



Investigation of the Agouti gene for the identification of useful markers for coat colour association studies in domestic rabbits

L. Fontanesi, M. P. Laforêt, D. Allain, S. Deretz, M. Tazzoli, V. Russo & A. Oulmouden

To cite this article: L. Fontanesi, M. P. Laforêt, D. Allain, S. Deretz, M. Tazzoli, V. Russo & A. Oulmouden (2007) Investigation of the Agouti gene for the identification of useful markers for coat colour association studies in domestic rabbits, Italian Journal of Animal Science, 6:sup1, 138-138, DOI: [10.4081/ijas.2007.1s.138](https://doi.org/10.4081/ijas.2007.1s.138)

To link to this article: <https://doi.org/10.4081/ijas.2007.1s.138>



Copyright 2007 Taylor & Francis Group LLC



Published online: 15 Mar 2016.



Submit your article to this journal [↗](#)



Article views: 27



View related articles [↗](#)

Investigation of the Agouti gene for the identification of useful markers for coat colour association studies in domestic rabbits

L. Fontanesi¹, M. P. Laforêt⁴, D. Allain², S. Deretz³,
M. Tazzoli¹, V. Russo¹, A. Oulmouden⁴

¹ Dipartimento di Protezione e Valorizzazione Agroalimentare. Università di Bologna, Italy

² UR631, Station d'Amélioration Génétique des Animaux. INRA Toulouse, France

³ UE967, Génétique Expérimentale en Productions Animales. INRA Le Magneraud, France

⁴ UMR1061, Génétique Moléculaire Animale. INRA/Université de Limoges, France

Corresponding author: Luca Fontanesi. Dipartimento di Protezione e Valorizzazione Agroalimentare, Sezione di Allevamenti Zootecnici. Università di Bologna. Via F.lli Rosselli 107, 42100 Reggio Emilia, Italy - Tel. +39 0522 290516 - Fax: +39 0522 290523 - Email: luca.fontanesi@unibo.it

ABSTRACT

In wild-type mice, it is well known that Agouti is expressed in skin where it controls the banded-hair Agouti phenotype. Molecular genetics and pharmacological studies show that mutually exclusive binding of the melanocortin 1 receptor (MC1R) by the Agouti protein or by β -melanocyte-stimulating hormone (a-MSH) signals hair-bulb melanocytes to synthesise preferentially either pheomelanin (yellow-red pigment) or eumelanin (black-brown pigment), respectively. In mice as well as in other species, loss-of-function mutations of the *Agouti* gene determine only the production of eumelanin while gain-of-function mutations lead to pheomelanin production. A variety of coat colours appear as a result of these alterations that show also epistatic interactions with *MC1R* mutations. In rabbit, classical studies have suggested the presence of three alleles at the *Agouti* locus: *A* (wild type allele), *a'* (black and tan) and *a* (non-agouti). We recently showed that mutations in the rabbit *MC1R* gene are associated with coat colours in different breeds. We, furthermore, supposed that the *MC1R* gene might have partial epistatic actions over the *Agouti* locus. Here, in order to clarify the interactions between the *MC1R* and *Agouti* loci we studied the rabbit *Agouti* gene with the objective to identify mutations that could be associated or could be useful in association investigations with coat colours in domestic rabbit breeds. Total genomic DNA was extracted from peripheral blood or hair roots of rabbits belonging to breeds having different coat colours. PCR primers were designed to amplify the four exons of the *Agouti* gene. Sequencing of the fragment encompassing part of intron 2, exon 3 and part of intron 3 showed three single nucleotide polymorphisms (SNPs; A>T, A>G and T>C) in intron 2 and one in intron 3 (G>A). These SNPs produced two haplotypes, A-A-T-G and T-G-C-A. The first haplotype was observed in Giant Grey and Belgian Hare rabbits. The second haplotype was identified in Burgundy Fawn and Checkered Giant animals. Further studies are underway to obtain a complete characterization of the rabbit *Agouti* gene and to evaluate the identified markers in association studies with coat colours in this species.