Identifying Homozygous Genotypes Associated with Early-Onset Lymphoma in Bullmastiff by Melting Curve Analysis

Monica Chen, Master, University of Sydney,
Australia
Peter Williamson, Prof., University of Sydney, Australia

Abstract

Lymphoma is one of the most common hematopoietic malignancies affecting both humans and dogs. In dogs, some breeds are particularly predisposed to lymphoma, and Bullmastiff is one of them. Based on our laboratory's previous research on Bullmastiff dogs affected by lymphoma, a region of the size of 1.2Mb on CFA13 containing five haplotypes composed of 20 single-nucleotide polymorphisms (SNPs) are highly associated with early-onset lymphoma in the dog. According to the GWAS, a high percentage, 77.8%, of affected Bullmastiff dogs were found homozygous on those SNPs compared to low frequency of the unaffected Bullmastiff dogs or other breeds. On top of that, five SNPs are specified to determine whether the dog is homozygous or heterozygous through the related regions and hereby categorized into Risk, Carrier, and Normal groups. In a bid to distinguish genotypes of the tested samples quickly and economically, we developed a method combining quantitative real time polymerase chain reaction (qrt-PCR or qPCR) and SYBR Green melting curves. The concordance and accuracy of our results elucidated that melting curves analysis enable the identification of the homozygosity of SNP in a rapid, inexpensive, and reliable way. CFA13 has been reported to be related to several canine hereditary diseases while it also contains proto-oncogene c-MYC and a region that is syntenic with human PVT1. In short term, our study is expected to be helpful for revising breeding strategies for Bullmastiff population; long-term objective will be to improve the health of both dogs and humans.

Image

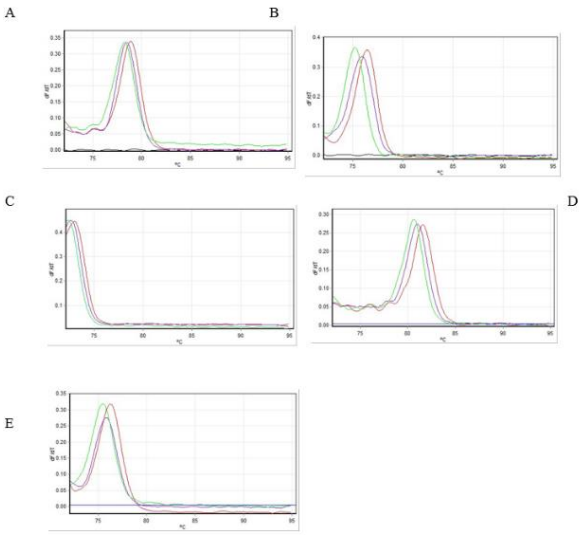


Fig. 1 Dissociation curves of (A) SNP1 (B) SNP2(C) SNP3 (D) SNP4 (5) SNP5

Red lines correspond to homozygote of SNP; Purple lines correspond to heterozygote; Light green lines corresponds to homozygote of wild type.

Biography



Monica completed her DVM in Taiwan and practiced medicine for about two years. Now she research master student in University of Sydney, Australia. She is especially interested in comparative oncology and dedicated to looking for the reason and cure for both animal and human beings.

Email: mche8180@uni.sydney.edu.au