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J. Borg¹, R. Galdies², C. A. Scerri², A. E. Felice^{1,2};
¹Laboratory of Molecular Genetics, Department of Physiology and Biochemistry, University of Malta, Msida, Malta, ²Department of Pathology (On Campus), University of Malta, Msida, Malta.

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Introduction: HbFMaltaI or [α 2 γ 2 2117(G19) His->Arg] is a haematologically and clinically benign G γ globin variant found in 1.8% of the Maltese newborn. It is linked to a stable abnormal haemoglobin, HbValletta or [α 2 β 2 287(f3) Thr->Pro]. The (AT)_xTy motif 5' to the β globin gene was investigated by genetic linkage analysis. **Methods:** A total of 112 samples (224 chromosomes) that included 61 HbFMaltaI and 51 normal Hb were analyzed. DNA sequencing was carried out at position -530bp comprising silencer II (AT)_xTy polymorphism and -300bp comprising silencer I 69969 C->T SNP. The HbFMaltaI were further typed for the XmnI genotype. **Results:** 69969C/T was in HWE for both HbFMaltaI and normal controls. (AT)_xTy was in HWE for normal controls but not for the HbFMaltaI ($\chi^2=17.34$; $p<0.005$). Two HbFMaltaI homozygotes carried the homozygous (AT)₉T₅ allele. Genetic data analyzed by Linkage Disequilibrium Analyzer (LDA) and PHASE v2.1.1 software strongly suggests linkage disequilibrium (LD) of the (AT)₉T₅ allele with HbValletta and HbFMaltaI ($\chi^2=93.30$; $p<0.001$; $D'=1.00$; $LR: p<0.001$) in the Maltese population. A statistically significant association between (AT)_xTy genotypes and the XmnI site in HbFMaltaI ($\chi^2=7.6$; $p=0.023$) was also observed. **Discussion:** The (AT)₉T₅ allele as shown by the HbFMaltaI homozygote samples, occurs on the same haplotype. All HbFMaltaI heterozygotes carried at least one of this allele type. The (AT)₉T₅ is in tight linkage disequilibrium with HbValletta and HbFMaltaI. HbFMaltaI may therefore serve as a model to understand better, both at the gene and protein level of interactions that occur *in vivo*.

Estimated Haplotypes by PHASE software v2.1.1

Haplotype	Haemoglobin	69758C/T	ATx	Ty	69969C/T	Allele count
1	HbF	t	7	7	t	55
2	HbF	t	7	7	c	25
3	HbF	c	7	7	t	33
4	HbF	c	9	5	t	37
5	HbF	c	9	5	c	2
6	HbF	c	11	3	t	9
7	HbFMaltaI	c	9	5	t	63
					Total	224