

ABSTRACT

The insertion of a full-length *Bos taurus* LINE element is responsible for a transcriptional deregulation of the Normande Agouti gene

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Mammalian pigmentation is controlled by the concerted action of Tyr, Tyrp1 and Dct producing eumelanin and/or pheomelanin in melanocytes. The ratio of these two pigments is determined by the agonist α -melanocyte stimulating hormone and the antagonist Agouti protein acting on the Mc1r. Here we show that the Agouti gene is over-expressed in Normande breed compared with Prim'Holstein breed. The Normande cattle have a characteristic coat color phenotype with a variable presence of black (eumelanin) hair over a red/brown background. We have found a previously undescribed full-length L1-BT element inserted in the 5'-genomic sequence of the Agouti gene in Normande cattle which promotes the over-expression of alternative transcripts. The variable expression of the alternative transcript directed by the long interspersed nuclear element promoter may be the origin of the brindle coat color pattern of the Normande breed. This new bovine Agouti allele isolated in Normande breed has been named Abr. Finally, as ectopic over-expression of Agouti in Ay mice is responsible for the obesity syndrome, we discuss the possible consequences of Abr for meat and milk production in cattle.

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