

Blood Group determination in stored alcohol containing blood samples for identity examination.

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Once in a while blood group serologists have to determine genetic blood markers in older stored alcohol containing hemolytic and possibly contaminated blood samples for identity examination. In this matter the arising problems and especially the risk of false results have been discussed from OEPEN (1982), OSTERHAUS and BIRKNER (1982,1985) as well as STRATTON and RENTON (1958). In order to have an information in such cases whether the investigation of certain blood group systems is successful or not and about the possibly influencing factors we have analysed the results of 52 investigated samples.

The tables 1a, b and c show the number of successful determinations arranged to increasing sample ages and to blood group, serum group and erythrocyte enzyme group systems.

Table 1a: Number of successful determinations of blood groups in 52 stored blood samples

Age of Sample Months	Blood Group System Systems										Total Number of Samples
	ABO	MN	Rh	P	Kell	Fy	Jk	Le	LU	XG	
1	1	1	1	1	1	1	1	1	1	1	1
2	3	1	3								3
3	5	2	3	1						1	5
4	11	5	8	2							5
5	13	7	11	5	1	1		1	1		13
6	8	5	6	2		1		1			8
7	2										2
8	4	2	2	2	1	1	1	1	1	1	4
9	2	1	1	1	1						2
10	1		1								1
11	1		1	1							1
12	1		1								1
Sum	52	24	38	15	4	4	2	4	2	3	52
40 Success	100	46	73	29	8	8	4	8	4	6	100

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Table 1b: Number of successful determinations of serum groups in 52 stored blood samples

Age of Sample Months	Serum Group Systems								Total Number of Samples
	Hp	Gc	Gm	Km	Ch ₁	C3	Bf	Tf	
1	1	1	1	1		1	1	1	1
2	1	3	3	3			2		3
3	1	5	5	5	1		2	1	5
4	6	8	11	11	2	1	9	1	11
5	7	12	13	13	2		5	1	13
6	1	8	8	8	1		3	1	8
7	2	2	2	2			2		2
8	3	4	4	4	3	1	2	1	4
9	1	2	2	2			1		2
10	1	1	1	1			1		1
11		1	1	1			1		1
12	1	1	1	1					1
Sum	25	48	52	52	9	3	29	6	52
% Success	48	92	100	100	17	6	56	12	100

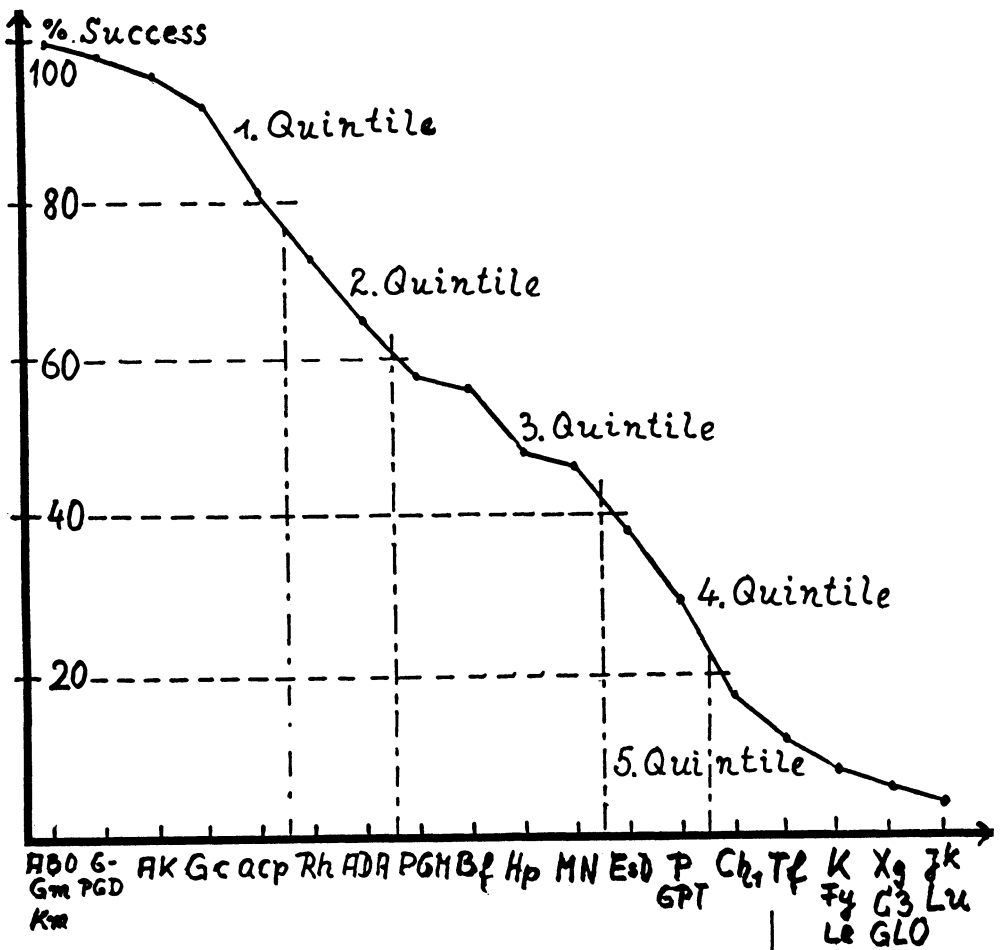
Table 1c: Number of successful determination of erythrocyte enzyme groups in 52 stored blood samples

Age of Sample Months	Erythrocyte Enzyme Group Systems								Total Number of Samples
	acp	PGM ₁	AK	ADA	6-PGD	EsD	GPT	GLO	
1	1	1	1	1	1	1		1	1
2	3	2	3	1	3	1			3
3	5	5	5	5	5		4		5
4	8	9	11	6	11	6	4		11
5	11	5	12	9	13	6	4	1	13
6	6	3	8	6	8	2	1		8
7	1	1	2	1	2			1	2
8	4	3	4	2	4	3	1		4
9	1		2	1	2		1		2
10	1	1	1	1	1				1
11			1	1	1	1			1
12	1								1
Sum	42	30	50	34	51	20	15	3	52
% Success	81	58	96	65	98	38	29	6	100

In Table 1 the percentages of success per system decreases successively from 100% to 4%. There are high middle and low determination successes. Surprisingly the influence of the sample's age seems to be minimal, except in very short and very long time stored samples.

The obviously closer association between the determination success and the different group systems can be demonstrated in a diagram with the group systems on the abscissa and the percentages of success on the ordinate (Fig.1). Subdividing the percentage scale in quintiles there are five blocks of group systems each with decreasing chances of determination success. The group systems: ABO, Gm, Km, 6-PGD, AK, Gc and acp are in the first quintile with success chances between 80% and 100%. Therefore it is reasonable to start an investigation with these seven systems. Next comes the second and third

Fig.1: Diagram of the mean percentage of success determining 26 blood group systems of stored blood samples.



quintile with success chances between 60% and 80% and between 40% and 60% respectively and with the group systems: Rh, ADA and PGM₁, Bf, HP, MN respectively. The determination of these systems should be tried in any case. The chances of success are not excellent but sufficient (Sachs et al. 1986). The chances of success in the determination

of the group systems of the last two quintiles: EsD, P, GPT, Ch₁, Tf, Kell, Fy, Lewis, Xg, C3, GLO, Lu and Jk are so limited that the investigation should be tried only in special cases.

Summary

The success of determination of genetic blood markers in old stored hemolytic and alcohol containing blood samples depends lesser on the age of the samples but more on the susceptibility or resistance of the various group systems against autolysis, contamination pathogens etc. For this reason it is recommended first to determine group systems with a high chance of success like ABO, Gm, Km, 6-PGD, AK, Gc, acp, Rh, ADA and possibly still PGM₁ and Bf. Other group systems with limited chances of success should be determined only in special cases.

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