A Silent Allele in the Orosomucoid (ORM) System

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Orosomucoid 1 (ORM1) - or alpha-1-acid glycoprotein assigned as a genetic polymorphism to human chromosome 9 - with its common three codominant autosomal alleles ORM1*F1, ORM1*F2 and ORM1*S is a very useful system in paternity testing. In 1986 the existence of a second structual locus ORM2 was discovered and has been confirmed in the meantime. This study seems to present evidence for a silent allele ORM1*Q0.

In a paternity case 31 different genetic marker systems were tested [10 red cell membrane systems, 12 plasma-protein systems and 9 red cell enzyme systems: ABO, MNSs, P, Rh, Kell, Duffy, Kidd, Xg, Lu, Co, Hp, Gc*, Gm, Km, C'3, Bf, Pi*, Tf*, FXIII B, PLG, A2HS, ORM1, Gt, acP, PGM1*, AK, ADA, ALT, EsD*, 6-PGD and GLO, * = includes subtyping].

One single apparent exclusion was found in the ORM1 system showing an opposite homozygousity:

child ORM1(F1), mother ORM1(F1), putative father ORM1(F2).

Methods:

Routine ORM phenotyping was carried out using PAGIF with PHARMALYTES at pH 4.2 - 5.4; sera were treated with neuraminidase. After IEF human acid alpha-1-glyco-protein antiserum from ATAB was used for immunofixation. There was a clear difference in the intensity between the pattern of mother and child, which was confirmed by quantitative investigations with NOR-PARTIGEN plates (Behring). The ORM concentration in the mother was normal; whereas, the concentrations in the sera of the child and the alleged father were only approximately 50 % of normal. No additional exclusion was observed by HLA-testing. The biostatistical evaluation showed a likelihood of paternityin the remaining systems including HLA (without ORM) of

W = 99.9998 %.

PI 31 946 **PI*s** = 10 542 **A** = >99.99 %.

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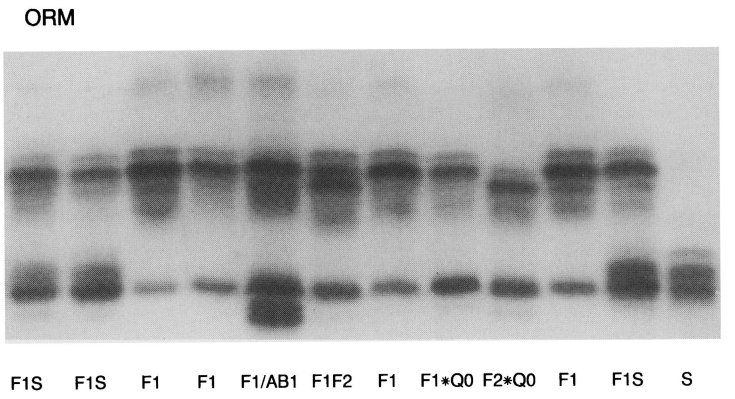
Conclusions:

The reduced level of ORM1 in the child and in the alleged father in comparison to controls indicate the presence of an inheritable null allele. **ORM1*Q0** should be taken into consideration when using this effective system in paternity testing.



ORM1 frequencies in blood donors of Baden-Württemberg/West Germany

	n = 1007	n = 484
Phenotype	Frequency (%)	Weidinger et al. South Germany (1987) Frequency (%)
ORM1 F1	35.65	38.22
ORM1 F1F2	2.98	4.55
ORM1 F2	0.3	0
ORM1 F1S	42.40	41.74
ORM1 F2S	2.68	2.48
ORM1 S	15.99	12.81
ORM1 F1S1	0	0.20

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