

犬MC1R基因T105A基因座多态性及与毛色性状相关性的研究 Research on the Relationship Between the Polymorphism of T105A Locus in MC1R Gene and Coat Color in Dogs

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摘要

为了检测犬MC1R基因T105A基因座的多态性, 并分析该多态性与犬毛色表型的相关性, 抽取111只外科手术学实验用杂种犬血液并提取DNA, 记录毛色表型。采用PCR-RFLP技术, 对MC1R基因T105A基因座进行基因多态性分析, 并对该基因座DNA进行克隆测序; 用二元变量相关分析的统计学方法分析基因座多态性与毛色性状之间的相关性。经PCR-RFLP分析结果表明, T105A基因座序列具有多态性, 表现为A、B二个等位基因和AA、AB及BB 3种基因型。A、B等位基因频率分别为72.97%和27.03%, 基因杂合度(H)为0.39。基因型AA频率为55.86%, BB为9.91%, AB为34.23%。对T105A多态性片段DNA克隆测序后发现, MC1R基因在编码第105位氨基酸的密码子第一个碱基存在由G到A的单碱基突变, 该突变导致第105位氨基酸发生由丙氨酸向苏氨酸的改变。统计分析结果表明MC1R基因T105A基因座的多态性与毛色性状不存在显著的相关性, 这可能是由于外科手术学实验用犬是杂种犬, 其遗传背景不同所致, 尚须在纯种犬群体中进一步研究MC1R基因对毛色的影响。

Abstract: In order to detect the polymorphism of T105A in MC1R gene in dogs and to analyze the relationship between the genetic polymorphisms and phenotypes of dog coat color, the blood samples of 111 cross-breed dogs were taken and their genomic DNAs were extracted. The phenotypes of dog coat color were recorded. The T105A locus of MC1R gene in the canine was detected through the technology of PCR-RFLP. Furthermore, the polymorphic fragments at T105A were sequenced. The relationships between the polymorphism of T105A and coat color trait were analyzed by the statistical methods of bivariate correlation analysis. By the method of PCR-RFLP, the T105A polymorphism was found with two alleles A and B and three genotypes AA, AB and BB. The frequencies of two alleles were 72.97% and 27.03%, respectively. The heterozygosity of T105A locus was 0.39. The frequencies of three genotypes were 55.86%, 34.23% and 9.91%, respectively. According to the results of sequencing, one base change from G to A at the position 105 was found at T105A locus and it altered amino acid at the position 105 from alanine to threonine. According to the statistical analysis, no significant association between the polymorphism of MC1R gene and the coat color was found and the result may be due to the differences of genetic background. Further research on MC1R gene should be done in pure breed dogs.

关键词 [犬](#) [MC1R基因](#) [T105A基因座](#) [PCR-RFLP](#) [毛色](#) Key words [canine](#) [MC1R gene](#) [T105A locus](#) [PCR-RFLP](#) [coat color](#)

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