

## Polymorphism of Plasminogen in Sardinia (Italy)

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### INTRODUCTION

Plasminogen (PLG), a plasma protein of the beta globulin fraction with a molecular weight of about 92000 and a constant portion of 2-3% carbohydrate, is the precursor of the fibrinolytic enzyme plasmin.

Plasminogen polymorphism was first independently described by Hobart (1979) and Raum *et al.* (1979). Several methods demonstrating PLG phenotypes have been reported. Skoda *et al.* (1986) recommended to use desialized serum samples, IEF for separation and subsequent functional and/or immunological methods for the detection of PLG phenotypes. Plasminogen polymorphism comprises two common, codominant autosomal, alleles and a number of rare variants, including a silent allele PLG\*Q0. The common alleles are designated PLG\*A and PLG\*B, while the rare variants are differentiated into three groups according to their electrophoretic mobility: PLG A, PLG B and PLG M variants (for a review see Asmundo 1990).

We report the frequencies of PLG system in a population from Sardinia. This region is genetically highly differentiated, for its peculiar ethno-geographical situation, as compared to Continental Italy. This has to be taken into account considering the choice of allele frequencies for probability of paternity calculation (Domenici *et al.* 1988).

### MATERIALS AND METHODS

Sera were collected from 495 unrelated blood donors originating from Cagliari, Sardinia (all their parents and grandparents were born in Cagliari province). PLG typing was performed as elsewhere described (Spinetti *et al.* 1990).

### RESULTS AND DISCUSSION

PLG phenotype pattern obtained from neuraminidase-treated serum, by IEF on agarose gels followed by immunofixation with monospecific antiserum, is shown in Fig.1. The distribution of phenotypes and estimated gene frequencies in our population sample are reported in Table 1. The uncommon allotypes A-A3, A-M4 and B-M4 were seen. The observed phenotypes do not present any meaningful deviation from the Hardy-Weinberg equilibrium. The theoretical exclusion rate in cases of disputed paternity is 18.12% (I class = 9.66%, II class = 8.46%).

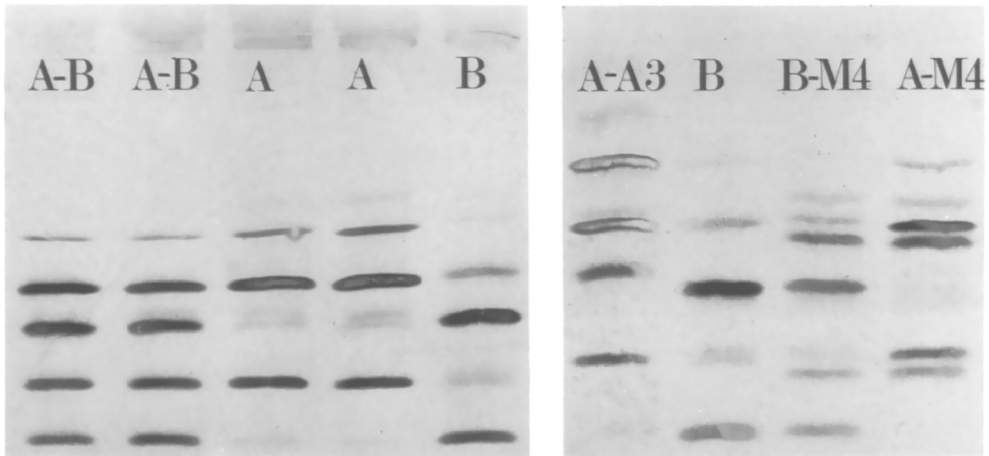


Fig.1 PLG phenotypes observed by isoelectric focusing on agarose gel and immunofixation

Table 1. Phenotype distribution and allele frequencies in a sample from Cagliari (Italy)

Phenotype	Observed	Expected	Allele frequencies
A	227	235.60	PLG*A = .6899 ±.015
A-B	218	203.52	
B	38	43.95	PLG*B = .2980 ±.014
A-A3	8		
A-M4	3	8.28 (*)	PLG*A3 = .0081 ±.003
B-A3	0		
B-M4	1	3.58 (*)	PLG*M4 = .0040 ±.002
A3	0		
M4	0	0.07 (*)	
Total	495	495.00	
$\Sigma\chi^2 = 4.73$ , df = 3, P > .10		(*) A3+M4 pooled	

Table 2 shows a comparison between our results and previous data about some other Italian population samples. It appears that the Sardinia frequencies are very close to those of Tuscany reported by Spinetti *et al.* (1990), but very different from all the others ( $\chi^2$  heterogeneity of Sardinia against Venetia + Venetia Julia + Lombardy [pooled] = 134,  $P < .0001$  for 1 df).

Table 2. PLG allele frequencies in Italy

Region	n	PLG*A	PLG*B	PLG*rare	References
Venetia	1325	.840	.159	.001	Cortivo <i>et al.</i> (1986)
Venetia Julia	716	.858	.140	.001	Foi <i>et al.</i> (1988)
Lombardy	877	.840	.158	.002	Cerri <i>et al.</i> (1989)
Tuscany	(*)	.830	.160	.010	Pascali <i>et al.</i> (1984)
Tuscany	383	.675	.322	.003	Spinetti <i>et al.</i> (1990)
Latium	(*)	.810	.180	.010	Pascali <i>et al.</i> (1984)
Campania	(*)	.810	.180	.010	Pascali <i>et al.</i> (1984)
Lucania	(*)	.780	.210	.010	Pascali <i>et al.</i> (1984)
Sardinia	495	.690	.298	.012	This study

(\*) Tuscany + Latium + Lucania + Campania: n = 2116

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