

# Genetic Variations in the Myostatin Gene among Irish Cattle Breeds

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## Background

Myostatin, a gene recognised for its importance in skeletal muscle growth and consequently carcass performance, acts as a negative regulator of the proliferation of muscle fibres. A number of mutations within the myostatin gene result in the whole or partial loss of function of myostatin activity, leading to increased muscle mass, or the so-called ‘double-muscle’ phenotype. The objective of this study was to determine the prevalence of each of these mutations and to characterise the haplotype (i.e., sequence of variants) variation within the myostatin gene in Irish cattle.

## Methods

Genotypes of 21 known causative myostatin variants from 137,606 dairy and beef cattle across 12 breeds were available. The 21 myostatin variants were phased; phasing entails separating maternally and paternally inherited alleles into haplotypes (a “chunk” of alleles inherited together). A paternal and maternal haplotype was formed for each animal. Allele and haplotype frequency were both estimated within each breed separately.

## Results

Of the 21 myostatin variants, 12 were monomorphic (i.e., no variability) across all breeds. All animals of the Belgium Blue breed and 99% of the Limousin breed were carriers for the nt821 and F94L mutations, respectively. Across all breeds, 22 haplotypes accounted for 97% of the total haplotypes present, 8 of which were novel to just one breed. The haplotype that contained no mutant alleles was present in, on average, 43% of animals within breed.

## Conclusion

While some myostatin mutations and haplotypes are prevalent in several breeds, breed-specific mutations and haplotypes also exist. Therefore, determining which traits these mutations may be influencing in the respective breeds will be of key interest in future studies.