sw^a.

Our studies have been carried out on the frequency of blood groups, Vel, I, Wr^a, and Sw^a, as well as of the Rh and Kidd blood groups among the Japanese living in Tokyo.

Materials and methods. The blood samples were taken at random from staff members of the Scientific Police Research Institute and of the Tokyo Medical and Dental University, as well as from donors to the Nihon Seiyaku Blood Bank. These samples were tested by using the following antisera:—

1) the anti-C(rh'), anti-c(hr'), anti-D(Rh₀), anti-E(rh''), and anti-e(hr'') for Rh blood groups

2) the anti-Jk^a and anti-Jk^b for Kidd blood groups

3) the anti-Vel, anti-I, anti-Wr^a, and anti-Sw^a for other groups.

The anti-C, anti-Jk^a, anti-Jk^b, anti-Vel, anti-I, and anti-Sw^a were available through the kindness of Dr. F. H. Allen, while the anti-Wr^a was kindly supplied by Dr. F. H. Allen and Dr. J. F. Mohn of the University of Buffalo.

The other antisera were obtained from Ortho Pharmaceutical Corporation, New Jersey, and were used according to the directions.

Results. 1) Rh groups: 167 blood samples were tested with the five antisera, anti-C, anti-c, anti-D, anti-E, and anti-e. The result is shown in Table I.

For estimating the frequency of chromosomes carrying Rh genes among the Japanese, samples are too few, and we compared our results with the data given by Nakajima (1961),¹⁾ who had examined citizens of Tokyo for the same purpose. Since no significant difference was found between these two samples, calculation was made on the above two combined data. The calculation was carried on by method of

^{*)} Scientific Police Research Institute.

^{**)} Department of Legal Medicine, Tokyo Medical and Dental University.

Table I. Rh groups (tested with anti-C, -c, -D, -E, and -e)

Population Phenotype	Japanese (Present study)		Japanese (Nakajima, '61) ¹⁾		Japanese (Furuhata) ²⁾ (et al., '54)		Japanese (Noda and Ha- yakawa, '60) ³⁾	
	No.	%	No.	%	No.	%	No.	%
CCDee	74	44.31	79	42.93	383	45.06	1402	43.38
CCDEe	1	0.60	0	0.00	27	3.18	419	12.96
CCDEE	0	0.00	0	0.00				
CcDEe	59	35.33	65	35.33	264	31.06	774	23.94
CcDEE	0	0.00	0	0.00				
CcDee	10	5.99	16	8.70	58	6.82	330	10.22
ccDEe	13	7.78	2	1.09	98	11.53	261	8.07
ccDEE	8	4.79	16	8.70				
ccDee	0	0.00	1	0.54	8	0.97	19	0.59
CCdee	0	0.00	0	0.00	0	0.00	6	0.19
Ccdee	0	0.00	1	0.54	0	0.00	0	0.00
CcdEe	0	0.00	0	0.00	1	0.12	3	0.09
CcdEE	0	0.00	0	0.00				
ccdee	1	0.60	2	1.09	3	0.35	7	0.22
ccdEe	0	0.00	1	0.54	8	1.94	11	0.34
ccdEE	1	0.60	1	0.54				
Total	167		184		850		3232	

Table II. Frequencies of the Rh chromosomes

Population	Number tested	cde	Cde	cdE	cDe	CDe	CDE	cDE
a) Japanese (Present study)	351*	0.0630	0.0226	0.0759	0.0097	0.6298	0.0014	0.1976
b) Japanese (Furuhata et al., '54) ²⁾	850	0.0594	0.0000	0.0543	0.0543	0.6712	0.0233	0.1375
c) Japanese (Noda and Hayakawa, '60) ³⁾	3232	0.0469	0.0171	0.0279	0.0431	0.6429	0.0918	0.1303
d) Koreans (Chong et al., '60) ⁴⁾	387	0.0000	0.0000	0.0000	0.0573	0.6197	0.0082	0.3148
e) Southern Chinese (Simmons et al., '50) ⁵⁾	250	0.0000	0.0000	0.0000	0.0409	0.7591	0.0049	0.1951
f) English (Race and Sanger, '58) ⁶⁾	2000	0.3886	0.0098	0.0119	0.0257	0.4076	0.0024	0.1411
g) American Whites (Wiener et al., '52) ⁷⁾	743	0.4109	0.0045	0.0036	0.0260	0.4165	0.0015	0.1369
h) American Negroes (Miller et al., '51) ⁸⁾	200	0.2338	0.0107	0.0000	0.4850	0.1593	0.0000	0.1121

Method of calculation:

a) d) Mourant's method

b) c) Fisher's simpler method

f) Fisher's maximum likelihood method

* Including the 184 blood samples previously tested by Nakajima ('61).

Mourant (1954),⁹⁾ with the kind co-operation of Prof. K. Tanaka of the Department of Human Genetics of the Tokyo Medical and Dental University. The result is shown in Table II. It is to be noted that

the frequency of *cde* chromosomes among the Japanese is much lower than that among American Whites or among English people, while the frequency of *CDe* chromosomes is higher than among these white people.

2) Kidd groups: 100 blood samples were tested, using the anti-Jk^a and anti-Jk^b sera. Table III shows that the frequency of the Jk^a among Japanese is lower than that among English, while the frequency of the Jk^b is higher.

Table III. Kidd groups (tested with anti-Jk^a and -Jk^b)

Population	Number tested	Phenotype						Gene frequency		
		Jk(a+b-)		Jk(a+b+)		Jk(a-b+)		Jk ^a	Jk ^b	σ
		No.	%	No.	%	No.	%			
Japanese (Present study)	100	15	15.00	44	44.00	41	41.00	0.3700	0.6300	0.0346
Japanese (Nakajima, '61) ¹¹	51	9	17.65	23	45.10	19	37.25	0.4020	0.5980	0.0490
English (Race and Sanger, '58) ⁶⁾	275	75	27.27	139	50.55	61	22.88	0.5255	0.4745	0.0212
New York Negroes (Race and Sanger, '58) ⁶⁾	67	38	56.72	23	34.33	6	8.95	0.7389	0.2611	0.0374

3) Wr^a and Sw^a antigens: 217 blood samples were tested with the anti-Wr^a and anti-Sw^a sera, but all the blood samples showed negative reaction (Tables IV and V).

Table IV. Wr^a antigen

Population	Number tested	Wr(a+)		Wr(a-)	
		No.	%	No.	%
Japanese (Present study)	217	0	0.00	217	100.00
English (Holman, '53) ¹⁰⁾	1004	0	0.00	1004	100.00
English (Cleghorn, '60) ¹²⁾	31522	24	0.08	31498	99.93
Dutchmen (van Loghem et al., '55) ¹¹⁾	5000	15	0.30	4985	99.70
Glaswegians (Wallace and Milne, '56) ¹⁴⁾	1000	1	0.10	999	99.90

Table V. Sw^a antigen

Population	Number tested	Sw(a+)		Sw(a-)	
		No.	%	No.	%
Japanese (Present study)	217	0	0.00	217	100.00
English (Cleghorn, '60) ¹²⁾	31522	5	0.02	31517	99.98

4) Vel antigen: As the anti-Vel serum used by us contained the anti-A and anti-B agglutinins, only the O blood cells were tested. We were unable to test many blood samples. All the 42 samples tested showed positive reactions, and no case of Vel negative was found (Table VI).

Table VI. Vel antigen

Population	Number tested	Vel +		Vel -	
		No.	%	No.	%
Japanese (Present study)	42	42	100.00	0	0.00
American Whites (Sussman and Miller, '52) ¹³⁾	10000	9996	99.96	4	0.04
American Negroes (Sussman and Miller, '52) ¹³⁾	200	200	100.00	0	0.00

5) I antigen: 145 blood samples were tested, using the anti-I serum. No I-negative blood cells were found, all being positive.

Summary. Studies were carried out on the frequencies of the Rh and Kidd blood groups as well as of the W_r^a , Sw^a , Vel, and I antigens among residents in Tokyo. It has been found that of the Rh group the frequency of *cde* chromosomes is much lower than among English or American Whites, while the frequency of *CDe* chromosomes is somewhat higher than among the latter. Our study of the Kidd groups has shown that the frequency of the Jk^a factor among the Japanese is lower than that among the English.

Our examination has revealed no case of Vel negative, I negative, nor of W_r^a and Sw^a positive.

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