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Serum genetic markers in the mother-fetus system

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The polymorphism of four serum genetic factors Gc, Hp, Gm^a and InV in a representative sample of 66 mother-fetus combinations (umbilical cord blood) has been studied. Gene frequencies were established and statistical analysis has proven that the distribution of genetic markers corresponds to the mean data for the entire Bulgarian population (Bliznakov and Popvassilev, 1980). The results are in contradiction with the data of Bliznakov and Popvassilev, who have found that the Gm^a factor is established eight months postpartum. In a population genetics aspect a certain interest presents the lack of the haptoglobin complex product in a case of bifetal pregnancy.

Key words: serum genetic markers, gene frequencies.

From a population-genetics point of view as well as from a forensic medical standpoint the study of serum genetic factors polymorphism presents a definite interest. Bliznakov, Popvassilev (1980) supply a number of data in that respect for the Bulgarian population. In the present study we set ourselves the goal to investigate four serum factors Hp, Gm^a , InV and Gc in a representative sample of 66 mother-fetus combinations (umbilical cord blood), to establish the gene frequencies and the mechanisms of inheritance of the above factors as well as whether they have got their development to the full at the time of parturition.

Material and Methods

Four serum genetic markers- Hp, Gm^a , InV and Gc in 66 mother-fetus combinations (umbilical cord blood) have been studied. The mothers were with normally developed pregnancy. Electrophoretic methods were used - horizontal starch gel electrophoresis for Hp [5] and R D H A (reaction for delayed hemaglutination) for Gm^a and InV [3].Gc was studied by immunoelectrophoresis (1). The apparatus used was LKB-Multiphor. The mathematical analysis was carried out after the methods of the nonparametric analysis and the κ^2 criterion.

Results and Discussion

The figure values concerning the distribution of the four serum factors Gc, Hp, Gm^a and InV are presented in Table 1. Conditions for the application of the Hardy-Weinberg postulate were created by dividing the experimental material into two presumptive populations - maternal and infant ones which were compared with one another and both individually with literature data on the whole Bulgarian population(1). It is seen from the tables that regarding the polymorphic dispersion of the factors studied the experimental groups differ both among themselves and also from the available evidence about the gene frequencies in the Bulgarian population. The differences, however, are not statistically significant and are therefore the result of the selection and volume of the experimental material.

The distinctly differentiated subtypes of the markers under study allow us to reject the Bliznakov and Popvassilev assertion according to whom the Gm^a types are only developed eight months post partum. Our finding is that all factors under study

T a b l e 1. Normal pregnancy — 66 combinations

Umbil. cord			Observed and expected number											
			Gc			Hp			Gm		InV			
Mother			1—1	2—1	2—2	1—1	2—1	2—2	+	—	+	—		
	Gc	1—1	24 22,86	10 9,69	* *									
		2—1	8 9,69	15 13,8	3 4,11									
		2—2	* *	5 4.11	1 1.74									
	Hp	1—1				3 2.90	7 5.31	* *						
		2—1				4 5.31	16 1506	8 9.75						
		2—2				* *	10 9.75	18 1792						
	Gm	+							3 0.67	2 2.45				
		—							3	58				
		—												
	InV	+									2 0.84	4 2.78		
		—									3 2.78	57 59.60		

Hp¹=0.3638 Hp²=0.6362 Ex²=0.103

Gc¹=0,7266 Gc²=0.2734 Ex²=0.246

Hp¹=0.3524 Hp²=0.6476 Ex²=0.448

Gm¹=0.2369 Gm²=0.7631 Ex²=0.016

Gc¹=0.7023 Gc²=0.2977 Ex²=0.118

Gm¹=0,2176 Gm²=0.7824 Ex²=0.021

InV¹=0.0802 InV²=0.9198 Ex²=0.1480

InV¹=0.0674 InV²=0.9326 Ex²=0.2560

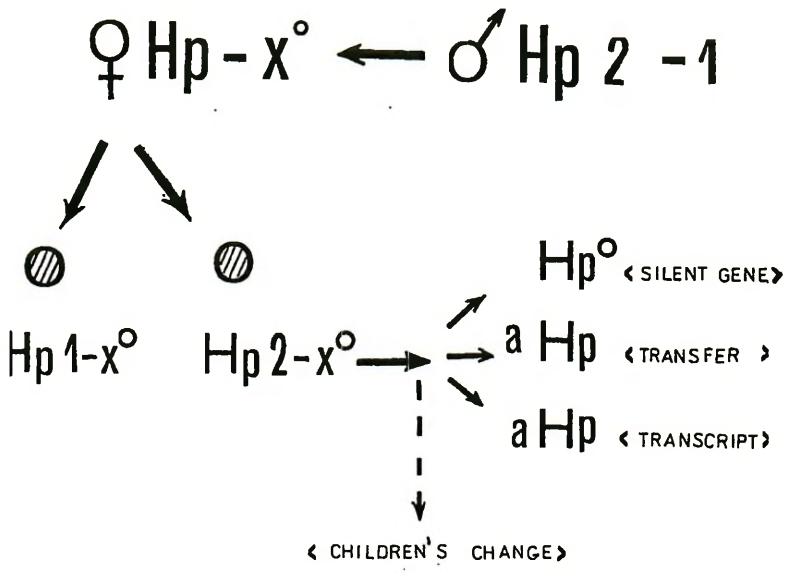

Fig. 1. An Hp — complex in a two-twin bearing mother

are formed to the full extent already at time of parturition. Most probably they are formed in the fourth intrauterine month like most blood group, serum markers and erythrocyte enzyme systems [6].

In a genetic aspect the lack of the haptoglobin complex product presented in Figure 1 in a two-twin bearing mother from the experimental group with normal pregnancy presents certain interest. It is seen from the figure that while in the mother haptoglobin activity is absent the children's types are respectively 1-x and 2-x. Most probably this a case of a total ahaptoglobinemia in the mother and of bearing of a silent allele in the two new-born children , the features thus developed being acquired from the biological father of the two children.

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